<u>Lunenburg County Planning Commission</u> <u>Agenda for April 4, 2024, at 7:00 p.m.</u>

If anyone desires to speak during Citizen Time or a Public Hearing, please approach the lectern <u>prior</u> to the start of the meeting to provide your name and your address. Please place it under the appropriate section (Citizen Time or corresponding Public Hearing).

- 1. Call to Order
- 2. Roll Call of Members
- 3. Requests for Additions or Modifications to the Agenda*
- 4. Declaration of Conflict-Of-Interest Statements
- 5. Approval of Minutes
- 6. Planning and Economic Development Update
 - a. Director of Planning and Economic Development March Monthly Report
- 7. Citizen Time*(Public Speaking Guidelines are to be followed)
- 8. Public Hearing* for the following:
 - a. <u>15.2-2232 Hearing for CUP 11-23: Conditional Use Permit for Virginia</u> <u>Electric and Power Company dba Dominion Energy Virginia</u> to construct and operate a major public utility (230/500kV Electric Transmission "Unity" Substation) on tax parcel 059-0A-0-18A, located Southeast of 251 Dusty Lane, Kenbridge, VA 23944, consisting of 213.45-acres (of which 49.740-acres has been subdivided for purchase and utilization by Virginia Electric and Power Company) in an A-1 Agricultural zone. The 15.2-2232 process is required by the Code of Virginia prior to any request for a zoning amendment regarding specified projects to be considered. The process determines if the request is in compliance with the Lunenburg-Kenbridge-Victoria Comprehensive Plan.
- 9. Other Business
- 10.Attorney Update-if needed
- 11. Announcement of the Next Meeting Date
 - a. May 2, 2024, at 7:00 p.m. (time may change to 6:00 p.m. depending on the agenda)
- 12.Adjournment

3* To the extent necessary to consider items requiring Commission action, the order of the agenda for a regular Commission meeting shall be as followed, unless by majority vote and the Commission shall confine discussions to matters contained on the agenda. The Chairman may allow any agenda items to be called out of sequence.

7*Any member(s) of the public may speak on any item not on the current agenda under the Public speaking guidelines found in item 8*. At the beginning of the comments by a citizen, additional time may be requested by the speaker. The Chairman shall decide on the amount of time to be provided.

Declaration of Conflict-Of-Interests

DECLARATION OF PERSONAL INTEREST

Pursuant to Virginia Code Section 2.2-3116, I have the following personal interest in Agenda Item#_____, on tonight's meeting agenda: I reside at______, which is located in the immediate vicinity of the activities considered in the proposed agenda item.

Therefore, I am a member of a residential area that is affected by this item on tonight's agenda. However, I am able to participate in this matter fairly, objectively, and in the public interest.

Lunenburg Planning Commission

Date

DECLARATION OF PERSONAL INTEREST

Pursuant to Virginia Code Section 2.2-3116, I have the following personal interest in Agenda Item#______ on tonight's meeting agenda: I am a family member of an applicant or proponent of this agenda item.

I am able to participate in this matter fairly, objectively, and in the public interest; or

I choose not to participate in any discussion or vote of the indicated agenda item.

Lunenburg Planning Commission

Date

DECLARATION OF PERSONAL INTEREST

Pursuant to Virginia Code Section 2.2-3116, I have the following personal interest in Agenda Item #______ on tonight's meeting agenda: I have a personal business interest in ______, which may be discussed during this agenda item.

Because of that interest, I will not participate in any discussion or vote of that agenda item.

Lunenburg Planning Commission

Date

Approval of Minutes

MINUTES OF THE LUNENBURG COUNTY PLANNING COMMISSION March 7, 2024, AT 7:00 PM

The Lunenburg County Planning Commission held its meeting on March 7, 2024, at 7:00 p.m. in the 2nd floor courtroom, Lunenburg Courts Bldg., Lunenburg, VA.

The meeting was called to order at 7:00 p.m.

Mrs. King conducted a roll call of Commissioners, in which Commissioners Drummond, Garrett, Jennings, Tharpe, Thompson, and Trent were present. Commissioner Pennington was absent. Also, in attendance were Assistant County Attorney, Drew DiStanislao and Clerk of the Planning Commission, Taylor N. King.

Chairman Tharpe called for any additions or modifications to the agenda. None were brought forward.

Chairman Tharpe called for declarations of conflict of interest to be disclosed. None were brought forth by any member.

Chairman Tharpe called for action on the minutes of the January 4, 2024, meeting. There being no additions or corrections to the minutes, a motion was made by Commissioner Thompson and seconded by Commissioner Jennings that the minutes be approved, as presented. The motion was unanimously approved.

The Director of Planning and Economic Development monthly report was provided. It was advised that it was in their packet. No questions arose from the Commission.

Chairman Tharpe called for Citizen Time. None came forward. Mrs. King read the public speaking guidelines.

Chairman Tharpe read, <u>CUP 4-23 Conditional Use Permit for Jason and Ella Moses</u>, to construct and operate a Retail Store and Shop as well as Uses and Structures Accessory to Permitted Conditional Uses (livestock auction, flea market, and store selling baked goods/food items) on tax parcels 033A9-05-0-7, 033A9-03-0-2A, 033A9-05-0-8, and 033A9-05-0-9, 368 K-V Road, Victoria, VA 23974, consisting of 3.528-acres in an A-1 (Agricultural) zone.

On a motion by Commissioner Drummond and seconded by Commissioner Thompson and unanimously approved, the Commission entered the public hearing. Jason and Ella Moses presented the history of their family and farming and farming in Lunenburg. They presented the need for farmers to meet to swap and sell. The applicants provided background of purchasing the livestock market and reviving the existing structure. They discussed the desire to provide education on healthy foods, farm fresh goods, animal safety, farming, homesteading, and selfsufficiency, etc. Also, they discussed the addition of the store to sell farm essentials, farm fresh produce and goods, and serve food as a food hub. The greenhouse that will be added will provide job opportunities for those with intellectual disabilities. Commissioner Thompson questioned if there were conditions to address the expansion needs. Chairman Tharpe advised that it is in the recommended conditions. Commissioner Thompson advised it is the desire to see them succeed but does not want issues to arise for expansion. Ella advised that what is seen from the road is not all the space, there is still a large portion of the property that has trees, so there is space for expansion. Commissioner Garrett questioned the entrance. Mrs. King read the letter from VDOT advising that the current entrance is sufficient.

On a motion by Commissioner Thompson, which was seconded by Commissioner Jennings and unanimously approved, the Commission exited public hearing. Mrs. King read the recommended conditions, which included:

- Adhere to the fire code maximum occupancy of the building.
- Provide adequate room for law enforcement, fire, and EMS to make entrance to the parking area, building and surrounding areas on the parcel and can exit the location.
- Maintain licensure through the State of Virginia. Display license as required by the State of Virginia.
- Obtain any required building permits for additional structures anticipated to be added and complete all necessary requirements of the Building Inspector including, but not limited to inspections.
- Obtain a building permit for the store/commercial kitchen within two (2) years of Conditional Use Permit approval. In the event a building permit is not obtained within two (2) years of Conditional Use Permit approval, then the applicant understands that they will be required to apply for a new Conditional Use Permit for the store/commercial kitchen.
- Comply with all Uniform Building Codes.
- Comply with VDOT's requirements for commercial entrance.
- Ensure there is adequate parking on-site to prohibit parking on the side of Route 40.
- Ensure not to impede the flow of traffic on Route 40.
- Comply with the requirements of the Virginia Department of Agriculture including, but not limited to rules, regulations, operating procedures, inspections, licensure, livestock inspection, record retention, etc.
- Adhere to the setback requirements in the Lunenburg County Code for A-1: Agriculture District.
- Adhere to the sign regulations in the Lunenburg County Code for A-1: Agriculture District.
- Agree to provide a potable domestic water supply on-site sewage disposal or sewer service connection necessary to accommodate the customers to the satisfaction of the Virginia Department of Health.
- Properly dispose of and remove any human waste, garbage, or refuse from the Property, including waste contained in any Porta-Johns being used on the Property, in compliance with all local, state, and federal laws, on a weekly basis so as to prevent potentially hazardous conditions and noxious odors.
- Comply with the Virginia Department of Health's requirements for the preparation and service of food, which includes but is not limited to inspections, licensure, etc.

- Contact the Commissioner of Revenues office annually to complete all mandatory reporting requirements including, but not limited to annual reporting of all tangible property.
- Comply with the County's Noise Ordinance.
- No overnight accommodation.
- Ensure that there is not a negative impact on the adjacent residences as well as the school traffic to Lunenburg Middle School and Central High School.
- Comply with all federal, state, and local regulations.

• The Conditional Use Permit is limited to the applicant and does not run with the land. Chairman Tharpe requested the addition of "or as needed" for cleaning of the Porta Johns. On a motion by Commissioner Thompson to recommend approval with the amendment, which was seconded by Commissioner Drummond, the request was unanimously approved for recommendation to the Board of Supervisors.

Chairman Tharpe read, <u>CUP 1-24 Conditional Use Permit for Virginia Shed Company, LLC.</u>, to operate a Retail Store and Shop (sale of portable storage sheds and metal carports) on tax parcel 007-0A-0-2, 134 Patrick Henry Highway, Keysville, VA 23947, consisting of 5.166-acres in an A-1 (Agricultural) zone.

On a motion by Commissioner Thompson and seconded by Commissioner Jennings, which was unanimously approved, the Commissioner entered public hearing. Mr. Kent Weaver, applicant, presented. He advised that it was similar to the Stringfellow CUP; however, he would be adding the sale of metal carports. He advised that he was a driver for the Stringfellows through Old Hickory Buildings. Old Hickory Buildings will be purchasing the property contingent upon Conditional Use Permit approval. The portable storage sheds will be through Old Hickory Buildings, but the metal carports will be through a different company. On a motion by Commissioner Thompson, which was seconded by Commissioner Drummond and unanimously approved, the Commission exited public hearing.

Mrs King read the recommended conditions of approval, which included:

- Adhere to the fire code maximum occupancy of the building
- Comply with all Uniform Building Codes
- Provide adequate room for fire, EMS, and law enforcement to make entrance to the parking area, building, and surrounding areas on the parcel and can exit the location.
- Ensure there is adequate parking, which will not impede the flow of traffic on Hwy 360.
- Adhere to the Lunenburg County Noise Ordinance.
- Comply with the Lunenburg County Code pertaining to signage in an A-1: Agricultural District.
- Trash must be contained and removed from the property on a regular basis.
- No portable storage sheds or metal carports should be placed past the existing structure, closer to Hwy 360. Comply with the Lunenburg County Code pertaining to setbacks in an A-1: Agricultural District.
- The entrance from Hwy 360 must be maintained to ensure the entrance approach is free of mud and debris from delivery trucks, employees, and customers.
- Comply with all federal, state, and local regulations.

• The Conditional Use Permit is limited to the applicant and does not run with the property. Mrs. King requested the addition of the condition to report annually to the Commissioner of Revenue's Office. On a motion by Commissioner Drummond to recommend approval with amendment and seconded by Commissioner Trent, the request was unanimously approved for recommendation to the Board of Supervisors.

Chairman Tharpe read, <u>CUP 1-23 Conditional Use Permit for Oral Oaks Solar</u>, to construct and operate a twelve-megawatt (12 MW), utility-scale solar array located on tax parcel 058-0A-0-29, which has road frontage on Oral Oaks Road and surrounds 5844 Oral Oaks Road, Kenbridge, VA 23944 on three (3) sides. The parcel consists of 128.239 acres in an A-1 (Agricultural) zone.

On a motion by Commissioner Trent and seconded by Commissioner Thompson, which was unanimously approved, the Commissioner entered public hearing. Tom Holt, Amersco, presented the application, where he addressed:

- Project Team Intro
- About Ameresco
- Industry Awards & Analyst Recognition
- Oral Oaks Road Solar Project
- Project Info
- Project Benefits
- Project Location
- Surrounding Area
- Project Aerial
- Site Plan
- Public Health & Safety

Chairman Tharpe asked if there were any questions or comments. Commissioner Garrett requested clarity on the project name, who the substantial cash payment will be going to, will the project be connected to Dominion or Southside, and the timeline of the project. Commissioner Garrett also questioned the wetlands. Mr. Holt advised that it is outside of the fence and presented a map of the site. Commissioner Garrett questioned the type of posts. Mr. Holt advised that it would be drilling posts, which Commissioner Garrett then questioned the wiring that would be left in the ground. Mr. Holt advised that is industry practice. Commissioner Garrett questioned the depth of the wiring. Mr. Holt advised that it 18", but may be just the conduit left in the ground. Commissioner Garrett questioned if it was feasible to require everything to be removed, which Mr. Holt responded that it is feasible. Commissioner Trent questioned the drainage to the south and whether the applicant has discussed this with the adjacent property owner. Mr. Holt advised they would be doing water testing, but they have not spoken with the adjacent property owner. Assistant County Attorney DiStanislao requested Mr. Holt to explain the type of panel. Mr. Holt advised that it would be silicone based panels. Commissioner Garrett questioned what would happen if a panel were broken. Mr. Holt advised that it will not remain on site, it will be recycled or repurposed. On a motion by Commissioner Thompson, which was seconded by Commissioner Drummond and unanimously approved, the Commission exited public hearing.

Linds Edwards, Berkley Group, presented the staff report addressing:

- Planning Commission Role
- Project Development
- Existing Conditions & Zoning
- Adjacent & Surrounding Uses
- Staff Review, Analysis, & Comments
- Staff Recommendation
- Planning Commission Action; Draft Options

The landowner's son, Jason Wilson, requested to address the Commission. On a motion by Commissioner Thompson, which was seconded by Commissioner Drummond and unanimously approved, the Commission entered public hearing. Mr. Wilson addressed the Commission discussing the history of the family's love of nature and property. He noted about the property was not suitable for farming and they are requesting the Commission give her a chance for a retirement. He advised that it would be built behind her house, so it would not be visible from the road. On a motion by Commissioner Thompson, which was seconded by Commissioner Drummond and unanimously approved, the Commission exited public hearing.

Commissioner Trent questioned the slope as there is a difference between the conditions and the report. Assistant County Attorney DiStanislao clarified that there would be no permanent slopes created greater than 8% and no panels on slopes greater than 15%.

A motion was made by Commissioner Trent to recommend approval of the Conditional Use Permit, which was seconded by Commissioner Thompson and unanimously approved. A roll call vote was conducted:

- Commissioner Thompson—Yah—Send it to the Board of Supervisors.
- Commissioner Trent—Yah—One good thing is that it is compact with a buffer, and the issues have been discussed.
- Chairman Tharpe—Yah—A lot of work has gone into this project, conditions have been added, the site is compact and hidden from the road.
- Commissioner Garrett—Yah—Although he had a lot of questions, and most have been answered. He does wish all materials would be removed from the ground, but overall, a good project.
- Commissioner Drummond—Yah—Seems to be a well fit solar plan for the community, and it is out of sight.
- Commissioner Jennings—Yah—For all of the above reasons.

Chairman Tharpe called for Other Business, where he discuss the Comp Plan update.

Chairman Tharpe called for Attorney Update. Assistant County Attorney DiStanislao provided an update on the Comp Plan and it being done in tandem with the solar ordinance, so the study period can be completed.

The announcement of the next Planning Commission meeting on April 4, 2024, at 7:00 p.m. (time may be changed based on the number of agenda items) was made. On a motion by Commissioner Thompson, and seconded by Chairman Tharpe, the meeting was adjourned.

James Tharpe, Chairman Lunenburg County Planning Commission

Taylor N. King, Clerk Lunenburg County Planning Commission

Planning and Economic Development Monthly Report

Planning Commission Meeting—April 4, 2024 Director of Planning and Economic Development's Monthly Report

Events in March:

March 1st: *VX Meeting*—*Nottoway* March 1st: *Ribbon Cutting at South Broad Street Lofts—Kenbridge* March 1st: *Site Visits* March 4th: Work From Home–VGA Marketing Committee Mtg-Virtual March 5th: Work From Home—Oral Oaks Solar Mtg-Virtual March 6th: STO-8 hours March 7th: VGA Board Mtg-South Hill March 7th: JCP Work Session—Victoria Town Hall March 7th: Planning Commission Mtg March 8th: VATI Project Management Mtg-Virtual March 13th: Dogwood Lane Solar Monthly Mtg-Virtual March 13th: VDACS Announcing Spring 2024 Infrastructure Grants Program-Virtual March 20th: CRC Board Mtg-Virtual March 21st: *Building Community Resilience Webinar* March 27th: *STO*—8 hours March 28th: Six Steps to Build TrailNation-Virtual

Planning Commission

- Public hearings were heard for:
 - o CUP 4-23: Jason and Ella Moses
 - CUP 1-24: Virginia Shed Company, LLC.
 - o CUP 1-23: Oral Oaks Solar
- All were recommended for approval to the Board of Supervisors

Broadband

- 911 Fiber (County Owned)
 - Continue to respond to Miss Utility tickets to mark the fiber.
 - Will be working to get the survey of the fiber route and easements with the Town of Victoria.
- VATI/RDOF
 - March monthly report from Kinex (see attached)
 - Responded to public questions pertaining to when they will receive broadband service.
 - For citizens that have questions about the status of the project and when work is anticipated to be completed in their area, they can call 434.392.4804 ext. 7 or go to https://signup.kinextel.net
- Citizen Broadband Advisory Board

<mark>Solar</mark>

- Red Brick Solar
 - \circ The monthly project update meeting was cancelled for the month of March.
 - The developer is still diligently working on the project.
- Dogwood Lane Solar
 - The monthly project update meeting was held on 3.13.24.
 - The building permit documents are with the 3rd party consultant for review.
 - o Coordinating with VDOT for video footage of the roadway prior to land disturbance.
- Laurel Branch Solar

- Continuing to work with the developer.
- Laurel Branch Switchyard
 - Continuing to work with the developer.
- Wheelhouse Solar
 - No update at this time.
- Oral Oaks Solar
 - Continuing to work with the developer.
 - Approval recommended to the Board of Supervisors at the 3.7.24 Planning Commission meeting.
 - Public hearing is scheduled before the Board of Supervisors on April 11, 2024.

