



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, WILMINGTON DISTRICT  
WASHINGTON REGULATORY OFFICE  
2407 W. 5TH STREET  
WASHINGTON NORTH CAROLINA 27889

September 20, 2024

Regulatory Program/Division

Sent Via Email: dougdaec@gmail.com

Joel & Stacy Justice  
PO Box 308  
Grandy, NC 27939

Dear Mr. & Mrs. Justice:

This letter is in response to your request to the Wilmington District, Washington Regulatory Field Office for an approved jurisdictional determination. The project/review area is located south of Indian Kettle Road, at Latitude 36.197470 and Longitude - 75.859870; in Jarvisburg, Currituck County, North Carolina. The review area for this determination is limited to an approximately 15.48-acre area (comprised of one parcel (parcel numbers: 0109000053F0000)), which is illustrated on the enclosed site maps. This request has been assigned the file number SAW-2024-01349 (0 Indian Kettle Road Jarvisburg). This file number should be referenced in all correspondence concerning this project.

Based on our review of the information you furnished, a site inspection conducted on August 22, 2024, and other information available to our office, we have determined the above-referenced area does not contain any waters of the United States under U.S. Army Corps of Engineers (Corps) regulatory jurisdiction. This determination was made in accordance with the Corps regulatory authority pursuant to Section 404 of the Clean Water Act, and based upon criteria contained in the 1987 Corps of Engineers Wetland Delineation Manual and the Atlantic and Gulf Coastal Plain regional supplement. This determination is valid for a period of **five years** from the date of the letter, unless new information warrants revision of the determination before the expiration date or a District Engineer has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.

This letter contains an approved jurisdictional determination for your subject site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the Division Appeals Officer at the address listed on the RFA form. In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under

33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received by the Corps by November 19, 2024. **It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.**

Section 404 of the Clean Water Act requires a Department of the Army (DA) permit be obtained prior to the discharge of dredged or fill material into waters of the United States, including wetlands. Section 10 of the Rivers and Harbors Act of 1899 requires a DA permit be obtained for any work in, on, over or under navigable waters of the United States.

This determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the review area identified in this request. The determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

You are cautioned that work performed below the mean high water line or ordinary high water line in waters of the United States; and/or, the discharge of dredged or fill material into any areas identified on the enclosed information as within Federal jurisdiction, without a Department of the Army permit could subject you to enforcement action. Receipt of a permit from a state or local municipality does not obviate the requirement for obtaining a Department of the Army permit.

If you have any questions concerning this correspondence, please contact Joshua Tutt, Regulatory Specialist of the Washington Regulatory Field Office at 910-251-4629, by mail at the above address, or by email at [Joshua.C.Tutt@usace.army.mil](mailto:Joshua.C.Tutt@usace.army.mil). Please take a moment to complete our customer satisfaction survey located at <https://regulatory.ops.usace.army.mil/customer-service-survey/>.

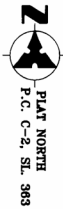
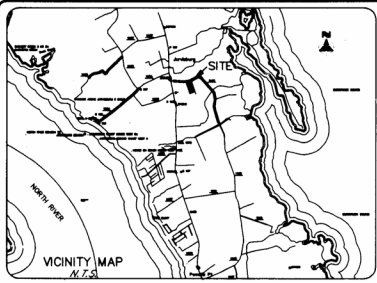
Sincerely,

*Joshua C. Tutt*

Josh Tutt  
Regulatory Specialist

Enclosures

cc: Doug Dorman, Atlantic Environmental LLC (via [Dougdaec@gmail.com](mailto:Dougdaec@gmail.com))



- NOTES:**
- AREA DETERMINED BY COORDINATE METHOD.
  - IRON PINS AT ALL LOT CORNERS UNLESS OTHERWISE NOTED HEREON.
  - UNDERGROUND UTILITIES, IF ANY, WERE NOT LOCATED BY THIS SURVEY; FURTHER EVALUATION MAY BE REQUIRED.
  - NO RECOVERABLE WOOD MONUMENTS APPEAR TO BE WITHIN 2000' OF THE SUBJECT PROPERTY SHOWN HEREON.
  - THIS SURVEY IS SUBJECT TO ANY FACTS THAT MAY BE DISCLOSED BY A FULL AND ACCURATE TITLE SEARCH.
  - F.I.R.M. ZONE: ZONE X, PANEL #370078 9920 J  
REVISION DATE: 12/8/2000  
(SUBJECT TO CHANGE BY F.L.A.A.)
  - PIN NOS: PARCEL A - 0109-000-0005-0000  
RESIDUAL PARCEL: 0109-000-003F-0000  
PROPERTY OWNERS: JOEL K. JUSTICE & STACY T. JUSTICE  
JULY BOX 88  
JAYSVILLE, NC 27947
  - PROPERTY ADDRESS: 150 BLACK FOREST LAKE  
JAYSVILLE, NC 27947
  - RECORDED REFERENCES:  
D.B. 403, PGS. 021-023 P.C. F. S.L. 141  
D.B. 403, PG. 012 P.C. C-2, S.L. 363  
D.B. 403, PG. 029
  - LOT COVERAGE:  
RESIDENCE: 2,413 SQ.FT.  
CONCRETE: 368 SQ.FT.  
TRAILERS/STORAGE BUILDINGS: 1,418 SQ.FT.  
TOTAL COVERAGE: 4,200 SQ.FT.

LINE	LENGTH	BEARING
L1	52.96	S84°15'47"W
L2	20.27	N71°06'37"W

**SURVEYORS CERTIFICATE**  
I, JAMES W. HUGGINS, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION FROM P.C. C-2, S.L. 363; THAT THE BEING/MEASURES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FROM INFORMATION FOUND IN DEED BOOK 403, PAGE 021; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:110,000; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 41-30 AS AMENDED.

THIS SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT-ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION.

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 20<sup>th</sup> DAY OF July 2007.



**OWNER CERTIFICATE**  
THIS RECOMBINATION WAS PREPARED AT THE DIRECTION OF THE UNDERSIGNED OWNER OF THE PROPERTY AS SHOWN HEREON.

DATE: 7/27/07

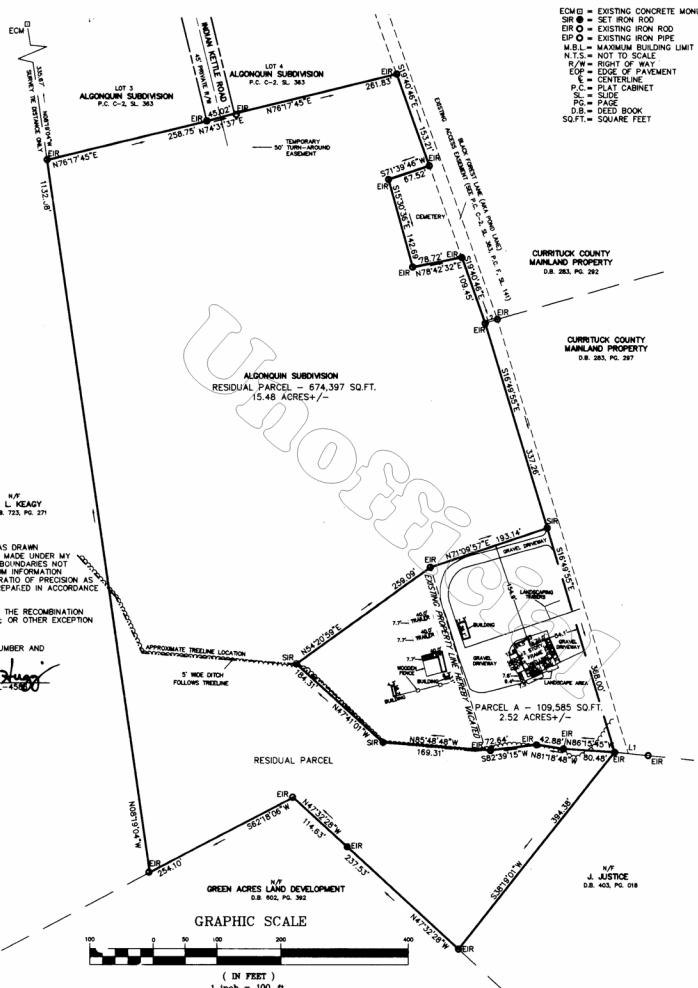
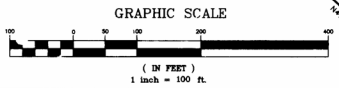
*Joel K. Justice*  
*Stacy T. Justice*

**NOTARY PUBLIC**  
I, James W. Huggins, a Notary Public of the County of Currituck, North Carolina, DO HEREBY CERTIFY THAT Joel K. Justice & Stacy T. Justice PERSONALLY APPEARED BEFORE ME THIS DATE AND ACKNOWLEDGED THE DUE EXECUTION OF THE FOREGOING CERTIFICATE.

WITNESS MY HAND AND SEAL THIS DAY OF July, 2007.  
James W. Huggins  
 Notary Public  
 My Commission Expires 4-10-10

STATE OF NORTH CAROLINA  
COUNTY OF CURRITUCK  
REVIEW OFFICE:  
I, James D. Glaw, REVIEW OFFICER OF CURRITUCK COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

DATE: 7/30/07  
James D. Glaw  
REVIEW OFFICER



- ECM = EXISTING CONCRETE MON.
- ER B = SET IRON ROD
- ER O = EXISTING IRON ROD
- ER P = EXISTING IRON PIPE
- N.T.S. = NOT TO SCALE
- R/W = RIGHT OF WAY
- E.O.P. = EDGE OF PAVEMENT
- C.L. = CENTERLINE
- P.C. = PLAT CABINET
- S.L. = SLIDE
- P.C. = PLAT CABINET
- D.B. = DEED BOOK
- SQ.FT. = SQUARE FEET

**WESSELL**  
Blair/Dickens Group  
3010 West Greenway Parkway  
Durham, North Carolina 27606  
Phone: (919) 286-2900  
Fax: (919) 286-2911

PROJECT: **JOEL K. JUSTICE AND STACY T. JUSTICE**  
ADDPAR BRANCH TOWNSHIP CURRITUCK COUNTY NORTH CAROLINA  
LOT RECOMBINATION PLAT

REVISIONS

NO.	DATE	DESCRIPTION	BY

DATE: 07-18-07 SCALE: 1"=100'  
 BPG JMH  
 OMW BPG  
 SHEET: 1 of 1  
 CAD FILE: 3826-RECOMBO  
 PROJECT NO: 3826

Filed for registration on June 30, 2007  
 at 3:55 PM - Currituck County  
 by James W. Huggins - Surveyor  
 Registered in North Carolina

## NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Joel & Stacy Justice, Atlantic Environmental	File Number: SAW-2024-01349	Date: 9/20/2024
Attached is:		See Section below
<input type="checkbox"/>	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
<input type="checkbox"/>	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
<input type="checkbox"/>	PERMIT DENIAL WITHOUT PREJUDICE	C
<input type="checkbox"/>	PERMIT DENIAL WITH PREJUDICE	D
<input checked="" type="checkbox"/>	APPROVED JURISDICTIONAL DETERMINATION	E
<input type="checkbox"/>	PRELIMINARY JURISDICTIONAL DETERMINATION	F

### SECTION I

The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/appeals/> or Corps regulations at 33 CFR Part 331.

**A: INITIAL PROFFERED PERMIT:** You may accept or object to the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

**B: PROFFERED PERMIT:** You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.



**C. PERMIT DENIAL WITHOUT PREJUDICE: Not appealable**

You received a permit denial without prejudice because a required Federal, state, and/or local authorization and/or certification has been denied for activities which also require a Department of the Army permit before final action has been taken on the Army permit application. The permit denial without prejudice is not appealable. There is no prejudice to the right of the applicant to reinstate processing of the Army permit application if subsequent approval is received from the appropriate Federal, state, and/or local agency on a previously denied authorization and/or certification.

**D: PERMIT DENIAL WITH PREJUDICE: You may appeal the permit denial**

You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**E: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information for reconsideration**

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.
- **RECONSIDERATION:** You may request that the district engineer reconsider the approved JD by submitting new information or data to the district engineer within 60 days of the date of this notice. The district will determine whether the information submitted qualifies as new information or data that justifies reconsideration of the approved JD. A reconsideration request does not initiate the appeal process. You may submit a request for appeal to the division engineer to preserve your appeal rights while the district is determining whether the submitted information qualifies for a reconsideration.

**F: PRELIMINARY JURISDICTIONAL DETERMINATION: Not appealable**

You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

**POINT OF CONTACT FOR QUESTIONS OR INFORMATION:**

If you have questions regarding this decision you may contact:

District Engineer, Wilmington Regulatory Division  
Attn: Joshua Tutt  
Wilmington District U.S. Army Corps of Engineers  
2407 W. 5th Street  
Washington, NC 27889

If you have questions regarding the appeal process, or to submit your request for appeal, you may contact:

Krista Sabin  
Regulatory Administrative Appeal Review Officer  
U.S. Army Corps of Engineers  
South Atlantic Division  
60 Forsyth Street Room M9  
Atlanta, Georgia 30303-8801

Phone: 904-314-9631

Email: [Krista.D.Sabin@usace.army.mil](mailto:Krista.D.Sabin@usace.army.mil)

**SECTION II – REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT**

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. Use additional pages as necessary. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15-day notice of any site investigation and will have the opportunity to participate in all site investigations.

<hr/> <p>Signature of appellant or agent.</p>	Date:
Email address of appellant and/or agent:	Telephone number:



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, WILMINGTON DISTRICT  
WASHINGTON REGULATORY OFFICE  
69 DARLINGTON AVENUE  
WASHINGTON NORTH CAROLINA 27889

CESAW-RG-W

September 20, 2024

MEMORANDUM FOR RECORD

SUBJECT: US Army Corps of Engineers (Corps) Approved Jurisdictional Determination in accordance with the "Revised Definition of 'Waters of the United States'"; (88 FR 3004 (January 18, 2023) as amended by the "Revised Definition of 'Waters of the United States'; Conforming" (8 September 2023),<sup>1</sup> SAW-2024-01349 [(MFR 1 of 1)]<sup>2</sup>

BACKGROUND. An Approved Jurisdictional Determination (AJD) is a Corps document stating the presence or absence of waters of the United States on a parcel or a written statement and map identifying the limits of waters of the United States on a parcel. AJDs are clearly designated appealable actions and will include a basis of JD with the document.<sup>3</sup> AJDs are case-specific and are typically made in response to a request. AJDs are valid for a period of five years unless new information warrants revision of the determination before the expiration date or a District Engineer has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.<sup>4</sup>

On January 18, 2023, the Environmental Protection Agency (EPA) and the Department of the Army ("the agencies") published the "Revised Definition of 'Waters of the United States,'" 88 FR 3004 (January 18, 2023) ("2023 Rule"). On September 8, 2023, the agencies published the "Revised Definition of 'Waters of the United States'; Conforming", which amended the 2023 Rule to conform to the 2023 Supreme Court decision in *Sackett v. EPA*, 598 U.S., 143 S. Ct. 1322 (2023) ("*Sackett*").

This Memorandum for Record (MFR) constitutes the basis of jurisdiction for a Corps AJD as defined in 33 CFR §331.2. For the purposes of this AJD, we have relied on Section 10 of the Rivers and Harbors Act of 1899 (RHA),<sup>5</sup> the 2023 Rule as amended,

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<sup>1</sup> While the Revised Definition of "Waters of the United States"; Conforming had no effect on some categories of waters covered under the CWA, and no effect on any waters covered under RHA, all categories are included in this Memorandum for Record for efficiency.

<sup>2</sup> When documenting aquatic resources within the review area that are jurisdictional under the Clean Water Act (CWA), use an additional MFR and group the aquatic resources on each MFR based on the TNW, the territorial seas, or interstate water that they are connected to. Be sure to provide an identifier to indicate when there are multiple MFRs associated with a single AJD request (i.e., number them 1, 2, 3, etc.).

<sup>3</sup> 33 CFR 331.2.

<sup>4</sup> Regulatory Guidance Letter 05-02.

<sup>5</sup> USACE has authority under both Section 9 and Section 10 of the Rivers and Harbors Act of 1899 but for convenience, in this MFR, jurisdiction under RHA will be referred to as Section 10.

CESAW-RG-W

SUBJECT: 2023 Rule, as amended, Approved Jurisdictional Determination in Light of *Sackett v. EPA*, 143 S. Ct. 1322 (2023), SAW-2024-01349

as well as other applicable guidance, relevant case law, and longstanding practice in evaluating jurisdiction.

1. SUMMARY OF CONCLUSIONS.

- a. The review area is comprised entirely of dry land (i.e., there are no waters such as streams, rivers, wetlands, lakes, ponds, tidal waters, ditches, and the like in the entire review area and there are no areas that have previously been determined to be jurisdictional under the Rivers and Harbors Act of 1899 in the review area).

2. REFERENCES.

- a. "Revised Definition of 'Waters of the United States,'" 88 FR 3004 (January 18, 2023) ("2023 Rule")
- b. "Revised Definition of 'Waters of the United States'; Conforming" 88 FR 61964 (September 8, 2023))
- c. *Sackett v. EPA*, 598 U.S. \_\_\_, 143 S. Ct. 1322 (2023)

3. REVIEW AREA.

- a. Project Are Size (in acres): 15.48
  - b. Location Description: The project/review area is located south of Indian Kettle Road.
  - c. Center Coordinates of the Project Site (in decimal degrees)  
Latitude: 36.197470 Longitude: -75.859870
  - d. Nearest City or Town: Jarvisburg
  - e. County: Currituck
  - f. State: North Carolina
  - g. Other associated Jurisdictional Determinations (including outcomes):
4. NEAREST TRADITIONAL NAVIGABLE WATER (TNW), THE TERRITORIAL SEAS, OR INTERSTATE WATER TO WHICH THE AQUATIC RESOURCE IS CONNECTED.  
N/A

CESAW-RG-W

SUBJECT: 2023 Rule, as amended, Approved Jurisdictional Determination in Light of *Sackett v. EPA*, 143 S. Ct. 1322 (2023), SAW-2024-01349

5. FLOWPATH FROM THE SUBJECT AQUATIC RESOURCES TO A TNW, THE TERRITORIAL SEAS, OR INTERSTATE WATER.

N/A

6. SECTION 10 JURISDICTIONAL WATERS<sup>6</sup>: Describe aquatic resources or other features within the review area determined to be jurisdictional in accordance with Section 10 of the Rivers and Harbors Act of 1899. Include the size of each aquatic resource or other feature within the review area and how it was determined to be jurisdictional in accordance with Section 10.<sup>7</sup>

N/A

7. SECTION 404 JURISDICTIONAL WATERS: Describe the aquatic resources within the review area that were found to meet the definition of waters of the United States in accordance with the 2023 Rule as amended, consistent with the Supreme Court's decision in *Sackett*. List each aquatic resource separately, by name, consistent with the naming convention used in section 1, above. Include a rationale for each aquatic resource, supporting that the aquatic resource meets the relevant category of "waters of the United States" in the 2023 Rule as amended. The rationale should also include a written description of, or reference to a map in the administrative record that shows, the lateral limits of jurisdiction for each aquatic resource, including how that limit was determined, and incorporate relevant references used. Include the size of each aquatic resource in acres or linear feet and attach and reference related figures as needed.

N/A

8. NON-JURISDICTIONAL AQUATIC RESOURCES AND FEATURES

- a. Describe aquatic resources and other features within the review area identified in the 2023 Rule as amended as not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5). Include the type of excluded aquatic resource or feature, the size of the aquatic resource or feature within the review area and describe how it was determined to meet one of the exclusions listed in 33 CFR 328.3(b).<sup>8</sup> N/A

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<sup>6</sup> 33 CFR 329.9(a) A waterbody which was navigable in its natural or improved state, or which was susceptible of reasonable improvement (as discussed in § 329.8(b) of this part) retains its character as "navigable in law" even though it is not presently used for commerce, or is presently incapable of such use because of changed conditions or the presence of obstructions.

<sup>7</sup> This MFR is not to be used to make a report of findings to support a determination that the water is a navigable water of the United States. The district must follow the procedures outlined in 33 CFR part 329.14 to make a determination that water is a navigable water of the United States subject to Section 10 of the RHA.

<sup>8</sup> 88 FR 3004 (January 18, 2023)

CESAW-RG-W

SUBJECT: 2023 Rule, as amended, Approved Jurisdictional Determination in Light of *Sackett v. EPA*, 143 S. Ct. 1322 (2023), SAW-2024-01349

- b. Describe aquatic resources and features within the review area that were determined to be non-jurisdictional because they do not meet one or more categories of waters of the United States under the 2023 Rule as amended (e.g., tributaries that are non-relatively permanent waters; non-tidal wetlands that do not have a continuous surface connection to a jurisdictional water).

N/A

9. DATA SOURCES. List sources of data/information used in making determination. Include titles and dates of sources used and ensure that information referenced is available in the administrative record.

- a. Office (Desk) Determination: 9/20/2024

Date(s) of Field Determination (if applicable): 8/22/2024

- b. Data sources used to support this determination (included in the administrative record).

- i. Vicinity Map
- ii. Aerial Imagery
- iii. Soils Map
- iv. NWI Map
- v. Delineation Map

10. OTHER SUPPORTING INFORMATION. N/A

11. NOTE: The structure and format of this MFR were developed in coordination with the EPA and Department of the Army. The MFR's structure and format may be subject to future modification or may be rescinded as needed to implement additional guidance from the agencies; however, the approved jurisdictional determination described herein is a final agency action.



NORTH CAROLINA  
Environmental Quality

ROY COOPER  
Governor

MARY PENNY KELLEY  
Secretary

WILLIAM E. TOBY VINSON, JR  
Interim Director

**September 27, 2024**

**LETTER OF APPROVAL**

Joel K. Justice  
150 Black Forest Ln  
Jarvisburg, North Carolina 27947

RE: Project Name: Algonquin Subdivision  
Application ID: PA-006867  
Permit Number: CURRI-2025-0124  
Acres Approved: 11 Acres  
County: Currituck  
City: Jarvisburg  
Address: Indian Kettle Rd  
River Basin: Pasquotank  
Stream Classification: SC: Aquatic Life, Secondary Contact Recreation, Tidal Salt Water  
Plan Type: New Plan - Single Family Subdivision (10 Lots), Road and Infrastructure

Dear Joel K. Justice,

This office has reviewed the subject erosion and sedimentation control plan. We hereby issue this Letter of Approval. Any modifications required for approval are listed in the body of the email that accompanied this attached letter. The enclosed Certificate of Approval must be posted at the job site. This plan approval shall expire three (3) years following the date of approval, if no land-disturbing activity has been undertaken, as is required by Title 15A NCAC 4B .0129.

As of April 1, 2019, all new construction activities not explicitly exempt are required to complete and submit an electronic Notice of Intent (eNOI) form requesting a Certificate of Coverage (COC) under the NCG010000 Construction General Permit. After the form is reviewed and found to be complete, you will receive a link with payment instructions for the annual permit fee. After the fee is processed, you will receive the COC. As the Financially Responsible Party shown on the FRO form submitted for this project, you MUST obtain the COC prior to commencement of any land disturbing activity. The eNOI form may be accessed at [deq.nc.gov/NCG01](https://deq.nc.gov/NCG01).



Please direct questions about the eNOI form to the [Stormwater Program staff](#) in the Raleigh central office. If the owner/operator of this project changes in the future, the new responsible party must obtain a new COC.

Title 15A NCAC 4B .0118(a) and the NCG01 permit require that the following documentation be kept on file at the job site:

1. The approved E&SC plan as well as any approved deviation.
2. The NCG01 permit and the COC, once it is received.
3. Records of inspections made during the previous 12 months.

Also, this letter gives the notice required by G.S. 113A-61.1(a) of our right of periodic inspection to ensure compliance with the approved plan.

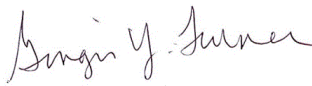
North Carolina's Sedimentation Pollution Control Act is performance-oriented, requiring protection of existing natural resources and adjoining properties. If, following the commencement of this project, the erosion and sedimentation control plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statute 113A-51 through 66), this office may require revisions to the plan and implementation of the revisions to ensure compliance with the Act.

Acceptance and approval of this plan is conditioned upon your compliance with Federal and State water quality laws, regulations, and rules. In addition, local city or county ordinances or rules may also apply to this land-disturbing activity. This approval does not supersede any other permit or approval.

Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility Form and on the plan, which you provided. You are requested to file an amended form if there is any change in the information included on the form.

Your cooperation is appreciated.

Sincerely,  
**Signed by:**



1B788953FD9E453...  
Ginger Y. Turner, PE for  
Samir Dumpor, PE  
Regional Engineer  
Land Quality Section



### **General Comments**

1. This permit allows for a land disturbance, as called for on the application plan, not to exceed **11.0** acres. Exceeding that acreage will be a violation of this permit and would require a revised plan and additional application fee. Any addition in impervious surface, over that already noted on the approved plan, would also require a revised plan to verify the appropriateness of the erosion control measures and stormwater retention measures (NCGS 113A-54.1(b)).
2. Additional measures may be required - the applicant is responsible for the control of sediment on-site. If the approved erosion and sedimentation control measures prove insufficient, the applicant must take those additional steps necessary to stop sediment from leaving this site (NCGS 113A-57(3); 15A NCAC 4B .0115). Each sediment storage device must be inspected after each storm event (NCGS 113A54.1(e)). Maintenance and/or clean out is necessary anytime the device is at 50% capacity. All sediment storage measures will remain on site and functional until all grading and final landscaping of the project is complete (15A NCAC 04B .0113).
3. The applicant is responsible for obtaining any and all permits and approvals necessary for the development of this project prior to the commencement of this land disturbing activity. This could include our agency's Stormwater regulations and the Division of Water Resources' enforcement requirements within Section 401 of the Clean Water Act, the U.S. Army Corps of Engineers' jurisdiction of Section 404 of the Clean Water Act, the Division of Coastal Management's CAMA requirements, the Division of Solid Waste Management's landfill regulations, the Environmental Protection Agency and/or The U.S. Army Corps of Engineers jurisdiction of the Clean Water Act, local County or Municipalities' ordinances, or others that may be required. This approval cannot supersede any other permit or approval; however, in the case of a Cease-and-Desist Order from the Corps of Engineers, that Order would only apply to wetland areas. All highlands would still have to be in compliance with the N.C. Sedimentation Pollution Control Act.
4. If any area on site falls within the jurisdiction of Section 401 or 404 of the Clean Water Act, the applicant is responsible for compliance with the requirements of the Division of Water Resources (DWR), the Corps of Engineers and the Environmental Protection Agency (EPA) respectively. Any erosion control measures that fall within jurisdictional wetland areas must be approved by the aforementioned agencies prior to installation. The Land Quality Section must be notified of a relocation of the measures in question to the transition point between the wetlands and the uplands to assure that the migration of sediment will not occur. If that relocation presents a problem or contradicts any requirements of either DWR, the Corps, or the EPA, it is the responsibility of the applicant to inform the Land Quality Section regional office so that an adequate contingency plan can be made to assure sufficient erosion control remains on site. Failure to do so will be considered a violation of this approval (NCGS 113A-54.1(b)).
5. Any off-site borrow and waste required for this project must come from a site with an approved erosion control plan, a site regulated under the Mining Act of 1971, or a landfill regulated by the Division of Solid Waste Management. Trash/debris from demolition activities or generated by any activities on site must be disposed of at a facility regulated by the Division of Solid Waste Management or per Division of Solid Waste Management or Division of Water Resources rules and regulations. [15A NCAC 4B .0110]

6. A graveled construction entrance must be located at each point of access and egress available to construction vehicles during the grading and construction phases of this project. Access and egress from the project site at a point without a graveled entrance will be considered a violation of this approval. Routine maintenance of the entrances is critical (113A-54.1(b)).
7. Because sediment traps and basins are shown on the plan as the primary sedimentation and erosion control devices on this project, it is necessary that the traps and basins and their collection systems be installed before any other grading takes place on site, and that every structure that receives more than one acre of drainage is built so that each dewater only from the surface (NCG010000). If that proves to be impractical, a revised plan must be submitted and approved that addresses erosion and sediment control needs during the interim period until the traps and basins are fully functioning (113A-54.1(b)).
8. Any and all existing ditches on this project site are assumed to be left undisturbed by the proposed development unless otherwise noted. The removal of vegetation within any existing ditch or channel is prohibited unless the ditch or channel is to be regraded with side slopes of 2 horizontal to 1 vertical or less steep (15A NCAC 04B .0124 (d)). Bank slopes may be mowed but stripping of vegetation is considered new earth work and is subject to the same erosion control requirements as new ditches (NCGS 113A52(6)).
9. As a condition of the NPDES General Stormwater Permit (NCG010000), the financially responsible party shall comply with the NCG01 Ground Stabilization and Materials Handling requirements that became effective April 1, 2019. The NCG01 Ground Stabilization and Materials Handling standard detail can be printed from the [deq.nc.gov/NCG01](http://deq.nc.gov/NCG01) website.
10. As a condition of the NPDES General Stormwater Permit (NCG010000), the financially responsible party shall comply with the NCG01 Self-Inspection, Recordkeeping and Reporting requirements that became effective April 1, 2019. The NCG01 Self-Inspection, Recordkeeping and Reporting standard details can be printed from the [deq.nc.gov/NCG01](http://deq.nc.gov/NCG01) website.
11. As a part of routine monitoring of the approved land-disturbing activity, the financially responsible party shall assure inspections of the area covered by the approved plan after each phase of the plan has been completed and after establishment of temporary ground cover in accordance with North Carolina General Statute 113A-54.1(e).
12. The NCG01 has a \$120 yearly fee and our office often receives closure inspection requests days prior to yearly NCG01 fee payment due dates. Be advised the project requires a closure inspection report by DEMLR prior to filing the Notice of Termination (NOT) to terminate NCG01 coverage. The closure inspection should not be requested until after the site has achieved full vegetative stabilization and measures have been removed. The removal of temporary ESC measures, including basins, requires prior approval. Often, a full growing season is necessary between initial seeding/mulching and removal of measures. Please plan your construction accordingly to avoid contacting our office prematurely for a closure inspection. Also be advised you may be asked for representative site pictures prior to a closure inspection.



