TIMMONS GROUP

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TRANSMITTAL

TO: Donna Voliva, Currituck County Planning

FROM: Kim Hamby, PE

DATE: May 25, 2023

RE: Tulls Creek Elementary School

Donna,

Attached please find two copies of each of the following:

- Three copies of the Major Site Plan application
- Three copies of the Major Stormwater Management Form SW-002 and associated drainage narrative with calculations.
- Three copies of the septic related email from ARHS with soil scientist draft report
- Three copies of the preliminary applications for the following permits:
  - Erosion Control
  - Stormwater
  - Driveway Permit
  - Encroachment agreement.
- Three copies of the site plan design plans.
- Three copies of the site lighting plans.
- Three copies of the architectural elevations.
- A disk containing pdfs of each of the items listed above.

Please let me know if you have any questions or need any additional information.

Thank you,

Kimberly D. Hamby

Tulls Creek School
LPP Field Investigation
Moyock, Currituck County, North Carolina
April 30, 2023

Prepared for

Ms. Kim Hamby, P.E.
Principal – Senior Project Manager
Timmons Group
1805 West City Drive, Unit E
Elizabeth City, NC 27909

Prepared by

Protocol Sampling Service, Inc.
4114 Laurel Ridge Drive
Raleigh, North Carolina 27612
Protocol Project No. 23-45

David E. Meyer, N.C.L.S.S.

Soil Scientist/President

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Executive Summary

Protocol Sampling Service, Inc. (Protocol) was asked to perform a Soils and Limited Hydrogeologic Study on a proposed LPP field. The purpose of the study is to determine if the proposed TS-II pressure-dosed LPP fields with a loading rate of 0.15 gpd/ft^2 for a daily design flow of 11,000 gallons/day is conducive to site specific ground water conditions.

A soil mapping and subsurface inspection was conducted by Protocol on February 15, March 8, and 9 and April 13, 2023 to describe the soils and test the subsurface aquifer in the proposed LPP fields. Protocol advanced nine (9) six to seven-foot-deep soil borings and two (2) twenty-two-foot drilled borings to describe subsurface lithology and installed 1 ¼" pvc well screen and riser in the drilled borings to determine depth to water, unsaturated thickness and aquifer coefficients (24-hour aquifer test) across the study area. Three (3) Constant-head permeameters were also run to determine the hydraulic conductivity of the most restrictive or limiting soil horizon. Information collected from the aquifer test was used to determine transmissivity and run the Colorado Mound Model. The seasonal high water table was found at an average elevation of 21-inches bls with surface elevations averaging 9.0-feet msl in the study area.

Protocol concludes that the four (4) LPP fields can accept the proposed loading of 11,000 gpd at 0.15 gpd/ft^2. This loading rate should be considered a reasonable long-term acceptance rate (LTAR) for a well-sorted very fine sand surficial aquifer which does not exceed the EPA recommended 4 to 10% of the most restrictive Ksat reading. The addition of at least 12-inches of clean sand fill to the LPP disposal fields in some areas will be required to satisfy separation requirements. Interceptor trenches should be installed in-between and along each LPP field and directed to the 10-foot deep drainage ditch located to the south of the LPP fields. Drainage windows should be installed into the underlying sand in each LPP field to enhance vertical drainage and help control mounding.

Hydrogeologic Study
Tulls Creek School
LPP Fields
Moyock, Currituck County, North Carolina
April 30, 2023

1.0 Introduction

1.1 Location

Tulls Creek Elementary School project is located along Tulls Creek Road in Moyock, Currituck County, North Carolina (Site Plan - Figure 1). The four (4) proposed LLP fields are located at 36° 30' 47.20" N latitude and -76° 07' 39.25" W longitude at elevations ranging from of 9.0 to 10.0 feet above mean sea level.

The site is located in the Lower Coastal Plain physiographic region along the centerline of a peninsula deposit with sand, clay, gravel, and peat deposited in marine, fluvial, eolian, and lacustrine environments. Elevations decrease from 10.0 feet msl in the southwest portion of the study area to 9.0-feet msl in the northern portion of the study area.

1.2 Scope

Protocol was asked to perform a Soils and Limited Hydrogeologic Study on a proposed LPP field. The purpose of the study is to determine if the proposed TS-II pressure-dosed LPP fields with a loading rate of 0.15 gpd/ft^2 for a daily design flow of 11,000 gallons/day is conducive to site specific ground water conditions.

1.3 Site History/Previous Investigations

The subject property is undeveloped and under agricultural production.

1.4 Site Topography/Potential Receptors

The site is located in the Lower Coastal Plain physiographic region along the centerline of a peninsula deposit with sand, clay, gravel, and peat deposited in marine, fluvial, eolian, and lacustrine environments. Elevations decrease from 10.0 feet msl in the southwest portion of the study area to 9.0-feet msl in the northern portion of the study area. The local ground water flow direction is east towards the Northwest River (4,800 feet).

2.0 Soils and Geology

2.1 Regional Geology

The site is located on the Lower Coastal Plain Physiographic Province of North Carolina. According to the Geologic Map of North Carolina (1985), the site lies in an area characterized by the undifferentiated surficial sediments of Quaternary age.

2.2 Site Soils and Geology

Nine (9) hand auger borings were made throughout the study area and their surveyed locations are shown on the Site Map (Figure 1). The soils on the subject property belong to the Altavista fine sandy loam (Thermic, Typic Hapludult) according to the Soil Survey of Currituck County, North Carolina. The soil encountered in the study area was found to match those mapped in 1979. Permeabilities ranged from 0.92 to 2.77 inches/hour in the Altavista soil series throughout the top 24-inches of the soil profile (Constant Head Permeameters-Appendix D). The seasonal high-water table was found to range from 12 to 29-inches below land surface (bls); the average depth to the ground water table surface ranged from 21 to 39-inches bls during our March 2023 investigation. Soil boring descriptions are included in Appendix C. The geology encountered during drilling at the site consists mainly of sandy clay loam and clay loam from 12 to 48-inches bls, over a loamy sand from 48 to 60-inches bls where a mixed sandy loam, clay loam extends to 96-inches where a moderately well to well sorted very fine sand extends to 20-feet bls. The localized ground water flow direction has been calculated to be to the south towards a 10-foot deep ditch that flows east under Tulls Creek Road to the Northwest River, Tull Bay and eventually the Currituck Sound.

Protocol advanced two 20-foot-deep lithologic borings and converted the borings into $1^{1/4}$ -inch diameter monitor wells for aquifer testing. Soil samples were collected at 2.5-foot intervals to characterize the underlying soils. No restrictive layer was found to a depth of twenty feet bls in the borings.

2.2 Site Hydrogeology

The potentiometric surface of the water table was mapped by Protocol as part of this effort. Synoptic water levels were collected on April 13, 2023. Ground water flow has been calculated to flow towards the 10-foot ditch located approximately 45 feet to the south of the study area. The hydraulic gradient ranges from 0.003 across the study area to 0.007 ft. /ft closer to the ditch showing a positive drainage impact by the ditch on local ground water flow gradient and direction (Potentiometric Map – Figure 2).

3.0 Aquifer Test Methodology

Aquifer parameters were obtained by conducting a 24-hour aquifer test at 1.75-gallons/minute on the 14 foot deep well (designated PW). The aquifer test was performed on the pumping well (PW) on March 8 & 9, 2023. PW was screened below the water table with a four-foot section of 1.25-inch 0.010" slotted well screen set from 10 to 14-feet bls. The 1.25-inch diameter observation well OW, was installed seven-feet west of the PW and was screened from 11 to 15-feet bls. The response in the OW was measured by a HOBO Water Level Logger pressure transducer and by

hand with a Solinst water level meter. Pressure transducers measure pressure changes within the well's water column and the information is stored in the logger, which converted and recorded the pressure reading to changes in the static water level.

The test data was analyzed using a computer type-curve matching program called Aqtesolve developed by HydroSolve, Inc. (1996-2007). The match was made using the Neuman solution for an unconfined aquifer using the early time data. Drawdown data and the curve generated from the aquifer test are presented in Appendix A.

3.1 Aquifer Properties

Using the aforementioned methods, the transmissivity value was determined to be 204 ft^2/day in an aquifer known to be at least 20-feet thick. Specific yield for a water table aquifer in this geologic setting ranges between 0.10 to 0.30 (Groundwater and Wells, Driscoll, 1986). This range is confirmed from site lithologic descriptions.

Ground water seepage velocity (v) is calculated from the formula V = k(I)/n where k refers to the hydraulic conductivity, I refers to the hydraulic gradient and n equals the effective porosity of the aquifer. Because these parameters can vary within the aquifer, the resultant velocities can also change. Using an average K value of 10 ft/day (200 ft^2/day/20 feet), an average horizontal gradient of 0.003 ft. /ft. based on the April 13, 2023 potentiometric calculations), and an effective porosity of .30, a reasonable estimate of average seepage velocity would be 0.1 ft/day or 37 ft/year across the site. Transit time (t) is calculated from the formula t = d/V where d refers to the number of feet to surface water and v is the velocity. The Northwest River is located 4,800-feet northeast of the proposed LPP fields. The diluted effluent can be expected to intersect the River in approximately 129 years (4,800 feet/37 feet/year).

3.2 Mound Modeling

Hydraulic conductivity is a measure of the rate at which water will pass through a soil in response to a given gradient. Hydraulic conductivity is most directly related to the texture and structure of a given soil. Relatively homogeneous soils with small pores or small particle size, such as clays, typically exhibit low hydraulic conductivity rates. Conversely, coarse textured soils with large pores or large particle size, such as sands or fluvial material which were encountered in the study area can exhibit extremely high conductivity rates.

At the time of the field investigation (March and April 2023), the water table depth ranged from 1.75 to 2.42 feet bls. The field data along with a very conservative seasonal high water table elevation of 1.5-feet bls was entered into the Artificial Recharge computer program authored by Dave Molden, D.K. Sunada and Jim Warner with Colorado State University also known as the Colorado Mound Model, (January 1984). The transmissivity of 204 ft^2/day, which is typical for this geologic setting produced a mound height which should be considered extremely conservative. The attached result printouts for a daily design flow of 11,000 gallons/day show that the proposed total daily loading of 0.15 gpd/ft^2 will create a mound height of 0.246 feet at 720 days and equilibrium was reached in less than 270-days. The moderately high transmissivity of the underlying sands accounts for the low mound height. The specific yield was entered as 0.15 **(**sand ranges from .10 to .30) and the distance to the nearest line sink (interceptor drain) was entered as

51 feet and will actually be closer to 10-feet which will keep the subsurface mounding lower than projected. A negligible mound should form beneath the LPP fields before the effluent begins to migrate toward the nearest line sink.