Tourism

- Working to finalize locations of the "Welcome to Lunenburg" signs, so Martin Monument can begin on the signs.
 - Directional signs for the Courthouse Complex
 - Working to confirm the design of the signs.
 - Once the designs are confirmed, then the signs will be finished and installed.
- Courthouse Complex Exhibit
 - The draft exhibit has been received.
 - The draft is being reviewed by the Historic Society as a whole and the State Historic Preservation Office.

Grants

- Aided the local business owners to locate funding sources for an economic development venture.

Joint Comprehensive Plan

- The next meeting is scheduled for April 4, 2024, at 4:30 p.m., at the Victoria Town Office.
- Community meetings are scheduled for April 15, 2024 and April 22, 2024.

Other Activities

- Responded to public questions about cell towers and broadband.
- Spoke with citizens to determine if they would need a Conditional Use Permit to operate their business.
- Assisted the CRC with coordination of Disaster Preparedness Activity Books to 2nd Graders in Lunenburg County Public Schools.
- Met with surveyors to answer questions.
- Met with CUP applicant to review application and prepare for March Planning Commission meeting.
- Continue to work on Part 107: Commercial Drone Operator's Course.

UPCOMING dates of interest:

April 4th: Solar Committee Mtg April 4th: Joint Comp Plan Work session April 4th: Planning Commission Mtg April 8th: STO—4 hours April 10th: Dogwood Lane Solar Monthly Mtg April 11th: VATI Project Management Team Mtg—Virtual April 17th: CRC Board Mtg April 19th: Employment Anniversary

			Addresses -	Addresses -		Addresses - Unserved,		
CBG	Feet	Miles	Total	Kinex RDOF	RDOF Passings	No RDOF	VATI Passing	VATI Passing
510499301005	423185	80	798	745		53	Cumberland	Cumberland
510499302002	207795	39	326	321		5	Cumberland	Cumberland
510499302003	37017	7	97	97		0	Cumberland	Cumberland
510499302001	299015	57	309	158		151	Cumberland	Cumberland
510499301004	293602	56	416	277		139	Cumberland	Cumberland
511119303001	499961	95	459	370		89	Lunenburg	Lunenburg
511119302003	350640	66	441	400		41	Lunenburg	Lunenburg
511119301002	200292	38	363	248		115	Lunenburg	Lunenburg
511119302004	463093	88	87	86		1	Lunenburg	Lunenburg
511119303002	311394	59	859	0		0	Lunenburg	Lunenburg
511119301003	183894	35	839	408		431	Lunenburg	Lunenburg
511119302001	79842	15	0	0		0	Lunenburg	Lunenburg
511119302002	487805	92	518	425		93	Lunenburg	Lunenburg
511119301001	348986	66	425	176		249	Lunenburg	Lunenburg
511479303004	324170	61	933	870		63	Prince Edward	Prince Edward
511479302022	200475	38	483	0		0	Prince Edward	Prince Edward
511479302011	21767	4	376	346		30	Prince Edward	Prince Edward
511479302012	1906	0	583	144		439	Prince Edward	Prince Edward
511479302023	196186	37	550	502		48	Prince Edward	Prince Edward
511479303001	230035	44	399	380		19	Prince Edward	Prince Edward
511479303003	349324	66	43	20		23	Prince Edward	Prince Edward
511479301002	250956	48	361	312		49	Prince Edward	Prince Edward
511479303002	71580	14	510	483		27	Prince Edward	Prince Edward
511479303005	485985	92	155	152		3	Prince Edward	Prince Edward
511479302021	245996	47	893	635		258	Prince Edward	Prince Edward
511479301003	429813	81	853	422		431	Prince Edward	Prince Edward
Total	6994714	1325	12076	7977		2757		

RDOF Update Information

As of 3/2/2024					
	Required RDOF	Current RDOF	Required RDOF	Certified RDOF	Current RDOF
	Miles	Miles	Passings	Passings	Installs
Cumberland		16	1598	156	2
Lunenburg		170	2113	735	460
Prince Edward		224	4266	1723	465
Total		410	7977	2614	927

1st Year RDOF Passing Requirement:	1519
2nd Year RDOF Passing Requirement:	2279
3rd Year RDOF Passing Requirement:	3038
4th Year RDOF Passing Requirement:	4557
5th Year RDOF Passing Requirement:	6076
6th Year RDOF Passing Requirement:	7595

16 68 84

VATI Update Information

	As of 3/	2/2024		
		Required VATI		
	Current VATI	Passings -	Current VATI	Current VATI
	Miles	Underserved	Passings	Installs
Cumberland	17	348	188	32
Lunenburg	29	1019	356	39
Prince Edward	37	1390	1236	30
Total	83	2757	1780	101

Still working in much of the non VATI and non RDOF areas in Cumberland.

Total Miles	493
Total Passings	4394

Citizen Time

Statement on Public Speaking for Planning Commission Meetings

Any member of the public addressing the Planning Commission shall approach the lectern, give his or her name and address in an audible tone of voice for the record, and address the Commission as a body rather than speak to any member. Unless further time is granted by the Commission, any member of the public shall address the Commission for a maximum of five (5) minutes, regardless of the number of issues he or she desires to discuss. The proponent of any application, petition, or plan that is the subject of a public hearing shall be allowed to address the Commission for a maximum of fifteen (15) minutes.

Citizen time

Any member of the public may speak on any item not on the current agenda under the above guidelines

Request for additional time to speak

At the beginning of the comments by a citizen additional time may be requested by the speaker. The Chairman shall decide on the amount of time to be provided.

Written comments

Written comments are most helpful in reviewing issues under consideration. Citizen input is valuable and appreciated. The Commission encourages citizens to submit their comments in writing or any information pertaining to the issues at hand. There is not a limit on written comments; clarity and succinctness is encouraged.

Public Hearing

LUNENBURG COUNTY - PUBLIC NOTICE

The Lunenburg County Planning Commission will hold a public hearing on **Thursday, April 4, 2024**, beginning at **7:00 PM** in the 2nd floor Courtroom; Lunenburg Courts Building, Lunenburg, VA 23952 for public input on the following:

15.2-2232 Hearing for CUP 11-23: Conditional Use Permit for Virginia Electric and Power Company dba Dominion Energy Virginia to construct and operate a major public utility (230/500kV Electric Transmission "Unity" Substation) on tax parcel 059-0A-0-18A, located Southeast of 251 Dusty Lane, Kenbridge, VA 23944, consisting of 213.45-acres (of which 49.740-acres has been subdivided for purchase and utilization by Virginia Electric and Power Company) in an A-1 Agricultural zone. The 15.2-2232 process is required by the Code of Virginia prior to any request for a zoning amendment regarding specified projects to be considered. The process determines if the request is in compliance with the Lunenburg-Kenbridge-Victoria Comprehensive Plan.

It is the intention of the Lunenburg County Planning Commission to comply with the Americans with Disabilities Act. Should you need special Accommodations, please contact the County Administration office at 434-696-2142 prior to the meeting date.

The full applications are available for review at:

www.lunenburgva.gov/government/planning commission/pending conditional use permit applica tions.php (select the "2023 Pending Conditional Use Permit Applications"). Written comments will be appreciated, in lieu of oral presentations. Please send comments to taylor@lunenburgva.gov or Lunenburg County, Department of Planning and Economic Development, 11413 Courthouse Road, Lunenburg, VA 23952. CUP 11-23: Unity Substation

Ar	Lunenburg Planning Office oplication for Conditional Use Permit for Solar Facilities Case Number: (Office Use Only)
Applicant Name:	Section 1 Virginia Electric and Power Company dba Dominion Energy Virginia
Owner Name:	Kevin L. Fields - Authorized Representative
Owner Signature:	X Ld-
Contact Name for Appl	ication: Chuck Weil
Physical and Mailing A	ddress: 5000 Dominion BLVD, 3rd Floor, Glen Allen, VA 23060
Phone Number: <u>(804)</u>	239-6450
Email Address: <u>Charle</u>	es.H.Weil@Dominionenergy.com
Fax Number (if applica	ble):
Power of Attorney Nan	ne: Kevin L Fields
Power of Attorney Sign	nature: XLL
As owner or authorized as my knowledge, and I auth reviewing this application	gent of this property, I certify that this application is complete and accurate to the best of norize the Lunenburg County representative(s) entry on the property for purposes of
	Section 2
Demost Number(a)	Property Information
Parcel Number(s):	009-0A-0-16A (SITE)
059-01-0-2 (ACCESS	
Area (ac /sq. ft):	059-0A-0-18A (213 45 ac / 9297882 sq. ft.)
Magisterial District:	
Address:	3832 LAUREL BRANCH ROAD, LUNENBURG COUNTY, VA
Existing Zoning:	A-1 : Agriculture
Requested Use:	Electrical Substation
Does this property have a	historical designation? If yes, describe: <u>NO</u>

Parcel number(s), acreage, magisterial district and existing zoning can be located at: <u>https://lunenburggis.timmons.com/#/mwl</u>. The address can be typed into the "*By Parcel Address*" search bar followed by selecting search. This will pull up the information pertaining to the parcel. The application deadline is the 1^{st} of the month proceeding the month in which the public hearing by the Planning Commission is to be held. The Planning Commission meeting is held on the 1^{st} Thursday of the month at 7:00 p.m. Applications must be submitted in completed form a minimum of forty-five (45) days prior to scheduling a public hearing by the Planning Commission. Notice of incomplete applications will be sent to the applicant at the listed address in Section 1.

The site plan must be submitted as described in the site plan requirements at the time of the application.

Application fee is \$2,500.00, which must be paid at the time of application submission. The applicant will be invoiced for any costs incurred, including but not limited to advertising, postage, legal fees, third-party consulting fees, etc.

Incomplete applications will be returned to the applicant and not docketed for a public hearing

Section 3 Certification of Adjoining Property Owners, Board of Supervisors, and Planning Commissioners

Applicants Certification:

I certify that I have notified all adjacent property owners, to the property which is the subject of this application request, that this application is being filed. Notifications were sent via first class mail.

Adjacent property includes all property touching the project parcel, across roadways, watercourses, railroads, and/or municipal boundaries.

I further certify that the names and addresses below are those of the adjacent property owners as listed in the tax records of the Commissioner of Revenue of Lunenburg County.

Applicant's Signature:	
State of:	
County of:	
Before me,	, on this day of
Name of Notary Public	
, 20,Applicant(s) Name	, personally appeared, and
Given under my hand and seal of office this day of	d consideration therein expressed.
Notary Public's Signature	
Location of Commission	
Registration #:	
Commission Expiration:	
Verification of Identity []Driver's License or Govt./State Identification Card: State:	(Seal)

Adjacent Parcel (Property) Owners				
Parcel Number	Name(s)	Address		
		PO BOX 1288		
059-01-0-2	FBJ GRAT-98 FORESTS LLC,	MOBILE AL 36633		
		PO BOX 1288		
059-01-0-3	FBJ GRAT-98 FORESTS LLC,	MOBILE AL 36633		
		3173 BRICKLAND ROAD		
059-02-0-1	LONG RANDALL S	SOUTH HILL VA 23970		
		3502 LAUREL BRANCH ROAD		
059-02-0-2A	LONG JOHNNY K	KENBRIDGE VA 23944		
	RAGSDALE DOUGLAS	12113 CREEKWOOD TERRACE		
059-03-0-5	INGRAM JR,	KNOXVILLE TN 37934		
	RAGSDALE DOUGLAS	12113 CREEKWOOD TERRACE		
059-03-0-6	INGRAM JR,	KNOXVILLE TN 37934		
		3173 BRICKLAND ROAD		
059-03-0-9	LONG RANDALL S,	SOUTH HILL VA 23970		
		3899 LAUREL BRANCH ROAD		
059-04-0-3	ARD CHRISTOPHER P	KENBRIDGE VA 23944		
		3899 LAUREL BRANCH ROAD		
059-04-0-4	CURLEY GEORGE W & SARA L	KENBRIDGE VA 23944		
		3173 BRICKLAND ROAD		
059-0A-0-18A	LONG RANDALL S,	SOUTH HILL VA 23970		
	YEATTS CLAUDE WESLEY & JAMES	4525 BRICKLAND ROAD		
059-0A-0-39	MELINDA CLAY NASH	KENBRIDGE VA 23944		
	HARVILICZ RONALD M OR	3963 LAUREL BRANCH ROAD		
059-0A-0-41	PATRICIA I	KENBRIDGE VA 23944		
		3832 LAUREL BRANCH ROAD		
059-0A-0-41A	BOAZ DAVID A,	KENBRIDGE VA 23944		
	CURLEY SARA L OR GEORGE	3883 LAUREL BRANCH ROAD		
059-0A-0-41B	W CURLEY	KENBRIDGE VA 23944		
	REESE MARK S SR OR CONNIE	8507 CRAIG MILL ROAD		
059-0A-0-41C	W,	KENBRIDGE VA 23944		
		3502 LAUREL BRANCH ROAD		
059-0A-0-41D	LONG JOHNNY K	KENBRIDGE VA 23944		
		251 DUSTY LANE		
059-0A-0-42	HOLMES CHARLIE ESTATE	KENBRIDGE VA 23944		
	REESE MARK S SR OR	8507 CRAIG MILL ROAD		
059-0A-0-43	CONNIE W,	KENBRIDGE VA 23944		
		3832 LAUREL BRANCH ROAD		
059-0A-0-43A	BOAZ DAVID A	KENBRIDGE VA 23944		
	LONG RONALD E OR	3589 LAUREL BRANCH ROAD		
059-0A-0-44	PATRICIA A	KENBRIDGE VA 23944		
	LONG RONALD E OR	3589 LAUREL BRANCH ROAD		
059-0A-0-44A		KENBRIDGE VA 23944		

*If there are additional adjacent property owners, please include them on a separate sheet. Also, the letter that follows can be completed and mailed to adjacent property owners.

Adjacent Parcel (Property) Owners					
Parcel Number	Name(s)	Address			
	REESE MARK S SR OR	8507 CRAIG MILL ROAD			
059-0A-0-44A1	CONNIE W	KENBRIDGE VA 23944			
	REESE MARK S SR OR	8507 CRAIG MILL ROAD			
059-0A-0-44B1	CONNIE W	KENBRIDGE VA 23944			
		3441 LAUREL BRANCH ROAD			
059-0A-0-44C	NOBLIN AMANDA R	KENBRIDGE VA 23944			
	REESE MARK S SR OR	8507 CRAIG MILL ROAD			
059-0A-0-44C1	CONNIE W,	KENBRIDGE VA 23944			
	HERRINGTON BRENDA	603 WINDSOR AVE			
059-0A-0-46	REESE ET A	LAWRENCEVILLE VA 23868			
		3502 LAUREL BRANCH ROAD			
059-0A-0-53A	LONG JOHNNIE K,	KENBRIDGE VA 23944			
	RAGSDALE DOUGLAS	12113 CREEKWOOD TERRACE			
059-0A-0-54	INGRAM JR,	KNOXVILLE TN 37934			
	LONG JOHNNY K OR	3502 LAUREL BRANCH ROAD			
059-0A-0-54A	LUCILLE S,	KENBRIDGE VA 23944			
059-0A-0-55	CEMETERY				
	YANCEY ROSA LEE OR CARSON W &,	3653 BRICKLAND ROAD			
071-0A-0-9		SOUTH HILL VA 23970			
		PO BOX 1288			
059-01-0-3	FBJ GRAT-98 FORESTS LLC,	MOBILE AL 36633			
		3173 BRICKLAND ROAD			
059-02-0-1	LONG RANDALL S	SOUTH HILL VA 23970			
		3502 LAUREL BRANCH ROAD			
059-02-0-2A	LONG JOHNNY K,	KENBRIDGE VA 23944			
	RAGSDALE DOUGLAS	12113 CREEKWOOD TERRACE			
059-03-0-5	INGRAM JR,	KNOXVILLE IN 37934			
		3173 BRICKLAND ROAD			
059-03-0-9	LONG RANDALL S	SOUTH HILL VA 23970			
		351 RUBIN LANE			
059-0A-0-18	MOORE ANN D,	KENBRIDGE VA 23944			
		13301 KINGSMILL ROAD			
059-0A-0-19	MARTIN DOROTHY S	MIDLOTHIAN VA 2311			
		<u> </u>			
		<u> </u>			

*If there are additional adjacent property owners, please include them on a separate sheet. Also, the letter that follows can be completed and mailed to adjacent property owners.

Notification of Application Submittal to Adjacent Property Owners

To: Adjacent Property Owner of Parcel(s)

From: Dominion Energy Virginia

Date:

The following application will be submitted for review to the Lunenburg County Planning Office:

- [] Rezoning
- [X] Conditional Use Permit
- [] Special Exception

Requested Use or Exception:

This application is for a Conditional Use Permit to construct a 230/500kV Electric Transmission Substation (a major public utility) on a parcel that is zoned A-1 Agricultural.

The application will be available for viewing at the Lunenburg County Planning Office. The Planning Office shall notify all adjacent property owner(s) of the time, day, and location of the public hearing(s) to be held on this application. Should you have questions and/or comments, please contact the Planning Office at 434.696.2142 or <u>taylor@lunenburgva.gov</u>.