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J.R. "JOEY" HOPKINS  
SECRETARY

November 19, 2024

**Driveway Permit ID:  
D011-027-24-00077**

Subject: Driveway Permit – Indian Kettle Rd  
County: Currituck

Joel K. & Stacy A. Justice  
P.O. Box 208  
Grandy, NC 27939

Dear Applicant,

Attached for your files is a copy of a Commercial Driveway Permit, which has been properly executed. Please note any comments, which may appear on the permit form.

Please feel free to contact the District Office at (252) 621-6400 if you have any questions.

Sincerely,

DocuSigned by:  
  
930880FAC40F45A...

Caitlin A. Spear, PE  
District Engineer

Attachments

Cc: Division Engineer  
County Maintenance Engineer



# Street and Driveway Access Permit General Provisions

Our mission is to safely and efficiently manage and facilitate, as much as practicable, the accommodation of street and driveway accesses along NCDOT Highways, while protecting our public infrastructure.

## Pre-Construction Notices

- PCN 1** Approval may be rescinded upon failure to follow any of the provisions in this permit and may be considered a violation of the Street and Driveway Access Permit.
- PCN 2** Prior to beginning work, the Applicant shall contact the Road Maintenance Supervisor for the corresponding county, to provide or verify the proposed pipe diameter. Please see the last page of the General Provisions for Contact Information
- PCN 3** Prior to beginning work, it is the requirement of the Applicant to contact the appropriate Utility Companies involved and make arrangements to adjust or relocate any utilities that conflict with the proposed work.
- PCN 4** It shall be the responsibility of the Applicant to determine the location of utilities within the permitted area. NCGS § 87-115 through § 87-130 of the Underground Utility Safety and Damage Prevention Act requires underground utilities to be located by calling 811 prior to construction. The Applicant shall be responsible for notifying other utility owners and providing protection and safeguards to prevent damage or interruption to existing facilities and maintain access to them.
- PCN 7** Trenching, bore pits and/or other excavations shall not be left open or unsafe overnight.

## Legal & Right-of-Way

- RW 1** This approval and associated plans and supporting documents shall not be interpreted to allow any design change or change in the intent of the design by the Owner, Design Engineer, or any of their representatives. Any revisions or changes to these approved plans or intent for construction must be obtained in writing from the District Engineer's office or their representative prior to construction or during construction, if an issue arises during construction to warrant changes.
- RW 2** NCDOT does not guarantee the right of way on this road, nor will it be responsible for any claim for damages brought about by any property owner by reason of this installation. It is the responsibility of the Applicant to verify the right of way.
- RW 3** Prior to the approval of any privately maintained facility within NCDOT right of way which the State of North Carolina is not the fee simple owner, written permission that each and every property owner affected by the installation shall be provided to NCDOT by the Applicant. (See corresponding attachment.)
- RW 4** Applicant shall be responsible for obtaining all necessary permanent and/or temporary construction, drainage, utility and/or sight distance easements.
- RW 6** No commercial advertising shall be allowed within NCDOT Right of Way.



# Street and Driveway Access Permit General Provisions

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## Work Zone Traffic Control

### TC 2 WORK ZONE TRAFFIC CONTROL QUALIFICATIONS AND TRAINING PROGRAM

All personnel performing any activity inside the highway right of way are required to be familiar with the NCDOT Maintenance / Utility Traffic Control Guidelines (MUTCG). No specific training course or test is required for qualification in the Maintenance /Utility Traffic Control Guidelines (MUTCG).

All flagging, spotting, or operating Automated Flagger Assist Devices (AFAD) inside the highway right of way requires qualified and trained Work Zone Flaggers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel involved with the installation of Work Zone Traffic Control devices inside the highway right of way are required to be qualified and trained Work Zone Installers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel in charge of overseeing work zone Temporary Traffic Control operations and installations inside the highway right of way are required to be qualified and trained Work Zone Supervisors. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

For questions and/or additional information regarding this training program please refer to <https://connect.ncdot.gov/projects/WZTC/Pages/Training.aspx> or call the NCDOT Work Zone Traffic Control Section (919) 814-5000.

### TC 3 The party of the second part shall employ traffic control measures that are in accordance with the prevailing federal, state, local, and NCDOT policies, standards, and procedures. These policies, standards, and procedures include, but are not limited to the following:

A) Manual on Uniform Traffic Control Devices (MUTCD) – North Carolina has adopted the MUTCD to provide basic principles and guidelines for traffic control device design, application, installation, and maintenance. North Carolina uses the MUTCD as a minimum requirement where higher supplemental standards specific to North Carolina are not established. Use fundamental principles and best practices of MUTCD (Part 6, Temporary Traffic Control).

B) NCDOT Maintenance / Utility Traffic Control Guidelines – This document enhances the fundamental principles and best practices established in MUTCD Part 6, Temporary Traffic Control, incorporating NCDOT-specific standards and details. It also covers important safety knowledge for a wide range of work zone job responsibilities.

### TC 4 If the Traffic Control Supervisor determines that portable concrete barrier (PCB) is required to shield a hazard within the clear zone, then PCB shall be designed and sealed by a licensed North Carolina Professional Engineer. PCB plans and design calculations shall be submitted to the District Engineer for review and approval prior to installation.

### TC 5 Ingress and egress shall be maintained to all businesses and dwellings affected by the project. Special attention shall be paid to police, EMS and fire stations, fire hydrants, secondary schools, and hospitals.



# Street and Driveway Access Permit General Provisions

**Our mission is to safely and efficiently manage and facilitate, as much as practicable, the accommodation of street and driveway accesses along NCDOT Highways, while protecting our public infrastructure.**

- TC 9** Work requiring lane or shoulder closures shall not be performed on both sides of the road simultaneously within the same area.
- TC 10** Any work requiring equipment or personnel within 5 feet of the edge of any travel lane of an undivided facility and within 10 feet of the edge of any travel lane of a divided facility shall require a lane closure with appropriate tapers per current NCDOT Roadway Standard Drawings or MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- TC 13** Any pavement markings that are damaged or obliterated shall be restored by the Applicant at no expense to NCDOT.
- TC 14** Sidewalk closures shall be installed as necessary. Pedestrian traffic shall be detoured around these closures and shall be signed appropriately and in accordance with The American with Disabilities Act Accessibility Guidelines. The Applicant must adhere to the guidelines for accommodating pedestrians in encroachment work zones as described in the NCDOT Pedestrian Work Zone Accommodations Training found at <https://www.youtube.com/watch?v=AOuYa5IW3dg&feature=youtu.be>
- TC 15** Parking and material storage shall not be allowed along the shoulders of any NCDOT roadways, any NCDOT roadways along the route and adjacent to the route.
- TC 16** During periods of construction inactivity, place approved traffic control drums 3' minimum from the existing travel way.
- TC 17** Any violation of the Traffic Control provisions will result in the termination of the permit application and liquidated damages in the amount of \$2,000 per hour or any portion thereof and will be assessed by the District Engineer's office.

## Environmental Regulations

- EC 1** The Applicant shall comply with all applicable Federal, State and local environmental regulations and shall obtain all necessary Federal, State and local environmental permits, including but not limited to, those related to sediment control, stormwater, wetland, streams, endangered species and historical sites. Additional information can be obtained by contacting the NCDOT Roadside Environmental Engineer regarding the North Carolina Natural Heritage Program or the United States Fish and Wildlife Services. Contact the Division Roadside Environmental Engineer's Office at (252) 621-6310
- EC 2** When surface area in excess of one acre will be disturbed, the Applicant shall submit a Sediment and Erosion Control Plan which has been approved by the appropriate regulatory agency or authority prior to beginning any work on the Right of Way. Failure to provide this information shall be grounds for suspension of operations. Proper temporary and permanent measures shall be used to control erosion and sedimentation in accordance with the approved sediment and erosion control plan.



# Street and Driveway Access Permit General Provisions

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- EC 3** The Verification of Compliance with Environmental Regulations (VCER-1) form is required for all non-utility permits or any utility permits when land disturbance within NCDOT right of way exceeds 1 acre. The VCER-1 form must be PE sealed by a NC registered professional engineer who has verified that all appropriate environmental permits (if applicable) have been obtained and all applicable environmental regulations have been followed.
- EC 4** All erosion control devices and measures shall be constructed, installed, maintained, and removed by the Applicant in accordance with all applicable Federal, State, and Local laws, regulations, ordinances, and policies. Permanent vegetation shall be established on all disturbed areas in accordance with the recommendations of the Division Roadside Environmental Engineer. All areas disturbed (shoulders, ditches, removed accesses, etc.) shall be graded and seeded in accordance with the latest NCDOT Standards Specifications for Roads and Structures and within 15 calendar days with an approved NCDOT seed mixture (all lawn type areas shall be maintained and reseeded as such). Seeding rates per acre shall be applied according to the Division Roadside Environmental Engineer. Any plant or vegetation in the NCDOT planted sites that is destroyed or damaged as a result of this permit shall be replaced with plants of like kind or similar shape.
- EC 5** No trees within NCDOT shall be cut without authorization from the Division Roadside Environmental Engineer. An inventory of trees measuring greater than 4 caliper inches (measured 6" above the ground) is required when trees within C/A right of way will be impacted by the encroachment installation. Mitigation is required and will be determined by the Division Roadside Environmental Engineer's Office.
- EC 6** Prior to installation, the Applicant shall contact the District Engineer to discuss any environmental issues associated with the installation to address concerns related to the root system of trees impacted by boring or non-utility construction of sidewalk, roadway widening, etc.
- EC 7** The applicant is responsible for identifying project impacts to waters of the United States (wetlands, intermittent streams, perennial streams and ponds) located within the NCDOT right-of-way. The discharge of dredged or fill material into waters of the United States requires authorization from the United States Army Corps of Engineers (USACE) and certification from the North Carolina Division of Water Quality (NCDWQ). The applicant is required to obtain pertinent permits or certification from these regulatory agencies if construction of the project impacts waters of the United States within the NCDOT right-of-way. The applicant is responsible for complying with any river or stream Riparian Buffer Rule as regulated by the NCDWQ. The Rule regulates activity within a 50-foot buffer along perennial streams, intermittent streams and ponds. Additional information can be obtained by contacting the NCDWQ or the USACE.
- EC 8** The contractor shall not begin the construction until after the traffic control and erosion control devices have been installed to the satisfaction of the District Engineer or their agent.
- EC 9** The contractor shall perform all monitoring and record keeping and any required maintenance of erosion and sediment control measures to maintain compliance with stormwater regulations.
- EC 10** Vegetative cover shall be established on all disturbed areas in accordance with the recommendations of the Division Roadside Environmental Engineer.



# Street and Driveway Access Permit General Provisions

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## General

- G 1** An executed copy of the Street and Driveway Access Permit, provisions and approved plans shall be present at the construction site at all times. If safety or traffic conditions warrant such an action, NCDOT reserves the right to further limit, restrict or suspend operations within the right of way.
- G 2** The Applicant and/or their Contractor shall comply with all OSHA requirements. If OSHA visits the work area associated with this permit, the District Office shall be notified by the encroaching party immediately if any violations are cited.
- G 3** Any REVISIONS marked in RED on the attached non-PE sealed plans shall be incorporated into and made part of the approved permit.
- G 4** All disturbed areas are to be fully restored to current NCDOT minimum roadway standards or as directed by the District Engineer or their representative. Disturbed areas within NCDOT Right-of-Way include, but not limited to, any excavation areas, pavement removal, drainage or other features.
- G 5** The Applicant shall notify the District Engineer or their representative immediately in the event any drainage structure is blocked, disturbed or damaged. All drainage structures disturbed, damaged or blocked shall be restored to its original condition as directed by the District Engineer or their representative.
- G 8** Unless specified otherwise, during non-working hours, equipment shall be located away from the job site or parked as close to the right of way line as possible and be properly barricaded in order not to have any equipment obstruction within the Clear Recovery Area. Also, during non-working hours, no parking or material storage shall be allowed along the shoulders of any state-maintained roadway.
- G 9** No access to the job site, parking or material storage shall be allowed along or from the Control of Access Roadway.
- G 10** Guardrail removed or damaged during construction shall be replaced or repaired to its original condition, meeting current NCDOT standards or as directed by the District Engineer or their representative.
- G 12** Right of Way monuments disturbed during construction shall be referenced by a registered Land Surveyor and reset after construction.
- G 13** All Traffic signs moved during construction shall be reinstalled as soon as possible to the satisfaction of the District Engineer or their representative.
- G 16** All driveways disturbed during construction shall be returned to a state comparable with the condition of the driveways prior to construction.
- G 17** Conformance with driveway permit review should be required in conjunction with this encroachment agreement. In the event there is a conflict between the driveway permit and the encroachment agreement, the District Engineer should resolve the conflict and notify the parties involved.
- G 18** If the approved method of construction is unsuccessful and other means are required, prior approval must be obtained through the District Engineer before construction may continue.
- G 22** Strict compliance with the Policy on Street and Driveway Access to North Carolina Highways manual shall be required.
- G 23** The Applicant may delegate the performance of certain provisions of this agreement to contractors or other parties. However, this shall not in any way release the Applicant from its obligations to the terms and provisions of the permit.





# Street and Driveway Access Permit General Provisions

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## Engineering

- E 1** All traffic control, asphalt mixes, structures, construction, workmanship and construction methods, and materials shall be in compliance with the most-recent versions of the following resources: ASTM Standards, Manual on Uniform Traffic Control Devices, NCDOT Utilities Accommodations Manual, NCDOT Standard Specifications for Roads and Structures, NCDOT Roadway Standard Drawings, NCDOT Asphalt Quality Management System manual, and the approved plans.

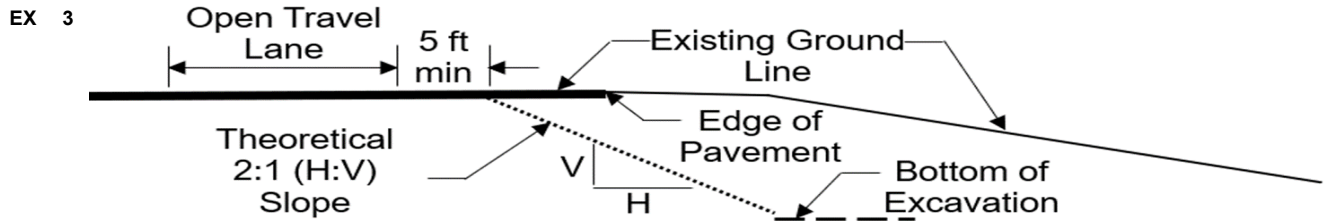
## Excavation

- EX 1** Excavation material shall not be placed on pavement.
- EX 2** It is the responsibility of the applicant and their contractor to prevent any mud/dirt from tracking onto the roadway. Any dirt which may collect on the roadway pavement from equipment and/or truck traffic on site shall be immediately removed to avoid any unsafe traffic conditions.
- EX 3** The utility shall be installed within 5 feet of the right of way line and outside the 5-foot minimum from travel lane plus theoretical 2:1 slope from the edge of pavement to the bottom of the nearest excavation wall for temporary shoring. If the 2:1 slope plus 5 feet requirement above is met for traffic, then temporary shoring is typically only necessary to protect roadways from damage when a theoretical 1:1 slope from the edge of pavement intersects the nearest excavation wall. This rule of thumb should be used with caution and does not apply to all subsurface conditions, surcharge loadings and excavation geometries. Situations where this 1:1 slope is not recommended include groundwater depth is above bottom of excavation or excavation is deeper than 10 feet or in Type B or C soils as defined by OSHA Technical Manual. Temporary shoring may be avoided by locating trenches, bore pits, and other excavations far enough away from the open travel lane, edge of pavement and any existing structure, support, utility, property, etc. to be protected. Temporary shoring is required when a theoretical 2:1 slope from the bottom of excavation will intersect the existing ground line less than 5 feet from the outside edge of an open travel lane as shown in the figure below or when a theoretical 2:1 slope from the bottom of excavation will intersect any existing structure, support, utility, property, etc. to be protected.



# Street and Driveway Access Permit General Provisions

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EX 4 Temporary shoring shall be designed and constructed in accordance with current NCDOT Standard Temporary Shoring provisions (refer to <https://connect.ncdot.gov/resources/Specifications/Pages/2018-Specifications-and-Special-Provisions.aspx> and see SP11 R002).

A) Temporary excavation shoring, such as sheet piling, shall be installed. The design of the shoring shall include the effects of traffic loads. The shoring system shall be designed and sealed by a licensed North Carolina Professional Engineer. Shoring plans and design calculations shall be submitted to the Division Engineer for review and approval prior to construction. (See NCDOT Utilities Accommodations Manual for more information on requirements for shoring plans and design calculations.) Trench boxes shall not be accepted as temporary shoring and will not be approved for use in instances where shoring is required to protect the highway, drainage structure, and/or supporting pavement or structure foundation.

B) All trench excavation inside the limits of the theoretical one-to-one slope, as defined by the policy, shall be completely backfilled and compacted at the end of each construction day. No portion of the trench shall be left open overnight. Any excavation that is not backfilled by the end of the workday must address any safety and traveling public concerns including accommodations for bicycles, pedestrians and persons with disabilities.

C) At the discretion of the District Engineer, a qualified NCDOT inspector shall be on the site at all times during construction. The applicant shall reimburse NCDOT for the cost of providing the inspector. If NCDOT cannot supply an inspector, the applicant (not the utility contractor) should make arrangements to have a qualified inspector, under the supervision of a licensed North Carolina Professional Engineer, on the site at all times. The Professional Registered Engineer shall certify that the utility was installed in accordance with the permit and that the backfill material meets the Statewide Borrow Criteria.

D) The length of parallel excavation shall be limited to the length necessary to install and backfill one joint of pipe at a time, not to exceed twenty-five (25) feet.



# Street and Driveway Access Permit General Provisions

**Our mission is to safely and efficiently manage and facilitate, as much as practicable, the accommodation of street and driveway accesses along NCDOT Highways, while protecting our public infrastructure.**

- EX 5** The trench backfill material shall meet the Statewide Borrow Criteria. The trench shall be backfilled in accordance with Section 300-7 of the latest NCDOT Standard Specifications for Roads and Structures, which basically requires the backfill material to be placed in layers not to exceed 6 inches loose and compacted to at least 95% of the density obtained by compacting a sample in accordance with AASHTO T99 as modified by DOT.
- EX 6** All material to a depth of 8 inches below the finished surface of the subgrade shall be compacted to a density equal to at least 100% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. The subgrade shall be compacted at a moisture content which is approximately that required to produce the maximum density indicated by the above test method. The contractor shall dry or add moisture to the subgrade when required to provide a uniformly compacted and acceptable subgrade. The option to backfill any trenches with dirt or either #57 stone or #78 stone with consolidation with a plate tamp and without a conventional density test may be pursued with the written consent of the District Engineer. If this option is exercised, then roadway ABC stone and asphalt repair as required will also be specified by the District Engineer.
- EX 7** All roadway sections, ditch lines and slopes, and shoulders affected by the operations under this encroachment shall be restored to the satisfaction of the District Engineer.

## Pavement Repair

- PR 7** Any pavement damaged because of settlement of the pavement or damaged by equipment used to perform the permitted work, shall be re-surfaced to the satisfaction of the District Engineer. This may include the removal of pavement and a 50' mechanical overlay. All pavement work and pavement markings (temporary and final) are the responsibility of the Applicant.



# Street and Driveway Access Permit General Provisions

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## Post-Construction

- I 1 The Applicant shall notify the Roadway Maintenance Supervisor's office within 2 business days after construction is complete. The Roadway Maintenance Supervisor may perform a construction inspection. Any deficiencies may be noted and reported to the Applicant to make immediate repairs or resolve any issues to restore the right-of-way to a similar condition prior to construction, including pavement, signage, traffic signals, pavement markings, drainage, structures/pipes, or other highway design features.

Roadway Maintenance Contact Information by County:

Camden  
(252) 621-6420

Currituck  
(252) 421-7200

Currituck OBX / Dare  
(252) 473-2990

Gates  
(252) 401-6050

Pasquotank  
(252) 621-6420

Perquimans  
(252) 426-4170

<b>APPLICATION IDENTIFICATION</b>		<b>N.C. DEPARTMENT OF TRANSPORTATION STREET AND DRIVEWAY ACCESS PERMIT APPLICATION</b>
Driveway Permit No. D011-027-24-00077	Date of Application November 19, 2024	
County: Currituck		
Development Name: Algonquin		

**LOCATION OF PROPERTY:**

Route/Road: Forbes Rd. (SR 1118)

Exact Distance 1422  Miles  Feet

N S E W

From the Intersection of Route No. 1118 and Route No. Hwy 158 Toward Jarvisburg Elem.

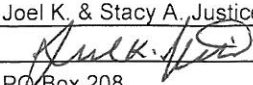
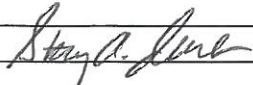
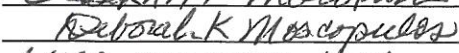
Property Will Be Used For:  Residential/Subdivision  Commercial  Educational Facilities  TND  Emergency Services  Other

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	<u>Joel K. &amp; Stacy A. Justice</u>	NAME	<u>DEBORAH K MISOPOLAS</u>
SIGNATURE	 	SIGNATURE	
ADDRESS	<u>PO Box 208</u>	ADDRESS	<u>6670 CARATOKE HWY</u>
	<u>Grandy, NC 27939</u> Phone No. <u>252 493-2500</u>		<u>GRANDY NC 27939</u>

AUTHORIZED AGENT		WITNESS	
COMPANY	<u>Bissell Professional Group</u>	NAME	<u>Amy Wills</u>
SIGNATURE		SIGNATURE	
ADDRESS	<u>3512 N. Croatan Highway</u>	ADDRESS	<u>6670 CARATOKE HWY</u>
	<u>Kitty Hawk, NC 27949</u> Phone No. <u>252-261-3266</u>		<u>GRANDY NC 27939</u>

**APPROVALS**

APPLICATION RECEIVED BY DISTRICT ENGINEER

_____ SIGNATURE	_____ DATE
--------------------	---------------

APPLICATION APPROVED BY LOCAL GOVERNMENTAL AUTHORITY (when required)

_____ SIGNATURE	_____ TITLE	_____ DATE
--------------------	----------------	---------------

APPLICATION APPROVED BY NCDOT

DocuSigned by:  SIGNATURE	DISTRICT ENGINEER TITLE	11/22/2024 DATE
--	----------------------------	--------------------

INSPECTION BY NCDOT

_____ SIGNATURE	_____ TITLE	_____ DATE
--------------------	----------------	---------------

COMMENTS:

















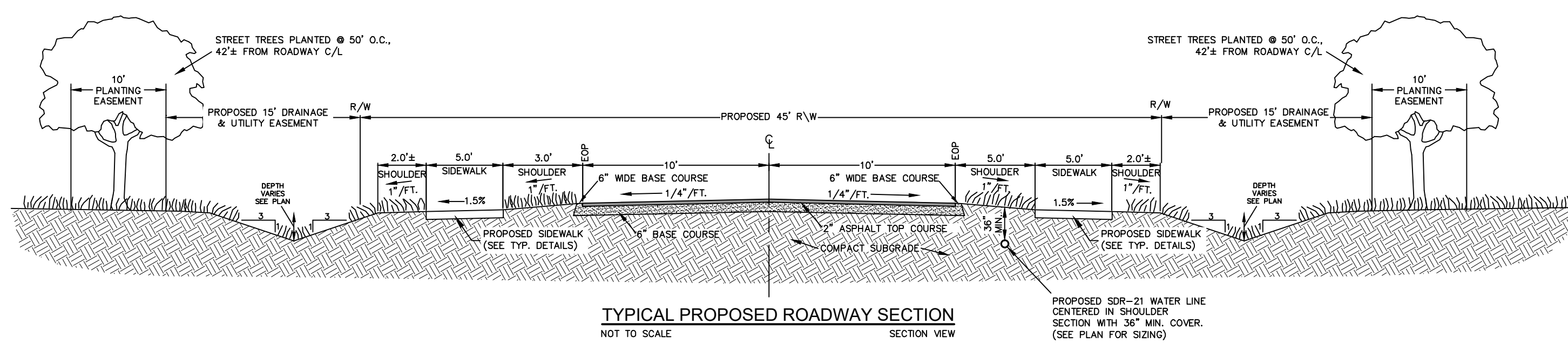




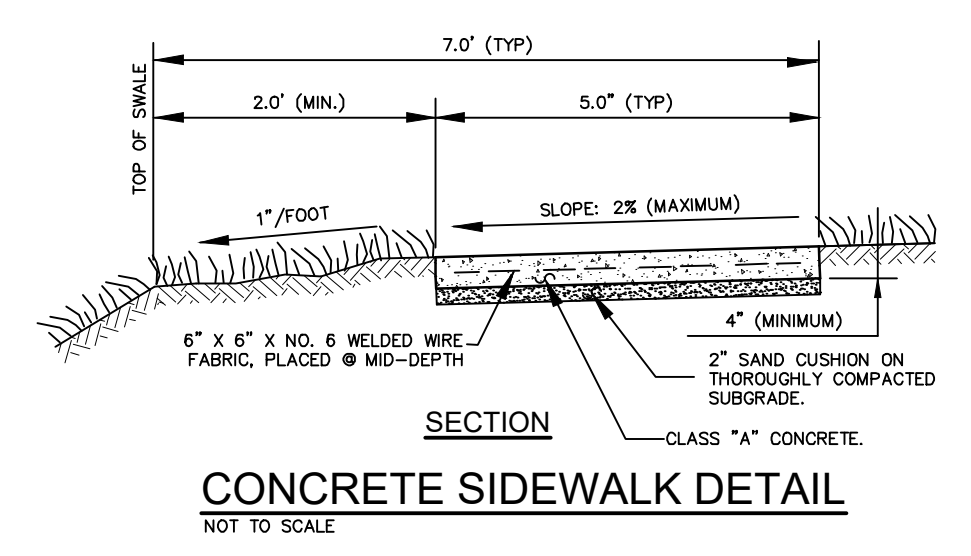




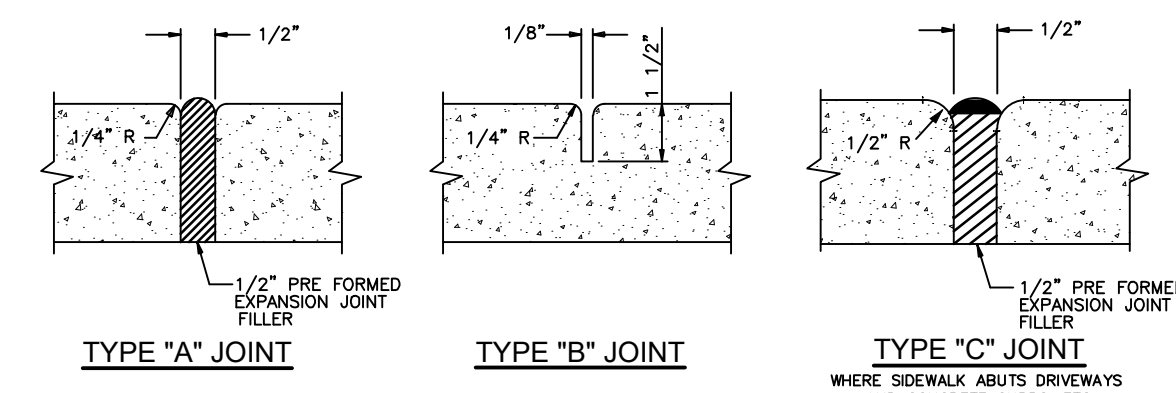




TYPICAL PROPOSED ROADWAY SECTION  
NOT TO SCALE



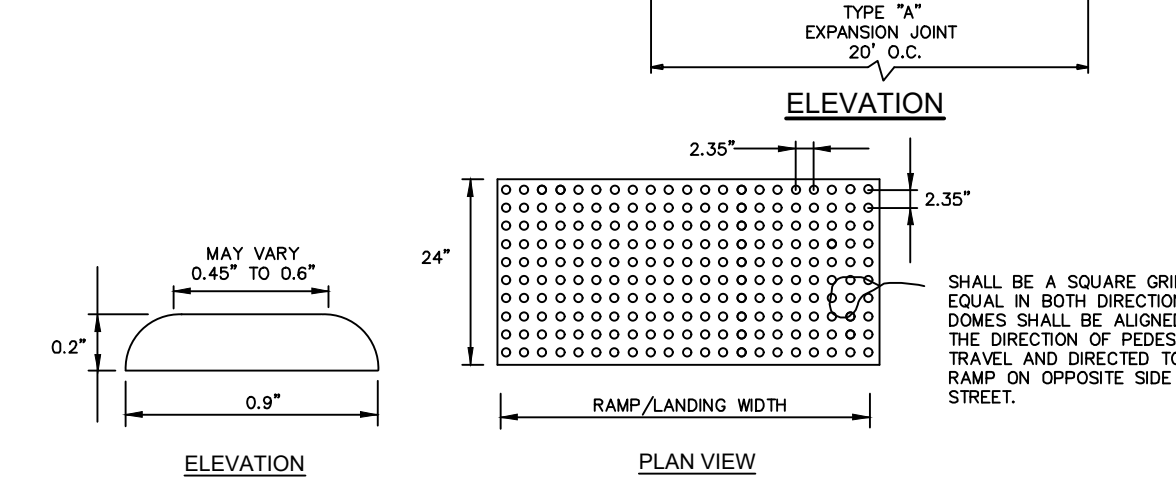
CONCRETE SIDEWALK DETAIL  
NOT TO SCALE



- SIDEWALK AND WALKING TRAIL NOTES:**
1. WALKS SHALL HAVE A 4 INCH MINIMUM THICKNESS.
  2. CONCRETE SHALL BE A MINIMUM OF 3000 PSI.
  3. WALKS SHALL HAVE A 5 FOOT MINIMUM WIDTH.
  4. CROSS SLOPE SHALL BE LIMITED TO A MAXIMUM OF 2%.
  5. LONGITUDINAL SLOPE SHALL BE LIMITED TO A MAXIMUM OF 1.20 (V/H) EXCEPT WHERE ACCESSIBILITY RAMPS ARE PROVIDED AS NOTED.
  6. ALL SIDEWALKS AND TRAILS SHALL BE COMPLIANT WITH THE LATEST HANDICAP ACCESSIBILITY REQUIREMENTS.