4.0 Conclusions

- Protocol concludes that the study area can accommodate four (4) LPP fields discharging a total of 11,000 gallons/day at an LTAR of 0.15 gpd/ft^2.
- The addition of at least 12-inches of clean sand fill to some portions of the LPP fields will be required to satisfy separation requirements.
- Interceptor trenches should be installed in-between and along each LPP field and directed to the 10-foot deep drainage ditch located to the south of the LPP fields.
- Drainage windows should be installed into the underlying sand in each LPP field to enhance vertical drainage and help control mounding.

5.0 Limits of Investigation

Conclusions and recommendations of this report are based on best available data, collected within budgetary and time constraints of the scope of services. It is the premise of this effort that the information collected and analyzed is representative of a reasonable effort to understand an existing problem. No guarantee is expressed or implied that new or additional data will not be required later. The findings presented herein represent Protocol's professional opinion based on our site and soils evaluation and knowledge of the current laws and rules governing on-site wastewater systems in North Carolina. The North Carolina On Site Water Protection Branch must make final approval of the subsurface discharge system. Any concurrence with the findings of this report would be made at that time.

References

Fetter, C.W. (1980). Applied Hydrogeology, Charles E. Merrill Publishing Co., Columbus, Ohio.

Freeze, R.A. and Cherry, J.A. (1979). Ground Water. Prentice-Hall, Englewood Cliffs, New Jersey.

Hvorslev, M.J., 1951. *Time Lag and Soil Permeability in Ground-Water Observations*: United States Corps of Engineers Waterways Experiment Station Bulletin 36, Vicksburg, Mississippi, 50 pp.

Soil Survey of Dare County, North Carolina. United States Soil Conservation Service, 1986.

Appendix A

Aquifer Test Data

Appendix B

Colorado Mound Model

Appendix C

Soil Profile

Appendix D

Constant Head Permeameters (Ksats)

FINANCIAL RESPONSIBILITY/OWNERSHIP FORM
SEDIMENTATION POLLUTION CONTROL ACT

No person may initiate any land-disturbing activity on one or more acres as covered by the Act before this form and an acceptable erosion and sedimentation control plan have been completed and approved by the Land Quality Section, N.C. Department of Environmental Quality. Submit the completed form to the appropriate Regional Office. (Please type or print and, if the question is not applicable or the e-mail address or phone number is unavailable, place N/A in the blank.)

Part A.

1. Project Name: Tulls Creek Elementary School

2. Location of land-disturbing activity: County: Currituck City or Township: Moyock
   Highway/Street: Tulls Creek Road & Old Jury Road Latitude (decimal degrees): 36.513253 Longitude (decimal degrees): -76.128846

3. Approximate date land-disturbing activity will commence: November 2023

4. Purpose of development (residential, commercial, industrial, institutional, etc.): institutional

5. Total acreage disturbed or uncovered (including off-site borrow and waste areas): 36.99

6. Amount of fee enclosed: $3,700.00. The application fee of $100.00 per acre (rounded up to the next acre) is assessed without a ceiling amount (Example: 8.10-acre application fee is $900). Checks should be addressed to NCDEQ.

7. Has an erosion and sediment control plan been filed? Yes ☒ Enclosed ☒ No ☐

8. Person to contact should erosion and sediment control issues arise during land-disturbing activity:
   Name: Jim Vachon E-mail Address: jvachon@sussexdevelopment.com
   Phone: Office # 757.422.2400 Mobile # 757.636.0548

9. Landowner(s) of Record (attach accompanied page to list additional owners):

Currituck County	252-232-2075	
Name	Phone: Office #	Mobile #
153 Courthouse Road, Suite 204	153 Courthouse Road, Suite 204	
Current Mailing Address	Current Street Address	
Currituck, NC 27929	Currituck, NC 27929	
City State Zip	City State Zip	

10. Deed Book No. 1642 Page No. 800 Provide a copy of the most current deed.

Part B.

1. Company(ies) who are financially responsible for the land-disturbing activity (Provide a comprehensive list of all responsible parties on accompanied page.) *If the company is a sole proprietorship or if the landowner(s) is an individual(s), the name(s) of the owner(s) may be listed as the financially responsible party(ies).*

Currituck County	ike.mcree@currituckcountync.com
Company Name	E-mail Address
153 Courthouse Road, Suite 204	153 Courthouse Road, Suite 204
Current Mailing Address	Current Street Address
Currituck, NC 27929	Currituck, NC 27929
City State Zip	City State Zip
Phone: Office # 252-232-2075	Mobile #

Note: If the Financially Responsible Party is not the owner of the land to be disturbed, include with this form the landowner's signed and dated written consent for the applicant to submit a draft erosion and sedimentation control plan and to conduct the anticipated land disturbing activity.

2. (a) If the Financially Responsible Party is a domestic company registered on the NC Secretary of State business registry, give name and street address of the Registered Agent:

Name of Registered Agent	E-mail Address
Current Mailing Address	Current Street Address
City State Zip	City State Zip
Phone: Office #	Mobile #

Name of Individual to Contact (if Registered Agent is a company)

(b) If the Financially Responsible Party is not a resident of North Carolina, give name and street address of the designated North Carolina agent who is registered on the NC Secretary of State business registry:

Name of Registered Agent	E-mail Address
Current Mailing Address	Current Street Address
City State Zip	City State Zip
Phone: Office #	Mobile #

Name of Individual to Contact (if Registered Agent is a company)

(c) If the Financially Responsible Party is engaging in business under an assumed name, give name under which the company is Doing Business As. If the Financially Responsible Party is an individual, General Partnership, or other company not registered and doing business under an assumed name, **attach a copy of the Certificate of Assumed Name.**

_____
Company DBA Name

The above information is true and correct to the best of my knowledge and belief and was provided by me under oath. (This form must be signed by the Financially Responsible Person if an individual(s) or his attorney-in-fact, or if not an individual, by an officer, director, partner, or registered agent with the authority to execute instruments for the Financially Responsible Party). I agree to provide corrected information should there be any change in the information provided herein.

Donald McRee, Jr.	County Manager
Type or print name	Title or Authority
Signature	Date

I, _____, a Notary Public of the County of _____

State of North Carolina, hereby certify that _____appeared personally before me this day and being duly sworn acknowledged that the above form was executed by him/her.

Witness my hand and notarial seal, this _____day of _____, 20_____

_____
Notary

Seal

My commission expires_____

DEMLR USE ONLY		
Date Received	Fee Paid	Permit Number
Applicable Rules: ☐ Coastal SW – 1995 ☐ Coastal SW – 2008 ☐ Ph II - Post Construction *(select all that apply)* ☐ Non-Coastal SW- HQW/ORW Waters ☐ Universal Stormwater Management Plan ☐ Other WQ Mgmt Plan: _____		

State of North Carolina
Department of Environment and Natural Resources
Division of Energy, Mineral and Land Resources

STORMWATER MANAGEMENT PERMIT APPLICATION FORM

This form may be photocopied for use as an original

I. GENERAL INFORMATION

1. Project Name (subdivision, facility, or establishment name - should be consistent with project name on plans, specifications, letters, operation and maintenance agreements, etc.):

   Tulls Creek Elementary School

2. Location of Project (street address):

   On Tulls Creek Road (SR 1222), between Campus Drive and Old Jury Road

   City: Moyock County: Currituck Zip: _____

3. Directions to project (from nearest major intersection):

   From the intersection of US Hwy 168 and Tulls Creek Road, travel east on Tulls Creek Road for approx. 2.9 miles. The site will be on the right between Campus Drive and Old Jury Road.

4. Latitude: 36° 30′ 47.7108″ N Longitude: 76° 7′ 43.8456″ W of the main entrance to the project.

II. PERMIT INFORMATION:

1. a. Specify whether project is (check one): ☒New ☐Modification ☐ Renewal w/ Modification†

   †*Renewals with modifications also requires SWU-102 – Renewal Application Form*

   b. If this application is being submitted as the result of a **modification** to an existing permit, list the existing permit number _____ , its issue date (if known) _____, and the status of construction: ☐Not Started ☐Partially Completed* ☐ Completed* **provide a designer's certification*

2. Specify the type of project (check one):
   ☒Low Density ☐High Density ☐Drains to an Offsite Stormwater System ☐Other

3. If this application is being submitted as the result of a **previously returned application** or a **letter from DEMLR requesting a state stormwater management permit application**, list the stormwater project number, if assigned, _____ and the previous name of the project, if different than currently proposed, _____.

4. a. Additional Project Requirements (check applicable blanks; information on required state permits can be obtained by contacting the Customer Service Center at 1-877-623-6748):

   ☐CAMA Major ☒Sedimentation/Erosion Control: 36.99 ac of Disturbed Area

   ☐NPDES Industrial Stormwater ☐404/401 Permit: Proposed Impacts _____

   b. If any of these permits have already been acquired please provide the Project Name, Project/Permit Number, issue date and the type of each permit: _____

5. Is the project located within 5 miles of a public airport? ☒No ☐Yes

   If yes, see S.L. 2012-200, Part VI: http://portal.ncdenr.org/web/lr/rules-and-regulations

III. CONTACT INFORMATION

1. a. Print Applicant / Signing Official's name and title (specifically the developer, property owner, lessee, designated government official, individual, etc. who owns the project):

Applicant/Organization: Currituck County

Signing Official & Title: Donald McRee, Jr., County Manager

b. Contact information for person listed in item 1a above:

Street Address: 153 Courthouse Road, Suite 204

City: Currituck State: NC Zip: 27929

Mailing Address (*if applicable*):

City: State: Zip:

Phone: (252) 232.2075 Fax: (252) 232.3551

Email: ike.mcree@currituckcountync.gov

c. Please check the appropriate box. The applicant listed above is:

☒ The property owner (Skip to Contact Information, item 3a)
☐ Lessee* (Attach a copy of the lease agreement and complete Contact Information, item 2a and 2b below)
☐ Purchaser* (Attach a copy of the pending sales agreement and complete Contact Information, item 2a and 2b below)
☐ Developer* (Complete Contact Information, item 2a and 2b below.)