Section 4 Applicant's Report Section 8.3(b) of Lunenburg Zoning Ordinance

Every application for a Conditional Use Permit shall be accompanied by a report from the applicant describing the proposed Conditional Use and explaining the manner which it complies with the requirements and standards of this article.

The following questions address the basic issues. The Planning Commission and/or Board of Supervisors may request additional information.

Describe how you plan to develop the property for the proposed use and any associated uses. The site will be cleared and graded for the installation of the substation and associate electrical equipment. A wet pond will be constructed to address stormwater management. An access road will be constructed from Laurel Branch Road to the substation. Describe why the proposed use is desirable and appropriate for the area. What measures will be taken to assure that the proposed use will not have a negative impact on the surrounding vicinity? The construction of the electrical utility substation will help meet growing power demands. The regulations of all local, state, or federal governmental bodies having jurisdiction over the project shall be observed at all times. Describe why the of Operations: The substation will be unmanned with personnel on site only when needed. b. Hours of Operation: 24/7 c. Traffic: Because the substation is unmanned there will be no increase in traffic and will only have personnel on site when maintenance is needed. d. Noise: We always work to design a new substation to meet the sound ordinance requirements of the locality whe substation resides which is typically specified as a specific "A" weighted sound level measured at the substation prope e. Dust/Smoke: There will be no generation of dust or smoke from the proposed substation once constructed. f. Runoff: This project was analyzed for the 1-year and 10-year storm events to show compliance with VA DEQ IIB Stormwater Management Water Quantity Requirements. There is one wet pond on site. g. Intensity of Use: The substation will have be low intensity due to it being an unmanned			
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6.)	Has a survey of the parcel(s) been conducted to include project parcel, property boundaries, existing
	roadways and structures, and adjoining parcels, as well as, the parcel owner? If so, is it included in the
	application packet? A combination of field run survey and GIS was used to show the existing conditions of the
	parcels. Site plan is included in submission packet.

7.)	Ias a site plan been included to note the information required on the survey, but also any new construction
	parking, clearing, planting, etc.? A site plan is included with this application.

8.) Has a business plan been established? If so, please provide it with application submittal. N/A

9.) Describe how the proposed project complies or refutes the goals and objectives noted in the Kenbridge-Victoria-Lunenburg Comprehensive Plan. This can be located the Lunenburg County, Virginia website. The construction of the electrical utility substation will help meet growing power demands. This complies with goals such as "Promote the expansion of a diversified economy"

Requirements for telecom site plans can be found in Section 22 Article III, items 22-81 thru 22-112 of the Lunenburg County Code.

Section 5 Construction Traffic Management Plan (CTMP)

VDOT and the County have identified that the construction phase of solar energy projects have an increased impact on VDOT's secondary road network. These impacts occur as VDOT's secondary road system was not designed to accommodate large numbers of truck traffic that results from the transport of the needed materials for the solar project to the construction sites. The increase in number of employees, also, impacts the roadways. To assist VDOT and the County in mitigating the increased maintenance costs associated with the increased traffic, the County requires the submission and approval of a CTMP. The outline below includes the needed elements for the required CTMP.

Construction Traffic Haul Routes

- Identify the routes to be used to transport supplies to the construction site. The plan shall begin at a VDOT maintained primary route and include all secondary routes to be used to access the site.
- The plan shall, also, include any truck routes that may be used to dispose of excess materials, clearing and grubbing debris, timber harvesting, or other activities that generate truck traffic leaving the site.

Roadway Condition Survey

- The applicant shall document by either photos, videos, or other method acceptable to VDOT and the County, the condition of the secondary roadways identified as haul routes. This condition survey will be utilized to identify areas damaged by the construction traffic that will be required to be repaired to the pre-existing conditions or better.

On-Site Storage, Unloading, and Turn-Around Areas

- The applicant shall demonstrate that they have adequate areas available on-site to unload trucks, store the materials on-site, and provide an area where trucks can turn around on-site prior to entering the VDOT roadway.

On-Site Parking Areas for Construction Employees

- The applicant shall provide an estimated number of employees to be on-site during construction and demonstrate that adequate on-site parking areas are available for the anticipated employees. Employees will not be allowed to park along roadways or within VDOT Right-of-Way (ROW) adjacent to the construction areas.

Dominion Energy Virginia Dominion Energy North Carolina Electric Transmission 5000 Dominion Boulevard Glen Allen, VA 23060 DominionEnergy.com



Sept. 20, 2023

Unity Substation Project (Part of the South Hill Electric Transmission Project)

Dear Neighbor:

At Dominion Energy, we are committed to keeping the communities we serve up-to-date on projects in their area.

To meet the increased energy demand of Lunenburg and surrounding counties, we are planning to build a new substation and related electric transmission infrastructure. This substation is part of a larger project, known as the South Hill Electric Transmission Line and Substation Project, which received approval from the Virginia State Corporation Commission (SCC) in June 2023. This project will allow Dominion Energy to continue providing secure and reliable electric service to the area.

You are receiving this letter because we are applying for a Conditional Use Permit and the substation is located in your area. Enclosed, you will find more information about the application. Pending all necessary approvals, construction is scheduled to begin in early 2024. We will continue to update you as activities progress. Thank you for your patience and understanding as we work to complete this important project.

Sincerely,

The Electric Transmission Project Team

Notification of Application Submittal to Adjacent Property Owners

To: Adjacent Property Owner of Parcel(s):

FBJ GRAT-98 FORESTS LLC 059-01-0-2 059-01-0-3

From: Dominion Energy Virginia

Date:

The following application will be submitted for review to the Lunenburg County Planning Office:

[] Rezoning

[x] Conditional Use Permit

[] Special Exception

Requested Use or Exception:

This application is for a Conditional Use Permit to construct a 230/500kV Electric Transmission Substation (a major public utility) on a parcel that is zoned A-1 Agricultural.

The application will be available for viewing at the Lunenburg County Planning Office. The Planning Office shall notify all adjacent property owner(s) of the time, day, and location of the public hearing(s) to be held on this application. Should you have questions and/or comments, please contact the Planning Office at 434.696.2142 or <u>taylor@lunenburgva.gov</u>.

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C-102 DOMINION SPECIFICATIONS & GENERAL NOTES	C-302 SUBSTATION SITE LAYOUT PLAN 1
C-103 EXISTING CONDITIONS	C-303 SUBSTATION SITE LAYOUT PLAN 2
EROSION AND SEDIMENT CONTROL	GRADING AND DRAINAGE PLANS
C-201 ESC NARRATIVE I	C-401 OVERALL GRADING AND DRAINAGE PLANS
C-202 ESC NARRATIVE II	C-402 ACCESS ROAD PLAN & PROFILE STA.
C-203 ESC PHASE 1 AND DEMOLITION ACCESS ROAD STA. 0+00.00-9+50.00	0+00.00-9+50.00 C-403 ACCESS ROAD PLAN & PROFILE STA. 9+50 00-19+50 00
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C-211 ESC PHASE 2 ACCESS ROAD STA.	C-412 CULVERT DRAINAGE AREAS
19+50.00-29+50.00	C-413 SUBSTATION STORM SEWER DRAINAGE AREAS
C-212 ESC PHASE 2 ACCESS ROAD STA.	PROFILES
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C-218 SEDIMENT BASIN 2	C-505 SUBSTATION INTERIOR STORM SEWER PROFILES 2

OWNER DOMINION ENERGY VIRGINIA d/b/a DOMINION ENERGY **KEVIN FIELDS** DIRECTOR-ELECTRIC TRANSMISSION PROJECT MANAGEMENT PO BOX 26666 RICHMOND, VA 23261 (804) 771-3769 kevin.l.fields@dominionenergy.com

SITE ADDRESS: SITE LAT/LONG: **EXISTING USE:** PROPOSED USE: SITE AREA: PARKING REQUIRED: PARKING PROVIDED: HANDICAP REQUIRED/PROVIDED: TOTAL IMPERVIOUS/% TOTAL: TOTAL PERVIOUS/% TOTAL: TOTAL DISTURBED AREA:

TBD, LUNENBURG COUNTY, VA 36.887696 / -78.141171 AGRICULTURAL ELECTRICAL SUBSTATION 213.45 AC N/A (UNMANNED FACILITY) N/A (UNMANNED FACILITY) 15.98 AC/61%

SITE PERMITTING SPECIALIST 500 DOMINIONI BLVD, 3RD FLOOR GLEN ALLEN, VA 23060 (804)-239-6450 CHARLES.H.WEIL@DOMINIONENERGY.COM

APPLICANT

CHUCK WEIL

DOMINION ENERGY

ZONING: TAX MAP/GPIN NO .:

PROJECT DESCRIPTION:

THIS PROJECT IS FOR THE PROPOSED CONSTRUCTION OF DOMINION ENERGY 'S NEW 500/230KV SUBSTATION IN LUNENBURG COUNTY, VA.

THIS PLAN SET IS THE SITE PLAN FOR THE NEW SUBSTATION, TO BE KNOWN AS UNITY SUBSTATION.

10.27 AC/39%

26.25 AC

RESPONSIBLE LAND DISTURBER

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THE DEWBERRY ENGINEERS INC. SEALING ENGINEER SHALL BE THE RESPONSIBLE LAND DISTURBER (RLD) FOR THIS PROJECT FOR APPROVAL PURPOSES ONLY. ONCE THE PROJECT HAS BEEN AWARDED, THE CONTRACTOR SHALL PROVIDE AN RLD AS NOTED ON PLAN SHEET 1707908-C-201.

ALL EXISTING AND PROPOSED GRADES SHOWN ON THE SITE PLAN ARE DIRT GRADES.

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STORMWATER MANAGEMENT C-601 SWM NARRATIVE C-602 BMP COMPS C-603 BMP MAP C-604 PRE DEVELOPMENT LAND USE MAP C-605 POST DEVELOPMENT LAND USE MAP C-606 PRE DEVELOPMENT DRAINAGE AREA C-607 POST DEVELOPMENT DRAINAGE AREA MAP C-608 PRE DEVELOPMENT CN COMPS C-609 PRE DEVELOPMENT TC COMPS C-610 POST DEVELOPMENT CN COMPS C-611 POST DEVELOPMENT TC COMPS C-612 ROUTING COMPS C-613 ROUTING COMPS C-614 SWM BASIN PLAN C-615 SWM BASIN PROFILES C-616 SWM RISER DETAILS C-617 SWM DETAILS C-618 SWM DETAILS C-619 SWM LANDSCAPE DETAILS C-620 SWM LANDSCAPE PLAN C-621 SWM TOP SOIL DETAILS

C-801 CONSTRUCTION DETAILS

C-901 DRAINAGE CALCULATIONS C-902 DRAINAGE CALCULATIONS

Project Contact Information

CIVIL ENGINEER DEWBERRY ENGINEERS INC. DEREK MARSHALL 4805 LAKE BROOK DR., SUITE 200 GLEN ALLEN, VA 23060 (804) 205-3337 dmarshall@dewberry.com

Site Statistics

A-1: AGRICULTURE 059-0A-0-18A 059-01-0-2 059-03-0-6

IMPORTANT GRADING NOTE



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DOMINION SITE PREPARATION PERFORMANCE SPECIFICATIONS

PREFACE

It is the intent of these specifications to have a completely prepared site for the construction of an electrical facility at the completion of the "work" as indicated on the drawings, specifications, or other documents provided.

The regulations of all local, state, or federal governmental bodies having jurisdiction over the working areas shall be observed at all times.

Any specifications or instructions appearing on the drawings shall have precedence over the written specifications which appear herein. In the event that a discrepancy or omission has occurred, Dominion shall be consulted for resolutions.

All "work" shall be performed in a manner consistent with the best practices of the trades involved.

All "work" shall be performed within the limits of the property / rights-of-way shown on the drawings. The contractor will recognize and abide by all terms and conditions of permits, easements, and agreements relating to the project.

CLEARING AND GRUBBING

Limits for clearing and/or grubbing shall be as defined on the drawings.

Clearing shall consist of removal and disposal of brush, downed timber, logs, standing trees and snags, other growth and any items that would interfere with construction operations

Grubbing shall consist of removal and disposal of stumps, buried logs, roots greater than $\frac{1}{2}$ " diameter, and any other organic material below the ground surface. All cleared

areas will be grubbed unless otherwise noted. Disposal of cleared/grubbed material by burning shall only be used when written approval is obtained from local authorities and Dominion. Otherwise, disposal shall be outside

the limits of Dominion controlled land.

All topsoil and surface soils containing organic material shall be removed from the grubbed area. Topsoil shall be stockpiled for future use in approved locations unless otherwise shown on the drawings.

Topsoil shall not be used as, or mixed with, fill material in the construction of earth embankments unless otherwise shown on the drawings.

Topsoil material used as a surface dressing shall be reasonably free of cinders, debris, and stones. Unsuitable and excess topsoil material shall be disposed offsite.

EARTHWORK

Excavation shall be accomplished by cutting accurately to the cross sections, grades, and elevations shown on the drawings.

Soft, unstable, or otherwise unsatisfactory materials encountered at the required grades shall be removed as directed and replaced with approved, properly compacted material.

Common excavation shall include all material which can be removed by common earth excavation equipment, other than solid rock or boulders and detached pieces of rock, each

exceeding 2 cubic yards in volume.

Rock excavation shall be material which requires the use of pneumatic hammers and/or explosives for removal.

Site Preparation

If earthwork operations are performed during wet seasons, contractor shall avoid operating equipment on saturated soils. Any wet subgrade areas which receive compacted fill shall be drained and allowed to dry.

The exposed subgrades of the building pad and roadbeds shall be proofrolled to detect unsuitable soil conditions. Proofrolling shall be done after a suitable period of dry weather to avoid degrading the subgrade. Proofrolling shall be performed with a heavily loaded dump truck or with similar approved construction equipment. Soft materials encountered shall be completely excavated and replaced with approved fill materials.

Benching:

Benching shall consist of a series of horizontal cuts beginning at the toe of the existing sloped surface and continuing at each vertical intersection of the previous cut. satisfactory material removed during this operation shall be re-compacted along with the new embankment material as generally specified, except moisture content shall be maintained within 10 percent of the optimum.

Benching shall be required for all fill embankments placed on existing slopes as follows:

Slopes steeper than 4:1 but not steeper than $1\frac{1}{2}$:1, the bench shall be at least 6 ft. in width.

Embankment:

Embankment work shall consist of the placement and compaction of fill material above the natural ground or other surface in conformance with the drawings.

Materials

Approved soils used in compacted fills shall be free of debris and fibrous organic material. Frozen material will not be permitted in the fill. Satisfactory materials shall comprise those classified in accordance with the unified soil system, ASTM D-2487 as GW, GP, SW, SP, SM, and SC. These materials shall possess a maximum dry density of 100 #/cu.ft. or greater referenced to ASTM D-698 standard proctor. Soils shall have a liquid limit less than 40 percent and a plasticity index less than 15.

Other materials, when approved by engineering, may be permitted in fill areas.

Unsatisfactory soils include those classified as PT, OH OR OL, CH, MH, CL, and ML, as referenced to ASTM D-2487.

THESE MATERIAL SPECIFICATIONS ARE DOMINION STANDARDS. SATISFACTORY AND UNSATISFACTORY MATERIAL USE SHOULD BE VERIFIED AGAINST SITE-SPECIFIC GEOTECHNICAL ENGINEERING REPORT AND RECOMMENDATIONS. REFER TO THE GEOTECHNICAL REPORT AND ITS ADDENDUMS FOR FINAL DETERMINATIONS.

Compaction:

Compaction equipment shall consist of vibratory or tamping rollers, sheepsfoot roller, pnuematic-tired rollers, three-wheel power rollers, walk behind vibratory rollers, vibratory plate or other approved equipment well suited to the soil being compacted.

Approved fill material shall be placed in uniform horizontal lifts of approximately 8" depth (loose measurement), except for road materials above subgrade elevation and the upper 12" of building pads which require 6" lifts. Where walk behind rollers and vibratory plate compactors are used, the lift thickness shall not exceed 4".

Generally, fills shall be compacted to at least 95 percent of the standard proctor maximum dry density (ASTM D-698), with moisture content ranging between less than 3 percent up to the optimum as determined by the proctor density test. The upper 12" of roadbeds and control enclosure building pads require 98 percent compaction referenced to ASTM D-698, with moisture content maintained within 2 percent of the optimum.

Each successive lift will be placed on firm approved subgrade or compacted fill. Where previous lifts are found to be unacceptable, the area will be scarified, aerated or moistened, re-compacted or removed, and replaced as required.

Drainage.

The fill surface shall be adequately maintained during construction. The surface shall be sloped to achieve sufficient drainage, and to prevent water from ponding on the fill. If precipitation is expected while fill construction is temporarily halted, the surface shall be rolled with rubber-tired or steel-drummed equipment to improve surface runoff. For placement during or after difficult weather conditions, wet or frozen material shall be removed.

Finished Grade Tolerances:

The top of earthwork for substation pad and roadway travel areas shall be within 0.10 ft. above or below the theoretical grade.

Earth Slopes:

Excavated slopes steeper than 3:1 shall be rough graded in a manner to provide horizontal ridges and grooves having an average deviation no greater than 0.75 ft. from the theoretical line of the typical cross section.

Excavated slopes 3:1 or flatter shall be uniformly finished and shall not deviate from the theoretical plane surface by more than 0.50 ft.

Embankment slopes steeper than 3:1 shall be rough graded in a manner to provide horizontal ridges and grooves not more than 0.50 ft. from the theoretical line of the typical cross section.

Embankment slopes 3:1 or flatter shall be uniformly finished and shall not deviate from the theoretical plane surface by more than 0.50 ft.

Rock Slopes

Shall not deviate from a plane surface by more than 2.0 ft. and shall not deviate from their theoretical location by more than 2.0 ft. Measured along any line perpendicular to the theoretical slope line.