**TABLE OF SIDEWALK JOINTS**

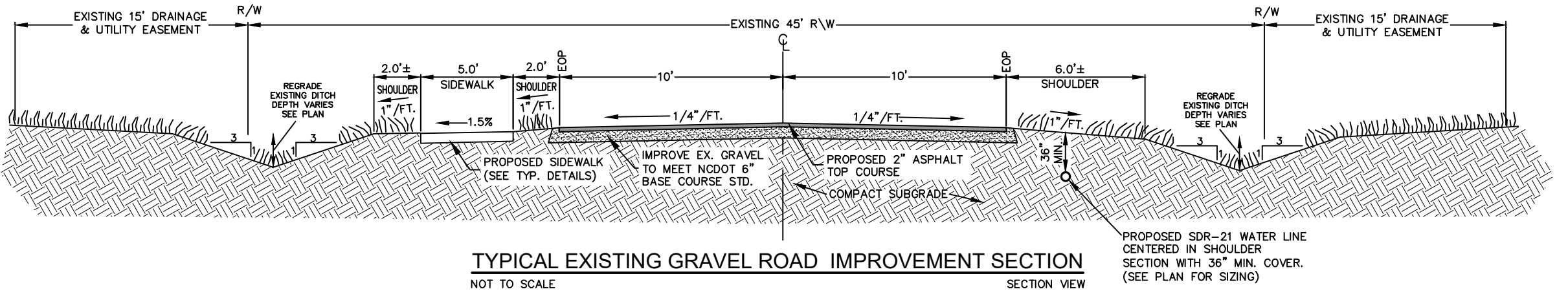
TYPE	LOCATION
"A"	20' CENTER TO CENTER ON SIDEWALKS, P.C. AND P.T. OF CURVES, JUNCTION OF EXISTING AND NEW SIDEWALKS, DRIVEWAYS, AND SIMILAR STRUCTURES.
"B"	5' CENTER TO CENTER ON SIDEWALKS.



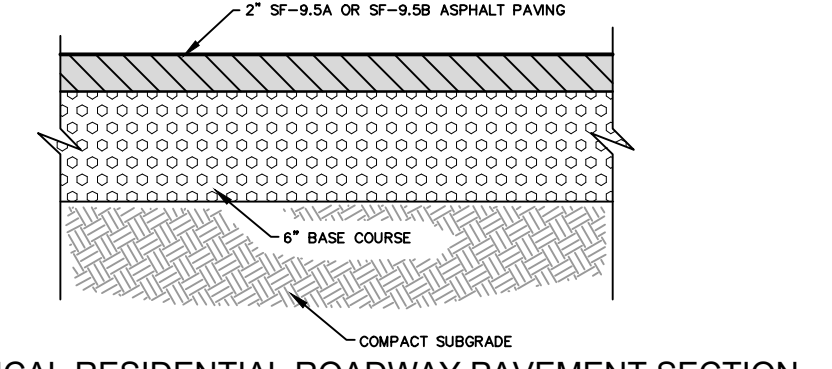
TRUNCATED DOME DETECTABLE WARNING DETAIL  
NOT TO SCALE

**DETECTABLE WARNING GENERAL NOTES**

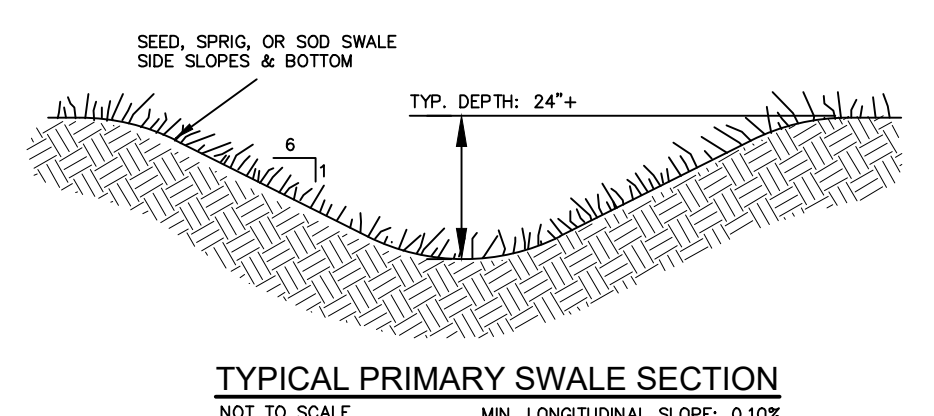
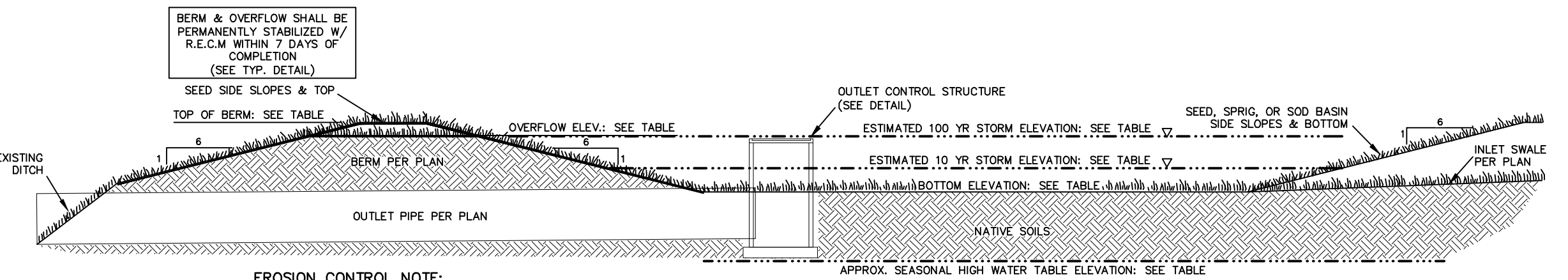
1. DETECTABLE WARNING SHALL CONSIST OF RAISED TRUNCATED DOMES MANUFACTURED BY "COTE-L INDUSTRIES, INC." CALLED "SAFTI-TRAX", WITH POLYURETHANE COATING "DURABAK", OR APPROVED EQUAL. APPLIED ON SMOOTH (NON-GROOVED) CLEAN CONCRETE RAMP AND SHALL CONFORM TO THE DETAILS IN THE PLANS AND IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND INSTALLATION INSTRUCTIONS.
2. ALL DETECTABLE WARNING AREAS SHALL START AT BACK OF CURB, BE 24 INCHES IN DEPTH AND COVER THE COMPLETE WIDTH OF THE RAMP AREA 48 INCHES MIN.
3. 70% VISUAL CONTRAST IS REQUIRED. THE COLOR SHALL BE AN INTEGRAL PART OF THE DETECTABLE WARNING MATERIAL, AS SPECIFIED ON THE PLANS. COLOR TO BE DETERMINED BY THE CITY STAFF, SAFETY YELLOW IS THE DEFAULT COLOR.
4. THE SMOOTH AND CLEAN CONCRETE UNDER DETECTABLE WARNING DEVICE AREA SHALL BE INCLUDED IN THE COST OF THE CONCRETE CURB RAMP. THE COST OF FURNISHING AND INSTALLING THE DETECTABLE WARNING DEVICE SHALL BE INCLUDED SEPARATELY AS "DETECTABLE WARNING DEVICE" PER SQUARE FOOT OR AS OUTLINED IN THE SPECIFICATIONS.
5. DETECTABLE WARNING SURFACE: APPLIED A COATING OF "DURABAK" SLIP-RESISTANT POLYURETHANE COATING TO THE SMOOTH, CLEAN CONCRETE SURFACE. ON TOP OF THE POLYURETHANE COATING APPLY TRUNCATED DOMES FROM A "SAFTI-TRAX" CONTACT SHEET ON TOP OF THE TRUNCATED DOMES AND INITIAL POLYURETHANE COATING PLACE THREE ADDITIONAL COATS OF "DURABAK" POLYURETHANE COATING. COLOR TO BE DETERMINED BY CITY STAFF OR AS SPECIFIED ON THE PLANS. SAFETY YELLOW IS A DEFAULT COLOR.
6. ALL RAMPS AND DETECTABLE WARNING SHALL BE ALIGNED IN THE DIRECTION OF PEDESTRIAN TRAVEL AND DIRECTED TOWARD RAMP ON THE OPPOSITE SIDE OF STREET.



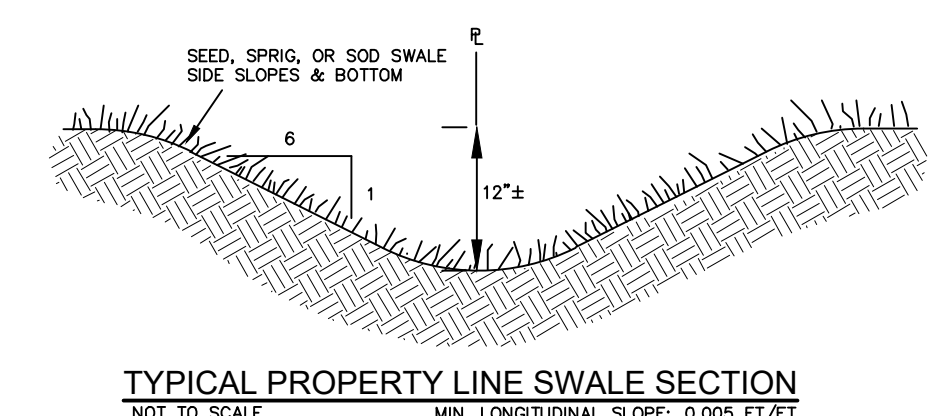
TYPICAL EXISTING GRAVEL ROAD IMPROVEMENT SECTION  
NOT TO SCALE



TYPICAL RESIDENTIAL ROADWAY PAVEMENT SECTION  
NOT TO SCALE



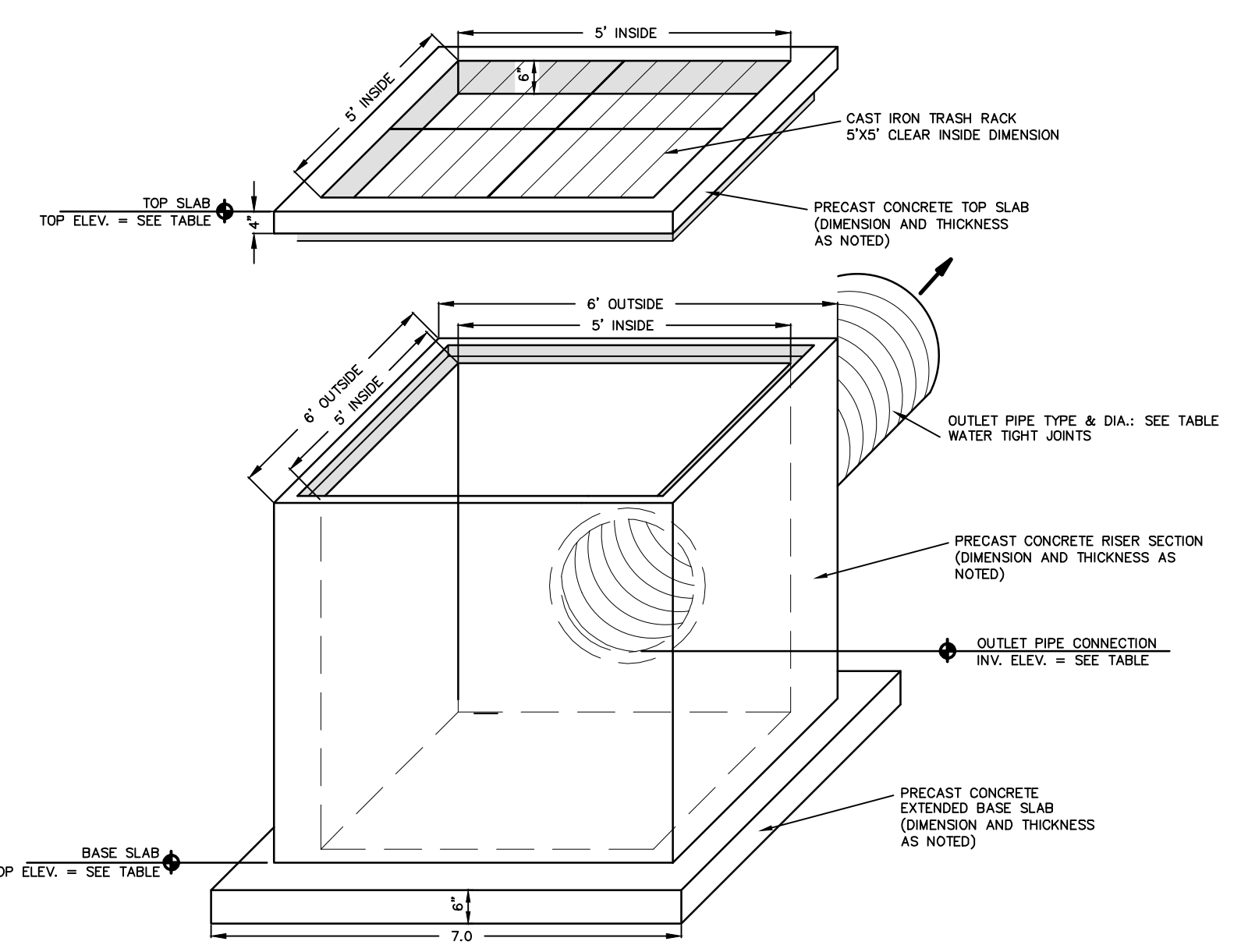
TYPICAL PRIMARY SWALE SECTION  
NOT TO SCALE



TYPICAL PROPERTY LINE SWALE SECTION  
NOT TO SCALE

- BMP CONSTRUCTION SEQUENCE NOTES:**
1. THE POND SHALL BE CONSTRUCTED AS DIRECTED ON THE PLAN AND DETAILS. PERIMETER SLOPE IMPROVEMENTS SHALL BE STABILIZED WITH TEMPORARY VEGETATION WITHIN 7 DAYS OF CONSTRUCTION. THIS WILL CREATE A TEMPORARY SEDIMENT BARRIER DURING PROJECT CONSTRUCTION. A GOOD TEMPORARY MEANS OF STABILIZATION IS A WET HYDROSEED MIX.
  2. DURING CONSTRUCTION, THE POND WILL BE UTILIZED AS AN EROSION & SEDIMENT CONTROL SEDIMENT BASIN. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS PROPERLY STABILIZED, THE BMP SHALL BE CLEANED AND RESTORED TO ITS DESIGN SPECIFICATIONS AND THE BANKS PERMANENTLY STABILIZED WITHIN 7 DAYS.

STORMWATER INFILTRATION BASIN TYPICAL CROSS SECTION  
NOT TO SCALE

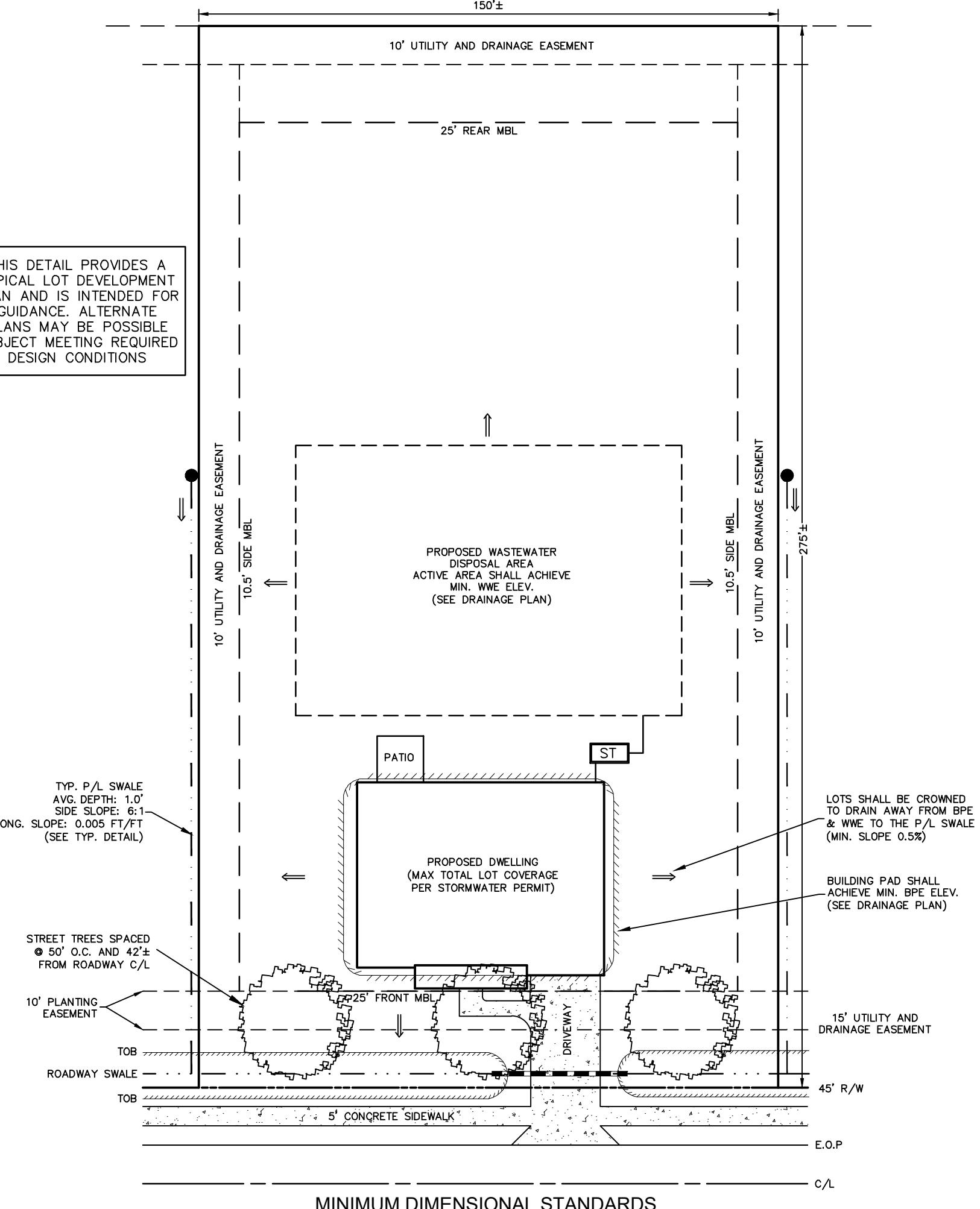


OUTLET CONTROL STRUCTURE  
NO SCALE

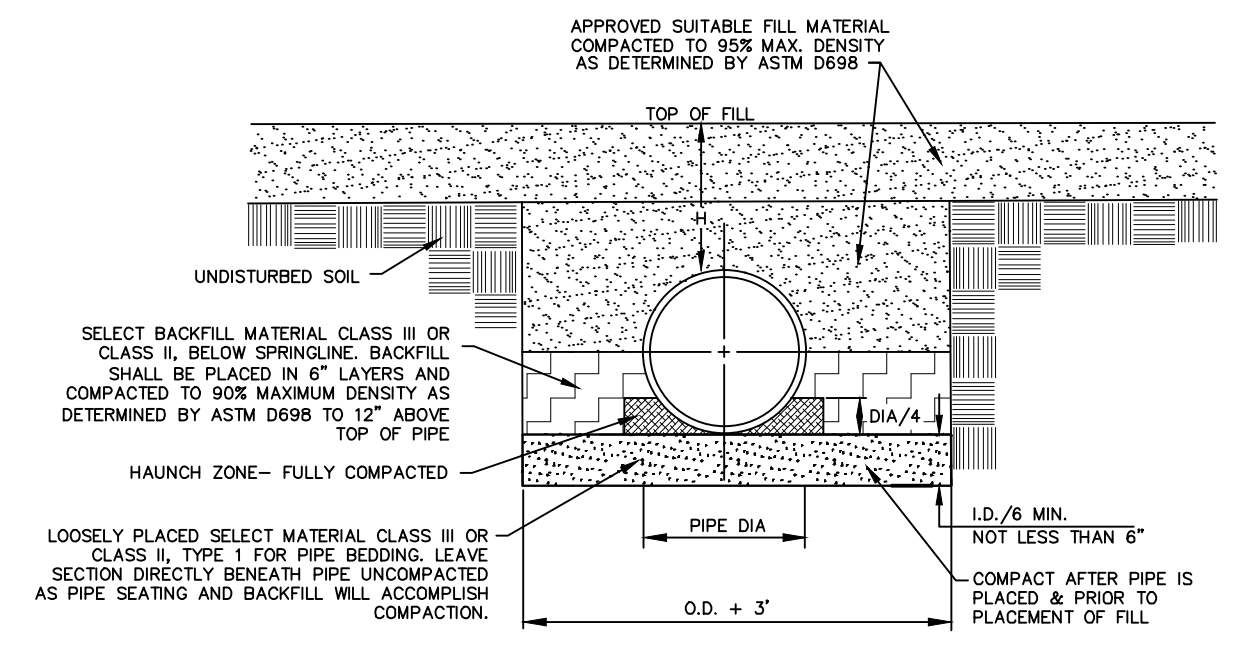
**OUTLET CONTROL STRUCTURE TABLE**

STRUCTURE	TOP ELEV. (FMSL)	BASE ELEV. (FMSL)	DIAMETER INVERT IN (INCHES)	OUTLET PIPE INVERT IN (FMSL)
01	11.40	7.40	(1) 24" HDPE	7.70

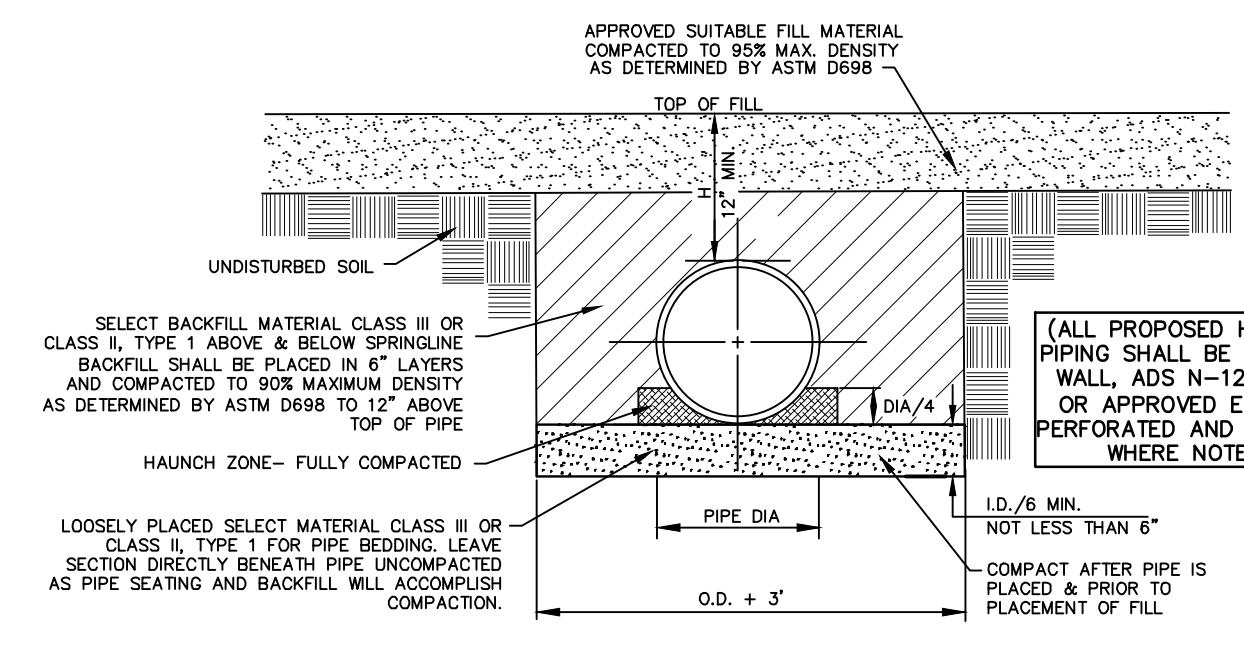
THIS DETAIL PROVIDES A TYPICAL LOT DEVELOPMENT PLAN AND IS INTENDED FOR GUIDANCE. ALTERNATE PLANS MAY BE POSSIBLE SUBJECT MEETING REQUIRED DESIGN CONDITIONS



MINIMUM DIMENSIONAL STANDARDS  
MINIMUM LOT SIZE = 40,000 S.F.  
MINIMUM LOT WIDTH = 125'  
(EXCEPT CUL-DE-SAC LOTS)  
SCALE: 1"=30'



STANDARD RIGID PIPE INSTALLATION DETAIL  
NOT TO SCALE



STANDARD FLEXIBLE PIPE INSTALLATION DETAIL  
NOT TO SCALE

- GENERAL PIPE INSTALLATION NOTES:**
1. ALL EXCAVATIONS SHALL COMPLY WITH THE TERMS AND CONDITIONS OF THE CONSTRUCTION STANDARDS FOR EXCAVATIONS IN OSHA "SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION" CHAPTER XVII OF TITLE 29, CFR, PART 1926. THE CONTRACTOR SHALL HAVE A COMPETENT PERSON ON THE JOB AT ALL TIMES AND SHALL EMPLOY A PROFESSIONAL ENGINEER TO ACT UPON ALL PERTINENT MATTERS OF THE WORK.
  2. DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE UNLESS THE PIPE HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.
  3. THE PIPE CULVERT INSTALLATION SHALL BE INSTALLED IN ACCORDANCE WITH NCDOT TYPICAL STANDARD DETAIL 300.01.
  4. PIPES TO BE INSTALLED BELOW PAVEMENT STRUCTURES SHALL HAVE THE FOLLOWING MINIMUM FILL HEIGHT (H) AS MEASURED FROM THE TOP OF PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE:
    - 12" - 60" FLEXIBLE HDPE PIPE: H = 2' MINIMUM
    - CLASS II & CLASS III RIGID RCP PIPE: H = 1' MINIMUM
    - CLASS II & CLASS III RIGID RCP PIPE: H = 2' MINIMUM

Bissell Professional Group  
3512 North Carolina Highway  
Kitty Hawk, North Carolina 27949  
(252) 751-2566  
FAX (252) 261-7760

**BISSELL**  
PROFESSIONAL GROUP  
Engineers, Planners, Surveyors  
and Environmental Specialists

ROADWAY, DRAINAGE &  
TYP. CONSTRUCTION DETAILS  
THIS DOCUMENT IS THE SOLE PROPERTY OF BPG, INC. OF KITTY HAWK, NORTH CAROLINA. THE REPRODUCTION IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN CONSENT OF BPG, INC. IS PROHIBITED. © BPG, INC. 2005. BISSSEL PRINCIPAL OF BPG, INC. COPYRIGHT 2005.