2. a. Print Property Owner's name and title below, if you are the lessee, purchaser or developer. (This is the person who owns the property that the project is located on):

Property Owner/Organization:

Signing Official & Title:

b. Contact information for person listed in item 2a above:

Street Address:

City: State: Zip:

Mailing Address (*if applicable*):

City: State: Zip:

Phone: ( ) Fax: ( )

Email:

3. a. (Optional) Print the name and title of another contact such as the project's construction supervisor or other person who can answer questions about the project:

Other Contact Person/Organization:

Signing Official & Title:

b. Contact information for person listed in item 3a above:

Mailing Address:

City: State: Zip:

Phone: ( ) Fax: ( )

Email:

4. Local jurisdiction for building permits: Currituck County

Point of Contact: Kevin Kemp, Dev Services Dir. Phone #: (252) 232-3055

IV. PROJECT INFORMATION

1. In the space provided below, briefly summarize how the stormwater runoff will be treated.

   Runoff from impervious surfaces will be collected in an underground piped drainage system and swales to two ponds designed to provide stormwater storage and controlled release to meet Currituck County stormwater regulations for post-development runoff control.

2. a. **If claiming vested rights**, identify the supporting documents provided and the date they were approved:
   - ☐ Approval of a Site Specific Development Plan or PUD — Approval Date: _____
   - ☐ Valid Building Permit — Issued Date: _____
   - ☐ Other: _____ — Date: _____

   b. **If claiming vested rights**, identify the regulation(s) the project has been designed in accordance with:
   ☐ Coastal SW – 1995 ☐ Ph II – Post Construction

3. Stormwater runoff from this project drains to the Pasquotank River basin.

4. Total Property Area: 36.55 acres

5. Total Coastal Wetlands Area: 0 acres

6. Total Surface Water Area: 0 acres

7. Total Property Area (4) – Total Coastal Wetlands Area (5) – Total Surface Water Area (6) = Total Project Area+: 36.55 acres

   + *Total project area shall be calculated to exclude the following: the normal pool of impounded structures, the area between the banks of streams and rivers, the area below the Normal High Water (NHW) line or Mean High Water (MHW) line, and coastal wetlands landward from the NHW (or MHW) line. The resultant project area is used to calculate overall percent built upon area (BUA). Non-coastal wetlands landward of the NHW (or MHW) line may be included in the total project area.*

8. Project percent of impervious area: (Total Impervious Area / Total Project Area) X 100 = 21.09 %

9. How many drainage areas does the project have? 1 *(For high density, count 1 for each proposed engineered stormwater BMP. For low density and other projects, use 1 for the whole property area)*

10. Complete the following information for each drainage area identified in Project Information item 9. If there are more than four drainage areas in the project, attach an additional sheet with the information for each area provided in the same format as below.

Basin Information	Drainage Area 1	Drainage Area __	Drainage Area __	Drainage Area __
Receiving Stream Name	Northwest River			
Stream Class *	C; Sw			
Stream Index Number *	30-1-2-2			
Total Drainage Area (sf)	1,592,062			
On-site Drainage Area (sf)	1,592,062			
Off-site Drainage Area (sf)	0			
Proposed Impervious Area** (sf)	335,806			
% Impervious Area** (total)	21.09			

Impervious** Surface Area	Drainage Area 1	Drainage Area __	Drainage Area __	Drainage Area __
On-site Buildings/Lots (sf)	84,742			
On-site Streets (sf)				
On-site Parking (sf)	192,402			
On-site Sidewalks (sf)	44,492			
Other on-site (sf)				
Future (sf)	14,170			
Off-site (sf)				
Existing BUA*** (sf)				
Total (sf):	335,806			

* *Stream Class and Index Number can be determined at: http://portal.ncdenr.org/web/wq/ps/csu/classifications*

** *Impervious area is defined as the built upon area including, but not limited to, buildings, roads, parking areas, sidewalks, gravel areas, etc.*

*** *Report only that amount of existing BUA that will remain after development. Do not report any existing BUA that is to be removed and which will be replaced by new BUA.*

11. How was the off-site impervious area listed above determined? Provide documentation. By design.

Projects in Union County: *Contact DEMLR Central Office staff to check if the project is located within a Threatened & Endangered Species watershed that may be subject to more stringent stormwater requirements as per 15A NCAC 02B .0600.*

V. SUPPLEMENT AND O&M FORMS

The applicable state stormwater management permit supplement and operation and maintenance (O&M) forms must be submitted for each BMP specified for this project. The latest versions of the forms can be downloaded from http://portal.ncdenr.org/web/wq/ws/su/bmp-manual.

VI. SUBMITTAL REQUIREMENTS

Only complete application packages will be accepted and reviewed by the Division of Energy, Mineral and Land Resources (DEMLR). A complete package includes all of the items listed below. A detailed application instruction sheet and BMP checklists are available from http://portal.ncdenr.org/web/wq/ws/su/statesw/forms_docs**. The complete application package should be submitted to the appropriate DEMLR Office.** (The appropriate office may be found by locating project on the interactive online map at http://portal.ncdenr.org/web/wq/ws/su/maps.)

Please **indicate that the following required information have been provided by initialing** in the space provided for each item. All original documents MUST be signed and initialed in **blue ink**. **Download the latest versions for each submitted application package** from http://portal.ncdenr.org/web/wq/ws/su/statesw/forms_docs.

Initials

1. *Original and one copy* of the Stormwater Management Permit Application Form. _____
2. *Original and one copy* of the signed and notarized Deed Restrictions & Protective Covenants Form. *(if required as per Part VII below)* _____
3. *Original* of the applicable Supplement Form(s) (sealed, signed and dated) **and** O&M agreement(s) for each BMP. _____
4. Permit application processing fee of $505 *payable to NCDENR.* (For an Express review, refer to http://www.envhelp.org/pages/onestopexpress.html for information on the Express program and the associated fees. Contact the appropriate regional office Express Permit Coordinator for additional information and to schedule the required application meeting.) _____
5. A detailed narrative (one to two pages) describing the stormwater treatment/management for _____
6. A USGS map identifying the site location. If the receiving stream is reported as class SA or the receiving stream drains to class SA waters within ½ mile of the site boundary, include the ½ mile radius on the map. _____
7. Sealed, signed and dated calculations (one copy). _____
8. Two sets of plans folded to 8.5" x 14" (sealed, signed, & dated), including: _____
   a. Development/Project name.
   b. Engineer and firm.
   c. Location map with named streets and NCSR numbers.
   d. Legend.
   e. North arrow.
   f. Scale.
   g. Revision number and dates.
   h. Identify all surface waters on the plans by delineating the normal pool elevation of impounded structures, the banks of streams and rivers, the MHW or NHW line of tidal waters, and any coastal wetlands landward of the MHW or NHW lines.
      - Delineate the vegetated buffer landward from the normal pool elevation of impounded structures, the banks of streams or rivers, and the MHW (or NHW) of tidal waters.
   i. Dimensioned property/project boundary with bearings & distances.
   j. Site Layout with all BUA identified and dimensioned.
   k. Existing contours, proposed contours, spot elevations, finished floor elevations.
   l. Details of roads, drainage features, collection systems, and stormwater control measures.
   m. Wetlands delineated, or a note on the plans that none exist. (Must be delineated by a qualified person. Provide documentation of qualifications and identify the person who made the determination on the plans.
   n. Existing drainage (including off-site), drainage easements, pipe sizes, runoff calculations.
   o. Drainage areas delineated (included in the main set of plans, not as a separate document).

p. Vegetated buffers (where required).

9. Copy of any applicable soils report with the associated SHWT elevations (Please identify elevations in addition to depths) as well as a map of the boring locations with the existing elevations and boring logs. Include an 8.5"x11" copy of the NRCS County Soils map with the project area clearly delineated. For projects with infiltration BMPs, the report should also include the soil type, expected infiltration rate, and the method of determining the infiltration rate. (**Infiltration Devices submitted to WiRO:** S*chedule a site visit for DEMLR to verify the SHWT prior to submittal, (910) 796-7378.)* _____
10. A copy of the most current property deed. Deed book: _____ Page No: _____ _____
11. For corporations and limited liability corporations (LLC): Provide documentation from the NC Secretary of State or other official documentation, which supports the titles and positions held by the persons listed in Contact Information, item 1a, 2a, and/or 3a per 15A NCAC 2H.1003(e). The corporation or LLC must be listed as an active corporation in good standing with the NC Secretary of State, otherwise the application will be returned. http://www.secretary.state.nc.us/Corporations/CSearch.aspx _____

VII. DEED RESTRICTIONS AND PROTECTIVE COVENANTS

For all subdivisions, outparcels, and future development, the appropriate property restrictions and protective covenants are required to be recorded prior to the sale of any lot. If lot sizes vary significantly or the proposed BUA allocations vary, a table listing each lot number, lot size, and the allowable built-upon area must be provided as an attachment to the completed and notarized deed restriction form. The appropriate deed restrictions and protective covenants forms can be downloaded from http://portal.ncdenr.org/web/lr/state-stormwater-forms_docs. Download the latest versions for each submittal.

In the instances where the applicant is different than the property owner, it is the responsibility of the property owner to sign the deed restrictions and protective covenants form while the applicant is responsible for ensuring that the deed restrictions are recorded.

By the notarized signature(s) below, the permit holder(s) certify that the recorded property restrictions and protective covenants for this project, if required, shall include all the items required in the permit and listed on the forms available on the website, that the covenants will be binding on all parties and persons claiming under them, that they will run with the land, that the required covenants cannot be changed or deleted without concurrence from the NC DEMLR, and that they will be recorded prior to the sale of any lot.

VIII. CONSULTANT INFORMATION AND AUTHORIZATION

Applicant: Complete this section if you wish to designate authority to another individual and/or firm (such as a consulting engineer and/or firm) so that they may provide information on your behalf for this project (such as addressing requests for additional information).

Consulting Engineer: Kimberly Hamby, PE

Consulting Firm: Timmons Group

Mailing Address: 1805 W. City Drive, Unit E

City: Elizabeth City State: NC Zip: 27909

Phone: (252) 621-5030 Fax: (252) 562-6974

Email: kim.hamby@timmons.com

IX. PROPERTY OWNER AUTHORIZATION *(if Contact Information, item 2 has been filled out, complete this section)*

I, *(print or type name of person listed in Contact Information, item 2a)* _____, certify that I own the property identified in this permit application, and thus give permission to *(print or type name of person listed in Contact Information, item 1a)* _____ with *(print or type name of organization listed in Contact Information, item 1a)* _____ to develop the project as currently proposed. A copy of the lease agreement or pending property sales contract has been provided with the submittal, which indicates the party responsible for the operation and maintenance of the stormwater system.

As the legal property owner I acknowledge, understand, and agree by my signature below, that if my designated agent (entity listed in Contact Information, item 1) dissolves their company and/or cancels or defaults on their lease agreement, or pending sale, responsibility for compliance with the DEMLR Stormwater permit reverts back to me, the property owner. As the property owner, it is my responsibility to notify DEMLR immediately and submit a completed Name/Ownership Change Form within 30 days; otherwise I will be operating a stormwater treatment facility without a valid permit. I understand that the operation of a stormwater treatment facility without a valid permit is a violation of NC General Statue 143-215.1 and may result in appropriate enforcement action including the assessment of civil penalties of up to $25,000 per day, pursuant to NCGS 143-215.6.