MATERIALS/INSTALLATION

Items referenced to the Virginia Department of Transportation shown on the drawings shall conform to the requirements of their latest standards and specifications.

Manufacturers' Items.

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Items referenced to specific manufacturers or brand names shall be subject to any recommendations or limitations pertaining to their installation or use.

Requests for substitutions must be approved by engineering. Sufficient information regarding requests must be received by engineering 10 days in advance of approval.

GENERAL NOTES

GENERAL

- 1. The "Miss Utility Law" requires the contractor to call (1-800-552-7001) at least 3 working days in advance of the planned work to allow time for marking, that the marks be respected and protected, and that excavation be completed carefully.
- 2. The site work for this project shall meet or exceed the project specifications.
- 3. Contractor shall be responsible for site security and job safety. Construction work and materials shall comply with local regulations, Commonwealth of Virginia regulations and codes, and O.S.H.A. Standards.
- 4. Areas disturbed during construction and not restored with impervious surfaces (buildings, pavement, walks, gravel, etc.) shall follow detail provided by Virginia Erosion and Sediment Control Handbook for site specific seeding mixtures in accordance with standard & specification 3.32 unless otherwise stated in project specifications.
- 5. Contractor shall immediately report any discrepancies between existing conditions and contract documents to the owner and engineer.
- 6. Upon award of contract, contractor shall make necessary construction notifications and apply for and obtain necessary permits, pay fees, and post bonds associated with the work indicated on the drawings, in the specifications, and in the contract documents. Do not close or obstruct roadways, sidewalks and fire hydrants without appropriate permits. 7. Contractor shall be responsible for all relocations, (unless otherwise noted on plans) including but not limited to, all utilities, storm drainage, signs, traffic signals & poles, etc. As required. All work shall be in accordance with governing authorities requirements and project specifications and shall be approved by such. All cost shall be included in base bid. 8. Traffic signage shall conform to the Manual for Uniform Traffic Control Devices.
- 9. Areas outside the limits of proposed work disturbed by the contractor's operation shall be restored by the contractor to their original condition at the contractor's expense. 10. In the event that suspected contaminated soil, groundwater, and other media are encountered during excavation and construction activities based on visual, olfactory (smell), or other evidence, the contractor shall stop work in the vicinity of the suspect material to avoid further spreading of the material, and shall notify the engineer immediately so that the appropriate testing and subsequent action can be taken.

11. Contractor shall prevent dust, sediment, and debris from exiting the site and shall be responsible for cleanup, repairs and corrective action if such occurs.

- 12. Damage resulting from construction loads shall be repaired by the contractor at no additional cost to owner. 13. Contractor shall control stormwater runoff during construction to prevent adverse impacts to on site and off site areas, and shall be responsible to repair resulting damages, if any, at no cost to owner.
- 14. All contractor laydown areas shall be located within the limits of disturbance line as shown on this plan.
- 15. A properly zoned/permitted site containing horizontal and vertical control points (benchmarks) and substation control grid baselines will be furnished by Dominion. 16. Contractor shall notify the Dominion Project Engineer through Dominion's Construction Coordinator a minimum of 1 (one) week prior to completion of site grading and prior to
- installation of any fencing and below grade work to allow Dominion to perform in-place soil resistivity testing. 17. Field inspection service may be furnished by Dominion for its use in ensuring compliance with the plans and specifications. The contractor shall be fully responsible for compliance with the technical requirements of the project in all respects. The lack of inspection service at any time by Dominion will not constitute a waiver of this responsibility. Dominion reserves the right to determine compliance with specifications of the "work" being performed or performed at all times.

DEMOLITION

- 1. Contractor shall remove and dispose of existing manmade surface features (if present) within the limit of work including pavements, slabs, curbing, fences, utility poles, signs, etc. unless indicated otherwise on the drawings. Civil site plan does not include demolition of substation electrical components/equipment. See electrical plans, by others, for all electrical demolition.
- 2. Contractor shall dispose of demolition debris in accordance with applicable federal, state and local regulations, ordinances and statutes.

EXISTING CONDITIONS

- 1. Topography: Elevations based on NAVD 88 datum. Horizontal control is Virginia State Plane Coordinates, Zone 4502, NAD 83. Contour interval is one (1) foot. Survey prepared by Dewberry Engineers.
- 2. Geotechnical engineering report prepared by Schnabel Engineering and dated December 1, 2022. 3. Wetlands and USCOE streams are present onsite, delineation performed by C2 Environmental.
- 4. This project is located within FEMA zone "X" as shown on FEMA firm map number 51111C0175B, effective July 20, 2009.

GRADING

- 1. All cut or fill slopes shall be 3:1 or flatter unless otherwise noted. All grades shown within substation are "soil" grades.
- 2. Existing grade contours shown at one (1) foot intervals. 3. Proposed grade contours shown at one (1) foot intervals unless otherwise noted.
- 4. If any existing structures to remain are damaged during construction it shall be the contractor's responsibility to repair and/or replace the existing structure as necessary to return it to existing conditions or better.
- 5. Contractor shall assure positive drainage on all natural and graveled areas. 6. All unsurfaced areas disturbed by grading operation shall receive 6 inches of topsoil (except pad area). Contractor shall stabilize disturbed areas in accordance with governing specifications until a healthy stand of vegetation is obtained.
- 7. Contractor shall notify the Dominion project engineer through Dominion's construction coordinator a minimum of one (1) week prior to completion of site grading and prior to installation of any fencing and below grade work to allow Dominion to perform in-place soil resistivity testing.

DRAINAGE

- Prior to start of construction, contractor shall verify existing ground elevations adjacent to drainage outlets to assure proper transitions between existing and proposed facilities.
- 2. Prior to job completion, ditches shall be cleaned out to remove all silt and debris build-up. 3. Set drainage ditches in accordance with elevations on the grading and drainage plans. Contractor is responsible for positive drainage.

LAYOUT AND MATERIALS

- 1. Dimensions are from the face of curb, face of building, face of wall and center line of pavement markings, unless otherwise noted.
- 2. Any property monumentation disturbed during construction shall be set or reset by a professional licensed surveyor paid by the contractor at no expense to the owner. 3. Prior to start of construction, contractor shall verify existing improvements to assure proper transitions between existing and proposed facilities.
- 4 Existing structures within construction limits are to be abandoned, removed or relocated as necessary. All costs shall be included in base bid.
- 5. Symbols and legends of project features are graphic representations and are not necessarily scaled to their actual dimensions or locations on the drawings. The contractor shall refer to the detail sheet dimensions, manufacturer's literature, shop drawings and field measurements of supplied products for layout of the project features.
- 6. Contractor shall not rely solely on electronic versions of plans, specifications and data files that are obtained from the designers, but shall verify location of project features in accordance with the paper copies of the plans and specifications that are supplied as part of the contract documents.

UTILITIES

- 1. The locations, size and types of existing utilities are shown as an approximate representation only. The owner or its representative(s) have not independently verified this information as shown on the plans. The utility information shown does not guarantee the actual existence, serviceability, or other data concerning the utilities, nor does it guarantee against the possibility that additional utilities may be present that are not shown on the plans. Prior to ordering materials and beginning construction, the contractor shall verify and determine the exact locations, sizes and elevations of the points of connections to existing utilities and shall confirm that there are no interferences with existing utilities and the proposed utility routes, including routes within public rights of way.
- The contractor must call "Miss Utility" (1-800-552-7001) at least 72 hours before excavation to request field location of utilities.
- Where an existing utility is found to conflict with the proposed work, or existing conditions differ from those shown such that the work cannot be completed as intended, the location, elevation, and size of the utility shall be accurately determined without delay by the contractor, and the information furnished in writing to the owner's representative(s) for the resolution of the conflict. Contractor's failure to notify prior to performing additional work releases owner from obligations for additional payments which otherwise may be warranted to resolve the conflict.
- 4. The location, size, depth, and specifications for construction of proposed private utility services shall be installed according to the requirements provided by, and approved by, Dominion.
- 5. All fill material is to be in place and compacted before installation of proposed utilities.
- 6. Lines underground shall be installed, inspected and approved prior to backfilling.
- Contractor is responsible for all necessary inspections and/or certifications required by codes and/or utility service companies. 8. Contractors shall notify operators who maintain underground utility lines in the area of proposed excavation or blasting at least two working days, but not more than ten working days prior to commencement of excavation or demolition.

SITE STONE MAINTENANCE

- 1. The uniform 4 inch covering of VDOT No. 57 stone coarse aggregate site stone covering the substation fenced area (excluding equipment access road areas) must remain loose and non-compacted.
- 2. Local areas where the stone becomes embedded into the subgrade must be immediately repaired by having the stone removed, subbase re-graded, and an application of new or cleaned coarse aggregate.

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3. The stone must always allow water to pass through for grounding protections and environmental water quality integrity.

	REVISIONS			GI	Dewberry Engineers Inc. 4805 Lake Brook Drive, Suite 200 Glen Allen, VA 23060; (p) 804.290.7957	
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EROSION & SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION

This project includes construction of a new Dominion Energy substation. The project also includes construction of a new stormwater management retention pond and retention forebay east of the substation, and a proposed access road south of the substation. The disturbed area is 26.25 AC.

EXISTING SITE CONDITIONS

The existing site is on an undeveloped grassy field.

ADJACENT AREAS

The project area is located east of Laurel Branch Road and to the northeast of Dusty Lane in Lunenburg County, Virginia. The site is bordered by wooded areas to the east and south, a residential property to the west, and an existing Dominion transmission easement to the north. The existing road beginning at Dusty Lane will be utilized for site access along with approximately 1000 LF of new 20' roadbed.

OFFSITE AREAS

Existing access across up to 4 parcels. Source of imported fill (if necessary) will be at the discretion of the contractor, not the engineer. Contractor shall only perform offsite activities that are covered under a separate VSMP permit.

The soils on site are: Appling sandy loam, 2 to 7 percent slopes, moderately eroded (H.S.G. B); Appling sandy loam, 7 to 15 percent slopes, moderately eroded (H.S.G. B); Cecil sandy loam, 2 to 7 percent slopes, eroded (H.S.G. B).

CRITICAL AREAS

ESC measures shall be provided adjacent to wetlands and streams.

EROSION AND SEDIMENT CONTROL MEASURES Construction Entrance (VESCH Std. & Spec. 3.02):

A stabilized stone pad with a filter fabric underliner located at points of vehicular ingress and egress on a construction site. The purpose is to reduce the amount of mud transported onto paved public roads by motor vehicles or runoff. Installed wherever traffic will be leaving a construction site and move directly onto a public road or other paved area.

Silt Fence (VESCH Std. & Spec. 3.05):

A temporary sediment barrier consisting of a filter fabric stretched across and attached to supporting posts and entrenched. Silt fence is installed to intercept and detain small amounts of sediment from disturbed areas during construction in order to prevent sediment from leaving the site and to decrease the velocity of sheet flows and low-to-moderate channel flows

Inlet Protection (VESCH Std. & Spec. 3.07):

A sediment filter or excavated impounding area around a storm drain drop inlet or curb inlet to prevent sediment from entering storm drainage systems prior to permanent stabilization of the disturbed area.

Culvert Inlet Protection (VESCH Std. & Spec. 3.08):

Prevents sediment from entering a culvert and associated drainage system prior to permanent stabilization of disturbed project area.

Diversion Ditch (VESCH Std. & Spec. 3.12):

A channel constructed across a slope with a supporting earthen ridge on the lower side. the purpose is to reduce slope length and to intercept and divert stormwater runoff to stablilzed outlets at non-erosive velocities.

Temporary Sediment Trap (VESCH Std. & Spec. 3.13);

A temporary ponding area formed by constructing an earthen embankment with a stone outlet. he purpose is to detain sediment-laden runoff from small disturbed areas long enough to allow the majority of the sediment to settle out.

Temporary Sediment Basin (VESCH Std. & Spec. 3.14);

A temporary barrier or dam with a controlled stormwater release structure formed by constructing an embankment of compacted soil across a drainageway. The purpose is to detain sediment-laden runoff from disturbed areas in "wet" and "dry" storage long enough for the majority of the sediment to settle out.

Rock Check Dam (VESCH Std. & Spec. 3.20); The contractor shall be responsible for providing an employee who will be responsible in charge of the Erosion and Sediment Control Plan and requirements for the project that is Small temporary stone dams constructed across a swale or drainage ditch. to reduce the velocity of concentrated stormwater flows, thereby reducing erosion of the swale certified by the Virginia Department of Environmental Quality (DEQ) as a Responsible Land Disturber (RLD). The name of the contractor's RLD and copy of his current certification shall be provided to the owner, engineer, and ESC inspector prior to performing any land disturbing activity. or ditch.

Temporary Seeding (VESCH Std. & Spec. 3.31):

The establishment of a temporary vegetative cover on disturbed areas by seeding with appropriate rapidly growing annual plants. Temporary seeding reduces erosion and or plant life. sedimentation by stabilizing disturbed areas that will not be brought to final grade for a period of more than 14 days. Temporary seeding reduces damage from sediment and runoff to downstream or off-site areas, and to provide protection to bare soils exposed during construction until permanent vegetation or other erosion control measures The contractor will maintain a log of inspections, maintenance performed, and repairs made for the inspection by the owner and plan approving authority. can be established. For use where exposed soil surfaces are not to be fine-graded for periods of longer than 14 days. Such areas include denuded areas, soil stockpiles, dikes, dams, sides of sediment basins, temporary roadbanks, etc. A permanent vegetative cover shall be applied to areas that will be left dormant for a period of more than No erosion and sediment control measures shall be removed without approval of the engineer or ESC inspector for the project. Sediment shall be placed in approved location. one (1) year.

Permanent Seeding (VESCH Std. & Spec. 3.32):

The establishment of a perennial vegetative cover on disturbed areas by planting seed. Permanent seeding reduces erosion and decreases sediment yield from disturbed Trees and vegetation adjacent to the actual work area or borrow area are to be protected with temporary fencing (construction safety fence for vegetation) to preserve areas. Permanent seeding stabilizes disturbed areas in a manner that is economical, adaptable to site conditions, and allows selection of the most appropriate plant existing items indicated to remain and to prevent damage to property. material. Permanent seeding also improves wildlife habitat and enhances natural beauty. For use in disturbed areas where permanent, long-lived vegetative cover is needed to stabilize the soil. For use where rough-graded areas will not be brought to final grade for one (1) year or more.

Mulching (VESCH Std. & Spec. 3.35):

Application of plant residues or other suitable materials to the soil surface. Mulching prevents erosion by protecting the soil surface from raindrop impact and reducing the velocity of overland flow. Mulching fosters the growth of vegetation by increasing available moisture and providing insulation against extreme heat and cold. For use in areas which have been permanently seeded. Mulching should occur immediately following seeding. Areas that cannot be seeded because of the season should be mulched with an organic mulch.

Tree Protection (VESCH Std. & Spec. 3.38):

Protects desirable trees from mechanical and other injury during land disturbing and construction activity.

Dust Control (VESCH Std. & Spec. 3.39):

Reducing surface and air movement of dust during land disturbing, demolition and construction activities. The purpose is to prevent surface and air movement of dust from exposed soil surfaces and reduce the presence of airborne substances which may present health hazards, traffic safety problems or harm animal or plant life.

TEMPORARY AND PERMANENT STABILIZATION

During construction: apply temporary and/or permanent seeding as grading operations are completed in areas not to receive pavement or other impervious surfaces.

Post construction: apply topsoil, permanent seeding per specifications and soil amendments (as necessary) to all disturbed surfaces not receiving pavement or other impervious surface.

Temporary seeding shall be applied within seven days to denuded areas that may not be at final grade, but will remain dormant for longer than 14 days and less than one year. This includes, but is not limited to, stockpiles and borrow areas.

Permanent seeding shall be applied and a perennial vegetative covering shall be established on disturbed areas within seven days of being brought to final grade on areas not otherwise protected. Selection of the seed mixture shall depend on the time of year it is to be applied.

Mulching shall be applied to all permanent seeding immediately upon completion of seed application. Mulch liberally during the mid-summer and winter seasons.

See Virginia Erosion and Sediment Control Technical Bulletin No. 4, Nutrient Management for Development Sites, for updated seed mixtures and schedules as well as updated liming, mulching, and fertilizing requirements. See Virginia Erosion and Sediment Control Handbook Std. and Spec. 3.35 for mulching specifications.

STORMWATER RUNOFF CONSIDERATIONS

A Construction General Permit (CGP) for the discharge of stormwater from construction activities is required for projects disturbing 1 acre or greater. Visit the Virginia Stormwater Management Program Permitting website for more information.

Water quantity requirements have been met by utilizing a Level 2 Wet Pond and decreasing the area going to outfall points. The wet pond is located on the south side of the pad.

Water quality requirement of 27.71 lbs/yr of phosphorous removal will be met with the combination of the Level 2 Wet Pond and the purchase of 6.28 lbs/yr of off-site nutrient credits.

CALCULATIONS

See pertinent detail sheets included in this plan set

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SOIL STOCKPILES AND BORROW AREAS

All soil stockpiles shall have silt fence installed on all sides. Stockpiles shall be temporary/permanently seeded depending on time frame for reuse or removal of soil material. All on-site borrow areas (if necessary) shall be delineated on the plan by contractor. Appropriate erosion and sediment control features (ex. silt fence, sediment traps/basins) shall be installed depending on locations and field conditions.