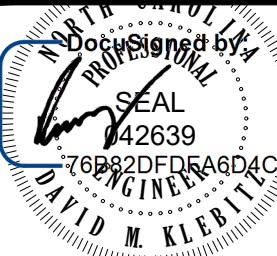
ALGONQUIN  
CURRITUCK COUNTY  
NORTH CAROLINA  
POPULAR BRANCH TOWNSHIP  
CONSTRUCTION DRAWINGS

REVISIONS

NO.	DATE	DESCRIPTION	BY	DATE	SCALE

DATE: 8/28/24 SCALE: AS NOTED  
 REVISION: BPG MSB  
 DRAWN: APPROVED: BPG  
 KI/W/DMK  
 SHEET: 10 OF 13  
 CAD FILE: 382600B2  
 PROJECT NO: 3826

FINAL DRAWING  
NOT RELEASED FOR  
CONSTRUCTION





ROY COOPER  
Governor  
MARY PENNY KELLEY  
Secretary  
RICHARD E. ROGERS, JR.  
Director



December 03, 2024

CURRITUCK COUNTY WATER DEPARTMENT  
ATTN: KENNETH C. GRIFFIN, PUBLIC UTILITIES DIRECTOR  
P.O. BOX 220  
CURRITUCK, NC 27929

Re: **Authorization to Construct (This is not a Final Approval)**  
Issue Date: December 03, 2024  
ALGONQUIN SUBDIVISION  
Serial No.: 24-00966      Water System No.: NC0427010  
Currituck County

Dear Applicant:

This letter is to confirm that a complete Engineer's Report and a Water System Management Plan have been received, and that engineering plans and specifications have been approved by the Department for **ALGONQUIN SUBDIVISION, Serial No.: 24-00966**.

The "Authorization to Construct" is valid for 36 months from the issue date. Authorization to construct may be extended if the Rules Governing Public Water Systems [15A NCAC 18C] and site conditions have not changed (see Rule .0305). The "Authorization to Construct" and the engineering plans and specifications approval letter shall be posted at the primary entrance of the job site before and during construction.

Upon completion of the construction or modification, **and prior to placing the new construction or modification into service**, the applicant must submit an Engineer's Certification and Applicant's Certification to the Public Water Supply Section.

- **Engineer's Certification:** in accordance with Rule .0303(a), the applicant shall submit a certification statement signed and sealed by a registered professional engineer stating that construction was completed in accordance with approved engineering plans and specifications, including any provisions stipulated in the Department's engineering plan and specification approval letter.
- **Applicant's Certification:** in accordance with Rule .0303(c), the applicant shall submit a signed certification statement indicating that the requirements for an Operation and Maintenance Plan and Emergency Management Plan have been satisfied in accordance with Rule .0307(d) and (e) and that the system has a certified operator in accordance with Rule .1300. The "Applicant's Certification" form is available at <http://www.ncwater.org/> (click on Public Water Supply Section, Plan Review, Plan Review Forms).

Certifications can be sent by mail or attachment to an e-mail message to **PWSSection.PlanReview@deq.nc.gov**.

If this "Authorization to Construct" is for a new public water system, the owner must submit a completed **application for an Operating Permit** and the appropriate fee. For a copy of the application for an Operating Permit please call (919) 707-9076.

Once the certifications and permit application and fee (if applicable) are received and determined adequate, the Department will issue a Final Approval letter to the applicant. In accordance with Rule .0309(a), **no portion of this project shall be placed into service until the Department has issued Final Approval**.

Please contact us at (919) 707-9100 if you have any questions or need additional information.

Sincerely,

A handwritten signature in black ink that reads "Rebecca Sadosky".

Rebecca Sadosky, Ph.D., Chief  
Public Water Supply Section  
Division of Water Resources, NCDEQ

cc: JAMIE MIDGETTE, P.E., Regional Engineer  
BISSELL PROFESSIONAL GROUP



North Carolina Department of Environmental Quality | Division of Water Resources  
512 North Salisbury Street | 1634 Mail Service Center | Raleigh, North Carolina 27699-1634  
919.707.9100

North Carolina Department of Environmental Quality  
Division of Water Resources

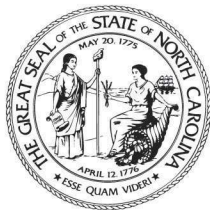
Authorization to Construct

Project Applicant:	<b>CURRITUCK COUNTY WATER DEPARTMENT</b>
Public Water System Name:	<b>CURRITUCK COUNTY WATER SYSTEM</b>
Water System No.:	<b>NC0427010</b>
Project Name:	<b>ALGONQUIN SUBDIVISION</b>
Serial No.:	<b>24-00966</b>
Issue Date:	<b>December 03, 2024</b>
Expiration Date:	<b>36 Months after Issue Date</b>

In accordance with 15A NCAC 18C .0305, this Authorization to Construct must be posted at the primary entrance to the job site during construction.

MARK S. BISSELL  
BISSELL PROFESSIONAL GROUP  
P.O. BOX 1068  
KITTY HAWK, NC 1068





NORTH CAROLINA  
*Environmental Quality*

ROY COOPER

*Governor*

MARY PENNY KELLEY

*Secretary*

RICHARD E. ROGERS, JR.

*Director*

December 3, 2024

Currituck County Water Department  
Attention: Kenneth C. Griffin, Public Utilities Director  
P.O. Box 220  
Currituck, North Carolina 27929

Re: Engineering Plans Approval  
Distribution Extension  
Algonquin Subdivision  
Currituck County Water System  
Water System No.: NC0427010  
Currituck County  
Serial No.: 24-00966

Dear Applicant:

Enclosed please find one copy of the "Application for Approval..." together with one copy of the referenced engineering plans bearing the Division of Water Resources stamp of approval for the referenced project. These engineering plans are approved under Division of Water Resources Serial Number, 24-00966 dated December 3, 2024.

Engineering plans prepared by Mark S. Bissell, P.E., call for the installation of approximately 660 linear feet of 8-inch water main, 330 linear feet of 4-inch water main, valves, a fire hydrant, and associated appurtenances to serve 10 single family lots. The proposed 8-inch water main will run along Indian Kettle Road and connect to an existing 10-inch water main along Forbes Road. The proposed 8-inch water main that runs along Indian Kettle Road will transition to a 4-inch water main and terminate at a blow-off assembly at the end of Indian Kettle Road. Construction of this project must be in accordance with Currituck County Water System's standard specifications.

Please note that in accordance with 15A NCAC 18C .0309(a), no construction, alteration, or expansion of a water system shall be placed into service or made available for human consumption until the Public Water Supply Section has issued Final Approval. Final Approval will be issued and mailed to the applicant upon receipt of both an Engineer's Certification and an Applicant's Certification submitted in accordance with 15A NCAC 18C .0303 (a) and (c).

These plans in the foregoing application are approved insofar as the protection of public health is concerned as provided in the rules, standards and criteria adopted under the authority of Chapter 130A-317 of the General Statutes. This approval does not constitute a warranty of the design, construction or future operation of the water system.



North Carolina Department of Environmental Quality | Division of Water Resources  
512 North Salisbury Street | 1634 Mail Service Center | Raleigh, North Carolina 27699-1634  
919.707.9100

Currituck County Water Department  
Attention: Kenneth C. Griffin, Public Utilities Director  
Page 2 of 2  
December 3, 2024

One copy of the "Application for Approval..." and a copy of the plans with a seal of approval from the department are enclosed. One copy of the approved documents in a digital format (USB) is being forwarded to our Washington Regional Office. The second copy of the USB is being retained in our office.

If the Public Water Supply Section can be of further service, please call (919) 707-9100.

Sincerely,



Rebecca Sadosky, Ph.D., Chief  
Public Water Supply Section  
Division of Water Resources

RS/DE

Enclosures: Approval Documents

cc: Jamie Midgette, P.E., Washington Regional Office  
Currituck County Health Department  
Bissell Professional Group



North Carolina Department of Environmental Quality | Division of Water Resources  
512 North Salisbury Street | 1634 Mail Service Center | Raleigh, North Carolina 27699-1634  
919.707.9100

ROY COOPER  
Governor

MARY PENNY KELLEY  
Secretary

WILLIAM E. TOBY VINSON, JR.  
Interim Director



December 3, 2024

Attn: Joel K. & Stacy A. Justice - Owners  
P.O. Box 208  
Grandy, NC 27939

**Subject: State Stormwater Management Permit No. SW7240901  
Algonquin Subdivision  
Low Density Subdivision Project  
Currituck County**

Dear Joel K. & Stacy A. Justice:

The Washington Regional Office received a complete State Stormwater Management Permit Application for the subject project on September 3, 2024. Staff review of the plans and specifications has determined that the project, as proposed, complies with the Stormwater Regulations set forth in 15A NCAC 2H.1000 amended on January 1, 2017 (2017 Rules). We are hereby forwarding Permit No. SW7240901 dated December 3, 2024, for the construction of the built-upon areas (BUA) and vegetated conveyances associated with the subject project.

This permit shall be effective from the date of issuance until rescinded and the project shall be subject to the conditions and limitations as specified therein and does not supersede any other agency permit that may be required. Failure to comply with these requirements will result in future compliance problems. Please note that this permit is not transferable except after notice to and approval by the Division.

This cover letter, attachments, and all documents on file with DEMLR shall be considered part of this permit and is herein incorporated by reference.

If any parts, requirements, or limitations contained in this permit are unacceptable, you have the right to request an adjudicatory hearing by filing a written petition with the Office of Administrative Hearings (OAH). The written petition must conform to Chapter 150B of the North Carolina General Statutes and must be filed with the OAH within thirty (30) days of receipt of this permit. You should contact the OAH with all questions regarding the filing fee (if a filing fee is required) and/or the details of the filing process at 6714 Mail Service Center, Raleigh, NC 27699-6714, or via telephone at 919-431-3000, or visit their website at [www.NCOAH.com](http://www.NCOAH.com). Unless such demands are made this permit shall be final and binding.

If you have any questions concerning this permit, please contact Denis Hyska in the Washington Regional Office, at (252) 948-3973 or [denis.hyska@deq.nc.gov](mailto:denis.hyska@deq.nc.gov).

Sincerely,

Denis Hyska, CAPM  
Division of Energy, Mineral and Land Resources

Enclosures: Attachment A – Max Allowable BUA per Lot  
Attachment B – Designer's Certification Form  
Application Documents

cc: David A. Deel, PE – Deel Engineering LLC. ([dadeeleng@gmail.com](mailto:dadeeleng@gmail.com))  
Currituck County Inspections - Bill Newns ([bill.newns@currituckcountync.gov](mailto:bill.newns@currituckcountync.gov))  
Washington Regional Office



North Carolina Department of Environmental Quality | Division of Energy, Mineral and Land Resources  
Washington Regional Office | 943 Washington Square Mall | Washington, North Carolina 27889  
252.946.6481

**STATE OF NORTH CAROLINA**  
**DEPARTMENT OF ENVIRONMENTAL QUALITY**  
**DIVISION OF ENERGY, MINERAL AND LAND RESOURCES**

**STATE STORMWATER MANAGEMENT PERMIT**

**LOW DENSITY SUBDIVISION DEVELOPMENT**

In compliance with the provisions of Article 21 of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules, and Regulations promulgated and adopted by the North Carolina Environmental Management Commission, including 15A NCAC 02H.1000 amended on January 1, 2017 (2017 Rules), the "stormwater rules"),

PERMISSION IS HEREBY GRANTED TO

Joel K. & Stacy A. Justice

*Algonquin Subdivision*

*Indian Kettle Road, Jarvisburg, Currituck County*

FOR THE

construction, management, operation and maintenance of built-upon area (BUA) for a 24% low density subdivision project (the "low density area") discharging to Class SC waters as outlined in the application, approved stormwater management plans, supplements, calculations, operation and maintenance agreement, recorded documents, specifications, and other supporting data (the "approved plans and specifications") as attached and/or on file with and approved by the Division of Energy, Mineral and Land Resources (the "Division" or "DEMLR"). The project shall be constructed, operated and maintained in accordance with these approved plans and specifications. The approved plans and specifications are incorporated by reference and are enforceable parts of this permit.

This permit shall be effective from the date of issuance until rescinded and shall be subject to the following specified conditions and limitations. The permit issued shall continue in force and effect until the permittee files a request with the Division for a permit modification, transfer, or rescission; however, these actions do not stay any condition. The issuance of this permit does not prohibit the Director from reopening and modifying the permit, revoking and reissuing the permit, or terminating the permit for cause as allowed by the laws, rules, and regulations contained in 15A NCAC 2H.1000 and NCGS 143-215.1 et.al.

1. **BUA REQUIREMENTS.** The maximum amount of BUA allowed for the entire project is 104,579 square feet. The BUA requirements and allocations for this project are as follows:

- a. **LOW DENSITY AREA BUA LIMITS.** The low-density area, in the approved plans and specifications, must not exceed 24% per the requirements of the stormwater rules. Within this low-density area, this permit approves a percent BUA of 16.52% and the construction of a total of 104,579 square feet of BUA. This permit does not provide any allocation of BUA for future development within this low-density area.
  - b. **BUA FOR INDIVIDUAL LOTS.** Each of the ten (10) lots are limited to a maximum of BUA, as indicated in the approved plans and specifications. **The maximum BUA assigned to each lot via this permit and the recorded deed restrictions and protective covenants may not be increased or decreased by either the individual lot owner or the permittee unless and until the permittee notifies the Division and obtains written approval from the Division.**
2. **PERVIOUS AREA IMPROVEMENTS.** At this time, none of the pervious area improvements listed in G.S. 143-214.7(b2) or the Stormwater Design Manual have been proposed for this project. Pervious area improvements will be allowed in this project if documentation is provided demonstrating those improvements meet the requirements of the stormwater rule.
  3. **LOW DENSITY AREA REQUIREMENTS.** The low-density area requirements for this project are as follows:
    - a. **LOW DENSITY AND CONVEYANCE DESIGN.** The low-density area is permitted based on the design criteria presented in the sealed, signed and dated supplement and as shown in the approved plans and specifications. This low-density area and conveyances must be provided and maintained at the design condition.
    - b. **PIPING.** Other than the piping shown on the approved plans, only minimal amounts of piping under driveways and roads is allowed within the low-density area when it cannot be avoided. No additional piping is allowed.
    - c. **DISPERSED FLOW.** The low-density area has maximized dispersed flow of stormwater runoff through vegetated areas and minimized the channelization of flow.
    - d. **VEGETATED CONVEYANCES.** Stormwater runoff that could not be released as dispersed flow may be transported by vegetated conveyances with minimum side slopes of 3:1 (H:V) designed to not erode during the peak flow from the 10-year storm event as defined in the stormwater rules and approved by the Division
  4. **NON-ENFORCEABLE SCMS.** The two wet ponds shown on the plans are **not** required by the Division and have not been demonstrated to meet the Minimum Design Criteria and therefore are not considered a part of the approved stormwater treatment system. These additional measures are incorporated only by reference and are not enforceable parts of the permit.
  5. **VEGETATED SETBACKS.** A 50-foot wide vegetative setback must be provided and maintained in grass or other vegetation adjacent to all surface waters as shown on the approved plans. The setback is 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.
    - a. **RELEASE OF STORMWATER NOT TREATED IN A STORMWATER CONTROL MEASURE (SCM).** Stormwater that is not treated in an SCM, such as in the low-density area (including roof drains), must be released at the edge of the vegetated setback and allowed to flow through the setback as dispersed flow.

6. **RECORDED DOCUMENT REQUIREMENTS.** The stormwater rules require the following documents to be recorded with the Office of the Register of Deeds prior to the sale of individual lots or groups of lots:
- a. **ACCESS AND/OR EASEMENTS.** The entire stormwater conveyance system and maintenance accesses must be located in public rights-of-way, dedicated common areas that extend to the nearest public right-of-way, and/or permanent recorded easements that extend to the nearest public right-of-way for the purpose of inspection, operation, maintenance, and repair.
  - b. **OPERATION AND MAINTENANCE AGREEMENT.** The operation and maintenance agreement must be recorded with the Office of the Register of Deeds.
  - c. **FINAL PLATS.** The final recorded plats must reference the operation and maintenance agreement and must also show all public rights-of-way, dedicated common areas, and/or permanent drainage easements, in accordance with the approved plans.
  - d. **DEED RESTRICTIONS AND PROTECTIVE COVENANTS.** Recorded deed restrictions and protective covenants must include, at a minimum, the following statements related to stormwater management:
    - i. The following covenants are intended to ensure ongoing compliance with State Stormwater Management Permit Number SW7240606, as issued by the Division of Energy, Mineral and Land Resources (the "Division") under 15A NCAC 02H.1000, effective January 1, 2017.
    - ii. The State of North Carolina is made a beneficiary of these covenants to the extent necessary to maintain compliance with the Stormwater Management Permit.
    - iii. These covenants are to run with the land and be binding on all persons and parties claiming under them.
    - iv. The covenants pertaining to stormwater may not be altered or rescinded without the express written consent of the Division.
    - v. Alteration of the drainage as shown on the approved plans may not take place without the concurrence of the Division.
    - vi. The maximum built-upon area (BUA) per lot is **15,000** square feet. This allotted amount includes any BUA constructed within the lot property boundaries, and that portion of the right-of-way between the front lot line and the edge of the pavement not shown on the approved plans. BUA has the same meaning as G.S. 143-214.7, as amended.
    - vii. The maximum allowable BUA shall not be exceeded on any lot until the permit is modified to ensure compliance with the stormwater rules, permit, and the approved plans and specifications.
    - viii. Filling in, piping or altering any vegetated conveyances (ditches, swales, etc.) associated with the development, except for average driveway crossings, is prohibited by any persons.
    - ix. A 50-foot wide vegetative setback must be provided and maintained adjacent to all surface waters in accordance with 15A NCAC 02H.1003(4) and the approved plans.
    - x. All roof drains shall be released no closer than at the edge of the 50-foot wide vegetated setback and allowed to flow through the setback as dispersed flow. At no time shall stormwater runoff be piped into or through the setback.
    - xi. Any individual or entity found to be in noncompliance with the provisions of a stormwater management permit or the requirements of the stormwater rules is subject to enforcement procedures as set forth in NCGS 143, Article 21.



- e. DEEDS FOR INDIVIDUAL LOTS. The permittee shall record deed restrictions and protective covenants prior to the issuance of a certificate of occupancy to ensure the permit conditions and the approved plans and specifications are maintained in perpetuity.
7. CONSTRUCTION. During construction, erosion shall be kept to a minimum and any eroded areas of the on-site stormwater system will be repaired immediately.
    - a. PROJECT CONSTRUCTION, OPERATION AND MAINTNEANCE. During construction, all operation and maintenance for the project and stormwater system shall follow the Erosion Control Plan requirements until the Sediment-Erosion Control devices are no longer needed.
    - b. FINAL GRADING. The vegetated areas and vegetated conveyances shall be entirely constructed and vegetated. Once the final grading is completed and the site is stabilized, the permittee shall provide and perform the operation and maintenance as outlined in the applicable section below.
  8. MODIFICATIONS. No person or entity, including the permittee, shall alter any component shown in the approved plans and specifications, except for minimum driveway crossings. Prior to the construction of any modification to the approved plans, the permittee shall submit to the Director, and shall have received approval for modified plans, specifications, and calculations including, but not limited to, those listed below. For changes to the project that impact the certifications, a new or updated certification(s), as applicable, will be required and a copy must be submitted to the appropriate DEQ regional office upon completion of the modification.
    - a. Any modification to the approved plans and specifications, regardless of size including the BUA, details, etc.
    - b. Redesign or addition to the approved amount of BUA.
    - c. Further development, subdivision, acquisition, lease or sale of any, all or part of the project and/or property area as reported in the approved plans and specifications.
    - d. The construction of any permeable pavement, #57 stone area, public trails, or landscaping material within the common areas to be considered a permeable surface that were not included in the approved plans and specifications.
    - e. Altering, modifying, removing, relocating, redirecting, regarding, or resizing of any component of the approved stormwater collection system and/or vegetative conveyance shown on the approved plan, except for minimum driveway crossings within the low density area.
    - f. The construction of any allocated future BUA.
    - g. Adding the option to use permeable pavement or #57 stone within the lots as a permeable surface. The request may require a proposed amendment to the deed restrictions and protective covenants for the subdivision to be submitted and recorded.
    - h. Other modifications as determined by the Director.

9. **DESIGNER'S CERTIFICATION.** Upon completion of the project, the permittee shall determine if the project is in compliance with the approved plans and take the necessary following actions:
  - a. If the permittee determines that the project is in compliance with the approved plans, then within 45 days of completion, the permittee shall submit to the Division one hard copy and one electronic copy of the following:
    - i. The completed and signed Designer's Certification provided in Attachment A noting any deviations from the approved plans and specifications. Deviations may require approval from the Division.
    - ii. A copy of the recorded operation and maintenance agreement.
    - iii. Unless already provided, a copy of the recorded deed restrictions and protective covenants; and
    - iv. A copy of the recorded plat delineating the public rights-of-way, dedicated common areas and/or permanent recorded easements, when applicable.
  - b. If the permittee determines that the project is not in compliance with the approved plans, the permittee shall submit an application to modify the permit within 30 days of completion of the project or provide a plan of action, with a timeline, to bring the site into compliance.
10. **OPERATION AND MAINTENANCE.** The permittee shall provide and perform the operation and maintenance necessary, as listed in the signed operation and maintenance agreement to assure that all components of the permitted on-site stormwater system are maintained at the approved design condition. The approved operation and maintenance agreement must be followed in its entirety and maintenance must occur at the scheduled intervals.
  - a. **CORRECTIVE ACTIONS REQUIRED.** In the event that the low-density area fails to meet the requirements of low density, the permittee shall take immediate corrective actions. This includes actions required by the Division and the stormwater rules such as the construction of additional or replacement on-site stormwater systems. These additional or replacement measures shall receive a permit from the Division prior to construction.
  - b. **MAINTENANCE RECORDS.** Records of maintenance activities must be kept and made available upon request to authorized personnel of the Division. The records will indicate the date, activity, name of person performing the work and what actions were taken.
11. **CURRENT PERMITTEE NAME OR ADDRESS CHANGES.** The permittee shall submit a completed Permit Information Update Application Form to the Division within 30 days to making any one or more of the following changes:
  - a. A name change of the current permittee;
  - b. A name change of the project;
  - c. A mailing address change of the permittee.
12. **TRANSFER.** This permit is not transferable to any person or entity except after notice to and approval by the Director. Neither the sale of the project and/or property, in whole or in part, nor the conveyance of common area to a third party constitutes an approved transfer of the permit.



- a. TRANSFER REQUEST. The transfer request must include the appropriate application, documentation and the processing fee as outlined in 15A NCAC 02H.1045(2) and must be submitted upon occurrence of any one or more of the following events:
    - i. The sale or conveyance of the project and/or property area in whole or in part, except in the case of an individual residential lot sale that is made subject to the recorded deed restrictions and protective covenants;
    - ii. The assignment of declarant rights to another individual or entity;
    - iii. The sale or conveyance of the common areas to a Homeowner's or Property Owner's Association, subject to the requirements of NCGS 143-214.7(c2);
    - iv. Dissolution of the partnership, corporate, or LLC entity, subject to NCGS 55-14-05 or NCGS 57D-6-07 and 08;
    - v. Bankruptcy.
    - vi. Foreclosure, subject to the requirements of Session Law 2013-121;
  - b. TRANSFER INSPECTION. Prior to transfer of the permit, a file review and site inspection will be conducted by Division personnel to ensure the permit conditions have been met and that the project and the on-site stormwater system complies with the permit conditions. Records of maintenance activities performed to date may be requested. Projects not in compliance with the permit will not be transferred until all permit and/or general statute conditions are met.
13. COMPLIANCE. The permittee is responsible for complying with the terms and conditions of this permit and the approved plans and specifications until the Division approves the transfer request.
- a. REVIEWING AND MONITORING EACH LOT FOR COMPLIANCE. The permittee is responsible for verifying that the proposed BUA on each individual lot, within each drainage area and for the entire project does not exceed the maximum amount allowed by this permit. The permittee shall review all individual lot plans for new construction and all subsequent modifications and additions for compliance. The plans reviewed must include all proposed BUA, grading, and driveway pipe placement. The permittee shall not approve any lot plans where the maximum allowed BUA limit has been exceeded or where modifications are proposed to the grading and/or to the stormwater collection system and/or to the vegetated conveyance unless and until a permit modification has been approved by the Division. The permittee shall review and routinely monitor the project and each lot to ensure continued compliance with the conditions of the permit, the approved plans and specifications, and the recorded deed restrictions and protective covenants. The permittee shall notify any lot owner that is found to be in noncompliance with the conditions of this permit in writing and shall require timely resolution.
  - b. ARCHITECTURAL REVIEW BOARD (ARB) OR COMMITTEE (ARC). The permittee may establish an ARB or ARC to conduct individual lot reviews. However, any approval given by the ARB or ARC on behalf of the permittee does not relieve the permittee of the responsibility to maintain compliance with the conditions of the permit and the approved plans and specifications.
  - c. APPROVED PLANS AND SPECIFICATIONS. A copy of this permit, approved plans, application, supplements, operation and maintenance agreement, all applicable recorded documents, and specifications shall be maintained on file by the permittee at all times.
  - d. MAINTENANCE ACCESS. SCMs, stormwater collection systems, and vegetated conveyances must be accessible for inspection, operation, maintenance and repair as shown on the approved plans.



- e. DIVISION ACCESS. The permittee grants Division Staff permission to enter the property during normal business hours to inspect all components of the permitted project.
- f. ENFORCEMENT. Any individual or entity found to be in noncompliance with the provisions of a stormwater management permit or the requirements of the stormwater rules is subject to enforcement procedures as set forth in NCGS 143 Article 21.
- g. ANNUAL CERTIFICATION. The permittee shall electronically submit to the Division an annual certification completed by either the permittee or their designee confirming the projects conformance with permit conditions.
- h. OBTAINING COMPLIANCE. The Director may notify the permittee when the permitted site does not meet one or more of the minimum requirements of the permit. Within the time frame specified in the notice, the permittee shall submit a written time schedule to the Director for modifying the site to meet minimum requirements. The permittee shall provide copies of modified plans and certification in writing to the Director that the changes have been made.
- i. OTHER PERMITS. The issuance of this permit does not preclude the permittee from obtaining and complying with any and all other permits or approvals that are required for this development to take place, as required by any statutes, rules, regulations, or ordinances, which are imposed by any other Local, State or Federal government agency having jurisdiction. Any activities undertaken at this site that cause a water quality violation or undertaken prior to receipt of the necessary permits or approvals to do so are considered violations of NCGS 143-215.1, and subject to enforcement procedures pursuant to NCGS 143-215.6.

The permit was issued this the 3rd day of December 2024.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION



\_\_\_\_\_  
For Toby Vinson, Interim Director  
Division of Energy, Mineral and Land Resources  
By Authority of the Environmental Management Commission

**Permit Number SW7240901**

**Attachment A**

Maximum Allowable BUA for Each Lot

<b>LOT No.</b>	<b>LOT AREA (ft<sup>2</sup>)</b>	<b>MAX ALLOWABLE BUA (ft<sup>2</sup>)</b>
1	40,000	8,000
2	40,000	8,000
3	40,000	8,000
4	42,819	8,564
5	46,232	9,246
6	40,697	8,139
7	40,075	8,015
8	40,037	8,007
9	40,024	8,005
10	40,009	8,002

## **Attachment B**

### Certification Forms

The following blank Designer Certification forms are included and specific for this project:

- As-Built Permittee Certification
- As-Built Designer's Certification for Low Density Projects

*A separate certification is required for each SCM. These blank certification forms may be copied and used, as needed, for each SCM and/or as a partial certification to address a section or phase of the project.*

**AS-BUILT PERMITTEE CERTIFICATION**

I hereby state that I am the current permittee for the project named above, and I certify by my signature below, that the project meets the below listed Final Submittal Requirements found in NCAC 02H.1042(4) and the terms, conditions and provisions listed in the permit documents, plans and specifications on file with or provided to the Division.

- Check here if this is a partial certification. Section/phase/SCM #? \_\_\_\_\_  
 Check here if this is part of a Fast Track As-built Package Submittal.