Signature:_____ Date:_____

I, _____, a Notary Public for the State of _____, County of _____, do hereby certify that _____ personally appeared before me this ___ day of _____, _____, and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal, _____

SEAL

My commission expires_____

X. APPLICANT'S CERTIFICATION

I, *(print or type name of person listed in Contact Information, item 1a)* Donald McRee, Jr., County Manager, certify that the information included on this permit application form is, to the best of my knowledge, correct and that the project will be constructed in conformance with the approved plans, that the required deed restrictions and protective covenants will be recorded, and that the proposed project complies with the requirements of the applicable stormwater rules under 15A NCAC 2H .1000 and any other applicable state stormwater requirements.

Signature:_____ Date:_____

I, _____, a Notary Public for the State of _____, County of _____, do hereby certify that _____ personally appeared before me this ___ day of _____, _____, and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal, _____

SEAL

My commission expires_____

Major Stormwater Plan Form SW-002

Review Process

Contact Information

Currituck County
Planning and Community Development
153 Courthouse Road, Suite 110
Currituck, NC 27929

Phone: 252.232.3055
Fax: 252.232.3026

Website: http://www.co.currituck.nc.us/planning-community-development.cfm

Currituck County
Engineering Department
153 Courthouse Road, Suite 302
Currituck, NC 27929

Phone: 252.232.6035

General

Major stormwater plan approval is required for:

- Major subdivisions.
- Major site plans - development or expansion on a nonresidential, multi-family, or mixed use lot by 5,000 square feet or more of impervious coverage or resulting in 10% or more total impervious coverage.

Step 1: Application Submittal

The applicant must submit a complete application packet consisting of the following:

- Completed Currituck County Minor Stormwater Plan Form SW-002 (unless submitting a major subdivision or major site plan).
- Completed Rational Method Form SW-003 or NRCS Method Form SW-004.
- Stormwater management plan drawn to scale. The plan shall include the items listed in the major stormwater plan design standards checklist.
- Alternative stormwater runoff storage analysis and/or downstream drainage capacity analysis, if applicable.
- NCDENR permit applications, if applicable.
- Number of Copies Submitted:
  - 3 Copies of required plans
  - 3 Hard copies of ALL documents
  - 1 PDF digital copy (ex. Compact Disk – e-mail not acceptable) of all plans AND documents.

On receiving an application, staff shall determine whether the application is complete or incomplete. A complete application contains all the information and materials listed above, and is in sufficient detail to evaluate and determine whether it complies with appropriate review standards. An application for major stormwater plan must be submitted and approved prior altering an existing drainage system, performing any land disturbing activity or, before construction documents are approved.

Step 2: Staff Review and Action

Once an application is determined complete staff shall approve, approve subject to conditions or disapprove the application.

OFFICIAL USE ONLY:
Permit Number: _____
Date Filed: _____
Date Approved: _____

Major Stormwater Plan
Form SW-002

Contact Information

APPLICANT:

Name: Currituck County
Address: 153 Courthouse Rd, Suite 204
Currituck NC 27929
Telephone: 252.232.2075
E-Mail Address: ike.mcree@currituckcountync.com

PROPERTY OWNER:

Name: Currituck County
Address: 153 Courthouse Rd, Suite 204
Currituck NC 27929
Telephone: 252.232.2075
E-Mail Address: ike.mcree@currituckcountync.com

Property Information

Physical Street Address: Not known - Across from 871 Tulls Creek Road, between Campus
Parcel Identification Number(s): 00220000210000
FEMA Flood Zone Designation: X

Request

Project Description: Proposed elementary school

Total land disturbance activity: 1,563,332 sf
Calculated volume of BMPs: 197,575 cf sf
Maximum lot coverage: 335,806 sf
Proposed lot coverage: 335,806 sf

TYPE OF REQUEST

- ☑ Major subdivision (10-year, 24-hour rate)
- ☒ Major site plan (5-year, 24-hour rate)

METHOD USED TO CALCULATE PEAK DISCHARGE

- ☑ Rational Method
- ☑ NRCS Method (TR-55 and TR-20)
- ☐ Simple volume calculation for small sites (less than 10 acres)
- ☒ Alternative stormwater runoff storage analysis
- ☐ Downstream drainage capacity analysis

I hereby authorize county officials to enter my property for purposes of determining compliance. All information submitted and required as part of this process shall become public record.

_____ _____
Property Owner(s)/Applicant Date

The table below depicts the design standards of the major stormwater plan application. Please make sure to include all applicable listed items to ensure all appropriate standards are reviewed.

Major Stormwater Plan

Design Standards Checklist

Date Received: 5-25-2023

Project Name: Tulls Creek Elementary School

Applicant/Property Owner: Currituck County

Minor Stormwater Plan Design Standards Checklist		
General		
1	Property owner name and address.	✓
2	Site address and parcel identification number.	✓
3	North arrow and scale to be 1" = 100' or larger.	✓
Site Features		
4	Scaled drawing showing existing and proposed site features: Property lines with dimensions, acreage, streets, easements, structures (dimensions and square footage), fences, bulkheads, septic area (active and repair), utilities, vehicular use areas, driveways, and sidewalks.	✓
5	Approximate location of all designated Areas of Environmental Concern (AEC) or other such areas which are environmentally sensitive on the property, such as Maritime Forest, CAMA, 404, or 401 wetlands as defined by the appropriate agency.	N/A
6	Existing and proposed ground elevations shown in one foot intervals. All elevation changes within the past six months shall be shown on the plan.	✓
8	Limits of all proposed fill, including the toe of fill slope and purpose of fill.	✓
9	Square footage of all existing and proposed impervious areas (structures, sidewalks, walkways, vehicular use areas regardless of surface material), including a description of surface materials.	✓
10	Existing and proposed drainage patterns, including direction of flow.	✓
11	Location, capacity, design plans (detention, retention, infiltration), and design discharge of existing and proposed stormwater management features.	✓
12	Elevation of the seasonal high water level as determined by a licensed soil scientist.	✓
13	Plant selection.	✓
Permits and Other Documentation		
14	NCDENR stormwater permit application (if 10,000sf or more of built upon area).	✓
15	NCDENR erosion and sedimentation control permit application (if one acre or more of land disturbance).	✓
16	NCDENR coastal area management act permit application, if applicable.	N/A
17	Stormwater management narrative with supporting calculations.	✓
18	Rational Method Form SW-003 or NRCS Method Form SW-004	N/A
19	Alternative stormwater runoff storage analysis and/or downstream drainage capacity analysis, if applicable	✓
20	Design spreadsheets for all BMPs (*Appendix F – Currituck County Stormwater Manual*).	✓
21	Detailed maintenance plan for all proposed BMPs.	✓

	Certificate	
22	The major stormwater plan shall contain the following certificate: I, _____, owner/agent hereby certify the information included on this and attached pages is true and correct to the best of my knowledge. On the plan entitled _____, stormwater drainage improvements shall be installed according to these plans and specifications and approved by Currituck County. Yearly inspections are required as part of the stormwater plan. The owner is responsible for all maintenance required. Currituck County assumes no responsibility for the design, maintenance, or performance of the stormwater improvements. Date:_____ Owner/Agent:_____	✓

Major Stormwater Plan Submittal Checklist

Staff will use the following checklist to determine the completeness of your application. Please make sure all of the listed items are included. Staff shall not process an application for further review until it is determined to be complete.

Major Stormwater Plan Form SW-002

Submittal Checklist

Date Received: 5-25-23

Project Name: Tulls Creek Elementary School

Applicant/Property Owner: Currituck County

	Major Stormwater Plan Form SW-002 Submittal Checklist	
1	Completed Major Stormwater Plan Form SW-002	
2	Completed Rational Method Form SW-003 or NRCS Method Form SW-004 N/A	
3	Stormwater plan	
4	NCDENR permit applications, if applicable	
5	3 copies of plans	
6	3 hard copies of ALL documents	
7	**1 PDF digital copy of all plans AND documents (ex. Compact Disk – e-mail not acceptable)**	

Comments

_____

_____

_____

Operation & Maintenance Agreement

Project Name:	**Tulls Creek Elementary School**
Project Location:	**XXX Tulls Creek Road**

Cover Page

Maintenance records shall be kept on the following SCM(s). This maintenance record shall be kept in a log in a known set location. Any deficient SCM elements noted in the inspection will be corrected, repaired, or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the pollutant removal efficiency of the SCM(s).

The SCM(s) on this project include (check all that apply & corresponding O&M sheets will be added automatically):

Infiltration Basin	Quantity:		Location(s):	
Infiltration Trench	Quantity:		Location(s):	
Bioretention Cell	Quantity:		Location(s):	
Wet Pond	Quantity:		Location(s):	
Stormwater Wetland	Quantity:		Location(s):	
Permeable Pavement	Quantity:		Location(s):	
Sand Filter	Quantity:		Location(s):	
Rainwater Harvesting	Quantity:		Location(s):	
Green Roof	Quantity:		Location(s):	
Level Spreader - Filter Strip	Quantity:		Location(s):	
Proprietary System	Quantity:		Location(s):	
Treatment Swale	Quantity:		Location(s):	
Dry Pond	Quantity:		Location(s):	
Disconnected Impervious Surface	Present:	No	Location(s):	
User Defined SCM	Present:	No	Location(s):	
Low Density	Present:	Yes	Type:	Vegetated swales/roadside ditches

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed for each SCM above, and attached O&M tables. I agree to notify NCDEQ of any problems with the system or prior to any changes to the system or responsible party.

Responsible Party:	**Donald McRee, Jr.**
Title & Organization:	**County Manager of Currituck County**
Street address:	**153 Courthouse Road, Suite 204**
City, state, zip:	**Currituck, NC 27929**
Phone number(s):	**252-232-2075**
Email:	**ike.mcree@currituckcountync.gov**

Signature: _____ Date: _____

I, _____, a Notary Public for the State of _____

County of _____, do hereby certify that _____

personally appeared before me this _____ day of _____ and

acknowledge the due execution of the Operations and Maintenance Agreement .

Witness my hand and official seal, _____.

Seal

My commission expires _____

Low Density Maintenance Requirements

Important maintenance procedures:

- The drainage area to the vegetated conveyance or vegetated receiving area will be carefully managed to reduce the sediment load to the vegetated conveyance or vegetated receiving area.
- After the initial fertilization to establish the grass in the vegetated conveyance or the vegetated receiving area, fertilizer will not be applied to the vegetated receiving areas.