EROSION & SEDIMENT CONTROL MAINTENANCE

In general, the project area shall be checked during or immediately following installation of ESC controls, and at least once in every five days. Within 48 hours after any runoff producing storm event and at the completion of the project to ensure that all erosion and sediment control devices are in working order. Erosion control devices shall be maintained according to the following schedule:

Construction Entrance

The entrance shall be maintained in a condition which will prevent tracking or flow of mud onto public right-of-way. This may require periodic top dressing with additional stone or the washing and reworking of existing stone as conditions demand and repair and/or cleanout of any structures used to trap sediment. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately. The use of water trucks to remove materials dropped, washed, or tracked outside the project area will not be permitted under any circumstances.

Silt Fence

Sediment deposits shall be removed when deposits reach approximately one-half the height of the barrier. Fabric shall be replaced if it has decomposed or become ineffective.

Inlet Protection

The structure shall be inspected after each rain and repairs made as needed. Sediment shall be removed and the trap restored to its original dimensions when the sediment has accumulated to one half the design depth of the trap. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode.

Culvert Inlet Protection The structure shall be inspected after each rain and repairs made as needed. Aggregate shall be replaced or cleaned when inspection reveals that clogged voids are causing ponding problems which interfere with on-site construction. Sediment shall be removed and the impoundment restored to its original dimensions when sediment has accumulated to one-half the design depth. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode and cause sedimentation problems. Temporary structures shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

Diversion Ditch

Before final stabilization, the diversion should be inspected after every rainfall and at least once every two weeks. Sediment shall be removed from the channel and repairs made as necessary. Seeded areas which fail to establish a vegetative cover shall be reseeded as necessary.

Rock Check Dam

Check dams should be checked for sediment accumulation after each runoff-producing storm event. Sediment should be removed when it reaches one half of the original height of the measure. Regular inspections should be made to insure that the center of the dam is lower than the edges. Erosion caused by high flows around the edges of the dam should be corrected immediately.

Seeding

The seeded areas shall be checked regularly to ensure that a good stand is maintained. Areas should be fertilized and re-seeded as needed.

Level Spreader 8.

The level spreader shall be inspected after every rainfall and repairs made, if required. Level spreader lip must remain at 0% slope. The contractor should avoid the placement of any material on and prevent construction traffic across the structure. If the level spreader is damaged by construction traffic, it shall be repaired immediately.

9 Sediment Trap

> Sediment shall be removed and the trap restored to its original dimensions when the sediment has accumulated to one half the design volume of the wet storage. Sediment removal from the basin shall be deposited in a suitable area and in such a manner that it will not erode and cause sedimentation problems. Filter stone shall be regularly checked to ensure that filtration performance is maintained. Stone choked with sediment shall be removed and cleaned or replaced. The structure should be checked regularly to ensure that it is structurally sound and has not been damaged by erosion or construction equipment. The height of the stone outlet should be checked to ensure that the center is at least 1 foot below the top of the embankment.

10. Sediment Basin

The basin embankment should be checked regularly to ensure that it is structurally sound and has not been damaged by erosion or construction equipment. The emergency spillway should be checked regularly to ensure that its lining is well established and erosion-resistant. The basin should be checked after each runoff-producing rainfall for sediment cleanout. When the sediment reaches the clean-out level, it shall be removed and properly disposed of.

The contractor shall be responsible for preventing surface and air movement of dust from exposed soils which may present health hazards, traffic safety problems, or harm animal

PLANT PROTECTION

2. Underground utilities shall be located so that construction will not damage or destroy the plants to remain. Utility trenching shall not be located closer than 1'-0" for each 1" in diameter up to a maximum of 20'-0" for trees to remain.

3. The parking of vehicles and storage of any construction equipment or materials shall not occur under the drip line of trees to be protected.

EROSION & SEDIMENT CONTROL SEQUENCE

Upon implementation and installation of the following areas: trailer, parking, lay down, porta-potty, wheel wash, concrete washout, mason's area, fuel and material storage containers, solid waste containers, etc., immediately denote them on the Stormwater Pollution Prevention Plan (SWPPP) and note any changes in location as they occur throughout the construction process. In addition, note in the SWPPP all areas where fill is imported from or soil is exported to.

- 2. Contractor may complete construction-related activities concurrently only if all preceding ESC measures have been completely installed.
- 3. The actual schedule for implementing ESC measures will be determined by project construction progress.
- 4. No ESC measure(s) shall be removed without approval of the engineer or ESC inspector for the project.
- 5. Additional ESC measures may be required due to site conditions at time of construction activity. Contractor shall provide any additional ESC measures as needed to control sediment run-off at no additional cost to owner.
- 6. Contractor may locate stockpiles for topsoil, suitable fill, and debris within limits of construction. Contractor shall surround stock pile with silt fence, temporary/permanently seed and maintain the stockpile per the VESCH.
- 7. Contractor shall perform construction sequencing such that earth materials are exposed for the least amount of time before they are covered, seeded or otherwise stabilized to prevent erosion.

PHASE I

- Install construction entrance, silt fence, tree protection, and inlet protection. Clear only those areas needed to install ESC measures.
- 2. Install diversion dikes, ditches, sediment basin, and sediment traps prior to land disturbance

PHASE II

6

- . Clear trees and brush. Perform demolition as noted on plan sheets.
- Begin rough grading the site.
- 4. Install culverts and CIP.
- Install check dams as ditches/channels are installed.
- 6. After installation of proposed storm drainage structures, install inlet protection. 7. Temporarily seed and mulch, throughout construction, within 7 days denuded areas that will be inactive for 14 days or more.
- 8. Permanently stabilize areas to be vegetated (6" topsoil and seed) as they are brought to final grade.
- 9. Prepare substation pad for gravel and install gravel.
- 10. Install electrical equipment and security fence.

Soils

36° 53' 41" N

36° 52' 45" N

of the version Soil Survey Ar

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____Hee 3000 lap projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Map Unit Legend

MAP LEGEND Area of Interest (AOI) Spoil Area Area of Interest (AOI Stony Spot Very Stony Spo Soil Map Unit Polygons Wet Spot Soil Map Unit Lines Other Soil Map Unit Points Special Line Feature **Special Point Features** Vater Features Blowout Streams and Cana Borrow Pit Transportatio 🥁 Clay Spot Rails ++++ Closed Depression Interstate Highways US Route Major Roads 20 Background Arsh or swamp Aerial Photography Miscellaneous Water Severely Eroded Spot Sodic Spot

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1B2	Appling sandy loam, 2 to 7 percent slopes, moderately eroded	221.2	30.4%
1C2	Appling sandy loam, 7 to 15 percent slopes, moderately eroded	167.2	23.0%
2C	Ashlar loamy coarse sand, 7 to 15 percent slopes	5.8	0.8%
2D	Ashlar loamy coarse sand, 15 to 25 percent slopes	12.7	1.8%
4B	Caroline sandy loam, 1 to 7 percent slopes	4.5	0.6%
5B2	Cecil sandy loam, 2 to 7 percent slopes, eroded	32.6	4.5%
5C2	Cecil sandy loam, 7 to 15 percent slopes, eroded	33.5	4.6%
6	Chewacla, Toccoa, and Augusta loams, frequently flooded	17.0	2.3%
10B	Helena sandy loam, 1 to 6 percent slopes	2.6	0.4%
10C2	Helena sandy loam, 6 to 10 percent slopes, eroded	4.4	0.6%
14B2	Madison sandy loam, 2 to 7 percent slopes, eroded	101.7	14.0%
14C2	Madison sandy loam, 7 to 15 percent slopes, eroded	67.0	9.2%
14D2	Madison sandy loam, 15 to 30 percent slopes, eroded	12.0	1.6%
15B	Masada fine sandy loam, 2 to 7 percent slopes	0.0	0.0%
19D2	Pacolet sandy loam, 15 to 30 percent slopes, eroded	22.1	3.0%
23D2	Wedowee sandy loam, 15 to 30 percent slopes, eroded	7.3	1.0%
24B	Worsham loam, 0 to 4 percent slopes	4.3	0.6%
W	Water	11.0	1.5%
Totals for Area of Interest		726.9	100.0%

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.
Warning: Soil Map may not be valid at this scale.
Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.
Please rely on the bar scale on each map sheet for map measurements.
Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857)
Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.
This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.
Soil Survey Area: Lunenburg County, Virginia Survey Area Data: Version 15, Aug 31, 2022
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.
Date(s) aerial images were photographed: Apr 25, 2022—May 20, 2022
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Water f Interest			11 (
f Interest	Water		11.0	.0 1.5%	
	iterest			100.0%	
REVISIONS			(Dewberry Engineers Inc. 4805 Lake Brook Drive, Suite 200 Glen Allen, VA 23060; (p) 804.290.7957	
				NITEALTH OF NAME ALTH OF LIC. NO. 036569 NO. 1/29/24 CSC/ONAL ENGINE	
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DPERATIONAL REGIO PROJECT 5017950 DESIGNER	UNIT	B/M No. DATE 8/18/23	STATIC	DN VIRGINIA SCALE AS SHOWN 07908-C-201	
LUNENBL OPERATIONAL REGIO PROJECT 5017950 DESIGNER PROJECT ENGINEEL	UNIT IRG COU	B/M No. DATE 8/18/23 8/18/23	STATIC	DN VIRGINIA SCALE AS SHOWN 07908-C-201	


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EROSION & SEDIMENT CONTROL NOTES

ES-1: Unless otherwise indicated, all vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and Virginia Regulations (9VAC25-840).

ES-2: The plan approving authority must be notified one week prior to the pre-construction conference, one week prior to the commencement of land disturbing activity, and one week prior to final inspection.

ES-3: All erosion and sediment control measures are to be placed prior to or as the first step in clearing.

- ES-4: A copy of the approved erosion and sediment control plan shall be maintained on the site at all times.
- ES-5: Prior to commencing land disturbing activities in areas other than indicated on these plans (including, but not limited to, off-site borrow or waste areas), the contractor shall submit a supplementary erosion control plan to the owner for review and approval by the plan approving authority.
- ES-6: The contractor is responsible for installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the plan approving authority.
- ES-7: All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until final stabilization is achieved.

ES-8: During dewatering operations, water shall be pumped into an approved filtering device.

ES-9: The contractor shall inspect all erosion control measures periodically after each runoff-producing rainfall event. Any necessary repairs or cleanup to maintain the effectiveness of the erosion control devices shall be made immediately.

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REVISIONS				Dewberr 4805 Lake B Glen Allen, VA	wberry [®] y Engineers Inc. rook Drive, Suite 200 23060; (p) 804.290.7957
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20'

40'

SCALE: 1" = 40'



EROSION & SEDIMENT CONTROL LEGEND				
<u>ID</u>	SYMBOL	NAME OF E&S MEASURE	SPEC*	
Œ		CONSTRUCTION ENTRANCE	3.02	
SF	X	SILT FENCE	3.05	
SSF	xx	SILT FENCE W/ WIRE SUPPORT	3.05	
IS		TEMPORARY SEEDING	3.31	
PS		PERMANENT SEEDING	3.32	
MU	(MU)	MULCHING	3.35	
(TP)	TP	TREE PROTECTION	3.38	
DC		DUST CONTROL	3.39	
	LOD	LIMITS OF DISTURBANCE		

* VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK SPECIFICATION NUMBER





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EROSION & SEDIMENT CONTROL LEGEND				
ID	SYMBOL	NAME OF E&S MEASURE	SPEC*	
Œ		CONSTRUCTION ENTRANCE	3.02	
SF	X	SILT FENCE	3.05	
SSF	XX	SILT FENCE W/ WIRE SUPPORT	3.05	
TS		TEMPORARY SEEDING	3.31	
PS		PERMANENT SEEDING	3.32	
		MULCHING	3.35	
TP	TP	TREE PROTECTION	3.38	
DC		DUST CONTROL	3.39	
	LOD	LIMITS OF DISTURBANCE		

* VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK SPECIFICATION NUMBER



0' 20' 40'

3

SCALE: 1" = 40'

80'



0' 20' 40'

SCALE: 1" = 40'

80'



* VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK SPECIFICATION NUMBER







0' 20' 40'

SCALE: 1" = 40'

EROSION & SEDIMENT CONTROL LEGEND				
ID	SYMBOL	NAME OF E&S MEASURE	SPEC*	
Œ		CONSTRUCTION ENTRANCE	3.02	
SF	x	SILT FENCE	3.05	
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MU	(MU)	MULCHING	3.35	
TP	TP	TREE PROTECTION	3.38	
DC	(DC)	DUST CONTROL	3.39	
	LOD	LIMITS OF DISTURBANCE		

* VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK SPECIFICATION NUMBER







	NAME OF E&S MEASURE	*
	SAFETY FENCE	3.01
¥	CONSTRUCTION ENTRANCE	3.02
	SILT FENCE	3.05
	SUPER SILT FENCE	N/A
	INLET PROTECTION	3.07
	CULVERT INLET PROTECTION	3.08
	DIVERSION DIKE	3.09
	SEDIMENT TRAP	3.13
	SEDIMENT BASIN	3.14
		5

I <u>D</u>	SYMBOL	NAME OF E&S MEASURE	*
		ROCK CHECK DAM	3.2
IS	(IS)	TEMPORARY SEEDING	3.3
PS		PERMANENT SEEDING	3.3
		MULCHING	3.3
M	BM	BLANKET MATTING	3.3
IP)	TP	TREE PROTECTION	3.3
C		DUST CONTROL	3.3





NT CONTROL LEGEN	LEGEND EROSION & SEDIMENT CONTROL LEGEN			ID	
NAME OF E&S MEASURE	* _	<u>ID</u>	SYMBOL	NAME OF E&S MEASURE	*
 SAFETY FENCE	3.01			ROCK CHECK DAM	3.20
CONSTRUCTION ENTRANCE	3.02	TS		TEMPORARY SEEDING	3.31
 SILT FENCE	3.05	PS		PERMANENT SEEDING	3.32
 SUPER SILT FENCE	N/A			MULCHING	3.35
INLET PROTECTION	3.07	BM	BM)	BLANKET MATTING	3.36
CULVERT INLET PROTECTION	3.08		TP	TREE PROTECTION	3.38
 DIVERSION DIKE	3.09			DUST CONTROL	3.39
SEDIMENT TRAP	3.13		LODLOD	LIMITS OF DISTURBANCE	
SEDIMENT BASIN	3.14	*	VIRGINIA EROSION & SEDII SPECIFICATION NUMBER	MENT CONTROL HANDBOOK	
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EROSION & SEDIMENT CONTROL LEGEND

	NAME OF E&S MEASURE	* _
	SAFETY FENCE	3.01
¥٤	CONSTRUCTION ENTRANCE	3.02
	SILT FENCE	3.05
	SUPER SILT FENCE	N/A
	INLET PROTECTION	3.07
	CULVERT INLET PROTECTION	3.08
	DIVERSION DIKE	3.09
	SEDIMENT TRAP	3.13
	SEDIMENT BASIN	3.14
		5

EROSION & SEDIMENT CONTROL LEGEND

<u>ID</u>	SYMBOL	NAME OF E&S MEASURE	*
		ROCK CHECK DAM	3.20
TS		TEMPORARY SEEDING	3.31
PS	- PS	PERMANENT SEEDING	3.32
MU	- MU -	MULCHING	3.35
TP	TP	TREE PROTECTION	3.38
		DUST CONTROL	3.39
	LOD-LOD-	LIMITS OF DISTURBANCE	

* VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK SPECIFICATION NUMBER

44

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SOURCE: VDOT DRAINAGE MANUAL SECTION 7.4.6

20'

SCALE: 1" = 40'







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EROSION & SEDIMENT CONTROL LEGEND

	NAME OF E&S MEASURE	* _
	SAFETY FENCE	3.01
¥	CONSTRUCTION ENTRANCE	3.02
	SILT FENCE	3.05
	SUPER SILT FENCE	N/A
	INLET PROTECTION	3.07
	CULVERT INLET PROTECTION	3.08
	DIVERSION DIKE	3.09
	SEDIMENT TRAP	3.13
	SEDIMENT BASIN	3.14
		5

EROSION & SEDIMENT CONTROL LEGEND

ID	SYMBOL	NAME OF E&S MEASURE	*
		ROCK CHECK DAM	3.20
TS		TEMPORARY SEEDING	3.31
PS	- PS	PERMANENT SEEDING	3.32
MU		MULCHING	3.35
TP	TP	TREE PROTECTION	3.38
DC		DUST CONTROL	3.39
	LOD-LOD-	LIMITS OF DISTURBANCE	

* VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK SPECIFICATION NUMBER

44

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DITCH LINING LEGEND



20'

SCALE: 1" = 40'

3

80'



EC-3-TY1

SOURCE: VDOT DRAINAGE MANUAL SECTION 7.4.6







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EROSION & SEDIMENT CONTROL LEGEND

	NAME OF E&S MEASURE	*
	SAFETY FENCE	3.01
¥	CONSTRUCTION ENTRANCE	3.02
	SILT FENCE	3.05
	SUPER SILT FENCE	N/A
	INLET PROTECTION	3.07
	CULVERT INLET PROTECTION	3.08
	DIVERSION DIKE	3.09
	SEDIMENT TRAP	3.13
	SEDIMENT BASIN	3.14
		5

EROSION & SEDIMENT CONTROL LEGEND

<u>ID</u>	SYMBOL	NAME OF E&S MEASURE	*
		ROCK CHECK DAM	3.20
TS		TEMPORARY SEEDING	3.31
PS	- PS	PERMANENT SEEDING	3.32
MU		MULCHING	3.35
TP	TP	TREE PROTECTION	3.38
		DUST CONTROL	3.39
	LOD-LOD-LOD-	LIMITS OF DISTURBANCE	

* VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK SPECIFICATION NUMBER

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EC-3-TY1

20'

SCALE: 1" = 40'

3

80'







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EROSION & SEDIMENT CONTROL LEGEND