Printed Name \_\_\_\_\_ Signature \_\_\_\_\_

I, \_\_\_\_\_, a Notary Public in the State of \_\_\_\_\_

County of \_\_\_\_\_, do hereby certify that \_\_\_\_\_

personally appeared before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_

and acknowledge the due execution of this as-built certification. (SEAL)

Witness my hand and official seal

\_\_\_\_\_

My commission expires \_\_\_\_\_

Permittee's Certification NCAC .1042(4)	Completed / Provided	N/A
<b>A. DEED RESTRICTIONS / BUA RECORDS</b>		
1. The deed restrictions and protective covenants have been recorded and contain the necessary language to ensure that the project is maintained consistent with the stormwater regulations and with the permit conditions.	Y or N	
2. A copy of the recorded deed restrictions and protective covenants has been provided to the Division.	Y or N	
3. Records which track the BUA on each lot are being kept. (See Note 1)	Y or N	
<b>B. MAINTENANCE ACCESS</b>		
1. The SCMs are accessible for inspection, maintenance and repair.	Y or N	
2. The access is a minimum of 10 feet wide.	Y or N	
3. The access extends to the nearest public right-of-way.	Y or N	
<b>C. EASEMENTS</b>		
1. The SCMs and the components of the runoff collection / conveyance system are located in recorded drainage easements.	Y or N	
2. A copy of the recorded plat(s) is provided.	Y or N	
<b>D. SINGLE FAMILY RESIDENTIAL LOTS - Plats for residential lots that have an SCM include the following:</b>	Y or N	
1. The specific location of the SCM on the lot.	Y or N	
2. A typical detail for the SCM.	Y or N	
3. A note that the SCM is required to meet stormwater regulations and that the lot owner is subject to enforcement action as set	Y or N	

forth in NCGS 143 Article 21 if the SCM is removed, relocated or altered without prior approval.		
<b>E. OPERATION AND MAINTENANCE AGREEMENT</b>	Y or N	
1. The O&M Agreement is referenced on the final recorded plat.	Y or N	
2. The O&M Agreement is recorded with the Register of Deeds and appears in the chain of title.	Y or N	
<b>F. OPERATION AND MAINTENANCE PLAN</b> - maintenance records are being kept in a known set location for each SCM and are available for review.	Y or N	
<b>G. DESIGNER'S CERTIFICATION FORM</b> - has been provided to the Division.	Y or N	

Note 1- Acceptable records include ARC approvals, as-built surveys, and county tax records.

Provide an explanation for every requirement that was not met, and for every "N/A" below. Attach additional sheets as needed.

## AS-BUILT DESIGNER'S CERTIFICATION FOR LOW DENSITY PROJECTS

I hereby state that I am a licensed professional and I certify by my signature and seal below, that I have observed the construction of the project named above to the best of my abilities with all due care and diligence, and that the project meets all of the MDC found in 15A NCAC 02H.1003, in accordance with the permit documents, plans and specifications on file with or provided to the Division, except as noted on the "AS-BUILT" drawings, such that the intent of the stormwater rules and the general statutes has been preserved.

- Check here if this is a partial certification. Section or phase \_\_\_\_\_
- Check here if this is part of a Fast-Track As-Built Package Submittal per 15A NCAC 02H .1044(3).
- Check here if the Designer did not observe the construction but is certifying the project.
- Check here if pictures of the project are provided.

Printed Name \_\_\_\_\_ Signature \_\_\_\_\_

NC Registration Number \_\_\_\_\_ Date \_\_\_\_\_

SEAL:

Consultant's Mailing Address:

\_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_

Consultant's Email address:

\_\_\_\_\_

- ① Circle N if the as-built value differs from the Plan/permit. If N is circled, provide an explanation on page 3.  
 ② N/E = Not Evaluated (provide explanation on page 2). ③ N/A = Not Applicable to this project/plan.

Consultant's Certification (MDC 15A NCAC 02H .1003)			
	①As-built	②N/E	③N/A
<b>Project Density and Built-Up Area</b>			
1. The project has areas of high density based on natural drainage area boundaries, variations in land use or construction phasing.	Y or N		
2. The project's built-upon area does not exceed the maximum limit specified in the permit.	Y or N		
<b>Dispersed Flow</b>			
1. The project maximizes dispersed flow through vegetated areas and minimizes channelized flow.	Y or N		

<b>Vegetated Conveyances</b>	①As-built	②N/E	③N/A
1. Stormwater that is not released as dispersed flow is transported by vegetated conveyances.	Y or N		
2. The project has a minimal amount of non-vegetated conveyances to reduce erosion.	Y or N		
3. Other than minimal piping under driveways and roads, no piping has been added beyond what is shown on the approved plans.	Y or N		
4. Side slopes are no steeper than 3H:1V.	Y or N		
5. The conveyance does not erode in response to the peak flow from the 10-year storm.	Y or N		
<b>Curb outlet systems (if applicable)</b>	①As-built	②N/E	③N/A
1. The swale or vegetated area can carry the peak flow from the 10-year storm at a non-erosive velocity.	Y or N		
2. The longitudinal slope of the swale or vegetated areas does not exceed 5%.	Y or N		
3. The swale has a trapezoidal cross-section and a minimum bottom width of two feet.	Y or N		
4. The minimum length of the swale or vegetated area is 100 feet.	Y or N		
5. Side slopes are no steeper than 3H:1V.	Y or N		
6. The project utilizes treatment swales designed per Section .1061 in lieu of the curb outlet system requirements.	Y or N		
<b>Vegetated Setbacks (if applicable)</b>	①As-built	②N/E	③N/A
1. The width of the vegetated setback is at least 50'.	Y or N		
2. The width of the vegetated setback has been measured from the normal pool of impounded waters, the MHW line of tidal waters, or the top of bank of each side of rivers or streams.	Y or N		
3. The vegetated setback is maintained in grass or other vegetation.	Y or N		
4. BUA that meets the requirements of NCGS 143-214.7(b2)(2) is located in the setback.	Y or N		
5. BUA that does NOT meet the requirements of NCGS 143-214.7(b2)(2) located within the setback and is limited to: <ul style="list-style-type: none"> <li>• Publicly-funded linear projects (road, greenway, or sidewalk)</li> <li>• Water dependent structures</li> <li>• Minimal footprint uses such as poles, signs, utility appurtenances, and security lights.</li> </ul>	Y or N		
6. The amount of BUA within the setback is minimized, and channeling of the runoff from the BUA has been avoided.	Y or N		



7. Stormwater is not discharged (via swale or pipe) through a vegetated setback. Stormwater is released at the edge of the setback and allowed to flow through the setback as dispersed flow.	Y or N		
<b>Outlets</b>	①As-built	②N/E	③N/A
1. Stormwater outlets do not cause erosion downslope of the discharge point during the peak flow from the 10-year storm.	Y or N		
<b>Variations</b>	①As-built	②N/E	③N/A
1. The project has variations from the MDC that were not previously approved. (Modification may be required.)	Y or N		
<b>Deed restrictions (if applicable)</b>	①As-built	②N/E	③N/A
1. Deed restrictions are recorded and ensure that the project and the BUA will be maintained in perpetuity consistent with the permit, approved plans, and specifications.	Y or N		
<b>For Subdivisions Only (Residential or Commercial)</b>	①As-built	②N/E	③N/A
1. The number of platted lots is consistent with the approved plans.	Y or N		
2. The project area is consistent with the approved plans.	Y or N		
3. The layout of the lots and streets is consistent with the approved plan.	Y or N		
4. The width / radius of streets, paved accesses, cul-de-sacs and sidewalk is consistent with the approved plan.	Y or N		
5. No piping, other than those minimum amounts needed under a driveway or under a road, has been added.	Y or N		
6. The lot grading, road grading, vegetated conveyances, piping, inverts, and elevations are consistent with the approved plans.	Y or N		

Provide an explanation for every requirement that was not met, and for every "N/A" below. Attach additional sheets as needed.

December 11, 2024

Currituck County Planning  
Currituck Historic Courthouse  
153 Courthouse Road, Suite 302  
Currituck, North Carolina 27929

Re: Stormwater Management Design Submittal  
Major Stormwater Plan  
**Algonquin Subdivision**  
Jarvisburg, Currituck County, NC

On behalf of Joel & Stacy Justice, we hereby submit for your review a Major Stormwater Plan application package for the stormwater management system design for the Algonquin Subdivision.

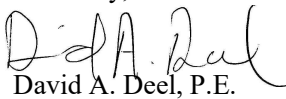
Three copies of the following items are included with and shall be considered part of this submittal package:

1. Major Stormwater Plan Form SW-002
2. NRCS Method Peak Flow Form SW-004 (pre-con & post-con)
3. Infiltration Basin Supplement
4. Infiltration Basin O&M Agreement
5. Stormwater Management Plan Narrative
6. EPA SWMM Model Report (Presented in Appendix D of the SWM Narrative)
7. 24" x 36" EPA SWMM Model Existing Conditions Schematic Plan (Electronic Copy only)
8. 24" x 36" EPA SWMM Model Proposed Conditions Schematic Plan

This package is being submitted with a matching Construction Plans TRC Submittal, and so additional Construction Plans are not included under this transmittal (you will receive your plans under the TRC submittal). An electronic copy of all documents will also accompany the TRC Submittal.

At your earliest convenience, please review the attached information for compliance. If you have any questions, or if you require any additional information, please do not hesitate to contact me at (252) 202-3803.

Sincerely,

  
David A. Deel, P.E.

Encl: as stated



# 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.



# Major Stormwater Plan Form SW-002

OFFICIAL USE ONLY:  
Permit Number: \_\_\_\_\_  
Date Filed: \_\_\_\_\_  
Date Approved: \_\_\_\_\_

### Contact Information

**APPLICANT:**

Name: Joel K. & Stacy A. Justice  
Address: P.O. Box 208  
Grandy, NC 27939  
Telephone: 252-493-2500  
E-Mail Address: joel@bluewaterrestoration.com

**PROPERTY OWNER:**

Name: same as applicant  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_  
E-Mail Address: \_\_\_\_\_

### Property Information

Physical Street Address: End of Indian Kettle Road, Jarvisburg, NC 27958  
Parcel Identification Number(s): 0109000053F0000  
FEMA Flood Zone Designation: X

### Request

Project Description: Proposed 10 Lot residential Subdivision on 14.53 Ac. of vacant land

Total land disturbance activity: 479,160 sf      Calculated volume of BMPs: 57,905 sf

Maximum lot coverage: 104,579 total sf      Proposed lot coverage: 104,579 total sf  
(81,979 Lots)      (81,979 Lots)

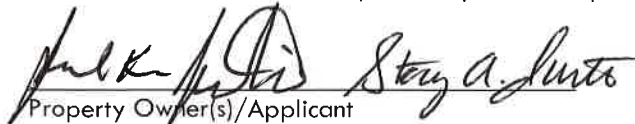
TYPE OF REQUEST

- 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

12/11/2024  
Date

## Major Stormwater Plan Design Standards Checklist

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: \_\_\_\_\_

Project Name: Algonquin Subdivision

Applicant/Property Owner: Joel K. & Stacy A. Justice

<b>Minor Stormwater Plan Design Standards Checklist</b>		
<b>General</b>		
1	Property owner name and address.	DAD
2	Site address and parcel identification number.	DAD
3	North arrow and scale to be 1" = 100' or larger.	DAD
<b>Site Features</b>		
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.	DAD
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.	DAD
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.	DAD
8	Limits of all proposed fill, including the toe of fill slope and purpose of fill.	DAD
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.	DAD
10	Existing and proposed drainage patterns, including direction of flow.	DAD
11	Location, capacity, design plans (detention, retention, infiltration), and design discharge of existing and proposed stormwater management features.	DAD
12	Elevation of the seasonal high water level as determined by a licensed soil scientist.	DAD
13	Plant selection.	DAD
<b>Permits and Other Documentation</b>		
14	NCDENR stormwater permit application (if 10,000sf or more of built upon area).	DAD
15	NCDENR erosion and sedimentation control permit application (if one acre or more of land disturbance).	DAD
16	NCDENR coastal area management act permit application, if applicable.	N/A
17	Stormwater management narrative with supporting calculations.	DAD
18	Rational Method Form SW-003 or NRCS Method Form SW-004	DAD
19	Alternative stormwater runoff storage analysis and/or downstream drainage capacity analysis, if applicable	N/A
20	Design spreadsheets for all BMPs ( <i>Appendix F – Currituck County Stormwater Manual</i> ).	N/A
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: \_\_\_\_\_

Project Name: \_\_\_\_\_ Algonquin Subdivision

Applicant/Property Owner: \_\_\_\_\_ Joel K. & Stacy A. Justice

**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	
3	Stormwater plan	
4	NCDENR permit applications, if applicable	
5	3 copies of plans	
6	3 hard copies of ALL documents	
7	<b>1 PDF digital copy of all plans AND documents (ex. Compact Disk – e-mail not acceptable)</b>	

**Comments**

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# NRCS Method Peak Flow Form SW-004

## Project Information

Project Location: Algonquin Subdivision

Parcel Identification Number(s): 0109000053F0000

Check One:  Pre-Development       Post-Development

## Calculations

### Runoff Curve Number and Runoff

#### 1. Runoff Curve Number (CN)

Soil Type	Cover Description	CN (Table 2-6)	Area (acres)	CN*A
<b>Totals</b>				

See Appendix C in SWM Narrative

$CN_{\text{Weighted}} = \frac{SCN * A}{SA} = \underline{\hspace{2cm}}$

Use CN =

#### 2. Runoff

Frequency. . . . . Yr  
 Rainfall, P (24-hour) (Use Table 2-7).. . . . . In  
 Runoff, Q. . . . . In

Storm #1	Storm #2	Storm #3

## Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

### Sheet flow (Applicable to T<sub>c</sub> only)

Segment ID		Pre		Post	
1.	Surface description				
2.	Manning's roughness coeff., n (Table 2-9)				
3.	Flow Length, L (total L ≤ 300 ft)	ft			
4.	24-hr rainfall, P	in	4.0	6.0	
5.	Land Slope, s	ft / ft			
6.	$T_1 = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$				= <input type="text"/>

See Calculations in SWM Narrative / EPA SWMM Narrative

### Shallow concentrated flow

Segment ID					
7.	Surface Description: paved (P) or unpaved (U)?				
8.	Flow Length, L	ft			
9.	Watercourse slope, s	ft / ft			
10.	Average velocity, V (Table 2-8)	ft / sec			
11.	$T_1 = L / V$	min			= <input type="text"/>

### Channel flow

Segment ID					
	Pipe (P) or Channel (C)?				
	If pipe, enter D (in):				
	If channel, enter bottom width:				
	If channel, enter side slopes (x:1):				
12.	Cross sectional flow area, a	sq ft			
13.	Wetted perimeter, w <sub>p</sub>	ft			
14.	Hydraulic radius, r = a / w <sub>p</sub>	ft			
15.	Channel slope, s	ft / ft			
16.	Manning's roughness coeff., n				
17.	$V = 1.49 r^{0.67} s^{0.5} / n$	ft / sec			
18.	Flow length, L	ft			
19.	$T_1 = L / 60V$	min			= <input type="text"/>
20.	Watershed or subarea T <sub>c</sub> or T <sub>t</sub> (add T <sub>t</sub> in steps 6, 11, 19)				min <input type="text"/>



## Graphical Peak Discharge

1. Data:

Drainage Area,  $A_m$  = \_\_\_\_\_ sq mi (acres/640)  
 Runoff Curve Number, CN = \_\_\_\_\_ (From Runoff Curve Number Worksheet)  
 Time of Concentration,  $T_c$  = \_\_\_\_\_ hr (From Time of Concentration Worksheet)  
 Rainfall Distribution = Type III

Pond and swamp areas spread throughout watershed = \_\_\_\_\_ % of  $A_m$   
 ( \_\_\_\_\_ acres covered)

See Calculations in SWM Narrative / EPA SWMM Narrative

	Storm #3

2. Frequency .....

3. Rainfall, P (24-hour) .....

4. Initial abstraction,  $I_a$  ..... in 

--	--	--

  
 (Use CN)

5. Compute  $I_a/P$  ..... 

--	--	--

6. Unit peak discharge,  $q_u$  ..... csm/in 

--	--	--

  
 (use  $T_c$  and  $I_a/P$  with Figure 2-9)

7. Runoff, Q ..... in 

--	--	--

  
 (From Runoff Curve Number Worksheet)

8. Pond and swamp adjustment factor,  $F_p$  ..... 

--	--	--

  
 (Use Table 2-10)

9. Peak discharge,  $Q_p$  ..... cfs 

--	--	--

  
 (Where  $Q_p = q_u A_m Q F_p$ )

  
 Applicant

12/11/2024  
 Date



## Time of Concentration (Tc)

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments

### Sheet flow (Applicable to T<sub>c</sub> only)

Segment ID		Pre		Post	
1.	Surface description				
2.	Manning's roughness coeff., n (Table 2-9)				
3.	Flow Length, L (total L ≤ 300 ft)	ft			
4.	24-hr rainfall, P	in	4.0	6.0	
5.	Land Slope, s	ft / ft			
6.	$T_1 = 0.42(nL)^{0.8} / P_2^{0.5} s^{0.4}$				= <input type="text"/>

See Calculations in SWM Narrative / EPA SWMM Narrative

### Shallow concentrated flow

Segment ID					
7.	Surface Description: paved (P) or unpaved (U)?				
8.	Flow Length, L	ft			
9.	Watercourse slope, s	ft / ft			
10.	Average velocity, V (Table 2-8)	ft / sec			
11.	$T_1 = L / V$	min			= <input type="text"/>

### Channel flow

Segment ID					
	Pipe (P) or Channel (C)?				
	If pipe, enter D (in):				
	If channel, enter bottom width:				
	If channel, enter side slopes (_:1):				
12.	Cross sectional flow area, a	sq ft			
13.	Wetted perimeter, w <sub>p</sub>	ft			
14.	Hydraulic radius, r = a / w <sub>p</sub>	ft			
15.	Channel slope, s	ft / ft			
16.	Manning's roughness coeff., n				
17.	$V = 1.49 r^{0.67} s^{0.5} / n$	ft / sec			
18.	Flow length, L	ft			
19.	$T_1 = L / 60V$	min			= <input type="text"/>
20.	Watershed or subarea T <sub>c</sub> or T <sub>t</sub> (add T <sub>t</sub> in steps 6, 11, 19)				min <input type="text"/>

**Graphical Peak Discharge**

1. Data:

Drainage Area,  $A_m$  = \_\_\_\_\_ sq mi (acres/640)  
 Runoff Curve Number, CN = \_\_\_\_\_ (From Runoff Curve Number Worksheet)  
 Time of Concentration,  $T_c$  = \_\_\_\_\_ hr (From Time of Concentration Worksheet)  
 Rainfall Distribution = Type III  
  
 Pond and swamp areas spread throughout watershed = \_\_\_\_\_ % of  $A_m$   
 ( \_\_\_\_\_ acres covered)

See Calculations in SWM Narrative / EPA SWMM Narrative

	Storm #3

2. Frequency .....  
 3. Rainfall, P (24-hour) .....

4. Initial abstraction,  $I_a$  ..... in 

--	--	--

  
 (Use CN)

5. Compute  $I_a/P$  ..... 

--	--	--

6. Unit peak discharge,  $q_u$  ..... csm/in 

--	--	--

  
 (use  $T_c$  and  $I_a/P$  with Figure 2-9)

7. Runoff, Q ..... in 

--	--	--

  
 (From Runoff Curve Number Worksheet)

8. Pond and swamp adjustment factor,  $F_p$  ..... 

--	--	--

  
 (Use Table 2-10)

9. Peak discharge,  $Q_p$  ..... cfs 

--	--	--

  
 (Where  $Q_p = q_u A_m Q F_p$ )

  
 Applicant

12/11/2024  
 Date

Please complete the yellow shaded items.

STORMWATER MANAGEMENT PERMIT APPLICATION FORM

**INFILTRATION BASIN**

*This form must be completely filled out, printed, initialed, and submitted.*

I. PROJECT INFORMATION	
Project Name	Algonquin Subdivision
Contact Person	David A. Deel, P.E.
Phone Number	252-202-3803
Date	12/11/2024
Drainage area number (for projects with multiple drainage areas, as labeled on plans)	Entire Developed Site

II. DESIGN INFORMATION	
------------------------	--

<b>Site Characteristics</b>	
Drainage area (Include both on- and off-site areas that flow to the infiltration basin)	633,132.00 ft <sup>2</sup>
Impervious surface area (Include both on- and off-site areas that flow to the infiltration basin)	104,579.00 ft <sup>2</sup>
Percent impervious	16.52 %
Project within 0.5 miles & draining to SA Waters	
<b>Peak Flow Calculations</b>	
Peak flow from the <b>wooded</b> 2-year, 24-hour storm	2.25 ft <sup>3</sup> /sec
Post-development 10-yr, 24-hr discharge	2.25 ft <sup>3</sup> /sec
Pre/Post peak flow control	0.00 ft <sup>3</sup> /sec
<b>Storage Volume</b>	
Minimum volume required (1.5" Rainfall Water Quality Volume)	15722.21 ft <sup>3</sup>
Volume provided	57,905.00 ft <sup>3</sup> OK
<b>Soils Report Summary (Include soils report)</b>	
Soil type	coarse loamy sand
Infiltration rate (Minimum 0.52 in/hr)	11.27 in/hr OK
SHWT elevation	6.54 fmsl
<b>Basin Bottom Dimensions</b>	
Basin length	varies ft
Basin width	varies ft
Bottom Surface Area (Used to calculate drawdown time)	24,734.00 ft <sup>2</sup>
<b>Basin Design Parameters</b>	
Basin side slopes	3.00 :1 OK
Basin bottom elevation	9.50 fmsl OK
Storage elevation	11.50 fmsl
Storage Surface Area (Provide surface area at storage elevation)	33,298.00 ft <sup>2</sup>
Top elevation	11.50 fmsl
Drawdown time	0.10 days
<b>Additional Information</b>	
Maximum runoff to each inlet to the basin?	1.44 ac-in OK
Length of vegetative filter for overflow (Minimum 50 feet in length for SA waters; Minimum 30 feet in length for non-SA waters)	30.00 ft OK
Distance to structure	>100 ft OK
Distance from surface waters (Minimum 50 feet from SA waters; Minimum 30 feet from non-SA waters)	>100 ft OK
Distance from water supply well(s) (Minimum 100 feet)	>100 ft OK
Separation from impervious soil layer	>6 ft OK
Naturally occurring soil above shwt	4.20 ft OK

Bottom covered with 4-in of clean sand? (Bottom of basin must be covered with clean sand to an average depth of 4 inches, unless native soils contain less than 2% fines)	Yes	OK
Proposed drainage easement provided?	Yes	OK
Capures all runoff at ultimate build-out?	Yes	OK
Bypass provided for larger storms? (Runoff in excess of design volume must be bypassed)	Yes	OK
Pretreatment device provided (List type provided)	Veg Swales	

**III. REQUIRED ITEMS CHECKLIST**

EDIT Please indicate the page or plan sheet numbers where the supporting documentation can be found. **An incomplete submittal**

**Required Item:**

- Plans (1" = 50' or larger) of the entire site showing:
  - Design at ultimate build-out,
  - Off-site drainage (if applicable),
  - Delineated drainage basins (include Rational C or Curve Number, CN per basin),
  - Basin dimensions,
  - Pretreatment system,
  - High flow bypass system,
  - Overflow device
  - Maintenance access,
  - Proposed drainage easement and public right of way (ROW), and
  - Boundaries of drainage easement.
- Plan details (1" = 30' or larger) for the infiltration basin showing:
  - Bypass structure,
  - Basin bottom dimensions,
  - Basin cross-section with benchmark for sediment cleanout,
  - Flow distribution detail for inflow,
  - Vegetated filter strip, and
  - Pretreatment device
- Section view of the infiltration basin (1" = 20' or larger) showing:
  - Pretreatment and treatment areas, and
  - Inlet and outlet structures
- A table of elevations, areas, incremental volumes, & accumulated volumes to verify the volume provided.
- A soils report that is based on actual field investigations, soil borings, and infiltration tests. County soil maps are not acceptable.
- A construction sequence that shows how the infiltration basin will be protected from sediment until the entire drainage area is stabilized.
- The supporting calculations.
- A detailed description for the operation and maintenance of the infiltration basin. Refer to the *Currituck County Stormwater Manual Appendix B - Sample Maintenance Plan*

Initials	Page or plan sheet number and any notes:
DAD	Entire Plan Set
DAD	Sheet 10
DAD	Sheet 10
DAD	SWM Narrative
DAD	SWM Narrative Appendices
DAD	Sheet 11
DAD	SWM Narrative
DAD	Attached Maintenance Agreement

# Operation & Maintenance Agreement

**Project Name:** Algonquin Subdivision  
**Project Location:** Jarvisburg, Currituck County, NC

## Cover Page

Maintenance records shall be kept on the following BMP(s). This maintenance record shall be kept in a log in a known set location. Any deficient BMP 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 BMP(s).

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

Bioretention Cell	Quantity:		Location(s):	
Dry Detention Basin	Quantity:		Location(s):	
Grassed Swale	Quantity:	1	Location(s):	Throughout Project Area
Green Roof	Quantity:		Location(s):	
Infiltration Basin	Quantity:	1	Location(s):	South End of Project
Infiltration Trench	Quantity:		Location(s):	
Level Spreader/VFS	Quantity:		Location(s):	
Permeable Pavement	Quantity:		Location(s):	
Proprietary System	Quantity:		Location(s):	
Rainwater Harvesting	Quantity:		Location(s):	
Sand Filter	Quantity:		Location(s):	
Stormwater Wetland	Quantity:		Location(s):	
Wet Detention Basin	Quantity:	0	Location(s):	
Disconnected Impervious Area	Present:	No	Location(s):	
User Defined BMP	Present:	No	Location(s):	

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

* Responsible Party:	Joel K. Justice & Stacy A. Justice
Title & Organization:	Property Owners
Street address:	P.O. Box 208
City, state, zip:	Grandy, NC 27958
Phone number(s):	252-493-2500
Email:	joel@bluewaterrestoration.com

Signature: *Joel K. Justice & Stacy A. Justice* Date: 12-11-24  
 I, Kimberly W Healy, a Notary Public for the State of NC  
 County of Currituck, do hereby certify that Joel K Justice + Stacy A Justice  
 personally appeared before me this 11th day of December, 2024 and  
 acknowledge the due execution of the Operations and Maintenance Agreement.

Witness my hand and official seal, *Kimberly W Healy*



Seal

My commission expires

Oct. 12, 2025

## Grassed Swale Maintenance Requirements

Important maintenance procedures:

- The drainage area of the grassed swale will be carefully managed to reduce the sediment load to the grassed swale.
- After the first-time fertilization to establish the grass in the swale, fertilizer will not be applied to the grassed swale.

The grassed swale will be inspected **once a quarter**. 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.

BMP element:	Potential problem:	How to remediate the problem:
<b>The perimeter of the BMP</b>	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.
<b>The entire length of the swale</b>	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 BMPs. Re-sod if necessary.
	Vegetation is too short or too long.	Maintain vegetation at a height of approximately six inches.
<b>The outlet device</b>	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.
<b>The receiving water</b>	Erosion or other signs of damage have occurred at the outlet.	Contact the local NC Department of Environment and Natural Resources Regional Office.



## Infiltration System Maintenance Requirements

Important maintenance procedures:

- The drainage area will be carefully managed to reduce The sediment load to The infiltration basin.
- Immediately after the infiltration basin is established, the vegetation will be watered twice weekly if needed until the plants become established (commonly six weeks).
- No portion of the infiltration basin will be fertilized after the initial fertilization that is required to establish the vegetation.
- The vegetation in and around the basin will be maintained at a height of approximately six inches.

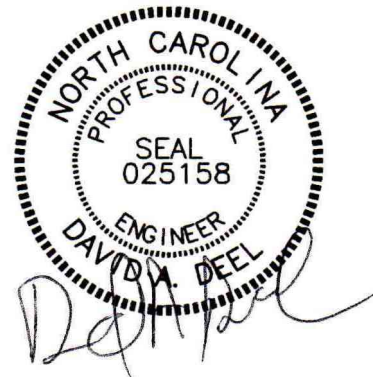
After the infiltration basin is established, it shall be inspected **once a quarter and within 24 hours after every storm event greater than 1.0 inches (or 1.5 inches if in a Coastal County)**. Records of operation and maintenance shall be kept in a known set location and shall be available upon request.

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

BMP element:	Potential problem:	How to remediate the problem:
<b>The entire BMP</b>	Trash/debris is present.	Remove the trash/debris.
<b>The perimeter of the infiltration basin</b>	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, and then plant a ground cover and water until it is established. Provide lime and a one-time fertilizer application.
<b>The inlet device: swale</b>		
	Erosion is occurring in the swale (if applicable).	Regrade the swale if necessary to smooth it over and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems with erosion.
<b>The main treatment area</b>	A visible layer of sediment has accumulated.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the BMP. Replace any media that was removed in the process. Revegetate disturbed areas immediately.
	Water is standing more than 5 days after a storm event.	Replace the top few inches of filter media and see if this corrects the standing water problem. If so, revegetate immediately. If not, consult an appropriate professional for a more extensive repair.
	Weeds and noxious plants are growing in the main treatment area.	Remove the plants by hand or by wiping them with pesticide (do not spray).
<b>The embankment</b>	Shrubs or trees have started to grow on the embankment.	Remove shrubs or trees immediately.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	Make all needed repairs.
<b>The outlet device</b>	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.
<b>The receiving water</b>	Erosion or other signs of damage have occurred at the outlet.	Contact the local NC Department of Environment and Natural Resources Regional Office.