The vegetated conveyance or vegetated receiving area will be inspected **quarterly**. Records of operation and maintenance will be kept in a known set location and will be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

SCM element:	Potential problem:	How to remediate the problem:
Vegetation	Vegetation is too short or too long.	Maintain grassed vegetation such that the swale or vegetated area does not erode during the peak flow from the 10-year storm
Vegetated receiving areas	Trash/debris is present.	Remove the trash/debris.
	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then re-sod (or plant with other appropriate species) and water until established. Provide lime and a one-time fertilizer application.
	Trees and/or other woody vegetation are present in the swale.	Remove the trees and woody vegetation from the swale, regrade the swale if necessary and re-establish grass as shown on the approved plans.
Vegetated conveyances / swales / roadside ditches (other than curb outlet swales)	Trash/debris is present.	Remove the trash/debris.
	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then re-sod (or plant with other appropriate species) and water until established. Provide lime and a one-time fertilizer application.
	Sediment covers the grass at the bottom of the swale.	Remove sediment and dispose in an area that will not impact streams or SCMs. Re-sod if necessary.
	The side slope is steeper than the approved configuration.	Regrade the slopes to the permitted configuration per the approved plan and reestablish vegetation. If as-built or existing conditions do not allow the slopes to be regraded, contact the applicable permitting agency.
	Grass is dead, diseased or dying.	Determine the source of the problem: soils, hydrology, disease, etc. Remedy the problem and replace plants. Provide a one-time fertilizer application to establish the ground cover if necessary.
	Trees and/or other woody vegetation are present in the vegetated conveyance.	Remove the trees and woody vegetation from the vegetated conveyance, regrade the vegetated conveyance if necessary and re-establish grass as shown on the approved plans.

The outlet device (if applicable)	Clogging has occurred.	Clean out the outlet device. Dispose of the sediment off-site.
	The outlet device is damaged	Repair or replace the outlet device.
The receiving water	Erosion or other signs of damage have occurred at the outlet.	Repair the damage and improve the flow dissipation structure.
	Discharges from the site are causing erosion or sedimentation in the receiving water.	Contact the local NCDEQ Regional Office.

Kim Hamby

From: Kevin Carver <kcarver@arhs-nc.org>
Sent: Tuesday, May 23, 2023 6:25 PM
To: Kim Hamby
Subject: RE: Tulls Creek School

Kim,

Regarding the above mentioned future school to be located at 871 Tulls Creek Rd., Moyock, the site appears to have the potential to support a septic system. A supporting letter, dated April 30, 2023, presented by Protocol Sampling Service, Inc. shows potential that the site can support the proposed 11,000gpd. This permit will be issued through our state offices with the assistance of our regional soil scientist due to the flow being greater than 3000gpd. If you have any questions, feel free to call me at anytime.

Kevin Carver
Environmental Health
Albemarle Regional Health Services
252-338-4490
252-232-6603

From: Kim Hamby [mailto:Kim.Hamby@timmons.com]
Sent: Tuesday, May 16, 2023 2:00 PM
To: Kevin Carver
Subject: FW: Tulls Creek School

Kevin,

Attached is a preliminary report from Dave Meyer. He is saying in this that we can go with LPP. We are going to plan for draintile to surround the overall grouping of fields with shallow swales in between.

Will this give you enough to get me a letter so I can get on the TRC agenda. The deadline is next Thursday. Can you have something to me next Wednesday?

Thanks!

Kim Hamby, PE
Principal - Senior Project Manager

TIMMONS GROUP | www.timmons.com
Office: 252.621.5029 | Fax: 252.562.6974
Mobile: 252-340-3264 | kim.hamby@timmons.com
Your Vision Achieved Through Ours

To send me files greater than 20MB click here.

From: David Meyer <protocolsampling@yahoo.com>
Sent: Thursday, April 27, 2023 4:45 PM

To: Kim Hamby <Kim.Hamby@timmons.com>
Subject: Re: Tulls Creek School

Kim;

Draft report attached. Any questions/changes let me know....

David E. Meyer, P.G., LSS, President
Protocol Sampling Service, Inc.
4114 Laurel Ridge Drive
Raleigh, North Carolina 27612
Email: Protocolsampling@yahoo.com
Website: Environmentalservicesnc.com
(919) 210-6547 cell

On Wednesday, April 26, 2023 at 11:34:36 AM EDT, Kim Hamby <kim.hamby@timmons.com> wrote:

Hey, David. Just checking in. I'm submitting to the county next week on the 3rd for a pre-application meeting. I have to submit formally two weeks later and really need some sort of report from you. How are you coming along?

Kimberly D. Hamby, PE

Principal - Senior Project Manager

TIMMONS GROUP | www.timmons.com

1805 West City Drive, Unit E | Elizabeth City, NC 27909

Office: 252.621.5029 | Fax: 252.562.6974

Mobile: 252-340-3264 | kim.hamby@timmons.com

Your Vision Achieved Through Ours

APPLICATION IDENTIFICATION		N.C. DEPARTMENT OF TRANSPORTATION
Driveway Permit No.	Date of Application	**STREET AND DRIVEWAY ACCESS PERMIT APPLICATION**
County: Currituck		
Development Name: Tulls Creek Elementary School		

LOCATION OF PROPERTY:

Route/Road: Tulls Creek Road/SR1222

Exact Distance 575 and 960 ☐ Miles ☒ Feet N ☐ S ☒ E ☒ W ☐

From the Intersection of Route No. Campus Drive and Route No. SR 1222 Toward southeast

Property Will Be Used For: ☐ Residential /Subdivision ☐ Commercial ☒ Educational Facilities ☐ TND ☐ Emergency Services ☐ Other

Property: ☒ is ☐ is not within Currituck County City Zoning Area.

AGREEMENT

- I, the undersigned property owner, request access and permission to construct driveway(s) or street(s) on public right-of-way at the above location.
- I agree to construct and maintain driveway(s) or street entrance(s) in absolute conformance with the current "Policy on Street and Driveway Access to North Carolina Highways" as adopted by the North Carolina Department of Transportation.
- I agree that no signs or objects will be placed on or over the public right-of-way other than those approved by NCDOT.
- I agree that the driveway(s) or street(s) will be constructed as shown on the attached plans.
- I agree that that driveway(s) or street(s) as used in this agreement include any approach tapers, storage lanes or speed change lanes as deemed necessary.
- I agree that if any future improvements to the roadway become necessary, the portion of driveway(s) or street(s) located on public right-of-way will be considered the property of the North Carolina Department of Transportation, and I will not be entitled to reimbursement or have any claim for present expenditures for driveway or street construction.
- I agree that this permit becomes void if construction of driveway(s) or street(s) is not completed within the time specified by the "Policy on Street and Driveway Access to North Carolina Highways".
- I agree to pay a $50 construction inspection fee. Make checks payable to NCDOT. This fee will be reimbursed if application is denied.
- I agree to construct and maintain the driveway(s) or street(s) in a safe manner so as not to interfere with or endanger the public travel.
- I agree to provide during and following construction proper signs, signal lights, flaggers and other warning devices for the protection of traffic in conformance with the current "Manual on Uniform Traffic Control Devices for Streets and Highways" and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the District Engineer.
- I agree to indemnify and save harmless the North Carolina Department of Transportation from all damages and claims for damage that may arise by reason of this construction.
- I agree that the North Carolina Department of Transportation will assume no responsibility for any damages that may be caused to such facilities, within the highway right-of-way limits, in carrying out its construction.
- I agree to provide a Performance and Indemnity Bond in the amount specified by the Division of Highways for any construction proposed on the State Highway system.
- The granting of this permit is subject to the regulatory powers of the NC Department of Transportation as provided by law and as set forth in the N.C. Policy on Driveways and shall not be construed as a contract access point.
- I agree that the entire cost of constructing and maintaining an approved private street or driveway access connection and conditions of this permit will be borne by the property owner, the applicant, and their grantees, successors, and assignees.
- **I AGREE TO NOTIFY THE DISTRICT ENGINEER WHEN THE PROPOSED WORK BEGINS AND WHEN IT IS COMPLETED.**

SIGNATURES OF APPLICANT

PROPERTY OWNER (APPLICANT)				WITNESS	
COMPANY	Currituck County			NAME	
SIGNATURE				SIGNATURE	
ADDRESS	153 Courthouse Road, Suite 204			ADDRESS	
	Currituck, NC 27929	Phone No.	252.232.2075		

AUTHORIZED AGENT				WITNESS	
COMPANY	Donald McRee, Jr.			NAME	
SIGNATURE				SIGNATURE	
ADDRESS	153 Courthouse Road, Suite 204			ADDRESS	
	Currituck, NC 27929	Phone No.	252.232.2075		

APPROVALS

APPLICATION RECEIVED BY DISTRICT ENGINEER

SIGNATURE **DATE**

APPLICATION APPROVED BY LOCAL GOVERNMENTAL AUTHORITY (when required)

SIGNATURE **TITLE** **DATE**

APPLICATION APPROVED BY NCDOT

SIGNATURE **TITLE** **DATE**

INSPECTION BY NCDOT

SIGNATURE **TITLE** **DATE**

COMMENTS:

STATE OF NORTH CAROLINA

ROUTE SR1222 PROJECT Tulls Creek Elementary School COUNTY OF Currituck

DEPARTMENT OF TRANSPORTATION

-AND-

Currituck County

153 Courthouse Road, Suite 204

Currituck, NC 27929

RIGHT OF WAY ENCROACHMENT AGREEMENT

PRIMARY AND SECONDARY HIGHWAYS

THIS AGREEMENT, made and entered into this the _____ day of _____ 20 _____ by and between the Department of Transportation, party of the first part; and Currituck County _____ party of the second part,

W I T N E S S E T H

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) Tulls Creek Road SR1222 , located across from 871 Tulls Creek Road, between Campus Drive and Old Jury Road

with the construction and/or erection of: connection to existing watermain by means of jack and bore under Tulls Creek Road to provide service to a new elementary school.

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the installation, operation, and maintenance of the above described facility will be accomplished in accordance with the party of the first part's latest UTILITIES ACCOMMODATIONS MANUAL, and such revisions and amendments thereto as may be in effect at the date of this agreement. Information as to these policies and procedures may be obtained from the Division Engineer or State Utilities Manager of the party of the first part.