	NAME OF E&S MEASURE	* _
	SAFETY FENCE	3.01
¥	CONSTRUCTION ENTRANCE	3.02
	SILT FENCE	3.05
	SUPER SILT FENCE	N/A
	INLET PROTECTION	3.07
	CULVERT INLET PROTECTION	3.08
	DIVERSION DIKE	3.09
	SEDIMENT TRAP	3.13
	SEDIMENT BASIN	3.14
		5

EROSION & SEDIMENT CONTROL LEGEND

<u>ID</u>	SYMBOL	NAME OF E&S MEASURE	*
		ROCK CHECK DAM	3.20
TS		TEMPORARY SEEDING	3.31
PS	- PS	PERMANENT SEEDING	3.32
MU	- MU	MULCHING	3.35
TP	TP	TREE PROTECTION	3.38
		DUST CONTROL	3.39
	LOD-LOD-LOD-LOD-	LIMITS OF DISTURBANCE	

* VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK SPECIFICATION NUMBER

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DITCH LINING LEGEND



SOURCE: VDOT DRAINAGE MANUAL SECTION 7.4.6



3

20'

SCALE: 1" = 40'

80'





JIVIENT CONTROL LEGEND					
	NAME OF E&S MEASURE	*			
	SAFETY FENCE	3.01			
	CONSTRUCTION ENTRANCE	3.02			
	SILT FENCE	3.05			
	SUPER SILT FENCE	N/A			
	INLET PROTECTION	3.07			
	CULVERT INLET PROTECTION	3.08			
	DIVERSION DIKE	3.09			
	SEDIMENT TRAP	3.13			
	SEDIMENT BASIN	3.14			

<u>ID</u>	SYMBOL	NAME OF E&S MEASURE	* -
		ROCK CHECK DAM	3
TS	(IS)	TEMPORARY SEEDING	3
PS		PERMANENT SEEDING	3







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FEBRUARY 16th THROUGH APRIL. ..ANNUAL RYE MAY 1st THROUGH AUGUST 15th ...FOXTAIL MILLET AUGUST 16th THROUGH OCTOBER. ..ANNUAL RYE NOVEMBER THROUGH FEBRUARY 15thWINTER RYE

** SUBSTITUTE SERICEA LESPEDEZA FOR CROWNVETCH EAST OF FARMVILLE, VA. (MAY THROUGH SEPTEMBER USE HULLED SERICEA, ALL OTHER PERIODS, USE UNHULLED SERICEA). IF FLATPEA IS USED IN LIEU OF CROWNVETCH, INCREASE RATE TO 30 LBS./ACRE. ALL LEGUME SEED MUST BE PROPERLY INOCULATED. WEEPING LOVEGRASS MAY BE ADDED TO ANY SLOPE OR LOW-MAINTENANCE MIX DURING WARMER SEEDING PERIODS; ADD 10-20 LBS./ACRE IN MIXES

MULCHING, Std. & Spec. 3.35

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	TABLE 3.35-A ORGANIC MULCH MATERIALS AND APPLICATION RATES							
1		RATES						
	MULCHES:	PER ACRE	PER 1000 SQ. FT.	NOTES:				
	STRAW OR HAY	1½– 2 TONS (MINIMUM 2 TONS FOR WINTER COVER)	70-90 LBS.	FREE FROM WEEDS AND COARSE MATTER. MUST BE ANCHORED. SPREAD WITH MULCH BLOWER OR BY HAND.				
	MINIMUM 1500 LBS.35 LBS.DO NOT USE AS MULCH FOR WINTER COVER OR DURING HOT, DRY PERIODS.* APPLY AS SLURRY.							
	*WHEN FIBER MULCH IS THE ONLY AVAILABLE MULCH DURING PERIODS WHEN STRAW SHOULD BE USED, APPLY AT A MINIMUM RATE OF 2000 LBS./AC. OR 45 LBS./1000 SQ. FT.							

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PERMANENT SEEDING, Std. & Spec. 3.32

FILTER CLOTH-

<u>Plant Selection</u>

Refer to Table 3.32-D for Seeding Mixtures for the Piedmont Area. Seedbed Preparation

In the Piedmont Region, apply 2 tons/acre pulverized agricultural grade limestone (90 lbs./1,000 sq, ft,). 2. Fertilizer

Shall be applied as 1000 lbs./acre of 10-20-10 (23 lbs./sq. ft.) or equivalent nutrients. Lime and Fertilizer shall be incorporated into the top 4-6 inches of the soil be discing or other means.

1. Certified seed will be used for all permanent seeding whenever

2. Legume seed should be inoculated with the inoculant appropriate to the species. Seed of the Lespedizas, the Clovers and the Crownvetch should be scarified to promote uniform germination. 3. Apply seed uniformly with a broadcast seeder, drill, culti-packer seeder, or hydroseeder on a firm, friable seedbed. Seeding depth

should be 1/4 to 1/2 inch. All permanent seeding must be mulched immediately upon completion

of seed application. <u>Irrigation</u>

New seedings should be provided with adequate moisture. <u>Re-seeding</u>

6

Inspect seeded areas for failure and make necessary repairs and re-seedings within the same season, if possible.



SEED							
APPLICATION DATES	SPECIES	APPLICATION RATES					
SEPT. 1 – FEB. 15	50/50 MIX OF ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) & CEREAL (WINTER) RYE (SECALE CEREALE)	50—100 (Ibs./acre)					
FEB. 16 – APR. 30	ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM)	60-100 (Ibs./acre)					
MAY 1 — AUG. 31	GERMAN MILLET	50 (Ibs./acre)					







SEDIMENT BASIN SUMMARY TABLE													
		WET ST	ORAGE	DRY ST	ORAGE								
SEDIMENT BASIN	DRAINAGE AREA (acres)	VOLUME REQUIRED (Cu. Yd.)	VOLUME PROVIDED (Cu. Yd.)	VOLUME REQUIRED (Cu. Yd.)	VOLUME PROVIDED (Cu. Yd.)	BOTTOM ELEVATION	RISER CREST ELEVATION	DEWATERING ORIFICE DIAMETER (Inches)	DEWATERING DEVICE ELEVATION	CLEAN OUT ELEVATION	DESIGN HIGH WATER ELEVATION	EMERGENCY SPILLWAY ELEVATION	TOP OF DAM
1	15.39	1031.13	3130.62	1031.13	5707.15	375.00	382.75	6	379.00	378.00	383.17	N/A	38



Donal Curren			
Label	Scenario	Return Event (years)	Н
Wet Pond (IN)	Post- Development 25 year	25	
Wet Pond (OUT)	Post- Development 25 year	25	
	E	levation	-Vc
F	Pond Elevation (ft)		
		379.00 380.00 381.00 382.00 383.00 384.00 385.00 386.00	





N/F FBJ GRAT-98 FORESTS LLC D.B. 262, PG. 783 TAX PARCEL 059-01-0-3

N

N/F

JOHNNY K. LONG D.B. 363, PG. 22 TAX PARCEL 059-02-0-2A



SCALE: 1" = 200'

PLANS FOR INFORMATION ONLY. 3. PROPOSED PARCEL ACREAGE IS 41.29 ACRES. HATCH LEGEND EQUIPMENT PATHWAY SEE DETAIL SHT. C-801 ACCES ROADS SEE DETAIL SHT. C-801 DAM TOP ACCESS ROAD SEE DETAIL SHT. C-801 SUBSTATION GRAVEL PAD SEE DETAIL SHT. C-801 Dewberry* Dewberry Engineers Inc. 4805 Lake Brook Drive, Suite 200 Glen Allen, VA 23060; (p) 804.290.7957 REVISIONS EALTH OF SKEITH A. SCHOLTEN J Lic. No. 036569 1/29/24 REV DATE DESCRIPTION DEWBERRY PROJECT NO.: 50157950 **Dominion** Energy° OVERALL SITE LAYOUT PLAN UNITY SUBSTATION LUNENBURG COUNTY VIRGINIA SCALE AS SHOWN OPERATIONAL REGION B/M No. PROJECT5017950NAMEDATESHEET:1707908-C-301DESIGNERMFR8/18/23 PROJECT ENGINEER GA 8/18/23 DRAWING: 1707908-C-301.dwg KAS 8/18/23 APPROVED BY 2 - 1

GENERAL NOTES

NOT ALL SUBSTATION COMPONENTS SHOWN FOR CLARITY.
ELECTRICAL GENERAL ARRANGEMENT PLANS BY OTHERS; SHOWN ON CIVIL



WEST ACCESS ROAD ALIGNMENT TABLE							
NUMBER	BEARING	LENGTH (FT)	RADIUS	START POINT	END POINT		
C13	N 40°20'48" W	77.44'	55.03'	PC:0+00.01 N:3482231.42 E:11587536.10	PT:0+77.45 N:3482285.69 E:11587490.00		
C14	N 41°14'24" W	75.73'	55.00'	PC:2+60.60 N:3482315.33 E:11587309.27	PT:3+36.33 N:3482367.88 E:11587263.20		
C15	N 5°23'55" W	25.17'	200.00'	PC:4+75.32 N:3482506.81 E:11587258.85	PT:5+00.49 N:3482531.85 E:11587256.48		
C16	N 5°23'55" W	25.17'	200.00'	PC:5+31.97 N:3482562.94 E:11587251.56	PT:5+57.14 N:3482587.98 E:11587249.19		
L12	N 80°41'13" W	183.14'		N:3482285.69 E:11587490.00	N:3482315.33 E:11587309.27		
L13	N 1°47'36" W	138.99'		N:3482367.88 E:11587263.20	N:3482506.81 E:11587258.85		
L14	N 9°00'14" W	31.48'		N:3482531.85 E:11587256.48	N:3482562.94 E:11587251.56		
L15	N 1°47'36" W	586.57'		N:3482587.98 E:11587249.19	N:3483174.27 E:11587230.83		

SWM ACCESS ROAD ALIGNMENT TABLE							
NUMBER	BEARING	LENGTH (FT)	RADIUS	START POINT	END POINT		
C19	N 43°56'53" E	84.38'	55.00'	PC:0+00.00 N:3482231.42 E:11587536.10	PT:0+84.38 N:3482286.39 E:11587589.09		
C20	N 43°37'41" E	83.76'	55.00'	PC:5+33.97 N:3482307.91 E:11588038.16	PT:6+17.73 N:3482362.85 E:11588090.53		
C21	N 26°23'24" E	50.67'	55.00'	PC:7+06.26 N:3482451.37 E:11588090.53	PT:7+56.92 N:3482495.17 E:11588112.26		
C22	N 30°12'11" E	43.34'	55.00'	PC:8+54.48 N:3482554.18 E:11588189.95	PT:8+97.83 N:3482590.68 E:11588211.19		
L18	N 87°15'21" E	449.59'		N:3482286.39 E:11587589.09	N:3482307.91 E:11588038.16		
L19	N 0°00'00" E	88.53'		N:3482362.85 E:11588090.53	N:3482451.37 E:11588090.53		
L20	N 52°46'48" E	97.56'		N:3482495.17 E:11588112.26	N:3482554.18 E:11588189.95		
L21	N 7°37'35" E	30.96'		N:3482590.68 E:11588211.19	N:3482621.36 E:11588215.30		





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	WES	T ACCESS ROA	D ALIGNMI	ENT TABLE	
NUMBER	BEARING	LENGTH (FT)	RADIUS	START POINT	END POINT
C17	N 44°06'12" E	88.12'	55.00'	PC:11+43.71 N:3483174.27 E:11587230.83	PT:12+31.83 N:3483230.99 E:11587285.81
C18	S 45°00'00" E	86.39'	55.00'	PC:14+27.07 N:3483230.99 E:11587481.05	PT:15+13.47 N:3483175.99 E:11587536.05
L15	N 1°47'36" W	586.57'		N:3482587.98 E:11587249.19	N:3483174.27 E:11587230.83
L16	N 90°00'00" E	195.24'		N:3483230.99 E:11587285.81	N:3483230.99 E:11587481.05
L17	S 0°00'00" W	82.04'		N:3483175.99 E:11587536.05	N:3483093.95 E:11587536.05

GENERAL NOTES

1. NOT ALL SUBSTATION COMPONENTS SHOWN FOR CLARITY. PLANS FOR INFORMATION ONLY. 5. 20' HIGH SUBSTATION SECURITY FENCE: 20 - 20 -

HATCH LEGEND



SEE DETAIL SHT. C-801 SUBSTATION GRAVEL PAD

SEE DETAIL SHT. C-801

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GENERAL NOTES

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- 1. NOT ALL SUBSTATION COMPONENTS SHOWN FOR CLARITY.
- 2. ELECTRICAL GENERAL ARRANGEMENT PLANS BY OTHERS; SHOWN ON CIVIL PLANS FOR INFORMATION ONLY.
- 3. LIMITS OF DISTURBANCE AND PROPOSED TREE LINE SHOWN SPACED FOR GRAPHICAL CLARITY. DO NOT CLEAR BEYOND LIMITS OF DISTURBANCE.
- 4. ALL GRADES SHOWN ARE SOIL GRADES AND PAVEMENT GRADES.

0' 100' 200' 400' SCALE: 1" = 200' Dewberry* Dewberry Engineers Inc. 4805 Lake Brook Drive, Suite 200 Glen Allen, VA 23060; (p) 804.290.7957 REVISIONS ----SKEITH A. SCHOLTEN Lic. No. 036569 1/29/24 DATE REV DESCRIPTION DEWBERRY PROJECT NO.: 50157950 Dominion Energy° OVERALL GRADING AND DRAINAGE PLANS UNITY SUBSTATION LUNENBURG COUNTY VIRGINIA OPERATIONAL REGION B/M No. SCALE AS SHOWN PROJECT 5017950 NAME DATE SHEET: 1707908-C-401 GA 8/18/23 DRAWING: PROJECT ENGINEER 1707908-C-401.dwg KAS 8/18/23 APPROVED BY - 1



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SEE SHEET 1707908-C-406 FOR SUBSTATION GRADING PLAN







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ROAD CENTERLINE EXISTING TREELINE PROPOSED TREELINE PROPERTY LINE 20' SUBSTATION SECURITY FENCE ACCES ROADS SEE DETAIL SHT. C-801 DAM TOP ACCESS ROAD SEE DETAIL SHT. C-801 SUBSTATION GRAVEL PAD SEE DETAIL SHT. C-801

EQUIPMENT PATHWAY SEE DETAIL SHT. C-801

WETLANDS

OUTLET PROTECTION

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GENERAL NOTES

- 1. NOT ALL SUBSTATION COMPONENTS SHOWN FOR CLARITY. PLANS FOR INFORMATION ONLY.
- 4. 20' HIGH SUBSTATION SECURITY FENCE: 20 - 20 - 20 -

GRADING LEGEND

SP = GROUND ELEVATION EP = EDGE OF PAVEMENT ELEVATION FL = DITCH FLOWLINE ELEVATION

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SUBSTATION GRADING AND DRAINAGE PLAN 1 🗛

SHOWN ON CIVIL PLANS FOR LOCATION ONLY. SEE CONFIDENTIAL FENCE PLANS (BY OTHERS) FOR DETAILED CONSTRUCTION PLANS. 5. ALL GRADES SHOWN ARE SOIL GRADES AND PAVEMENT GRADES.

2. ELECTRICAL GENERAL ARRANGEMENT PLANS BY OTHERS; SHOWN ON CIVIL 3. LIMITS OF DISTURBANCE AND PROPOSED TREE LINE SHOWN SPACED FOR GRAPHICAL CLARITY. DO NOT CLEAR BEYOND LIMITS OF DISTURBANCE.

Dewberry* Dewberry Engineers Inc. 4805 Lake Brook Drive, Suite 200 Glen Allen, VA 23060; (p) 804.290.7957 1/29/24 REV DATE DESCRIPTION DEWBERRY PROJECT NO.: 50157950 **Dominion** Energy[°]

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GENERAL NOTES

GRADING LEGEND

SP = GROUND ELEVATION EP = EDGE OF PAVEMENT ELEVATION FL = DITCH FLOWLINE ELEVATION

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OUTLET PROTEC CLASS A1 RIPRA LENGTH=15' WIDTH=15' DEPTH=2.2' W/ FILTER FABRI		D
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PROJECT BACKGROUND & SUMMARY

Dominion Energy Virginia ("Dominion") will be constructing an electrical utility substation in Lunenburg County, Virginia to meet growing power demand in the area and increase reliability. The proposed substation will be on a 213.45 ac parcel of land acquired by Dominion. The substation will be accessed by way of a proposed gravel access road connecting to Dusty Ln.

LIMITS OF DISTURBANCE & FLOW PATTERNS

The limits of disturbance for this project are 25.78 acres. The existing site has one main outfall point. The Pre-Development Drainage Map shows five drainage areas, but all five ultimately flow to the same point further downstream in Flat Rock Creek. The main outfall point is located next to a swale on the east side of the property where the concentrated flow from the pond's outfall is converted to sheetflow with the a level spreader and enters the existing natural channel. The drainage area that flows into the stream in the middle of the property consists of 2-15% slopes.

A Level 2 Wet Pond will be placed east of the substation pad, directly west of the stream (N36° 53' 15.59000", E281° 51' 36.13000"). The proposed SWM basin will capture 16.02 acres, while 0.16 acres within project limits will bypass the basin to reach the main outfall point as uncontrolled runoff. Stormwater coming from the substation pad will be directed through the pretreatment forebay by two grass-lined channels. From the forebay, the majority of the stormwater will flow through a wetland cell and then into the permanent pool. The basin outfalls through a riser structure with a 3" orifice, 1ft x 0.5ft orifice, 6ft x 6ft riser, and 24" RCP culvert. The discharge from the wet pond is directly converted to sheetflow using a level spreader.