# Stormwater Management Plan Narrative

Algonquin Subdivision  
Residential Subdivision  
Jarvisburg  
Currituck County Submittal  
October 2, 2024



## General

The Algonquin Subdivision project is a proposed Residential Subdivision to be located on a (+/-) 14.53 acre parcel located at the south end of Indian Kettle Road, approximately 350 feet south of the intersection of Indian Kettle Road and Forbes Road in Jarvisburg, Currituck County, NC. The project will be limited to a maximum of 16.52% Built-Upon-Area (BUA) and, accordingly, an NCDEQ Low Density Stormwater Permit is being pursued for this Project.

The following narrative will detail the proposed Stormwater Management design for the Algonquin Subdivision development and demonstrate compliance with the Currituck County Peak Flow Mitigation requirements.

## Summary of Existing Conditions

The project site consists of a 14.53 acre parcel located at the south end of Indian Kettle Road, approximately 350 feet south of the intersection of Indian Kettle Road and Forbes Road in Jarvisburg, Currituck County, NC. The Project Area currently consists of a large open field which is drained via overland flow to the west and south. Runoff that flows to the west flows across an adjoining open field before ultimately draining north to the Forbes Road ditch. Runoff that flows to the south is collected in "Forbes Ditch" which flows to the east and ultimately outfalls to Currituck Sound. Soils across the site consist primarily of loamy sand.

## Summary of Proposed Conditions

The Algonquin Subdivision consists of 10 single family residential lots with associated subdivision road and infrastructure. Runoff from the proposed subdivision road, lots, and open spaces will be collected in a series of grassed swales and conveyed to the southwest corner of the property. In the southwest corner, a dry infiltration basin, sized to capture and infiltrate runoff from the 10-year rainfall event, will be installed in order to meet Currituck County's peak flow reduction requirements. This infiltration basin is NOT intended to be an NCDEQ SCM and is not included as a part of the NCDEQ Low Density Stormwater Permit. The total coverage (BUA) proposed is 16.52% impervious coverage.

The entirety of the post-construction runoff resulting from a 10-yr, 24 hr storm event will be retained and infiltrated in the proposed infiltration basin in order to maintain a peak off-site flow rate which does not exceed the 2-yr, 24 hr peak runoff rate for the site in a theoretical wooded pre-development condition. The bulk of the runoff from the post-construction 100-yr, 24 hr storm event will also be retained and infiltrated, with minor overflow resulting in a peak flow rate which does not exceed the actual calculated pre-construction 100-yr, 24 hr peak runoff rate for the site.

# Stormwater Collection, Treatment, Storage and Disposal

Although NCDEQ requirements do not dictate the installation of SCM's, an infiltration basin is proposed to meet the requirements of Currituck County's Stormwater Management Ordinance.

## Collection

The stormwater runoff will be collected and directed via site grading, limited storm piping, and vegetated swales to the infiltration basin.

## Treatment

The proposed infiltration basin will offer several methods of stormwater runoff treatment prior to release. Runoff from developed areas will enter the basin via vegetated swales. The combination of limited, disperse impervious coverage and vegetated conveyances provide the treatment associated with a Low Density Permit and filtration / infiltration within the swale system should be considered the preliminary treatment method for the system. Primary treatment is provided within the infiltration basin due to filtration & biological processes within the soil subsurface of the pond.

## Storage

Currituck County's Stormwater Ordinance requires that the runoff rate from the 10-yr, 24-hr rainfall event in the post-construction condition not exceed the pre-construction value from the 2-yr, 24 hr rainfall event across a theoretically wooded site. An EPA SWMM Model was constructed of the subdivision and the pond was configured to meet this storage requirement. Due to the high-infiltration in-situ soils, the results required full capture and infiltration of the runoff from the 10-yr, 24 hr rainfall event (5.74 inch rainfall event).

## Disposal

As discussed in previous sections the majority of stormwater runoff entering this management system will be infiltrated, therefore infiltration will be the primary source of disposal. Using a factor of safety of 2.0 and an infiltration rate of 11.27 in/hr (per the soils investigation report), the drawdown time is calculated to be 4.99 hours for the proposed infiltration basin at maximum storage capacity.

In the event that the capacity of the system is exceeded, runoff will overflow the system via an overflow structure located in the southeast end of the basin which will then discharge to Forbes Ditch.

## Peak Flow Mitigation

Currituck County's Stormwater Ordinance requires that the runoff rate from the 10-yr, 24-hr storm in the post-construction condition not exceed the runoff rate from the 2-yr, 24-hr storm in the pre-construction, theoretical fully wooded condition. In order to demonstrate compliance and to adequately account for off-site, downstream factors and interconnection of outfalls via internal farm ditches, an EPA SWMM Model was constructed of the entire drainage shed.

Pre-development peak flow was calculated utilizing the NRCS (SCS) Method within EPA SWMM as per the Currituck Stormwater Ordinance. Due to the large number of drainage areas which were individually analyzed, the results are presented in excel spreadsheet format in the Appendix to this narrative rather than on the County's forms. Pre-development & post-development peak flows calculated for points of interest were as follows:

E006-E005	Forbes Ditch section immediately downstream of the project outlet
E012-E011	Forbes Road Ditch section immediately downstream of Co. required off-site improvements

2yr-10yr Analysis (Currituck County Req'mt):

	2yr-10yr Pre* (cfs)	10yr Post (cfs)
E006-E005	2.25	2.25
E012-E011	0.05	0.06**

100yr Analysis (Additional Flow Check):

	100yr Pre (cfs)	100yr Post (cfs)
E006-E005	8.87	8.85
E012-E011	1.48	1.65**

\* "2-yr / 10yr Pre" results reported represent results from the model with the 10-yr rainfall event applied to all off-site drainage areas and the 2-yr rainfall event applied to the Project Site

\*\*Peak flow within existing ditch E010-E009B is marginally increased in the post-construction condition as compared to the pre-construction condition. This is the result of off-site improvements to Indian Kettle Road requested by the County. All runoff from the Project Site that originally flowed to Forbes Road has been re-routed to the proposed infiltration basin in the post-construction condition. Modeled increases in flow at the Forbes Road ditch are marginal and within the capacity of the existing Forbes Road Ditch.

## Soils

Information collected on site indicates that the soils found throughout this site are composed primarily of sandy loam. These soil types will have moderately high to high permeability. These findings generally correlate with the description mapped and discussed in the United States Department of Agriculture, Soil Conservation Service, Soil Survey of Currituck County, North Carolina, which map the soil for this site as follows:

CnA – Conetoe loamy sand, Permeability is moderately high to high

No – Nimmo loamy sand, Permeability is moderately high to high

Pt – Portsmouth fine sandy loam, Permeability is very low to moderately high

A soils report has been included in the appendix of this narrative.

## Calculations

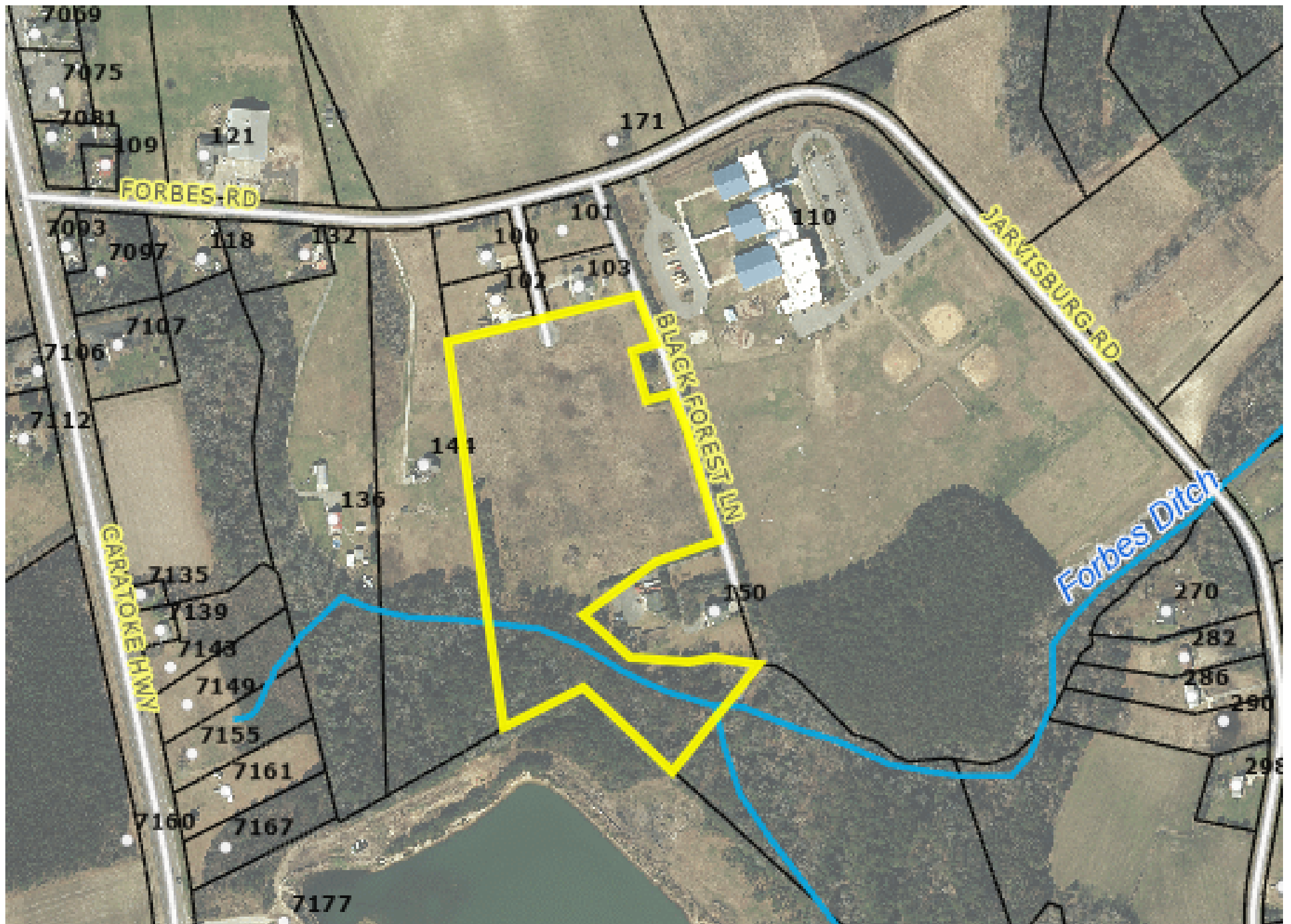
A set of Drainage Area Tabulations & EPA SWMM Model Report can be found within appendix portion of this narrative.

## Conclusions

The proposed stormwater management plan for this site will handle the difference in runoff between the pre-development 2-yr, 24hr and the post-development 10-yr, 24 hr storm events, as prescribed by the Currituck County Stormwater Management Ordinance. Additionally, the design mitigates peak flows from the 100-yr, 24 hr storm events.

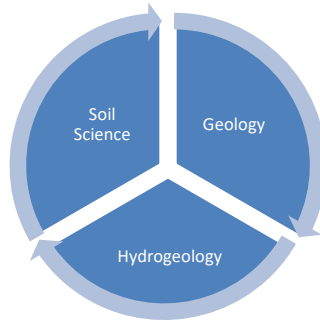
This proposed design will more than adequately serve the stormwater management requirements of this site.

**APPENDIX A**  
**Aerial GIS Imagery**





**APPENDIX B**  
**Protocol Sampling Soils Report**



4114 Laurel Ridge Drive  
Raleigh, North Carolina 27612

Protocol Sampling Service, Inc.  
"Experts in Environmental Compliance"  
(919) 210-6547

Protocolsampling@yahoo.com  
Environmentalservicesnc.com

August 27, 2024

Mr. David Klebitz, P.E.  
Bissell Professional Group, Inc.  
Post Office Box 1068  
Kitty Hawk, North Carolina 27949

Re: **Storm Water Management Soil Investigation  
Algonquin Subdivision  
Indian Kettle Road  
Jarvisburg, Currituck County, North Carolina  
Protocol Job No. 24-127**

Dear Mr. Klebitz:

The following Soil Investigation is submitted to assist in a site assessment for the proposed storm water management improvements associated with the Algonquin Subdivision along Indian Kettle Road in Jarvisburg, North Carolina. The study area is being considered for one (1) infiltration basin.

## **SITE HISTORY AND PHYSICAL CHARACTERISTICS**

Residential development and the Jarvisburg Elementary School surround the study area. Protocol Sampling Service, Inc. of Raleigh, North Carolina was hired to perform an investigation to identify the depth to seasonal high-water table, if any restrictive layers are present and determine subsurface permeabilities at or slightly below the expected infiltration basin bottom.

## **SOIL INVESTIGATION**

The field survey was conducted on Friday, June 21 and Wednesday, August 21, 2024. Two (2) soil borings were advanced from 48 to 60-inches below land surface (bls) with a hand auger at the proposed basin as shown on the attached exhibit. Soil color was determined with a Munsell Soil Color Chart. The presence of fill or other disturbances, the depth to the seasonal high-water table, soil structure and consistence were noted. The borings were also checked for reduced colors, an anaerobic smell or obvious soil wetness. Surface elevations range from 9.8 feet msl to 10.7 feet msl from south to north across the study area.

## **FINDINGS - Soil**

- The subject property contains soil belonging to the Conetoe and Nimmo series. The Conetoe series is a loamy, mixed, thermic, Arenic Hapludult and the Nimmo coarse loamy over sandy or sandy-skeletal, mixed, thermic Typic Ochraquult.

- The Conetoe series soil was found to have an apparent depth to seasonal high-water table of 50-inches bls in the soil boring No.1 and the Nimmo series soil had an apparent depth to seasonal high-water table of 24-inches bls in the soil boring No.2. Static water levels were found from 72-inches bls in soil boring No.1, and 48-inches in Soil boring No.2.
- No major restrictive horizons were encountered to a depth of 80-inches in any of the soil borings.

## **FINDINGS - Conductivity**

- **HYDRAULIC CONDUCTIVITY TESTING**
- Saturated hydraulic conductivity testing was performed to determine the subsurface permeability in the center of the proposed infiltration basin at the infiltrative elevation of 38-inches bls at a surveyed elevation of 10.70'-msl.
- Saturated hydraulic conductivity can be thought of as the ease with which pores of a saturated soil permit water movement. A common method to measure saturated hydraulic conductivity ( $K_{SAT}$ ) of the unsaturated zone is by a constant-head well permeameter method (Amoozegar and Mecklenburg, 1999). These  $K_{SAT}$  tests take into account soil morphologic factors other than texture, because soil structure and clay mineralogy have been found to have a significant impact on the rate of water movement through soils (Bouma et al., 1983; Schoeneberger et al, 1995, Vepraskas et al, 1996). The Compact Constant Head Permeameter (Amoozometer) is an example of a constant head permeameter which allows measurements of  $K_{SAT}$  in the vadose zone and is widely used in North Carolina and other parts of the country (Amoozegar, 2004; Amoozegar and Mecklenburg, 1999).
- The Ksat was run at an elevation of 7.54'-msl, 12-inches above the seasonal high water table elevation of 6.54'-msl (50-inches bls). The saturated hydraulic conductivity test (Ksat) reached steady state readings within five minutes and three consecutive readings revealed an average conductivity of 11.273 inches/hour. Porosity of the moderately well sorted fine to medium sand ranges from 20-25%.

The findings presented herein are based on the site conditions observed during performance of the field survey on Friday, June 21 and Wednesday, August 21, 2024.

Please call me at (919) 210-6547 if you have any questions or need further assistance.

Sincerely,  
**Protocol Sampling Service, Inc.**



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

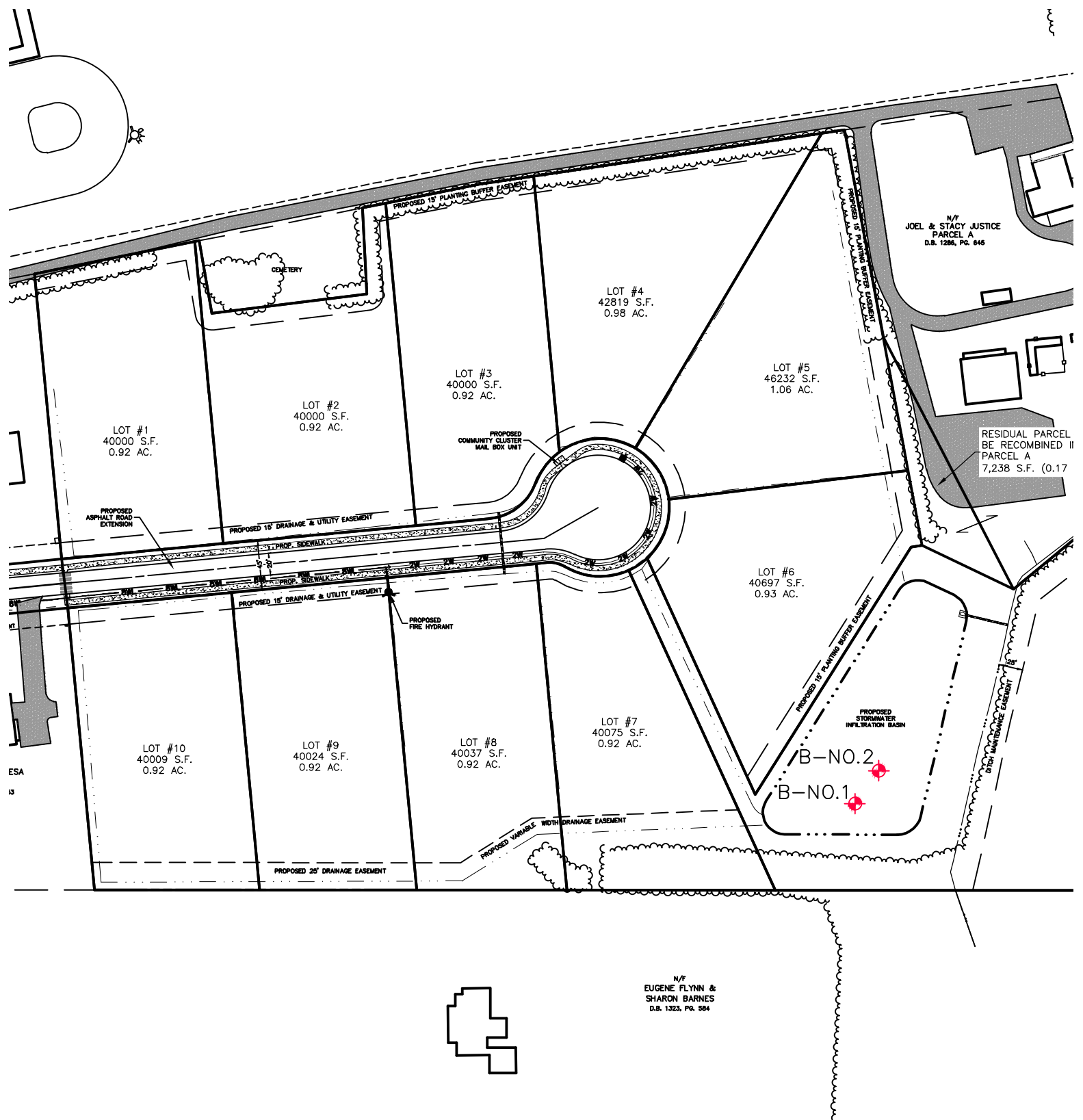
## Soil Profile Descriptions

- A 0 – 10 inches; dark brown (7.5YR 3/3) loamy fine sand; granular; friable.
- E 10 – 24 inches; yellowish brown (10YR 5/4) loamy sand; granular; friable.
- Bt 24 – 36 inches; brownish yellow (10YR 6/8) sandy loam; subangular blocky; friable.
- BC 36 – 50 inches; brownish yellow (10YR 6/8) and very pale brown (10YR 7/4) loamy sand; subangular blocky; friable.  
**Ksat 1 (38")**
- C1 50 – 60 inches; brownish yellow (10YR 6/8) fine sand with strong brown (7.5YR 5/6) concentrations and gray (10YR 6/1) depletions; single grained; loose
- C2 60 – 80 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose

Soil Series: **Conetoe**  
Landscape: Coastal Plain  
Landform: terrace  
Parent Material: Marine sediments  
Drainage Class: well drained  
Particle Size Class: sandy  
Temperature Regime: thermic  
Subgroup Classification: Arenic Hapludult  
Examination Method: auger boring  
Date: June 21, 2024  
Weather: Overcast, 78  
Investigators: David Meyer  
Shwt: 50"  
Measured water table depth: 72"

- A 0 – 8 inches; dark grayish brown (10YR 4/2) loamy sand; granular; friable.
- Bt1 8 – 18 inches; light brownish gray (10YR 6/2) loamy sand; granular; friable.
- Bt2 18 – 24 inches; gray (10YR 6/1) sandy loam; subangular blocky; friable
- C1 24 – 36 inches; light brownish gray (10YR 6/2) sand with strong brown (7.5YR 5/6) concentrations; granular; friable.
- C2 36 – 48 inches; brownish yellow (10YR 6/8) fine sand; single grained; loose

Soil Series: **Nimmo**  
Landscape: Coastal Plain  
Landform: low ridge, depressions  
Parent Material: Marine sediments  
Drainage Class: moderately well drained  
Particle Size Class: coarse loamy  
Temperature Regime: thermic  
Subgroup Classification: Typic Ochraqult  
Examination Method: auger boring  
Date: June 21, 2024  
Weather: Overcast, 78  
Investigators: David Meyer  
Shwt: 24"  
Measured water table depth: 48"



LOT #1  
40000 S.F.  
0.92 AC.

LOT #2  
40000 S.F.  
0.92 AC.

LOT #3  
40000 S.F.  
0.92 AC.

LOT #4  
42819 S.F.  
0.98 AC.

LOT #5  
46232 S.F.  
1.06 AC.

LOT #6  
40697 S.F.  
0.93 AC.

LOT #7  
40075 S.F.  
0.92 AC.

LOT #8  
40037 S.F.  
0.92 AC.

LOT #9  
40024 S.F.  
0.92 AC.

LOT #10  
40009 S.F.  
0.92 AC.

N/Y  
JOEL & STACY JUSTICE  
PARCEL A  
D.B. 1286, PG. 645

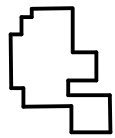
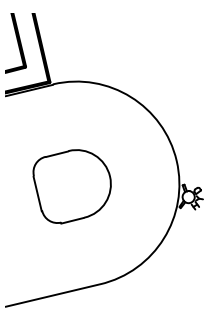
RESIDUAL PARCEL  
BE RECOMBINED II  
PARCEL A  
7,238 S.F. (0.17)

N/Y  
EUGENE FLYNN &  
SHARON BARNES  
D.B. 1323, PG. 584

ESA  
13

B-NO.2  
B-NO.1

BW  
MT



**SATURATED HYDRAULIC CONDUCTIVITY STUDY**  
Algonquin

Date: 8/14/2024      Weather Condition: sunny  
 Location: SB-1 Conetoe      Temperature (F): 85  
 Number: Ksat 1  
 Horizon: C

	cm	in
--	----	----

Depth(inches): 38.0

<b>SET UP</b>		
	cm	in

Hole Depth: 96.5    38.0    Target Water Level: 15.2    6.0  
 Reference: +    10.2    4.0    Beginning Water Level: 15.2    6.0  
 Head: -    15.2    6.0    Ending Water Level: 15.2    6.0  
 CHT Tube(s) setting: =    91.4    36.0

Hole diameter (d): 5.0    cm  
 Hole radius (r): 2.5    cm  
 coefficient A: 0.001136

Valve Setting: 

x
---

  
    1-ON    2-ON

**NOTE:** Readings based on Ending Water Level

Conversion Factor (C.F.): 105.0

Water Reading	Change in Water Level	Chamber C.F.	Clock Time (min)	Elapsed Time (min)	Elapsed Time (hr)	Q (cm <sup>3</sup> /hr)	K (cm/hr)	K (in/hr)	K (gal/ft <sup>2</sup> /day)
41			0.0						
33			2.0						
26	7.0	105.0	4.0	2.00	0.033	22050.0	25.0538	9.8637	147.577
22	4.0	105.0	5.0	1.00	0.017	25200.0	28.6329	11.2728	168.659
19	3.0	105.0	6.0	1.00	0.017	18900.0	21.4747	8.4546	126.494
15	4.0	105.0	7.0	1.00	0.017	25200.0	28.6329	11.2728	168.659
11	4.0	105.0	8.0	1.00	0.017	25200.0	28.6329	11.2728	168.659
7	4.0	105.0	9.0	1.00	0.017	25200.0	28.6329	11.2728	168.659
3	4.0	105.0	10.0	1.00	0.017	25200.0	28.6329	11.2728	168.659
<b>Final Ksat</b>							<b>28.633</b>	<b>11.273</b>	<b>168.659</b>

**APPENDIX C**  
**Drainage Area Tabulations**



## Existing Drainage Area Parameters - SCS Method

### Algonquin Ex. Conditions - Actual Conditions

**DA-AL-E006**

	CN	Area Ac.	Area SF	
Impervious - Disconnected	98	0.00	0	Weighted CN = 39
Woods A Soils	30	0.00	0	
Open Space A Soils	39	5.06	220475	Connected Impervious:
Farm Fields A Soils	64	0.00	0	Area Ac. Area SF % of DA
CN SubTotal		5.06	220475	0.00 0 0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	5.06	220475	220475
---------	------	--------	--------

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	705	S=	15.6	Ia=	3.13	Width:	312.73
Elev Up	12.8	Lag =	1.0 Hours				
Elev Dn (Inv)	9.05	Tc =	1.6 Hours				
Slope % = Y	0.53	Tc =	98.1 Minutes				
CN =	39						

## Existing Drainage Area Parameters - SCS Method

### Algonquin Ex. Conditions - Actual Conditions

**DA-AL-E011**

	CN	Area Ac.	Area SF	
Impervious - Disconnected	98	0.00	0	Weighted CN = 39
Woods A Soils	30	0.00	0	
Open Space A Soils	39	0.32	13996	Connected Impervious:
Farm Fields A Soils	64	0.00	0	Area Ac. Area SF % of DA
CN SubTotal		0.32	13996	0.00 0 0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	0.32	13996	13996
---------	------	-------	-------

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	150	S=	15.6	Ia=	3.13	Width:	93.31
Elev Up	12.3	Lag =	0.4 Hours				
Elev Dn (Inv)	11.9	Tc =	0.7 Hours				
Slope % = Y	0.27	Tc =	40.2 Minutes				
CN =	39						

## Existing Drainage Area Parameters - SCS Method

### Algonquin Ex. Conditions - Actual Conditions

**DA-AL-E012**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.03	1094	Weighted CN =		60
Woods      A Soils	30	0.00	0			
Open Space    A Soils	39	0.05	1989	Connected Impervious:		
Farm Fields    A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.07	3083		0.00	0      0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.07	3083	3083

Formula: Time of Concentration =  $5 / 3 * Lag$

Width:

Length = l	32	S=	6.7	Ia=	1.34	96.34
Elev Up	12.3	Lag =	0.0 Hours			
Elev Dn (Inv)	11.7	Tc =	0.0 Hours			
Slope % = Y	1.88	Tc =	2.6 Minutes			
CN =	60					

## Existing Drainage Area Parameters - SCS Method

### Algonquin Ex. Conditions - Actual Conditions

**DA-AL-E013**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.02	833	Weighted CN =		74
Woods      A Soils	30	0.00	0			
Open Space    A Soils	39	0.01	566	Connected Impervious:		
Farm Fields    A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.03	1399		0.00	0      0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.03	1399	1399

Formula: Time of Concentration =  $5 / 3 * Lag$

Width:

Length = l	32	S=	3.5	Ia=	0.70	43.72
Elev Up	12.3	Lag =	0.0 Hours			
Elev Dn (Inv)	11.7	Tc =	0.0 Hours			
Slope % = Y	1.88	Tc =	1.8 Minutes			
CN =	74					

## Existing Drainage Area Parameters - SCS Method

### Algonquin Ex. Conditions - Actual Conditions

**DA-AL-E014**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.06	2524	Weighted CN =		40
Woods      A Soils	30	0.00	0			
Open Space    A Soils	39	5.83	253749	Connected Impervious:		
Farm Fields    A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		5.88	256273	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

	Area Ac	Area SF	
	5.88	256273	256273

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	568	S=	15.3	Ia=	3.05	Width:	451.18
Elev Up	13.1	Lag =	0.9 Hours				
Elev Dn (Inv)	10.8	Tc =	1.6 Hours				
Slope % = Y	0.40	Tc =	93.1 Minutes				
CN =	40						

## Existing Drainage Area Parameters - SCS Method

### Algonquin Ex. Conditions - Actual Conditions

**DA-E002**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.19	8360	Weighted CN =		46
Woods      A Soils	30	0.38	16625			
Open Space    A Soils	39	0.86	37622	Connected Impervious:		
Woods      B Soils	55	0.31	13618	Area Ac.	Area SF	% of DA
CN SubTotal		1.75	76225	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

	Area Ac	Area SF	
	1.75	76225	76225

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	360	S=	11.6	Ia=	2.31	Width:	211.74
Elev Up	12.92	Lag =	0.3 Hours				
Elev Dn (Inv)	9	Tc =	0.5 Hours				
Slope % = Y	1.09	Tc =	32.9 Minutes				
CN =	46						