That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the construction site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

a. Compliance with Regulations: The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

b. Nondiscrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials

and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

c. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

d. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.

e. Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,

(1) withholding of payments to the contractor under the contract until the contractor complies, and/or
(2) cancellation, termination or suspension of the contract, in whole or in part.

f. Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

R/W (161) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (161) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: _____
DIVISION ENGINEER

ATTEST OR WITNESS:

Clerk to the Board

Leeann Walton

County Manager, Currituck County

Donald McRee, Jr.
Second Party

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the State Utilities Manager. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

1. All roadways and ramps.
2. Right of way lines and where applicable, the control of access lines.
3. Location of the existing and/or proposed encroachment.
4. Length, size and type of encroachment.
5. Method of installation.
6. Dimensions showing the distance from the encroachment to edge of pavement, shoulders, etc.
7. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
8. Drainage structures or bridges if affected by encroachment (show vertical and horizontal dimensions from encroachment to nearest part of structure).
9. Method of attachment to drainage structures or bridges.
10. Manhole design.
11. On underground utilities, the depth of bury under all traveled lanes, shoulders, ditches, sidewalks, etc.
12. Length, size and type of encasement where required.
13. On underground crossings, notation as to method of crossing - boring and jacking, open cut, etc.
14. Location of vents.

GENERAL REQUIREMENTS

1. Any attachment to a bridge or other drainage structure must be approved by the State Utilities Manager in Raleigh prior to submission of encroachment agreement to the Division Engineer.
2. All crossings should be as near as possible normal to the centerline of the highway.
3. Minimum vertical clearances of overhead wires and cables above all roadways must conform to clearances set out in the National Electric Safety Code.
4. Encasements shall extend from ditch line to ditch line in cut sections and 5' beyond toe of slopes in fill sections.
5. All vents should be extended to the right of way line or as otherwise required by the Department.
6. All pipe encasements as to material and strength shall meet the standards and specifications of the Department.
7. Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings.
8. The Department's Division Engineer should be given notice by the applicant prior to actual starting of installation included in this agreement.

TULLS CREEK ELEMENTARY SCHOOL
MOYOCK TOWNSHIP, CURRITUCK COUNTY, NORTH CAROLINIA

DRAINAGE NARRATIVE

MAY 25, 2023

PREPARED BY:

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

1805 West City Drive, Unit E
Elizabeth City, NC 27909
252.621.5030
License No. C-1652
www.timmons.com

Tulls Creek Elementary School – Drainage Narrative

The Currituck County Board of Education is proposing to develop Tulls Creek Elementary on an undeveloped 36-acre lot on Tulls Creek Road. The site is bounded by a residential subdivision to the west, some single-family residences to south and east, and Tulls Creek Road to the north. The site is zoned SFM (Single-Family Residential-Mainland). As this site is below the low-density threshold of 24%, no stormwater treatment is proposed. However, stormwater ponds will be created to attenuate the increase in runoff caused by the development.

Currently, most runoff on site drains to a central existing collector ditch that connects to the roadside ditch along Tulls Creek Road. The ditch runs in a southeast direction before crossing under the road via a 42” reinforced concrete pipe. The runoff eventually drains into the Northwest River. The western end of the site is lower in elevation and a portion sheet flows in a northwesterly direction to the northern property line ditch that drains west.

In the proposed conditions the site is broken into 3 drainage areas: Drainage Area 1 which contains the western developed portion of the site, Drainage Area 2 which contains the eastern developed portion of the site and Drainage Area 3 which accounts for the residual undeveloped area. Drainage Area 1 includes the western portion of the building and the visitor/parent parking and drives. Runoff is collected in a network of the stormwater pipes that discharge into Pond 1. Pond 1 drains into Pond 2, then flows into a series of pipes along the southern entrance driveway where it empties into the regraded roadside ditch on Tulls Creek Road. Drainage Area 2 contains the eastern portion of the building as well as the bus and staff parking. Runoff from Drainage Area 2 is routed through a network of stormwater pipes that discharge into Pond 2. Drainage area 3 drains into existing perimeter ditches that connect to the roadside ditch along Tulls Creek Road.

In accordance with the Currituck County Stormwater Manual, a drainage analysis is being performed using PCSWMM software to provide a pre/post comparison. The pre-development model is based on the 2-year, 24-hour storm with a depth of 3.71 inches, as if the site is wooded. The post-development model is based on the proposed conditions and the 5-year, 24-hour storm with a depth of 4.79 inches. At this time, we have developed only basic models for initial comparison. Our current results are showing that the discharge from the site from the site in the proposed conditions during the 5-year storm is higher than that of the 2-year, wooded condition. However, we are in process of adding the full pipe network on site and are confident that the increase will be handled when all piping and storage is accounted for in the complete model.

The disturbed area for the entire project will not exceed 36.99 acres. Standard erosion control measures such as temporary gravel construction entrance, silt fence, inlet protection, rip rap, check dams and required seeding are shown on the plans and in details. Runoff from disturbed areas will be routed to skimmer basins.

Appendix A

Curve Number Calculations & Pond Storage Volumes

TIMMONS GROUP
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Area CN Computations

Stormwater Drainage Analysis
Pre-Development

Project Name: Tulls Creek Elementary School
Timmons Group Project No. 48911
Date: 5/25/22
Calculated by: Ben Drew
Checked by: Kim Hamby

Drainage Area # S1

Cover Description	HSG	Curve Number, CN[1]	Area (SF)	Area (AC)	Total Area (SF)	Total Area (AC)	Area (AC) * CN
Asphalt, Concrete, Roofs	*All*	98					
Streets & Roads Paved; open ditches (w/ right-of-way)	A	83					
	B	89					
	C	92					
	D	93					
Residential District 1-acre average lot size	A	51					
	B	68					
	C	79					
	D	84					
Woods (Assume Good Condition)	A	30					
	B	55					
	C	70	1,592,062	36.55	**1,592,062**	**36.55**	2558.4
	D	77					
Row Crop Straight Row - good condition[2]	A	67					
	B	78					
	C	85					
	D	89					
Open Space (Assume Good Condition)	A	39					
	B	61					
	C	74					
	D	80					
Meadow - cont. grass	A	30					
	B	58					
	C	71					
	D	78					

Weighted CN = Total Product 2558.41 / Total Area (AC) 36.55 = **70**

Area (SF)	Area (AC)
1,592,062	36.55

Initial Abstraction (Dstore Perv) = 0.86

[1] CN values obtained from Tables 2-2a and 2-2c of the NRCS TR-55 Manual, rev. June 1986

Area CN Computations

Stormwater Drainage Analysis
Post-Development

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Project Name: Tulls Creek Elementary School
Timmons Group Project No. 51473
Date: 5/25/2023
Calculated by: Ben Drew
Checked by: Kim Hamby

Drainage Area # S1

Cover Description	HSG	Curve Number, CN[1]	Area (SF)	Area (AC)	Total Area (SF)	Total Area (AC)	Area (AC) * CN
Asphalt, Concrete, Roofs	*All*	98	151,510	3.48	**151,510**	**3.48**	340.9
Streets & Roads Paved; open ditches (w/ right-of-way)	A	83					
	B	89					
	C	92					
	D	93					
Residential District 1-acre average lot size	A	51					
	B	68					
	C	79					
	D	84					
Woods (Assume Good Condition)	A	30					
	B	55					
	C	70					
	D	77					
Row Crop Straight Row - good condition[2]	A	67					
	B	78					
	C	85					
	D	89					
Open Space (Assume Good Condition)	A	39					
	B	61			**341,737**	**7.85**	
	C	74	341,737	7.85			580.5
	D	80					
Meadow - cont. grass	A	30					
	B	58					
	C	71					
	D	78					

Weighted CN = Total Product 921.41 / Total Area (AC) 11.32 = **81**

Area (SF)	Area (AC)
493,247	11.32

Initial Abstraction (Dstore Perv) = 0.46

[1] CN values obtained from Tables 2-2a and 2-2c of the NRCS TR-55 Manual, rev. June 1986

Area CN Computations

Stormwater Drainage Analysis
Post-Development

Project Name: Tulls Creek Elementary School
Timmons Group Project No. 51473
Date: 5/25/2023
Calculated by: Ben Drew
Checked by: Kim Hamby

Drainage Area # S2

Cover Description	HSG	Curve Number, CN[1]	Area (SF)	Area (AC)	Total Area (SF)	Total Area (AC)	Area (AC) * CN
Asphalt, Concrete, Roofs	*All*	98	188,021	4.32	**188,021**	**4.32**	423.0
Streets & Roads Paved; open ditches (w/ right-of-way)	A	83					
	B	89					
	C	92					
	D	93					
Residential District 1-acre average lot size	A	51					
	B	68					
	C	79					
	D	84					
Woods (Assume Good Condition)	A	30					
	B	55					
	C	70					
	D	77					
Row Crop Straight Row - good condition[2]	A	67					
	B	78					
	C	85					
	D	89					
Open Space (Assume Good Condition)	A	39					
	B	61			**609,886**	**14.00**	
	C	74	609,886	14.00			1036.1
	D	80					
Meadow - cont. grass	A	30					
	B	58					
	C	71					
	D	78					

Weighted CN = Total Product 1459.08 / Total Area (AC) 18.32 = **80**

Area (SF)	Area (AC)
797,907	18.32

Initial Abstraction (Dstore Perv) = 0.51

[1] CN values obtained from Tables 2-2a and 2-2c of the NRCS TR-55 Manual, rev. June 1986

Area CN Computations

Stormwater Drainage Analysis
Post-Development

TIMMONS GROUP
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Project Name: Tulls Creek Elementary School
Timmons Group Project No. 51473
Date: 5/25/2023
Calculated by: Ben Drew
Checked by: Kim Hamby

Drainage Area # S3

Cover Description	HSG	Curve Number, CN[1]	Area (SF)	Area (AC)	Total Area (SF)	Total Area (AC)	Area (AC) * CN
Asphalt, Concrete, Roofs	*All*	98	17,952	0.41	**17,952**	**0.41**	40.4
Streets & Roads Paved; open ditches (w/ right-of-way)	A	83					
	B	89					
	C	92					
	D	93					
Residential District 1-acre average lot size	A	51					
	B	68					
	C	79					
	D	84					
Woods (Assume Good Condition)	A	30					
	B	55					
	C	70					
	D	77					
Row Crop Straight Row - good condition[2]	A	67					
	B	78					
	C	85					
	D	89					
Open Space (Assume Good Condition)	A	39					
	B	61					
	C	74	282,956	6.50	**282,956**	**6.50**	480.7
	D	80					
Meadow - cont. grass	A	30					
	B	58					
	C	71					
	D	78					