HYDROLOGIC METHODS

Stormwater management design for the site has been developed in accordance with Virginia Stormwater Management Program Regulations Part II-B criteria, 9VAC25-870-62 through 9VAC25-870-92. Rainfall-frequency-depth values for 24-hr storm events for Lunenburg County were obtained from NOAA Atlas 14 Precipitation Frequency Data Server. Soil groups were obtained from the National Resources Conservation Service (NRCS) Web Soil Survey. Times of concentration, runoff curve numbers, and routing of the stormwater management basin were determined with the SCS method. The required phosphorous load reduction was calculated using the Virginia Runoff Reduction Method (VRRM). Time of concentration calculations use a maximum sheet flow length of 100', before conversion to another flow type, as required by TR-55 User Manual, January 2009.

NOTE - RUNOFF CURVE NUMBERS

Runoff curve numbers were determined based on soil type and land cover. All gravel stone, compacted and non-compacted, were considered impervious for water quality. A curve number of 98 was used for the impervious areas. For water quantity, a CN value of 85 for B Soils (89 for C Soils) was used for the non-compacted substation pad gravel. This CN value is referenced in Dominion's Technical Memo, "Non- Compacted Stone - Pervious versus Impervious Substation Engineering - SWM Guidance" dated October 9, 2014.

WATER QUANTITY

This project was analyzed for the 1-year and 10-year storm events to show compliance with VA DEQ IIB Stormwater Management Water Quantity Requirements. There are 5 outfalls on this project. See sheets 1707908-C-606 and 1707908-C-607 for the pre and post developed drainage area maps. There is 1 stormwater quantity control structure provided for the project (Wet Pond) with the addition of two level spreaders.

Outfall 1

Pre-development outfall 1 outfalls along the east side of the project site into an unnamed tributary of Flat Rock Creek primarily as shallow concentrated/sheet flow. Post-development outfall 1 includes controlled runoff from Wet Pond #1 which is comprised of onsite runoff and some uncontrolled sheet flow. The controlled runoff discharging from Wet Pond #1 flows through a level spreader and is returned to sheet flow before exiting the project site into conserved open space. This allows for runoff reduction credit to be taken, and in turn, produces a curve number reduction for the drainage area for the 1-, 10-, and 100-year events. The curve number reduction is shown on the energy balance spreadsheet for outfall 1 on Sheet 1707908-C-602. Since the runoff is being converted to sheetflow, per Virginia code section 9VAC25-870-66 D, no further water quantity controls are required.

The level spreader was sized per GM 22-2012 3.305.2. See Sheet 1707908-C-617 for the computed level spreader design results. The 10-year velocity from the wet pond outfall of 0.37 fps was determined to be non-erosive with an allowable velocity of 1.7 fps from VESCH Table 5-14 (GM 22-2012 3.305.2.C.1). The receiving area was deemed to be in good condition. The level spreader was designed based on a sheet flow depth of 0.1 feet. The length of sheetflow to the down-gradient natural stormwater conveyance system of 75 feet was less than the allowable maximum sheet flow length of 78 feet.

The Outfall 1 level spreader was also designed based on additional design criteria outlined in the VA DEQ Stormwater Design Specifications for Sheet Flow to Conserved Open Space. The required minimum sheetflow length of 50 feet to the down-gradient SWM Conveyance System was met with a length of 75 feet. In addition, a more conservative level spreader length requirement of 13 feet for every 1 cfs results in a design length of 15 feet.

One- and ten-year discharges for outfall 1 are summarized below in table 1.

Return Event	Q _{pre} - _{outfall}	$\mathbf{Q}_{post-pond}$	Q _{post-uncont}	Q _{post-outfal}
	CFS	CFS	CFS	CFS
1-year	0.40	0.19	0.03	0.19
10-year	4.07	1.14	0.28	1.15

DA 1

100-YR STORM EVENT:

The basin has greater than 2 foot of freeboard for the 100-yr storm conditions: the 100-yr storm elevation is 383.04, while the top of dam elevation is 386.0'.

See 1707908-C-612 for basin routing calculations. See 1707908-C-614 for basin detail.

Outfall 2

Stormwater exits the property in pre-development as a combination of sheet flow/concentrated flow and discharges into the unnamed tributary of Flat Rock Creek on the north-east side of the Substation. Post-development outfall 2 includes concentrated runoff. An allowable discharge for the 10-year flood protection event is achieved, with the post-development peak flow rate computed at the outfall being less than the pre-development peak flow rate.

The energy balance flow rate (i.e. 1-year event) was met for outfall 2. Refer to energy balance computations on Sheet 1707908-C-602 .

One- and ten-year discharges for outfall 2 are summarized below in table 2.

	DA 2			
Return Event	Q _{pre} - _{outfall}	Q _{allowable}	Q _{undist.}	Q _{post-outfall}
	CFS	CFS	CFS	CFS
1-year	0.79	0.79		0.22
10-year	14.64	14.64	5.76	7.65

Outfall 3

Stormwater exits the property in pre-development as a combination of sheet flow/concentrated flow and discharges into the unnamed tributary of Flat Rock Creek on the west side of the Substation. Post-development outfall 3 includes shallow concentrated runoff. Attenuation from the road culvert was accounted for in the model. See Sheet 1707908-C-613 for the routing results. An allowable discharge for the 10-year flood protection event is achieved, with the post-development peak flow rate computed at the outfall being less than the pre-development peak flow rate.

The energy balance flow rate (i.e. 1-year event) was met for outfall 3. Refer to energy balance computations on Sheet 1707908-C-602.

One- and ten-year discharges for outfall 3 are summarized below in table 3.

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	DA 3					
Return Event	Q _{pre} - _{outfall}	Q _{allowable}	Q post-culvert	Q _{post-uncont}	Q _{post-outfall}	
	CFS	CFS	CFS	CFS	CFS	
1-year	1.01	1.01	0.73	0.58	1.01	
10-year	10.53	10.53	2.19	1.91	3.42	

Outfall 4

Stormwater exits the property in pre-development as a combination of sheet flow/concentrated flow and discharges into the unnamed tributary of Flat Rock Creek on the south side of the Substation. Post-development outfall 4 includes concentrated runoff. An allowable discharge for the 10-year flood protection event is achieved, with the post-development peak flow rate computed at the outfall being less than the pre-development peak flow rate.

The energy balance flow rate (i.e. 1-year ev 1707908-C-602 .

One- and ten-year discharges for outfall 4 are summarized below in table 4.

DA 4				
Return Event	Q _{pre} - _{outfall}	Q _{allowable}	Q _{undist.}	Q _{post-outfall}
	CFS	CFS	CFS	CFS
1-year	0.68	0.68		0.68
10-year	7.61	7.61	0.71	3.67

Outfall 5

Stormwater exits the property in pre-development as a combination of sheet flow/concentrated flow and discharges into the unnamed tributary of Flat Rock Creek on the south side of the Substation. Post-development outfall 5 includes concentrated runoff which flows through a level spreader and is returned to sheet flow before exiting the project site into conserved open space. Since the runoff is being converted to sheetflow, per Virginia code section 9VAC25-870-66 D, no further water quantity controls are required. See Sheet 1707908-C-617 for the computed level spreader design results.

The level spreader was sized per GM 22-2012 3.305.2. The 10-year velocity from the wet pond outfall of 1.16 fps was determined to be non-erosive with an allowable velocity of 1.7 fps from VESCH Table 5-14 (GM 22-2012 3.305.2.C.1). The receiving area was deemed to be in good condition. The level spreader was designed based on a sheet flow depth of 0.1 feet. The level spreader length of 15 feet was longer than the design length of 13.6 feet. The length of sheetflow to the down-gradient natural stormwater conveyance system of 20 feet was less than the allowable maximum sheet flow length of 90.3 feet.

DA 5		
Return Event	Q _{pre-dev}	Q _{post-dev}
	CFS	CFS
1-year	0.01	0.38
10-year	0.21	1.42

Outfall 1A

Outfall 1A includes the onsite, uncontrolled portion of drainage area 1 that cannot be represented by a concentrated flow rate at a specific location, but rather discharges as disconnected sheet flow over a width of approximately 430 ft and is analyzed independently from outfall 1. See Table 1A for a summary of the results.

DA 1A - Uncontrolled Sheet Flow			
Return Event	Q _{pre}	Q _{post-pond}	
	CFS	CFS	
2-year	0.11	0.33	
10-year	0.43	0.74	

Per the code of Virginia, Section 9VAC25-870-66D, the sheet flow for the 2- and 10-year events has increased for the post-development conditions. Considering the 10-year post-development flow rate of 0.74 cfs, which discharges over a total width of 430 feet, the resulting velocity is 0.1 fps. The sheet flow has been analyzed according to VESCH Table 5-14 (GM 22-2012 3.305.1.B.1) and it was determined that the velocities are non-erosive and that the receiving area is in good condition. In addition, it was verified that the sheetflow depth was less than 0.1 feet for the entire length of the flow path with a depth of 0.01 feet. The length of sheetflow of 100 feet was determined to be less than the maximum allowable of 242 feet. See this sheet for the disconnected sheetflow computations.

Outfall 3A

Outfall 3A includes the onsite, uncontrolled portion of drainage area 3 that cannot be represented by a concentrated flow rate at a specific location, but rather discharges as sheet flow over a width of approximately 900 ft and is analyzed independently from outfall 3. See Table 3A for a summary of the results.

DA 3A -	DA 3A - Uncontrolled Sheet Flow			
Return Event	Q _{pre}	$Q_{post-pond}$		
	CFS	CFS		
2-year	0.24	0.83		
10-year	1.00	1.81		

Per the code of Virginia, Section 9VAC25-870-66D, the sheet flow for the 2- and 10-year events has increased for the post-development conditions. Considering the 10-year post-development flow rate of 1.81 cfs, which discharges over a total width of 900 feet, the resulting velocity is 0.1 fps. The sheet flow has been analyzed according to VESCH Table 5-14 (GM 22-2012 3.305.1.B.1) and it was determined that the velocities are non-erosive and that the receiving area is in good condition. In addition, it was verified that the sheetflow depth was less than 0.1 feet for the entire length of the flow path with a depth of 0.02 feet. The length of sheetflow of 140 feet was determined to be less than the maximum allowable of 142 feet. See this sheet for the disconnected sheetflow computations.

Outfall 4A

Outfall 4A includes the onsite, uncontrolled portion of drainage area 4 that cannot be represented by a concentrated flow rate at a specific location, but rather discharges as sheet flow over a width of approximately 500 ft and is analyzed independently from outfall 4. See Table 4A for a summary of the results.

DA 4A -	Uncontrolle	ed Sheet Flow
Return Event	Q _{pre}	Q _{post-pond}
	CFS	CFS
2-year	0.09	0.54
10-year	0.43	1.12

Per the code of Virginia, Section 9VAC25-870-66D, the sheet flow for the 2- and 10-year events has increased for the post-development conditions. Considering the 10-year post-development flow rate of 1.12 cfs, which discharges over a total width of 500 feet, the resulting velocity is 0.1 fps. The sheet flow has been analyzed according to VESCH Table 5-14 (GM 22-2012 3.305.1.B.1) and it was determined that the velocities are non-erosive and that the receiving area is in good condition. In addition, it was verified that the sheetflow depth was less than 0.1 feet for the entire length of the flow path with a depth of 0.02 feet. The length of sheetflow computations.

WATER QUALITY

As calculated by the Virginia Runoff Reduction Method Spreadsheet v3.0, the required phosphorous removal of 27.32 lbs/yr will be addressed through a combination of the Level 2 Wet Pond and a level spreader discharging to conserved open space, achieving a removal of 27.55 lbs/yr.

See Sheet 1707908-C-602 for water quality calculations. See Sheet 1707908-C-603 for VRRM land cover maps.

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The energy balance flow rate (i.e. 1-year event) was met for outfall 4. Refer to energy balance computations on Sheet



STORMWATER MANAGEMENT FOREBAY

A metered rod will be installed in the wet pond forebays to measure the depth of sediment. The rod should be placed the flow path. See Sheet 1707908-C-618 for a metered rod detail.

MAINTENANCE PLAN AND SCHEDULE

The purpose of this section is to present a general maintenance program for the Level 2 Wet Pond. It should be note the maintenance tasks presented herein will not eliminate the possibility that a structural or subsurface deficiency ma develop in the future, nor will they eliminate all potential for dam failure. However, they significantly reduce the risk of problems and make it possible to catch potential problems early, before they can develop into serious threats to SWI facility. The owner is responsible for maintenance to the extent not maintained by the County.

1. EMBANKMENT

The purpose of the tasks described below is to maintain a thick, healthy grass cover over the embankment which is f from brush and trees. This type of cover will assist in the inspection of the dam.

- A. The embankment should be mowed at least twice during the growing season with the last cutting occurring and of the growing season. The grass cover should not be cut to less than 4" in height.
- B. The embankment should be limed, fertilized and seeded at least once every two years in the fall after the grosseason. Consulting with the Virginia Tech Cooperative Extension Service or the local soil and water conservation district office is recommended to determine the precise lime and fertilizer requirements.
- C. All erosion gullies and pathways noted during the growing season should be backfilled with topsoil, reserved protected (e.g. mulched) until revegetated.
- D. All bare areas and pathways on the embankment should be properly seeded and protected in order to elimin the potential for erosion.
- E. All animal burrows noted during mowing operations should be backfilled and compacted. Measures should taken to eliminate the animals from the area.
 E. Any vise acyer or brush should be removed from the dem embeddment, riser structure and dewnstream cult
- F. Any vine cover or brush should be removed from the dam embankment, riser structure and downstream cult outlet and outlet items (e.g. endwalls, wingwalls, etc.) at least twice per year. This will allow for proper inspective concrete in the spillway.

2. OUTLET STRUCTURE

- A. The outlet structure should be kept clear of debris which could impede flow into the structure. Clearing in the spring and fall of each year is recommended. In addition, the structure should be inspected after significant events to check for possible damage, and to remove any significant debris accumulation.
- B. Each year the concrete in the outlet structure and outlet culvert should be checked for cracks, spalling and be or loose sections. At this time, any cracked or spalled areas should be cleaned and refilled with an appropria patching concrete. Any broken or loose sections should be removed along with any loose debris underneath Replacement concrete should match the existing contour of the concrete, and fill the void underneath. If any extensive spalling or fractured areas are noted they should be inspected by a qualified structural engineer private repair.
- C. Each year the outlet structure and culvert should be inspected to determine if any water is entering the spillw through any joints or cracks. If any significant leakage is encountered it should be inspected by a qualified professional engineer. If recommended by the engineer, pressure grouting the cracks with an appropriate hydroactive joint or crack sealer should be performed.

3. PONDING AREA

A. The entire ponding area should be inspected annually for erosion or significant debris accumulation. Considerations should be given to stabilizing severely eroded areas with vegetative measures or other forms shoreline revetment such as riprap. Significant debris build-up should be removed from the ponding area.

4. LEVEL SPREADER

A. Level spreaders should be inspected annually for any required repairs during the non-growing season. Durin inspection, buildup of excess sediment should be removed to ensure an even distribution of flow. Level spre must remain at 0% slope to function properly.

5. CONSERVED OPEN SPACE

- A. No major disturbance shall occur within the Conserved Open Space during or after construction (i.e., no clear grading is allowed except temporary disturbances associated with incidental utility construction, restoration operations, or management of nuisance vegetation). The Conserved Open Space area shall not be stripped topsoil. Some light grading may be needed at the boundary to establish a level entry into the Conserved Open Space. This shall be accomplished using tracked vehicles to prevent compaction.
- B. The limits of disturbance shall be clearly shown on all construction drawings and protected by acceptable sig and erosion control measures.
- C. A long term vegetation management plan must be prepared to maintain the Conserved Open Space in a nat vegetative condition. Generally, Conserved Open Space management plans do not encourage or even allow active management. However, a specific plan should be developed to manage the unintended consequence passive recreation, control invasive species, provide for tree and understory maintenance, etc.
- D. The Conserved Open Space must be protected by a perpetual easement or deed restriction that assigns the responsible party to ensure that no future development, disturbance, or clearing may occur within the area.
- E. The existence and purpose of the open space shall be noted on the deed of record, and the owners shall be provided a simple document that explains the purpose of the open space and routine maintenance needs.

CONSERVED OPEN SPACE CONSTRUCTION SEQUENCE

The Conserved Open Space must be fully protected during the construction stage of development and kept outside t limits of disturbance on the Erosion and Sediment (E&S) Control Plan

- A. No clearing, grading or heavy equipment access is allowed except temporary disturbances associated with incidental utility construction, restoration operations or management of nuisance vegetation.
- B. The perimeter of the Conserved Open Space shall be protected from construction sediment by super silt fence since the area is down gradient from areas of construction.C. The limits of disturbance should be clearly shown on all construction drawings and identified and protected in
- field by acceptable signage, and chain link fence, orange safety fence, snow fence or other protective barrier keep unnecessary construction activity out of the area.
- D. Construction of the level spreaders shall not commence until the contributing drainage area has been stabiliz and perimeter E&S controls have been removed and cleaned out.
- E. Some light grading may be needed at the Conserved Open Space boundary; this should be done with tracker vehicles to prevent compaction.
 E. Stormwater about done the direct structure in the Conserved Open Space boundary; this should be done with tracker vehicles to prevent compaction.
- F. Stormwater should not be diverted into the Conserved Open Space until the Level Spreaders are installed an stabilized.