**Existing Drainage Area Parameters - SCS Method**

**Algonquin Ex. Conditions - Actual Conditions**

**DA-E003**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.01	370	Weighted CN =		48
Woods A Soils	30	0.00	0			
Open Space A Soils	39	0.14	6005	Connected Impervious:		
Woods B Soils	55	0.14	5904	Area Ac.	Area SF	% of DA
CN SubTotal		0.28	12279	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.28	12279	12279

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	150	S=	10.6	Ia=	2.13	Width:	81.86
Elev Up	11	Lag =	0.1 Hours				
Elev Dn (Inv)	8.2	Tc =	0.2 Hours				
Slope % = Y	1.87	Tc =	11.8 Minutes				
CN =	48						

**Existing Drainage Area Parameters - SCS Method**

**Algonquin Ex. Conditions - Actual Conditions**

**DA-E004**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.17	7452	Weighted CN =		69
Woods A Soils	30	0.00	0			
Open Space A Soils	39	0.10	4147	Connected Impervious:		
Woods B Soils	55	0.15	6430	Area Ac.	Area SF	% of DA
CN SubTotal		0.41	18029	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.41	18029	18029

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	230	S=	4.5	Ia=	0.89	Width:	78.39
Elev Up	12.3	Lag =	0.1 Hours				
Elev Dn (Inv)	8.2	Tc =	0.2 Hours				
Slope % = Y	1.78	Tc =	10.0 Minutes				
CN =	69						

**Existing Drainage Area Parameters - SCS Method**

### Algonquin Ex. Conditions - Actual Conditions

DA-E005

	CN	Area Ac.	Area SF				
Impervious - Disconnected	98	0.35	15392	Weighted CN =		69	
Woods A Soils	30	0.05	1985				
Open Space A Soils	39	0.19	8402				
Woods B Soils	55	0.18	7773	Connected Impervious:			
CN SubTotal		0.77	33552	Area Ac.	0.00	0	0.00
				Area SF			
				% of DA			

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.77	33552	33552

Formula: Time of Concentration =  $5 / 3 * Lag$

		S=		Ia=	Width:
Length = l	251		4.4	0.89	133.67
Elev Up	12.4	Lag =	0.1 Hours		
Elev Dn (Inv)	8.8	Tc =	0.2 Hours		
Slope % = Y	1.43	Tc =	12.0 Minutes		
CN =	69				

### Existing Drainage Area Parameters - SCS Method

#### Algonquin Ex. Conditions - Actual Conditions

DA-E006

	CN	Area Ac.	Area SF				
Impervious - Disconnected	98	0.13	5764	Weighted CN =		53	
Woods A Soils	30	0.22	9711				
Open Space A Soils	39	0.16	7050				
Woods B Soils	55	1.13	49125	Connected Impervious:			
CN SubTotal		1.64	71650	Area Ac.	0.00	0	0.00
				Area SF			
				% of DA			

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
1.64	71650	71650

Formula: Time of Concentration =  $5 / 3 * Lag$

		S=		Ia=	Width:
Length = l	322		8.7	1.74	222.52
Elev Up	12	Lag =	0.3 Hours		
Elev Dn (Inv)	10	Tc =	0.6 Hours		
Slope % = Y	0.62	Tc =	33.2 Minutes		
CN =	53				

### Existing Drainage Area Parameters - SCS Method

#### Algonquin Ex. Conditions - Actual Conditions

DA-E007

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	3.75	163514	Weighted CN =		58
Woods A Soils	30	0.53	23253			
Open Space A-B Soils Mix	53.2	18.80	818793			
Woods B Soils	55	17.66	769319			
CN SubTotal		40.75	1774879			
				Connected Impervious:		
				Area Ac.	Area SF	% of DA
				0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
40.75	1774879	1774879

Formula: Time of Concentration =  $5 / 3 * Lag$

		S=		Ia=	Width:
Length = l	1860		7.3	1.46	954.24
Elev Up	13	Lag =	2.3 Hours		
Elev Dn (Inv)	9.8	Tc =	3.8 Hours		
Slope % = Y	0.17	Tc =	230.4 Minutes		
CN =	58				

### Existing Drainage Area Parameters - SCS Method

layiso

#### Algonquin Ex. Conditions - Actual Conditions

DA-E011

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.17	7308	Weighted CN =		48
Woods A Soils	30	0.00	0			
Open Space A Soils	39	0.93	40628			
Woods B Soils	55	0.00	0			
CN SubTotal		1.10	47936			
				Connected Impervious:		
				Area Ac.	Area SF	% of DA
				0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
1.10	47936	47936

Formula: Time of Concentration =  $5 / 3 * Lag$

		S=		Ia=	Width:
Length = l	490		10.8	2.17	97.83
Elev Up	13	Lag =	0.7 Hours		
Elev Dn (Inv)	11.3	Tc =	1.2 Hours		
Slope % = Y	0.35	Tc =	71.5 Minutes		
CN =	48				

### Existing Drainage Area Parameters - SCS Method

#### Algonquin Ex. Conditions - Actual Conditions

DA-E012

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.19	8167	Weighted CN =		49
Woods A Soils	30	0.00	0			

Open Space	A Soils	39	0.93	40396	Connected Impervious:		
Woods	B Soils	55	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		1.11	48563	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:	Lag = $[(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$	Area Ac	Area SF	
		1.11	48563	48563

Formula: Time of Concentration =  $5 / 3 * \text{Lag}$

Width:

Length = l	130	S=	10.4	Ia=	2.09	373.56
Elev Up	12.1	Lag =	0.2 Hours			
Elev Dn (Inv)	11.6	Tc =	0.4 Hours			
Slope % = Y	0.38	Tc =	23.0 Minutes			
CN =	49					

### Existing Drainage Area Parameters - SCS Method

#### Algonquin Ex. Conditions - Actual Conditions

##### DA-E013

	CN	Area Ac.	Area SF	Weighted CN =	55		
Impervious - Disconnected	98	0.27	11702				
Woods	A Soils	30	0.00	0			
Open Space	A Soils	39	0.70	30571	Connected Impervious:		
Woods	B Soils	55	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		0.97	42273	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:	Lag = $[(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$	Area Ac	Area SF	
		0.97	42273	42273

Formula: Time of Concentration =  $5 / 3 * \text{Lag}$

Width:

Length = l	90	S=	8.1	Ia=	1.61	469.70
Elev Up	12.5	Lag =	0.1 Hours			
Elev Dn (Inv)	11.7	Tc =	0.2 Hours			
Slope % = Y	0.89	Tc =	9.6 Minutes			
CN =	55					

### Existing Drainage Area Parameters - SCS Method

#### Algonquin Ex. Conditions - Actual Conditions

##### DA-E014

	CN	Area Ac.	Area SF	Weighted CN =	42		
Impervious - Disconnected	98	0.44	19379				
Woods	A Soils	30	0.00	0			
Open Space	A Soils	39	8.13	354319	Connected Impervious:		
Woods	B Soils	55	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		8.58	373698	0.00	0	0.00



Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
8.58	373698	373698

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	830	S=	13.8	Ia=	2.76	Width:	450.24
Elev Up	12.79	Lag =	1.6 Hours				
Elev Dn (Inv)	11	Tc =	2.7 Hours				
Slope % = Y	0.22	Tc =	161.6 Minutes				
CN =	42						

### Existing Drainage Area Parameters - SCS Method

#### Algonquin Ex. Conditions - Actual Conditions

##### DA-E003A

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.00	0	Weighted CN =	57	
Woods A Soils	30	0.00	0			
Open Space B Soils	61	0.63	27635	Connected Impervious:		
Woods B Soils	55	1.15	50059	Area Ac.	Area SF	% of DA
CN SubTotal		1.78	77694	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
1.78	77694	77694

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	305	S=	7.5	Ia=	1.50	Width:	254.73
Elev Up	12	Lag =	0.2 Hours				
Elev Dn (Inv)	9	Tc =	0.4 Hours				
Slope % = Y	0.98	Tc =	23.1 Minutes				
CN =	57						

## Existing Drainage Area Parameters - SCS Method

### Algonquin Ex. Conditions - Wooded-2yr

**DA-AL-E006**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.00	0	Weighted CN =		30
Woods      A Soils	30	5.06	220475			
Open Space    A Soils	39	0.00	0	Connected Impervious:		
Farm Fields    A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		5.06	220475	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

	Area Ac	Area SF	
	5.06	220475	220475

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	705	S=	23.3	Ia=	4.67	Width:	312.73
Elev Up	12.8	Lag =	1.3 Hours				
Elev Dn (Inv)	9.05	Tc =	2.1 Hours				
Slope % = Y	0.53	Tc =	128.0 Minutes				
CN =	30						

## Existing Drainage Area Parameters - SCS Method

### Algonquin Ex. Conditions - Wooded-2yr

**DA-AL-E011**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.00	0	Weighted CN =		30
Woods      A Soils	30	0.32	13996			
Open Space    A Soils	39	0.00	0	Connected Impervious:		
Farm Fields    A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.32	13996	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

	Area Ac	Area SF	
	0.32	13996	13996

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	150	S=	23.3	Ia=	4.67	Width:	93.31
Elev Up	12.3	Lag =	0.5 Hours				
Elev Dn (Inv)	11.9	Tc =	0.9 Hours				
Slope % = Y	0.27	Tc =	52.4 Minutes				
CN =	30						

### Existing Drainage Area Parameters - SCS Method

#### Algonquin Ex. Conditions - Wooded-2yr

DA-AL-E012

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.00	0	Weighted CN =		30
Woods A Soils	30	0.07	3083			
Open Space A Soils	39	0.00	0	Connected Impervious:		
Farm Fields A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.07	3083	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.07	3083	3083

Formula: Time of Concentration =  $5 / 3 * Lag$

		S=		Ia=	Width:
Length = l	32	23.3		4.67	96.34
Elev Up	12.3	Lag =	0.1 Hours		
Elev Dn (Inv)	11.7	Tc =	0.1 Hours		
Slope % = Y	1.88	Tc =	5.7 Minutes		
CN =	30				

### Existing Drainage Area Parameters - SCS Method

#### Algonquin Ex. Conditions - Wooded-2yr

DA-AL-E013

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.00	0	Weighted CN =		30
Woods A Soils	30	0.03	1399			
Open Space A Soils	39	0.00	0	Connected Impervious:		
Farm Fields A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.03	1399	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.03	1399	1399

Formula: Time of Concentration =  $5 / 3 * Lag$

		S=		Ia=	Width:
Length = l	32	23.3		4.67	43.72
Elev Up	12.3	Lag =	0.1 Hours		
Elev Dn (Inv)	11.7	Tc =	0.1 Hours		
Slope % = Y	1.88	Tc =	5.7 Minutes		
CN =	30				

## Existing Drainage Area Parameters - SCS Method

### Algonquin Ex. Conditions - Wooded-2yr

**DA-AL-E014**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.00	0	Weighted CN =		30
Woods A Soils	30	5.88	256273			
Open Space A Soils	39	0.00	0	Connected Impervious:		
Farm Fields A Soils	64	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		5.88	256273	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
5.88	256273	256273

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	568	S =	23.3	Ia =	4.67	Width:	451.18
Elev Up	13.1	Lag =	1.2 Hours				
Elev Dn (Inv)	10.8	Tc =	2.1 Hours				
Slope % = Y	0.40	Tc =	123.4 Minutes				
CN =	30						

## Proposed Drainage Area Parameters - SCS Method

### Algonquin Prop. Conditions

**DA-P001**

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.10	4213	Weighted CN =	55	
Prop. Lots	A Soils	50.8	0.65	28377			
Open Space	A Soils	39	0.09	4115	Connected Impervious:		
Woods	A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal			0.84	36705	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.84	36705	36705

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	95	S=	8.2	Ia=	1.64	Width:	386.37
Elev Up	13.1	Lag =	0.1 Hours				
Elev Dn (Inv)	12.5	Tc =	0.2 Hours				
Slope % = Y	0.63	Tc =	12.0 Minutes				
CN =	55						

## Proposed Drainage Area Parameters - SCS Method

### Algonquin Prop. Conditions

**DA-P002**

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.04	1727	Weighted CN =	54	
Prop. Lots	A Soils	50.8	0.45	19490			
Open Space	A Soils	39	0.02	722	Connected Impervious:		
Woods	A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal			0.50	21939	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.50	21939	21939

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	95	S=	8.5	Ia=	1.70	Width:	230.94
Elev Up	13.1	Lag =	0.1 Hours				
Elev Dn (Inv)	12.5	Tc =	0.2 Hours				
Slope % = Y	0.63	Tc =	12.2 Minutes				
CN =	54						

## Proposed Drainage Area Parameters - SCS Method

### Algonquin Prop. Conditions

**DA-P003**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.05	2097	Weighted CN =		54
Prop. Lots     A Soils	50.8	0.59	25774			
Open Space     A Soils	39	0.02	1048	Connected Impervious:		
Woods            A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.66	28919	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:	$Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$	0.66	28919	28919
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Area Ac

Area SF

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	95	S=	8.6	Ia=	1.72	Width:	304.41
Elev Up	13.1	Lag =	0.1 Hours				
Elev Dn (Inv)	12.5	Tc =	0.2 Hours				
Slope % = Y	0.63	Tc =	12.3 Minutes				
CN =	54						

## Proposed Drainage Area Parameters - SCS Method

### Algonquin Prop. Conditions

**DA-P004**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.08	3355	Weighted CN =		54
Prop. Lots     A Soils	50.8	0.85	37153			
Open Space     A Soils	39	0.04	1712	Connected Impervious:		
Woods            A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.97	42220	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:	$Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$	0.97	42220	42220
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Area Ac

Area SF

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	95	S=	8.5	Ia=	1.70	Width:	444.42
Elev Up	13.1	Lag =	0.1 Hours				
Elev Dn (Inv)	12.5	Tc =	0.2 Hours				
Slope % = Y	0.63	Tc =	12.2 Minutes				
CN =	54						

## Proposed Drainage Area Parameters - SCS Method

### Algonquin Prop. Conditions

**DA-P005**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.00	0	Weighted CN =		51
Prop. Lots     A Soils	50.8	0.16	7167			
Open Space     A Soils	39	0.00	0	Connected Impervious:		
Woods            A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.16	7167	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:	$Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$	0.16	7167	7167
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Area Ac

Area SF

Formula: Time of Concentration =  $5 / 3 * Lag$

Width:

Length = l	65	S=	9.7	Ia=	1.94	110.26
Elev Up	12.1	Lag =	0.1 Hours			
Elev Dn (Inv)	11	Tc =	0.1 Hours			
Slope % = Y	1.69	Tc =	6.0 Minutes			
CN =	51					

## Proposed Drainage Area Parameters - SCS Method

### Algonquin Prop. Conditions

**DA-P006**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.08	3650	Weighted CN =		65
Prop. Lots     A Soils	50.8	0.14	6168			
Open Space     A Soils	39	0.03	1197	Connected Impervious:		
Woods            A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.25	11015	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:	$Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$	0.25	11015	11015
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Area Ac

Area SF

Formula: Time of Concentration =  $5 / 3 * Lag$

Width:

Length = l	90	S=	5.3	Ia=	1.07	122.39
Elev Up	13.6	Lag =	0.1 Hours			
Elev Dn (Inv)	12.4	Tc =	0.1 Hours			
Slope % = Y	1.33	Tc =	6.1 Minutes			
CN =	65					

## Proposed Drainage Area Parameters - SCS Method

### Algonquin Prop. Conditions

**DA-P007**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.04	1764	Weighted CN =		52
Prop. Lots     A Soils	50.8	0.96	41894			
Open Space     A Soils	39	0.02	884	Connected Impervious:		
Woods            A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		1.02	44542	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:	$Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$	1.02	44542	44542
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Area Ac    Area SF

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	290	S=	9.1	Ia=	1.81	Width:	153.59
Elev Up	12.9	Lag =	0.3 Hours				
Elev Dn (Inv)	11	Tc =	0.5 Hours				
Slope % = Y	0.66	Tc =	30.6 Minutes				
CN =	52						

## Proposed Drainage Area Parameters - SCS Method

### Algonquin Prop. Conditions

**DA-P008**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.08	3342	Weighted CN =		53
Prop. Lots     A Soils	50.8	1.28	55823			
Open Space     A Soils	39	0.04	1659	Connected Impervious:		
Woods            A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		1.40	60824	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:	$Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$	1.40	60824	60824
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Area Ac    Area SF

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	290	S=	8.8	Ia=	1.77	Width:	209.74
Elev Up	12.9	Lag =	0.3 Hours				
Elev Dn (Inv)	11	Tc =	0.5 Hours				
Slope % = Y	0.66	Tc =	30.1 Minutes				
CN =	53						



### Proposed Drainage Area Parameters - SCS Method

#### Algonquin Prop. Conditions

DA-P009

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.06	2447	Weighted CN =		52
Prop. Lots A Soils	50.8	1.40	60965			
Open Space A Soils	39	0.02	968	Connected Impervious:		
Woods A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		1.48	64380	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
1.48	64380	64380

Formula: Time of Concentration =  $5 / 3 * Lag$

		S=		Ia=	Width:
Length = l	290		9.1	1.82	222.00
Elev Up	12.9	Lag =	0.3 Hours		
Elev Dn (Inv)	11	Tc =	0.5 Hours		
Slope % = Y	0.66	Tc =	30.6 Minutes		
CN =	52				

### Proposed Drainage Area Parameters - SCS Method

#### Algonquin Prop. Conditions

DA-P010

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.00	0	Weighted CN =		51
Prop. Lots A Soils	50.8	0.63	27253			
Open Space A Soils	39	0.00	0	Connected Impervious:		
Woods A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.63	27253	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.63	27253	27253

Formula: Time of Concentration =  $5 / 3 * Lag$

		S=		Ia=	Width:
Length = l	92		9.7	1.94	296.23
Elev Up	12.4	Lag =	0.1 Hours		
Elev Dn (Inv)	11.2	Tc =	0.2 Hours		
Slope % = Y	1.30	Tc =	9.0 Minutes		
CN =	51				

### Proposed Drainage Area Parameters - SCS Method

**Algonquin Prop. Conditions**

**DA-P011**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.00	0	Weighted CN =		51
Prop. Lots A Soils	50.8	0.37	15963			
Open Space A Soils	39	0.00	0	Connected Impervious:		
Woods A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.37	15963	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(L^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.37	15963	15963

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	92	S=	9.7	Ia=	1.94	Width:	173.51
Elev Up	12.4	Lag =	0.1 Hours				
Elev Dn (Inv)	11.2	Tc =	0.2 Hours				
Slope % = Y	1.30	Tc =	9.0 Minutes				
CN =	51						

**Proposed Drainage Area Parameters - SCS Method**

**Algonquin Prop. Conditions**

**DA-P012**

	CN	Area Ac.	Area SF			
Impervious - Disconnected	98	0.00	0	Weighted CN =		51
Prop. Lots A Soils	50.8	0.44	19092			
Open Space A Soils	39	0.00	0	Connected Impervious:		
Woods A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
CN SubTotal		0.44	19092	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(L^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac	Area SF	
0.44	19092	19092

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	80	S=	9.7	Ia=	1.94	Width:	238.65
Elev Up	12.9	Lag =	0.1 Hours				
Elev Dn (Inv)	10.9	Tc =	0.1 Hours				
Slope % = Y	2.50	Tc =	5.8 Minutes				
CN =	51						

**Proposed Drainage Area Parameters - SCS Method**

**Algonquin Prop. Conditions**

**DA-P013**

	CN	Area Ac.	Area SF				
Impervious - Disconnected	98	0.00	0	Weighted CN =		51	
Prop. Lots	A Soils	50.8	0.56	24195			
Open Space	A Soils	39	0.00	0	Connected Impervious:		
Woods	A Soils	30	0.00	0	Area Ac.	Area SF	% of DA
	CN SubTotal		0.56	24195	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:	Lag = $[(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$	Area Ac	Area SF	
		0.56	24195	24195

Formula: Time of Concentration =  $5 / 3 * \text{Lag}$

Length = l	80	S=	9.7	Ia=	1.94	Width:	302.44
Elev Up	12.9	Lag =	0.1 Hours				
Elev Dn (Inv)	10.9	Tc =	0.1 Hours				
Slope % = Y	2.50	Tc =	5.8 Minutes				
CN =	51						

### Proposed Drainage Area Parameters - SCS Method

#### Algonquin Prop. Conditions

##### DA-Pond1

	CN	Area Ac.	Area SF				
Permanent Pool - Water	98	0.00	0	Weighted CN =		42	
Prop. Lots	A Soils	50.8	0.80	34950			
Open Space	A Soils	39	1.03	44677	Connected Impervious:		
Woods	A Soils	30	0.26	11383	Area Ac.	Area SF	% of DA
	CN SubTotal		2.09	91010	0.00	0	0.00

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:	Lag = $[(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$	Area Ac	Area SF	
		2.09	91010	91010

Formula: Time of Concentration =  $5 / 3 * \text{Lag}$

Length = l	90	S=	13.6	Ia=	2.72	Width:	1011.22
Elev Up	12.5	Lag =	0.1 Hours				
Elev Dn (Inv)	11.7	Tc =	0.2 Hours				
Slope % = Y	0.89	Tc =	13.3 Minutes				
CN =	42						

### Proposed Drainage Area Parameters - SCS Method

#### Algonquin Prop. Conditions

##### REVISED - E012

	CN	Area Ac.	Area SF		
Impervious - Disconnected	98	0.23	9985	Weighted CN =	51

Woods	A Soils	30	0.00	0			
Open Space	A Soils	39	0.89	38578			
Woods	B Soils	55	0.00	0			
	CN SubTotal		1.11	48563			
					0.00	0	0.00

Connected Impervious:  
Area Ac. Area SF % of DA

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac Area SF  
1.11 48563 48563

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	130	S=	9.6	Ia=	1.91	Width:	373.56
Elev Up	12.1	Lag =	0.2 Hours				
Elev Dn (Inv)	11.6	Tc =	0.4 Hours				
Slope % = Y	0.38	Tc =	21.7 Minutes				
CN =	51						

### Proposed Drainage Area Parameters - SCS Method

#### Algonquin Prop. Conditions

#### REVISED - E013

		CN	Area Ac.	Area SF			
Impervious - Disconnected		98	0.28	12348	Weighted CN =		56
Woods	A Soils	30	0.00	0			
Open Space	A Soils	39	0.69	29925			
Woods	B Soils	55	0.00	0			
	CN SubTotal		0.97	42273			
					0.00	0	0.00

Connected Impervious:  
Area Ac. Area SF % of DA

Formula: Potential Max Retention  $S = (1000 / CN) - 10$

Total Drainage Area:

Formula:  $Lag = [(l^{0.8}) * (S+1)^{0.7}] / 1900 * (Y^{0.5})$

Area Ac Area SF  
0.97 42273 42273

Formula: Time of Concentration =  $5 / 3 * Lag$

Length = l	90	S=	7.8	Ia=	1.56	Width:	469.70
Elev Up	12.5	Lag =	0.1 Hours				
Elev Dn (Inv)	11.7	Tc =	0.2 Hours				
Slope % = Y	0.89	Tc =	9.3 Minutes				
CN =	56						

**APPENDIX D**  
**EPA SWMM Model Report**

# EPA SWMM Model Report

Algonquin Subdivision – Residential Subdivision  
Jarvisburg, Currituck County  
October 2, 2024

## General

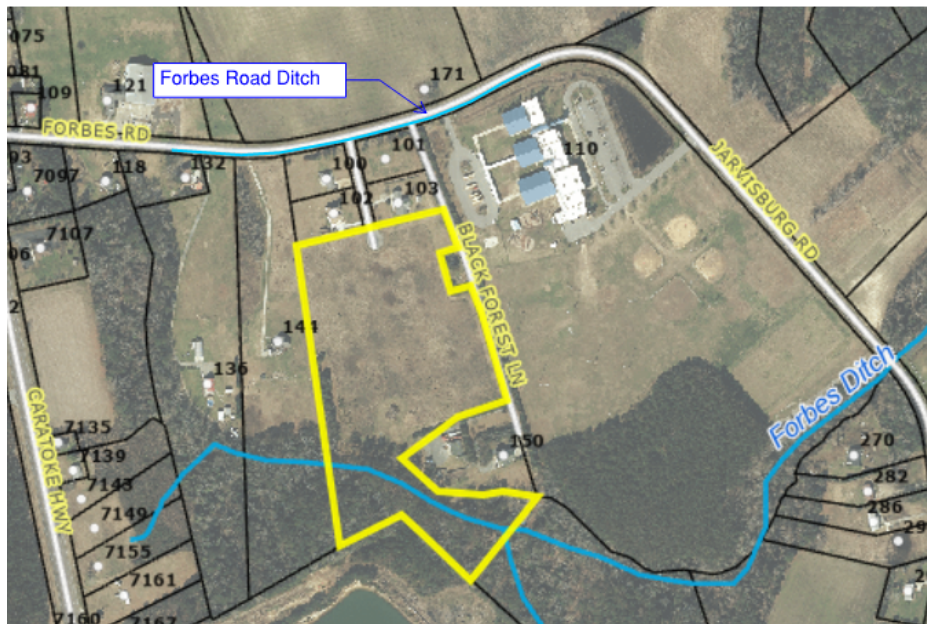
The following report will detail the EPA SWMM Model which was constructed & analyzed in order to provide design guidance for the stormwater management systems to be installed with the construction of the proposed Algonquin residential subdivision in Jarvisburg, NC.

## The Project Site

The Algonquin Subdivision project is a proposed Residential Subdivision to be located on a (+/-) 14.53 acre parcel located at the south end of Indian Kettle Road, approximately 350 feet south of the intersection of Indian Kettle Road and Forbes Road in Jarvisburg, Currituck County, NC. The project will be limited to a maximum of 16.52% Built-Upon-Area (BUA) and, accordingly, an NCDEQ Low Density Stormwater Permit is being pursued for this Project.

The Project Area currently consists of a large open field which is drained via overland flow to the west and south. Runoff that flows to the west flows across an adjoining open field before ultimately draining north to the Forbes Road ditch. Runoff that flows to the south is collected in “Forbes Ditch” which flows to the east and ultimately outfalls to Currituck Sound. Soils across the site consist primarily of loamy sand.

The Algonquin Subdivision consists of 10 single family residential lots with associated subdivision road and infrastructure. Runoff from the proposed subdivision road, lots, and open spaces will be collected in a series of grassed swales and conveyed to the southwest corner of the property. In the southwest corner, a dry infiltration basin, sized to capture and infiltrate runoff from the 10-year rainfall event, will be installed in order to meet Currituck County’s peak flow reduction requirements. This infiltration basin is NOT intended to be an NCDEQ SCM and is not included as a part of the NCDEQ Low Density Stormwater Permit. .



Plans which accompany this submittal are schematic in nature and are intended to provide guidance in how the SWMM Model was constructed. A separate submission of detailed Construction Plans will be submitted for Currituck County Construction Plans review.

## Target Design Standards

Post-construction runoff resulting from a 10-yr, 24 hr storm event will be retained and released at a peak flow rate which does not exceed the 2-yr, 24 hr peak runoff rate for the site in a theoretical wooded pre-development condition. Post-construction runoff resulting from a 100-yr, 24 hr storm event will be retained and released at a peak flow rate which does not exceed the actual calculated pre-construction 100-yr, 24 hr peak runoff rate for the site.