Weighted CN = Total Product 521.08 / Total Area (AC) 6.91 = **75**

Area (SF)	Area (AC)
300,908	6.91

Initial Abstraction (Dstore Perv) = 0.65

[1] CN values obtained from Tables 2-2a and 2-2c of the NRCS TR-55 Manual, rev. June 1986

TIMMONS GROUP
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Pond Volume Calculations

Pond 1	Elevation	Area SF	Cumulative Volume CF
Pond Bottom	4.0	10,806	
Base of Shelf	6.0	14,634	43,902
Top of Shelf	7.0	21,548	48,531
Top of Bank	9.0	25,997	**96,076**

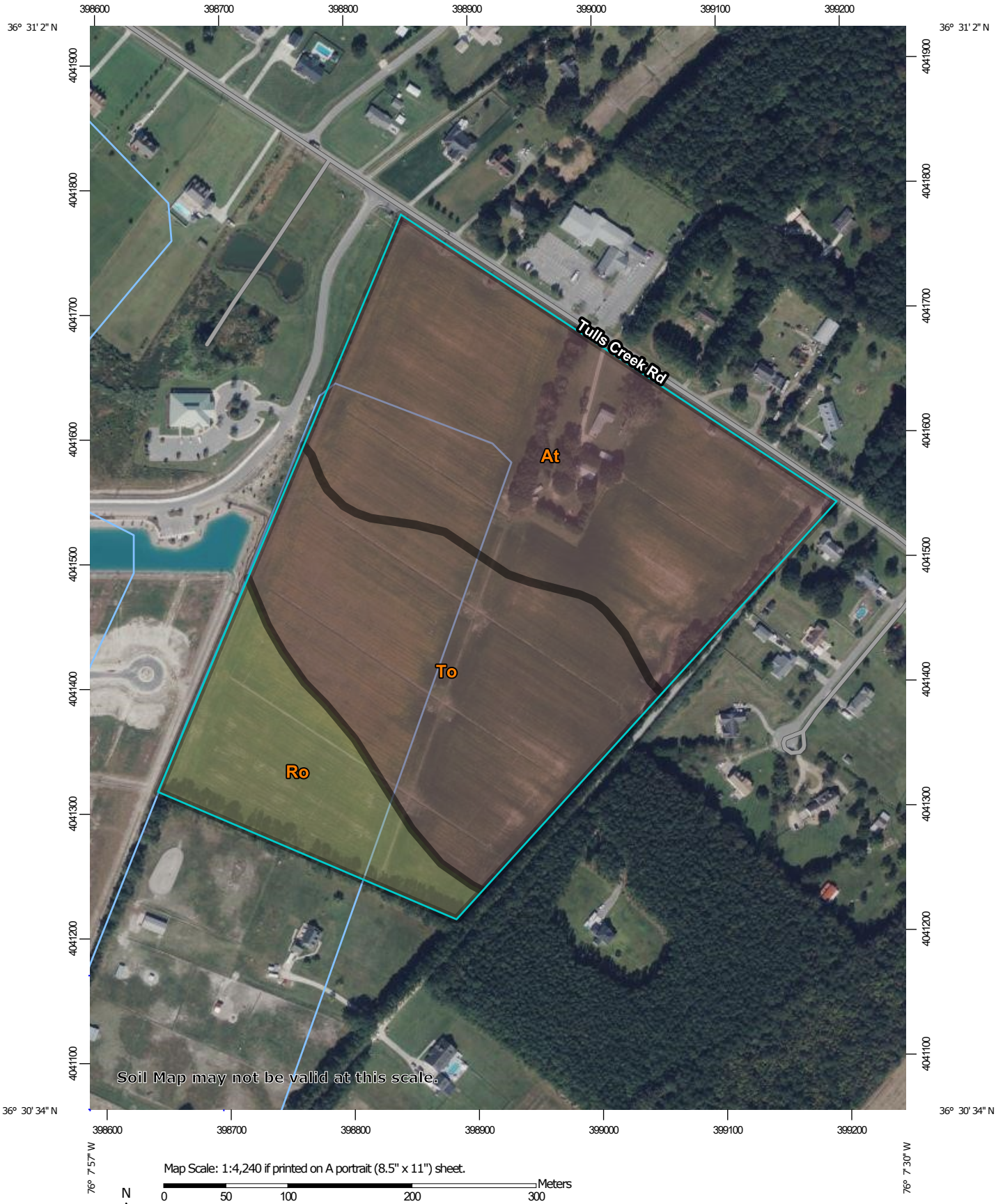
Pond 2	Elevation	Area SF	Cumulative Volume CF
Pond Bottom	2.0	7,765	
Base of Shelf	6.0	12,715	38,145
Top of Shelf	7.0	17,532	63,243
Top of Bank	9.0	20,724	**101,499**

Appendix B

WEB Soil Survey

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Hydrologic Soil Group—Currituck County, North Carolina
(Tulls Creek Elementary)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 1:20,000.

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: Currituck County, North Carolina
Survey Area Data: Version 22, Sep 8, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 5, 2020—Oct 7, 2020

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
At	Augusta fine sandy loam	B/D	18.8	47.5%
Ro	Roanoke fine sandy loam	C/D	6.4	16.1%
To	Tomotley fine sandy loam	B/D	14.4	36.4%
Totals for Area of Interest			**39.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

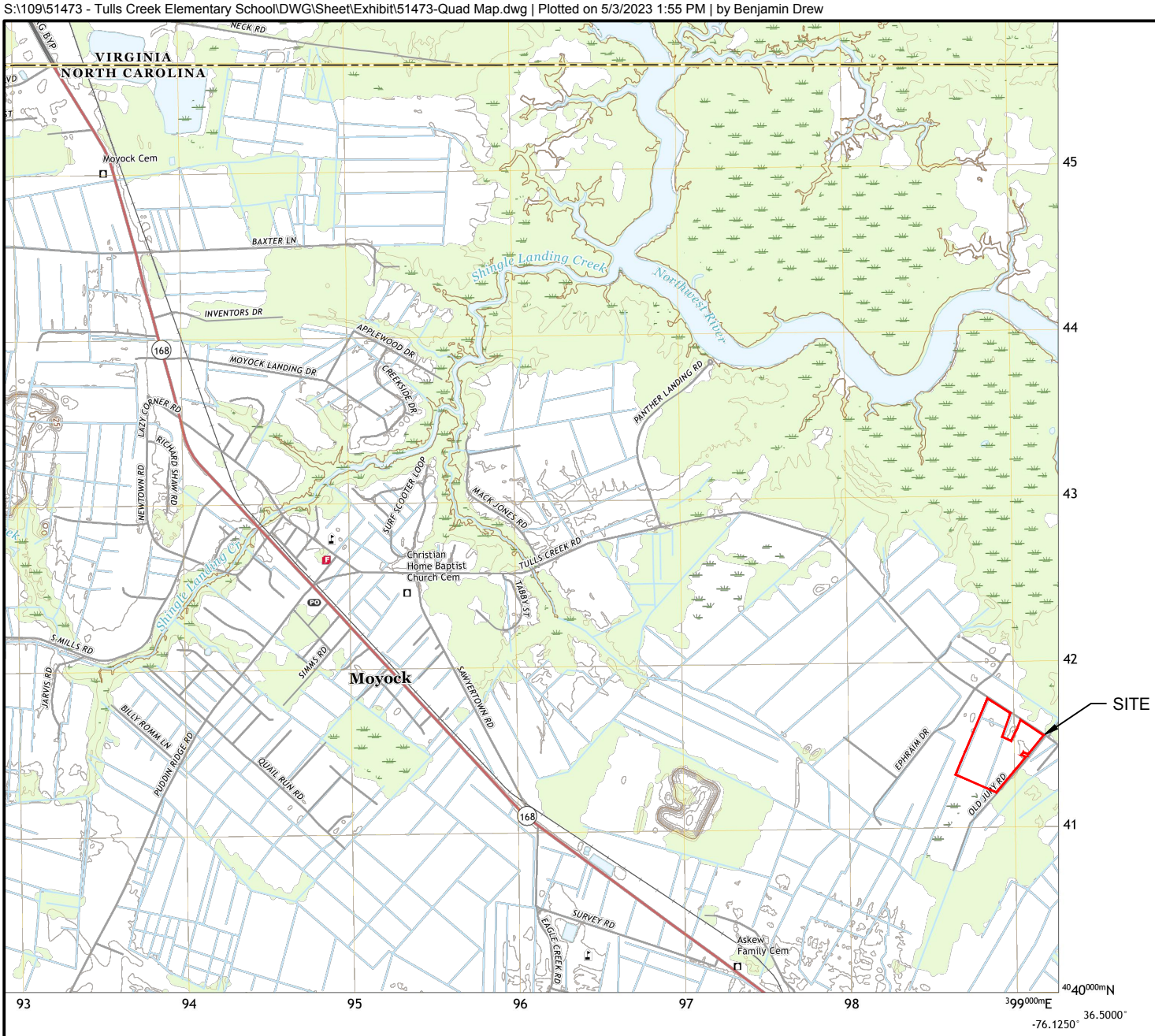
Tie-break Rule: Higher

Appendix C

USGS QUAD Map

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

S:\109\51473 - Tulls Creek Elementary School\DWG\Sheet\Exhibit\51473-Quad Map.dwg | Plotted on 5/3/2023 1:55 PM | by Benjamin Drew



USGS QUAD MAP EXHIBIT

MOYOCK, NC, VA

2019

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

FEET

THIS DRAWING PREPARED AT THE
ELIZABETH CITY OFFICE
1805 West City Drive, Unit E | Elizabeth City, NC 27909
TEL 252.621.5030 FAX 252.562.6974 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