Pre-development peak flow was calculated utilizing the NRCS (SCS) Method as incorporated into EPA SWMM software. Two existing ditches were identified and analyzed as control links. Pre-development (target) peak flows calculated for the links of interest are as follows:

E006-E005	Forbes Ditch section immediately downstream of the project outlet
E012-E011	Forbes Road Ditch section immediately downstream of Co. required off-site improvements

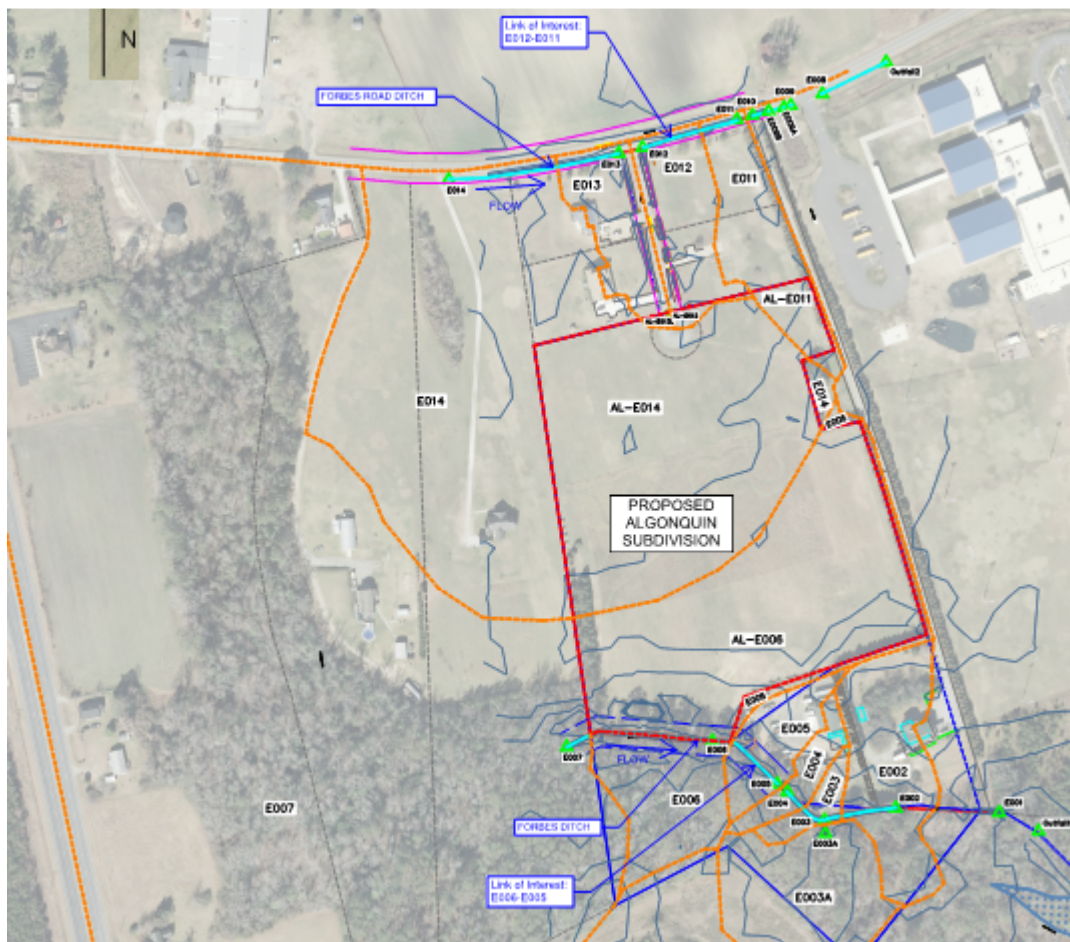
### 2yr-10yr Analysis (Currituck County Req'mt):

	2yr-10yr Pre (cfs)
E006-E005	2.25
E012-E011	0.05



# EPA SWMM Model (Ex. Conditions Aerial Schematic):

Electronic (readable) Copy enclosed with this submission

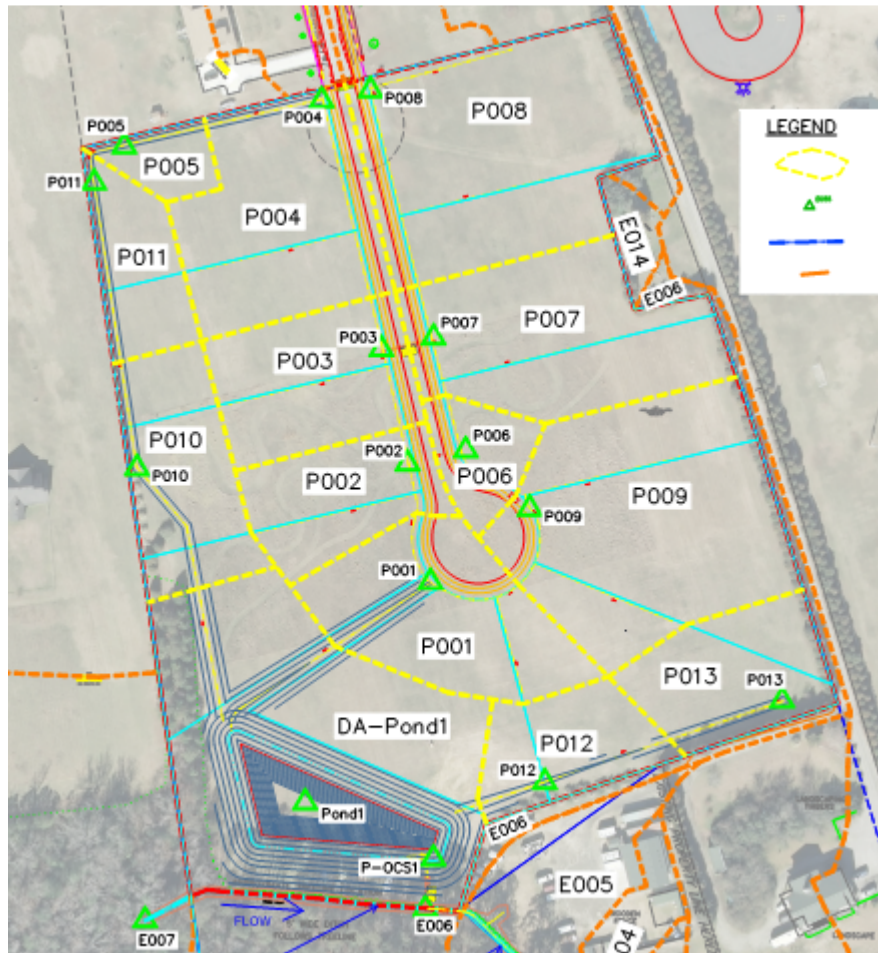






# EPA SWMM Model (Prop. Conditions Aerial Schematic):

Full-Size (readable) Copy enclosed with this submission







## Model Hydrology

Runoff was modeled utilizing the NRCS (SCS) Method for the 2-yr, 10-yr, and 100-yr, 24-hour storm events. NRCS standard Type III (coastal) rainfall distributions were utilized with total rainfall depths of:

2yr, 24hr Total Rainfall Depth = 3.74 in. (Currituck County Standard)  
10yr, 24 hr Total Rainfall Depth = 5.74 in. (NOAA Atlas 14)  
100yr, 24 hr Total Rainfall Depth = 9.54 in. (NOAA Atlas 14)

Runoff was routed through the model utilizing a Dynamic Wave method.

## Model Elements

Model Elements input data is included in the electronic files accompanying this narrative.

## Methodology

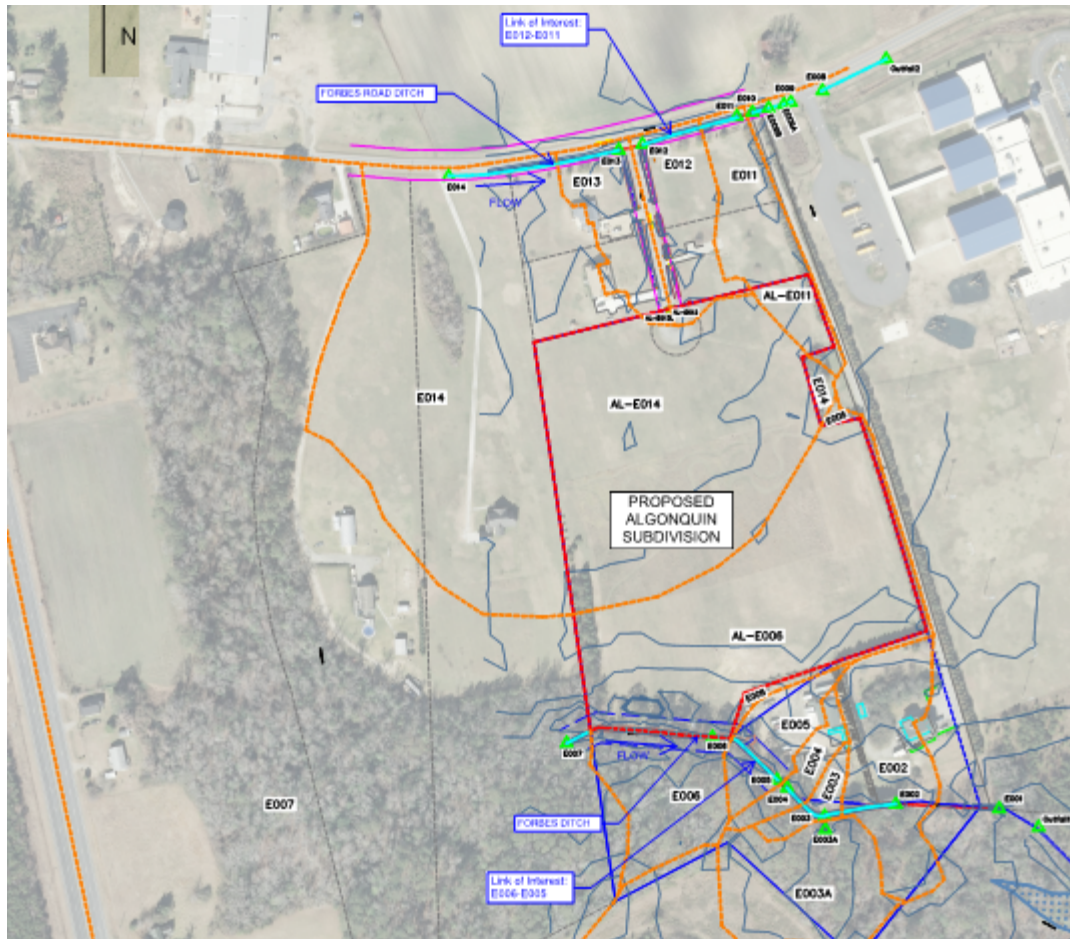
In an examination of the drainage shed, two Links of Interest (LOI) within the drainage system were identified:

E006-E005	Forbes Ditch section immediately downstream of the project outlet
E012-E011	Forbes Road Ditch section immediately downstream of Co. required off-site improvements

The Project Area currently consists of a large open field which is drained via overland flow to the west and south. Runoff that flows to the west flows across an adjoining open field before ultimately draining north to the Forbes Road ditch. Runoff that flows to the south is collected in “Forbes Ditch” which flows to the east and ultimately outfalls to Currituck Sound.

All contributing drainage areas flowing to the two outlets were analyzed and the proposed Project Area was segregated from off-site areas so that on-site conditions can be changed for the pre- / post- construction analysis. LOI were identified at locations within the existing drainage system immediately downstream of the Project Area. These LOI were utilized as the “comparison locations” to analyze the effectiveness of the system design in mitigating post-construction flows to pre-construction levels.

Off-site drainage areas were included in the analysis so that tailwater effects at the outfalls can be properly accounted for in the model.



The Post-Construction design collects runoff from the proposed subdivision road, lots, and open spaces in a series of grassed swales and conveys it to the southwest corner of the property, where a dry infiltration basin, sized to capture and infiltrate runoff from the entirety of the 10-year rainfall event, is proposed.

Existing and Proposed Conditions models were run to generate Peak Flow results for the 2-yr, 10-yr, and 100-yr, 24 hr rainfall events. An overflow weir structure was then designed to allow small overflow from the 100-yr rainfall event in order to restrict the post-construction flows in Forbes Ditch below the pre-construction rate for the 100-yr rainfall event.

The overflow weir is configured as follows:

<b><u>Pond</u></b>	<b><u>Outfall</u></b>	<b><u>Weir Configuration</u></b>
Pond 1*	Forbes Ditch	20' weir @ Elev. 11.4'

\*Note: The dry infiltration basin is identified as “Pond 1” in the model – the original modeling assumed that this feature would be a wet pond. During the design process, the wet pond that was originally modeled was converted to a dry infiltration basin but the naming convention was not changed. Therefore, “Pond 1” is a dry infiltration basin.

## Results:

A complete tabulation of flow & velocity results for the proposed project can be found in the Appendix to the Stormwater Narrative. Summary results pertaining to the design and Currituck County Compliance are as follows:

### Peak Flow Mitigation Results:

2-yr / 10-yr Rainfall Peak Flow Mitigation:

	2yr-10yr Pre* (cfs)	10yr Post (cfs)
E006-E005	2.25	2.25
E012-E011	0.05	0.06**

100-yr Rainfall Peak Flow Mitigation:

	100yr Pre (cfs)	100yr Post (cfs)
E006-E005	8.87	8.85
E012-E011	1.48	1.65**

\* "2-yr / 10yr Pre" results reported represent results from the model with the 10-yr rainfall event applied to all off-site drainage areas and the 2-yr rainfall event applied to the Project Site

\*\*Peak flow within existing ditch E010-E009B is marginally increased in the post-construction condition as compared to the pre-construction condition. This is the result of off-site improvements to Indian Kettle Road requested by the County. All runoff from the Project Site that originally flowed to Forbes Road has been re-routed to the proposed infiltration basin in the post-construction condition. Modeled increases in flow at the Forbes Road ditch are marginal and within the capacity of the existing Forbes Road Ditch.



## Infiltration Basin Drawdown:

Note: Infiltration within the dry infiltration basin was not modeled in EPA SWMM. In the model, the basin simply fills up and the water is trapped. Infiltration basin draw-down calculations, using NCDEQ SCM Manual methodology, are provided below.

<b>Algonquin Subdivision - Jarvisburg</b>					
High Density Infiltration Basin Calculations					
9/25/2024					
<b>DA1 Infiltration Basin</b>					
<b>Above Grade Storage</b>					
SHWT @:	6.54				
Bottom Basin @	9.5				
Top Storage @	11.5				
	<u>Elev:</u>	<u>Area (sf)</u>	<u>Avg Area</u>	<u>Vol</u>	<u>Sum Vol (cf)</u>
	9.5	24734			0
			25762	12881	
	10.0	26790			12881 (Total)
			28931	28931	
	11.0	31072			41812
			32185	16093	
	11.5	33298			<b>57905</b>
(Almost complete capture of 100-yr storm)					

**Algonquin Subdivision**

**Infiltration System Dewatering (drawdown) Calculations**

9/25/2024

Per SCM Manual:

$$T = FS \times (Dv \times 12) / (K \times SA)$$

T = dewatering time (hrs)

FS = factor of safety (use 2.0)

2

Dv = design volume (cf) (use Maximum Volume Stored instead)

K = hydraulic conductivity of soil (in/hr) =

11.27 in/hr

SA = surface area of bottom of infil system (sf)

**Drainage Area 1 - Infiltration Basin**

Actual Max Volume = 57905 cf

Surface Area = 24734 sf

T = 4.99 hrs

T = 0.21 days

**Conclusions:**

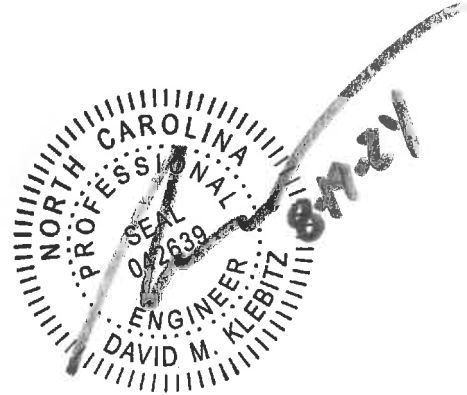
SWMM Modeling of the entire Algonquin Subdivision drainage shed demonstrates that the proposed design complies with the Currituck County Stormwater Ordinance requirement that Post-Development peak flow from the 10-yr, 24 hr rainfall event be maintained at or below the Pre-Development peak flow from a 2-yr, 24hr rainfall event across a theoretical wooded site. The proposed design also reduces post-development peak flow below the pre-development peak flow for the 100-yr, 24 hr rainfall event for the primary outfall (Forbes Ditch) and maintains the 100-yr flows in the Forbes Road Ditch within the ditch's current capacity.

**APPENDIX E**  
**SESCP Flow & Velocities Check**

## APPENDIX I – SEDIMENTATION & EROSION CONTROL CALCULATIONS

Calculations Include the Following:

- EROSION VELOCITY CHECKS
- SEDIMENT BASIN CALCULATIONS
- EROSION CONTROL SKIMMER CALCULATIONS



## **EROSIVE VELOCITY CHECK**

---

Calculations Include the Following:

- 2 Year, Bare Soil Condition; 2 fps Max Velocity
- 10 Year, Vegetated Condition; 4 fps Max Velocity

Note:

This check is performed by highlighting respective summaries of conveyances that exceed maximum permissible velocities as determined by EPA SWMM modeling performed by Deel Engineering, PLLC.

**2 YEAR, BARE SOIL CONDITION; 2 FPS MAX VELOCITY**

---



Link Flow and Velocity - 2yr		
Link	Flow (cfs)	Velocity (fps)
P001-Pond1	0.02	0.24
P002-P001	0.02	0.27
P003-P002	0.00	0.07
P004-P003	0.00	0.00
P005-P004	0.00	0.00
P005-P011	0.00	0.00
P006-P002	0.02	0.41
P007-P006	0.00	0.07
P008-P007	0.00	0.00
P009-P001	0.00	0.00
P010-Pond1	0.00	0.00
P011-P010	0.00	0.00
P012-Pond1	0.00	0.00
P013-P012	0.00	0.00
Pond1OutfallPipe	0.00	0.00

Velocity Check
Bare Soil > 2 fps
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK

\*Estimated peak flows and velocities per EPA SWMM calculations prepared by Deel Engineering, PLLC.

**10 YEAR, VEGETATED CONDITION; 4 FPS MAX VELOCITY**

---

Link Flow and Velocity - 10yr		
Link	Flow (cfs)	Velocity (fps)
P001-Pond1	0.39	0.59
P002-P001	0.29	0.55
P003-P002	0.15	0.32
P004-P003	0.09	0.29
P005-P004	0.01	0.06
P005-P011	0.00	0.08
P006-P002	0.19	1.01
P007-P006	0.12	0.31
P008-P007	0.08	0.30
P009-P001	0.07	0.22
P010-Pond1	0.04	0.28
P011-P010	0.01	0.10
P012-Pond1	0.04	0.52
P013-P012	0.02	0.22
Pond1OutfallPipe	0.01	0.20

Velocity Check
Vegetated > 4 fps
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK

\*Estimated peak flows and velocities per EPA SWMM calculations prepared by Deel Engineering, PLLC.

## **SEDIMENT BASIN CALCULATIONS**

---

**Sediment Basin A**

Requirements

Tributary Disturbed Area*	11.00	acres	
Min. Required Storage Volume	19,800	ft <sup>3</sup>	(1,800 ft <sup>3</sup> /acre)
Estimated 10 year peak inflow**	0.43	cfs	
Min. Required Surface Area	187	ft <sup>2</sup>	(435 ft <sup>2</sup> /cfs)

Design

Choose Avg. Storage Depth	2.0	ft	
Necessary Storage Surface Area	9,900	ft <sup>2</sup>	
Is Necessary Surface Area > Required	YES		
Choose Storage Width	100	ft	
Choose Storage Length	260	ft	
Length to Width Ratio	2.6	OK	
Surface Area Provided	24,790	ft <sup>2</sup>	132.5 times required
Is Surface Area Provided > Required	YES		
Storage Volume Provided	58,079	ft <sup>3</sup>	
Is Storage Volume Provided > Required	YES		2.9 times required

\* Tributary Disturbed Area from Autocad

\*\* Estimated 10 year peak flows per EPA SWMM calculations prepared by Deel Engineering, PLLC.

## **EROSION CONTROL SKIMMER CALCULATIONS**

---



**Sediment Basin A - Skimmer A**

Drawdown Period [ $t_d$ ]	2.00	days	
Drawdown Volume (Temp. pool) [V]	19,800	ft <sup>3</sup>	
Drawdown Discharge Rate [ $Q_d$ ]	9,900	ft <sup>3</sup> /day	0.11 cfs
Choose Skimmer Body Diameter	4.0	in.	1.31 fps
Head on Orifice from Table [H]	0.333	ft.	
Resulting Orifice Diameter [D]	2.7	in.	
Is Orifice Diameter < Skimmer Body Diameter	YES		

Head on orifice of various skimmer sizes

Skimmer Size (in.)	Head on Orifice (ft.)
1.5	0.125
2	0.167
2.5	0.208
3	0.250
4	0.333
5	0.333
6	0.417
8	0.500

Table 6.64a NC Erosion Control Manual

Equations:

$$Q_d = V / t_d \text{ (ft}^3\text{/day)}$$





$$D = \sqrt{Q_d / (2310 * \sqrt{H})} \text{ (inches)}$$

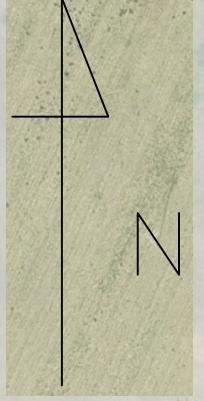
Drawdown volumes based on Min. Required per separate Sediment Basin Calculation.



**ALGONQUIN SUBDIVISION**  
 EXISTING CONDITIONS  
 EPA SWMM MODEL EXHIBIT  
 DRAINAGE AREA, NODE & LINK LAYOUT

**LEGEND**

-  DRAINAGE AREA (MULTIPLE COLORS)
-  EPA SWMM NODE (MULTIPLE COLORS)
-  EPA SWMM LINK (DITCH)
-  EPA SWMM LINK (PIPE)



Link of Interest:  
E012-E011

FORBES ROAD DITCH

FLOW

**PROPOSED  
 ALGONQUIN  
 SUBDIVISION**

Link of Interest:  
E006-E005

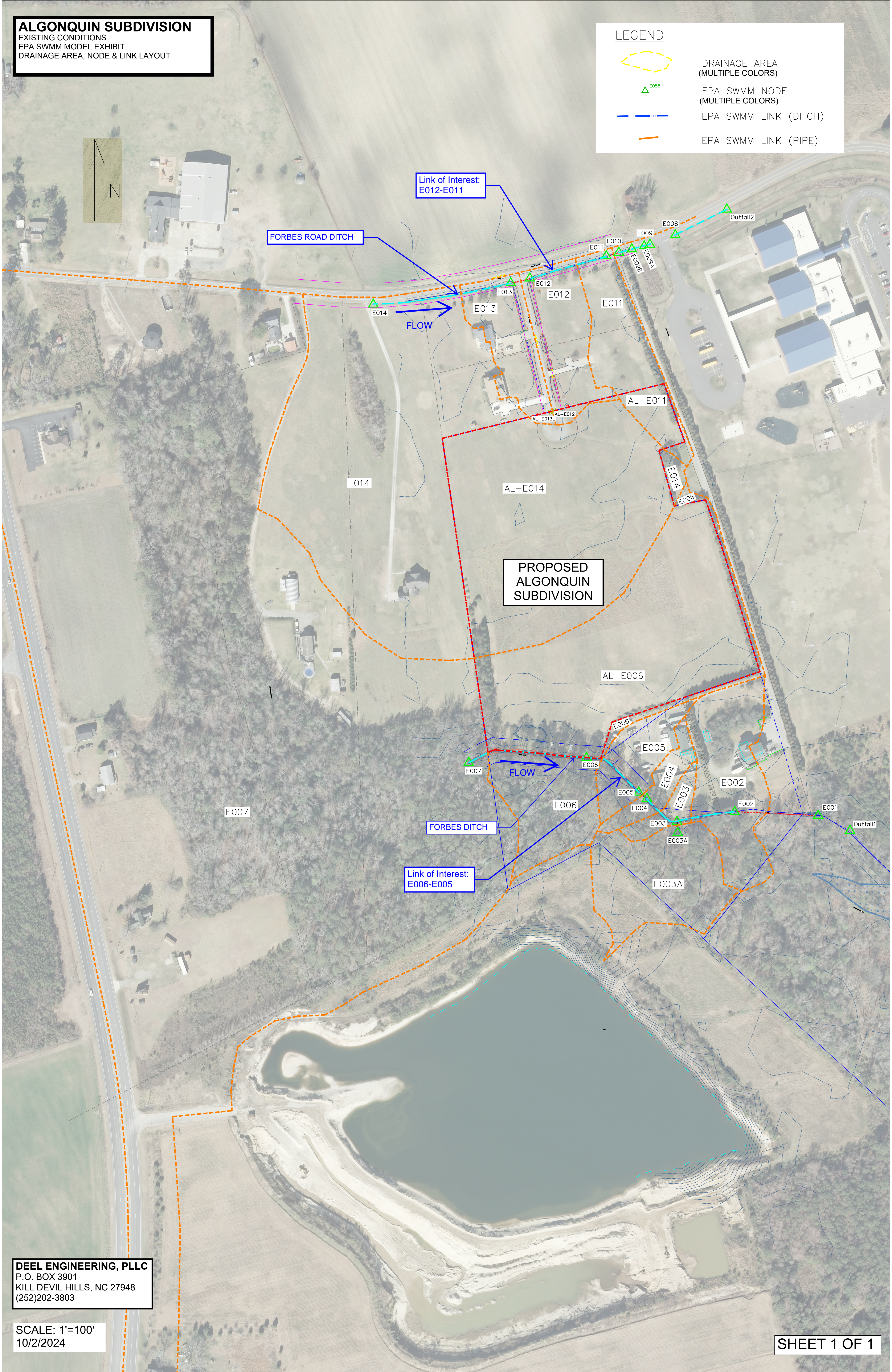
FORBES DITCH

FLOW

**DEEL ENGINEERING, PLLC**  
 P.O. BOX 3901  
 KILL DEVIL HILLS, NC 27948  
 (252)202-3803

SCALE: 1"=100'  
 10/2/2024

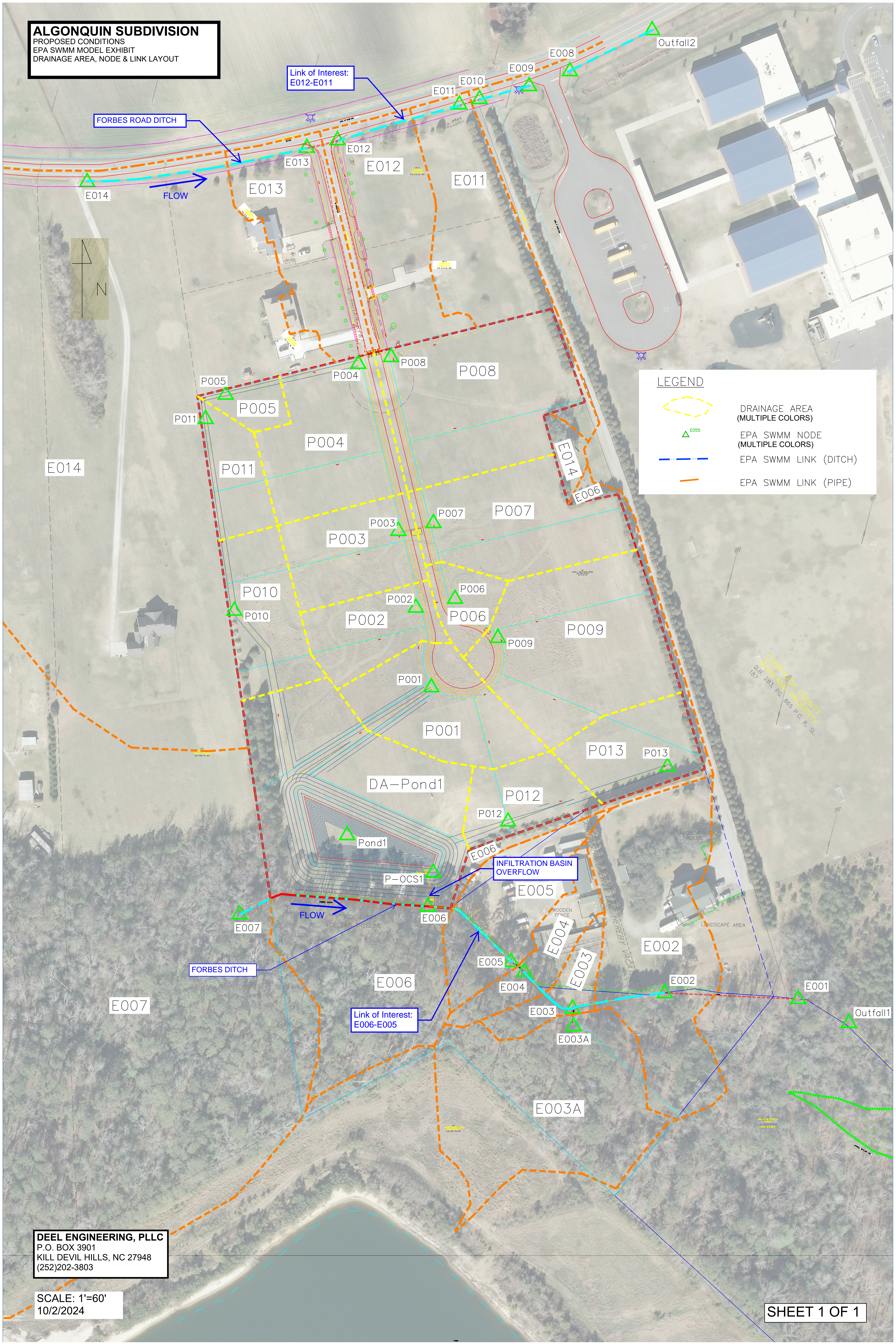
**SHEET 1 OF 1**





**ALGONQUIN SUBDIVISION**

PROPOSED CONDITIONS  
EPA SWMM MODEL EXHIBIT  
DRAINAGE AREA, NODE & LINK LAYOUT



**LEGEND**

- DRAINAGE AREA (MULTIPLE COLORS)
- EPA SWMM NODE (MULTIPLE COLORS)
- EPA SWMM LINK (DITCH)
- EPA SWMM LINK (PIPE)

**DEEL ENGINEERING, PLLC**  
P.O. BOX 3901  
KILL DEVIL HILLS, NC 27948  
(252)202-3803

SCALE: 1"=60'  
10/2/2024