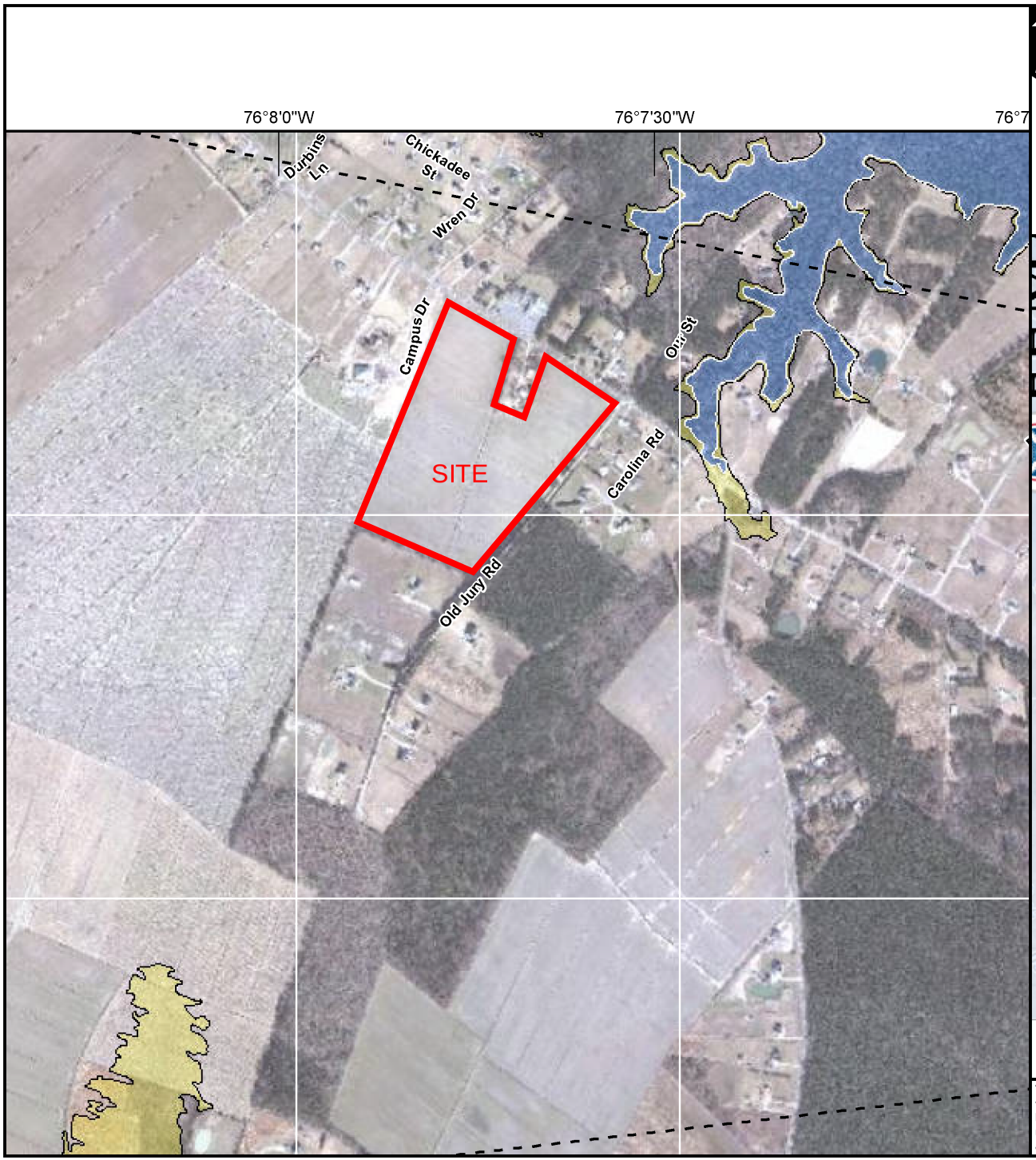
MOYOCK TOWNSHIP	*CURRITUCK COUNTY*
Date: 09-21-2022	*Scale: 1"=3000'*
Sheet 1 of 1	*J.N.:51473*
Drawn by: JHS	*Checked by:KDH*

TIMMONS GROUP

Appendix D

Flood Map

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.



Map Projection:
North Carolina State Plane Projection Feet (Zo
Datum: NAD 1983 (Horizontal), NAVD 1988 (V

1 inch = 1,000 feet

0 500 1,000 2,000
Feet
Meters

National Flood Insurance Progr

NORTH CAROLINA

PANEL 8040

FEMA

Panel Contains:

COMMUNITY	CID	PANEL	SUFFIX
CURRITUCK COUNTY	370078	8040	K

VERSION NUMBER
2.3.3.2

MAP NUMBER
3721804000K

MAP REVISED
December 21, 2018

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

Appendix E

Rainfall Data

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

NOAA Atlas 14, Volume 2, Version 3
Location name: Moyock, North Carolina, USA*
Latitude: 36.5137°, Longitude: -76.1288°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.435 (0.395-0.480)	0.506 (0.458-0.561)	0.568 (0.514-0.629)	0.655 (0.590-0.725)	0.738 (0.662-0.815)	0.815 (0.729-0.900)	0.882 (0.786-0.976)	0.949 (0.841-1.05)	1.03 (0.903-1.14)	1.11 (0.966-1.23)
10-min	0.695 (0.630-0.766)	0.809 (0.733-0.896)	0.909 (0.822-1.01)	1.05 (0.944-1.16)	1.18 (1.05-1.30)	1.30 (1.16-1.43)	1.40 (1.25-1.55)	1.51 (1.33-1.66)	1.63 (1.43-1.80)	1.75 (1.52-1.94)
15-min	0.868 (0.788-0.958)	1.02 (0.921-1.13)	1.15 (1.04-1.27)	1.33 (1.19-1.47)	1.49 (1.34-1.65)	1.64 (1.47-1.81)	1.77 (1.58-1.96)	1.90 (1.68-2.10)	2.05 (1.80-2.27)	2.19 (1.91-2.43)
30-min	1.19 (1.08-1.31)	1.41 (1.27-1.56)	1.63 (1.48-1.81)	1.92 (1.73-2.13)	2.21 (1.98-2.44)	2.47 (2.21-2.73)	2.72 (2.42-3.00)	2.96 (2.62-3.27)	3.26 (2.86-3.61)	3.55 (3.09-3.94)
60-min	1.48 (1.35-1.64)	1.76 (1.60-1.95)	2.10 (1.90-2.32)	2.50 (2.25-2.77)	2.94 (2.64-3.25)	3.35 (3.00-3.70)	3.74 (3.33-4.13)	4.15 (3.67-4.58)	4.67 (4.11-5.18)	5.18 (4.51-5.75)
2-hr	1.74 (1.57-1.94)	2.08 (1.87-2.32)	2.51 (2.26-2.80)	3.05 (2.73-3.39)	3.66 (3.26-4.06)	4.25 (3.77-4.71)	4.82 (4.25-5.34)	5.42 (4.76-6.02)	6.23 (5.42-6.92)	7.02 (6.06-7.80)
3-hr	1.87 (1.68-2.09)	2.23 (1.99-2.50)	2.70 (2.42-3.02)	3.30 (2.95-3.69)	4.00 (3.55-4.46)	4.69 (4.14-5.22)	5.38 (4.72-5.98)	6.12 (5.34-6.80)	7.14 (6.16-7.93)	8.14 (6.95-9.05)
6-hr	2.23 (2.01-2.49)	2.65 (2.38-2.97)	3.22 (2.89-3.61)	3.94 (3.52-4.41)	4.79 (4.25-5.35)	5.65 (4.98-6.28)	6.49 (5.69-7.22)	7.43 (6.45-8.24)	8.70 (7.47-9.65)	9.98 (8.47-11.1)
12-hr	2.62 (2.36-2.94)	3.12 (2.78-3.51)	3.80 (3.39-4.27)	4.68 (4.16-5.25)	5.73 (5.06-6.41)	6.80 (5.96-7.59)	7.88 (6.85-8.78)	9.08 (7.81-10.1)	10.7 (9.10-12.0)	12.4 (10.4-13.8)
24-hr	3.05 (2.80-3.35)	3.71 (3.41-4.08)	4.79 (4.39-5.26)	5.70 (5.21-6.24)	7.05 (6.39-7.70)	8.20 (7.38-8.95)	9.47 (8.44-10.3)	10.9 (9.59-11.9)	13.0 (11.2-14.2)	14.7 (12.6-16.2)
2-day	3.54 (3.26-3.88)	4.29 (3.95-4.70)	5.51 (5.06-6.02)	6.55 (5.99-7.15)	8.12 (7.36-8.84)	9.47 (8.52-10.3)	11.0 (9.78-12.0)	12.7 (11.1-13.8)	15.2 (13.1-16.7)	17.4 (14.7-19.2)
3-day	3.76 (3.48-4.10)	4.56 (4.21-4.97)	5.82 (5.37-6.34)	6.89 (6.33-7.49)	8.47 (7.72-9.19)	9.82 (8.88-10.6)	11.3 (10.1-12.3)	12.9 (11.4-14.1)	15.4 (13.4-16.8)	17.6 (15.0-19.3)
4-day	3.98 (3.69-4.32)	4.82 (4.47-5.24)	6.14 (5.68-6.65)	7.24 (6.67-7.83)	8.83 (8.08-9.54)	10.2 (9.24-11.0)	11.6 (10.5-12.6)	13.2 (11.7-14.3)	15.5 (13.6-16.9)	17.7 (15.3-19.4)
7-day	4.66 (4.34-5.04)	5.62 (5.23-6.08)	7.06 (6.56-7.62)	8.25 (7.64-8.89)	9.96 (9.17-10.7)	11.4 (10.4-12.3)	12.9 (11.7-13.9)	14.6 (13.1-15.8)	17.0 (15.0-18.4)	18.9 (16.5-20.7)
10-day	5.27 (4.93-5.65)	6.32 (5.92-6.77)	7.83 (7.31-8.38)	9.07 (8.46-9.70)	10.9 (10.1-11.6)	12.3 (11.4-13.2)	13.9 (12.7-14.9)	15.6 (14.1-16.8)	18.0 (16.1-19.5)	20.0 (17.6-21.8)
20-day	7.16 (6.73-7.63)	8.52 (8.02-9.09)	10.4 (9.73-11.0)	11.9 (11.1-12.6)	14.0 (13.0-14.9)	15.7 (14.6-16.8)	17.6 (16.2-18.8)	19.5 (17.8-20.9)	22.2 (20.0-23.9)	24.4 (21.7-26.5)
30-day	8.82 (8.33-9.37)	10.5 (9.90-11.1)	12.6 (11.9-13.4)	14.3 (13.5-15.2)	16.7 (15.6-17.7)	18.5 (17.3-19.7)	20.4 (18.9-21.8)	22.4 (20.6-23.9)	25.1 (22.8-26.9)	27.2 (24.5-29.3)
45-day	10.9 (10.3-11.6)	13.0 (12.2-13.8)	15.5 (14.6-16.5)	17.5 (16.5-18.6)	20.4 (19.2-21.7)	22.8 (21.3-24.3)	25.3 (23.4-26.9)	27.8 (25.6-29.7)	31.4 (28.5-33.6)	34.2 (30.8-36.8)
60-day	13.1 (12.4-13.9)	15.5 (14.7-16.4)	18.3 (17.3-19.4)	20.5 (19.4-21.7)	23.6 (22.2-24.9)	26.0 (24.3-27.5)	28.4 (26.5-30.2)	30.9 (28.6-32.8)	34.2 (31.4-36.6)	36.8 (33.5-39.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

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