DISCONNECTED SHEETFLOW CALCUL

Sheetflo	w Computations Spreadsheet	
<u>Step #</u>	Step Descriptions	<u>Unit</u>
1	Discharge (Q) Outfall Slope (S) Flow Width (b) Velocity (v) Allowable Velocity Land Cover Allowable Velocity (GM 22-2012 3.305.1.B.1)	cfs ft/ft fps
2	Depth (d) Allowable Depth	ft ft
3	N-value (n) Land Cover	

Weighted N-value (n) (GM 22-2012 3.305.1.B.3) L_{sF} (Maximum Length of Sheetflow) Length to down-gradient SW Convenance System

	ADEQUATE OUTFALL CALCULATIONS	
d with	Dewberry	
	Adequate Outfall Flood Protection Summary	
	Outfall Type: Channel	
id th iy futu	Channel Type: Natural	
M	Flood Protection - 10-year post < pre	ſ
	Existing 10-yr Discharge Proposed 10-yr (cfs) Discharge (cfs)	
ree	14.64 7.65	
at th	Is the outfall adequate? YES	
wing ation	Notes / Remarks:	
d, ar	The channel is adequate for flood protection because the post 10-year discharge is less than the pre 10-year discharge.	
nate		
be /ert	③ Dewberry	
ction	Adequate Outfall Flood Protection Summary Outfall Number: 3 Project: Unity Substation	
	Outfall Type: Channel	
e	Channel Type: Natural	
proke	Flood Protection - 10-year post < pre	
ate h.	Existing 10-yr Discharge Proposed 10-yr	
rior to	10.53 3.42	(
ay	Is the outfall adequate? YES	
	Notes / Remarks:	
	The channel is adequate for flood protection because the post 10-year discharge is less than the pre 10-year discharge.	
s of		
	Dewberry	
ng the	Adequate Outfall Flood Protection Summary Outfall Number: 4 Project: Unity Substation	é
ader	Outfall Type: Channel	
orina	Channel Type: Natural	
of	Flood Protection - 10-year post < pre	
en	Existing 10-yr Discharge Proposed 10-yr (cfs) Discharge (cfs)	
tural	7.61 3.67	
v any es of	Is the outfall adequate? YES	
Э	Notes / Remarks:	E
e	The channel is adequate for flood protection because the post 10-year discharge is less than the pre 10-year discharge.	
the		erry°
	REVISIONS Dewberry Enginee 4805 Lake Brook Drive Glen Allen, VA 23060; (p)	rs Inc. , Suite 200 804.290.7957
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zed	EDWARD R. UM	BRELL 388 et al
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AT	DNS Device A Project N	0 50157950
<u>s</u>	Da 1a Da 3a Da 4a Da 4a	
	0.74 1.81 1.12 0.09 0.08 0.09 420 000 0.08 0.09	
	430 900 500 0.1 0.1 0.1 Reed Canarygrass	
	3.0 3.0 3.0 0.01 0.02 0.02	
	0.10 0.10 0.10 UNITY SUBSTATION	
	ense Grasses (Inside LOD), and (Natural) and	RGINIA
	ange (Natural) Light Underbrush Light Underbrush OPERATIONAL REGION B/M No. SCALE ASS 0.13 0.20 0.20 0.20 NAME DATE CHEET	SHOWN
	242 142 154 100 140 110)1
	АРРКОУЕД ВУ КАЗ 01/29/24 1707908-C-601.	dwg

ADEQUATE OUTFALL CALCULATIONS



Site-Civil Engineering STEP 1: Determine the Pre Developed, Forested, and Post Developed Conditions within Pre Developed Conditions **Forested Conditions** Post D Weighted CN = 55.0 Weighted CN = 60.4 Weigh Area (ac) = 6.48 Area (ac) = 6.48 P(in.) = 2.73P(in.) = 2.73STEP 2: Determine the peak discharge for each area. The total predevelopment discharg Pre Developed Discharge Forested Conditions Discharge Post D 8.2 6.5 S S S Ia 1.3 Ia 1.6 Ia Q(in) 0.3 in Q(in) 0.1 in Q(in)Volume 0.137 ac-ft Volume 0.070 ac-ft Volum Total Forested Peak Discharge 0.20 cfs (From PondPack) **STEP 3**: Calculate Adjusted CN value using Runoff Reduction provided in BMPs Runoff BMP Reduction Total = 0 ft^3 STEP 4: Calculate Qallowable using the energy balance equation. Only apply the improven Energy Balance Equation: $Q_{\text{Developed}} \leq \text{I.F.x}(Q_{\text{Pre-Developed}} \times RV_{\text{Pre-Developed}}) / RV_{\text{Developed}}$ Improvement Factor 0.8 $Q_{allowable} \leq [Total Predevelopment Discharge (Offsite Volume + (Improvement Factor x))]$ 3.17 cfs Qallowable STEP 5: Calculated Maximum Allowable Peak Discharge. Maximum Allowable Peak Discharge = Maximum (Q_{forest or} Q_{allowable}) Maximum Allowable Peak Discharge cannot be greater than Total Predevelopment Discl Q_{forest} = Total Forest Peak Discharge x (Forest Volume + Offsite Volume)/(Post-Develop 0.51 cfs Q_{forest} Maximum Allowable
 Maximum

 Peak Discharge

 0.79 cfs
 STEP 6: Ensure $Q_{\text{post-developed}}$ is less than the Maximum Allowable Peak Discharge Dist-developed (from Pond Pack) 0.22 cfs hannel is Adequate

nity Sub Station

Lunden County

ewberry

Unity Sub Station <i>Lunden County</i> Dewberry Site-Civil Engineering			
STEP 1: Determine the Pre Devel	oped, Forested, and Post	Developed Condit	tions within
Pre Developed Conditions	Forested Cor	nditions	Post D
Weighted CN = 60.9 Area (ac) = 5.11 P (in.) = 2.73	Weighted CN = Area (ac) = P (in.) =	55.0 5.11 2.73	Weigh A
STEP 2: Determine the peak discl	harge for each area. The t	otal predevelopme	ent discharge
Pre Developed Discharge	Forested Condition	ns Discharge	Post De
S 6.4 Ia 1.3 Q (in) 0.3 in Volume 0.113 ac-	S Ia Q (in) ft Volume	8.2 1.6 0.1 in 0.055 ac-ft	S Ia Q (ir Volur
STEP 3 : Calculate Adjusted CN v	Total Forested Peak Discharge (From PondPack) value using Runoff Reduc	0.16 cfs	BMPs
	BMP	Runoff	
	DMI	Reduction	
	Total =	ft ³ ft ³ ft ³ ft ³ ft ³ 0 ft ³	
STEP 4: Calculate Q _{allowable} using	the energy balance equat	ion. Only apply th	e improvem
Energy Balance Equation: $Q_{Develop}$ Improvement Factor 0.8 $Q_{allowable} \leq$ [Total Predevelopmen $Q_{allowable}$ 1.16 cfs STEP 5: Calculated Maximum Al	_{ed} ≤ I.F.x(Q _{Pre-Developed} x R tt Discharge (Offsite Volu llowable Peak Discharge.	V _{Pre-Developed}) / RV ₁ ume + (Improveme	Developed
Maximum Allowable Peak Discha Maximum Allowable Peak Discha Q _{forest} = Total Forest Peak Dischar Q _{forest} 0.17 cfs Maximum Allowable Peak Discharge 0.68 cfs	arge = Maximum (Q _{forest} arge cannot be greater tha ge x (Forest Volume + O	_{or} Q _{allowable}) n Total Predevelop ffsite Volume)/(Po	pment Disch Dst-Developi
STEP 6 : Ensure Q _{post-developed} is les	s than the Maximum All	owable Peak Discl	narge
Q _{post-developed} (from Pond Pack) Channel is Adeauate	0.68	cfs	

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		E				
C 2011 BMP Standards and Specification	ons	2013 Draft B	MP Standards and	Specifications		
					-	
Project Name:		Unity	Sub Station			CLEAR AL
Date:		1/	/24/2024		1	
BMP Design Specifications List:	2013 Draft Std	s & Specs				
Site Information						
Post-Development Project	(Treatme	nt Volume a	and Loads)			
Post-Development Project	: (Treatme	nt Volume a	and Loads)			
Post-Development Project	(Treatme	nt Volume a	and Loads)			
Post-Development Project Land Cover (acres)	(Treatme	nt Volume a	and Loads) C Soils	D Soils	Totals	1
Post-Development Project Land Cover (acres) Forest/Open Space (acres) undisturbed,	t (Treatme A Soils	nt Volume a	and Loads) C Soils	D Soils	Totals]
Post-Development Project Land Cover (acres) Forest/Open Space (acres) undisturbed, protected forest/open space or reforested land	A Soils	nt Volume a	and Loads) C Soils	D Soils	Totals 1.17]*
Post-Development Project Land Cover (acres) Forest/Open Space (acres) undisturbed, protected forest/open space or reforested land Managed Turf (acres) disturbed, graded for	A Soils	nt Volume a	C Soils	D Soils 0.00	Totals 1.17 10.27	*
Post-Development Project Land Cover (acres) Forest/Open Space (acres) undisturbed, protected forest/open space or reforested land Managed Turf (acres) disturbed, graded for yards or other turf to be mowed/managed	A Soils	B Soils 1.17 10.27	C Soils	D Soils 0.00 0.00	Totals 1.17 10.27] *
Post-Development Project Land Cover (acres) Forest/Open Space (acres) undisturbed, protected forest/open space or reforested land Managed Turf (acres) disturbed, graded for yards or other turf to be mowed/managed Impervious Cover (acres)	(Treatme A Soils 0.00 0.00 0.00	B Soils 1.17 10.27 15.51	C Soils 0.00 0.00 0.00	D Soils 0.00 0.00 0.00	Totals 1.17 10.27 15.51	*

onstants		Runoff Coefficients	(Rv)	
nnual Rainfall (inches)	43		A Soils	B Soils
arget Rainfall Event (inches)	1.00	Forest/Open Space	0.02	0.03
otal Phosphorus (TP) EMC (mg/L)	0.26	Managed Turf	0.15	0.20
otal Nitrogen (TN) EMC (mg/L)	1.86	Impervious Cover	0.95	0.95
arget TP Load (lb/acre/yr)	0.41			
j (unitless correction factor)	0.90			

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr) 27.32

POST DEVELOPMENT

LAN	D COVER 30	
Land Cover Summary		_
Forest/Open Space Cover (acres)	1.17	
Weighted Rv (forest)	0.03	
% Forest	4%	
Managed Turf Cover (acres)	10.27	
Weighted Rv (turf)	0.20	
% Managed Turf	38%	
Impervious Cover (acres)	15.51	
Rv (impervious)	0.95	
% Impervious	58%	
Site Area (acres)	26.95	
Site Rv	0.62	

Treatment Volume and Nutrien	Loads
Treatment Volume (acre-ft)	1.4021
Treatment Volume (cubic feet)	61,076
TP Load (lb/yr)	38.37
TN Load (lb/yr) (Informational Purposes Only)	274.52

Drainage Area A

)rainage Area A Land Cover (acres)										
	A Soils	B Soils	C Soils	D Soils	Totals	Land Cover Rv				
Forest/Open Space (acres)	0.00	0.00	0.00	0.00	0.00	0.00				
Managed Turf (acres)	0.00	3.29	0.00	0.00	3.29	0.20				
Impervious Cover (acres)	0.00	12.89	0.00	0.00	12.89	0.95				

Stormwater Best Management Practices	[RR = Runoff Reduction]

				Total	16.18]	_	Post D	Development Tr	eatment Volum	e in D.A. A (ft ³)	46,847]					
Stormwater Best Manageme	nt Practic	es (RR = Ru	noff Reduc	ction)									Select from dropdown lists					
Practice	Runoff Reduction Credit (%)	Managed Turi Credit Area (acres)	f Impervious Cover Credit Area (acres)	Volume from Upstream Practice (ft ³)	Runoff Reduction (ft ³)	Remaining Runoff Volume (ft ³)	Total BMP Treatment Volume (ft ³)	Phosphorus Removal Efficiency (%)	Phosphorus Load from Upstream Practices (Ib)	Untreated Phosphorus Load to Practice (Ib)	Phosphorus Removed By Practice (Ib)	Remaining Phosphorus Load (Ib)	Downstream Practice to be Employed	Nitrogen Removal Efficiency (%)	Nitrogen Load from Upstream Practices (lbs)	Untreated Nitrogen Load to Practice (lbs)	Nitrogen Removed By Practice (Ibs)	Remainii Nitrogen L) (Ibs)
13. Wet Ponds (no RR)	/et Ponds (no RR) 13. Wet Ponds (no RR)																	
13.a. Wet Pond #1 (Spec #14)	0			0	0	0	0	50	0.00	0.00	0.00	0.00		30	0.00	0.00	0.00	0.00
13.b. Wet Pond #1 (Coastal Plain) (Spec #14)	0			0	0	0	0	45	0.00	0.00	0.00	0.00		20	0.00	0.00	0.00	0.00
13.c. Wet Pond #2 (Spec #14)	0	3.13	12.89	0	0	46,735	46,735	75	0.00	29.33	22.00	7.33	9.a. Sheetflow to A/B Soil Conservation Area	40	0.00	209.82	83.93	125.89
13.d. Wet Pond #2 (Coastal Plain) (Spec #14)	0			0	0	0	0	65	0.00	0.00	0.00	0.00		30	0.00	0.00	0.00	0.00
9. Sheetflow to Filter/Open Space (RR)														9. Sheetflow to	o Filter/Open Spa	ce (RR)		
9.a. Sheetflow to Conservation Area, A/B Soils (Spec #2)	75	0.16		46,735	35,135	11,712	46,847	0	7.33	0.07	5.55	1.85		0	125.89	0.51	94.80	31.60
9.b. Sheetflow to Conservation Area, C/D Soils (Spec #2)	50			0	0	0	0	0	0.00	0.00	0.00	0.00		0	0.00	0.00	0.00	0.00
9.c. Sheetflow to Vegetated Filter Strip, A Soils or Compost Amended B/C/D Soils (Spec #2 & #4)	50			0	0	0	0	0	0.00	0.00	0.00	0.00		0	0.00	0.00	0.00	0.00

Site Results	Water Oualit	v Compliance)
Site Results	watch Quant	

Area Checks	D.A. A	D.A. B	D.A. C
FOREST/OPEN SPACE (ac)	0.00	0.00	0.00
IMPERVIOUS COVER (ac)	12.89	0.00	0.00
IMPERVIOUS COVER TREATED (ac)	12.89	0.00	0.00
MANAGED TURF AREA (ac)	3.29	0.00	0.00
MANAGED TURF AREA TREATED (ac)	3.29	0.00	0.00
AREA CHECK	OK.	OK.	OK.
Site Treatment Volume (ft ³)	61,076]	
Runoff Reduction Volume and TP By Drainage Area			
	D.A. A	D.A. B	D.A. C
RUNOFF REDUCTION VOLUME ACHIEVED (ft ³)	35,135	0	0
TP LOAD AVAILABLE FOR REMOVAL (Ib/yr)	29.43	0.00	0.00
TP LOAD REDUCTION ACHIEVED (Ib/yr)	27.55	0.00	0.00
TP LOAD REMAINING (Ib/yr)	1.88	0.00	0.00
NITROGEN LOAD REDUCTION ACHIEVED (Ib/yr)	178.73	0.00	0.00
Total Phosphorus			
FINAL POST-DEVELOPMENT TP LOAD (Ib/yr)	38.37	1	
TP LOAD REDUCTION REQUIRED (Ib/yr)	27.32		
TP LOAD REDUCTION ACHIEVED (Ib/yr)	27.55		
TP LOAD REMAINING (lb/yr):	10.82		
REMAINING TP LOAD REDUCTION REQUIRED (Ib/yr):	0.00	**	
	** TARGET TP RED	UCTION EXCEEDED	BY 0.23 LB/YEAR
Total Nitrogen (For Information Purposes)			
POST-DEVELOPMENT LOAD (Ib/yr)	274.52	1	
NITROGEN LOAD REDUCTION ACHIEVED (Ib/yr)	178.73		
REMAINING POST-DEVELOPMENT NITROGEN LOAD (Ib/yr)	95.79		

TOTAL IMPERVIOUS COVER TREATED (ac)12.89AREA CHECK:TOTAL MANAGED TURF AREA TREATED (ac)3.29AREA CHECK:

TOTAL PHOSPHORUS REMOVAL REQUIRED

TOTAL PHOSPHORUS AVAILABLE FOR REMOVAL I TOTAL PHOSPHORUS REMOVED WITHOUT RUNOFF REDUCTION PRACTICES II

TOTAL PHOSPHORUS REMOVED WITH RUNOFF REDUCTION PRACTICES II TOTAL PHOSPHORUS LOAD REDUCTION ACHIEVED II TOTAL PHOSPHORUS REMAINING AFTER APPLYING BMP LOAD REDUCTIONS II

SEE WATER QUALITY COMPLIANCE TAB FOR SITE COMPLIA

NITROGEN REMOVED WITH RUNOFF REDUCTION PRACTICES II

NITROGEN REMOVED WITHOUT RUNOFF REDUCTION PRACTICES II

	Outfall: Channel Type:	2 Natural	Engineer: Checker	KZ EU
	channer Type.		Checkel.	
1 the disturbe	ed area and the off	site area draining to p	project BMPs.	
Developed (Conditions	Offs	ite Conditio	ns
thed CN =	61.0	Weighted CN	= 61.0)
Area (ac) =	1.22	Area (ac)	= 0.00)
P (in.) =	2.73	P (in.)	= 2.73	}
ge combines	offsite and pre dev	veloped conditions.		
evelopmen	t Discharge	Offsite C	onditions Dis	scharge
	6.4	S	6.4	ļ.
ι	1.3	Ia	1.3	3
in)	0.3 in	Q (in)	0.3	3 in
ime	0.027 ac-ft	Volume	0.000) ac-ft
		Total		
		Predevelopment		
		Discharge	0.79	o cfs
		(From PondPack)		
nent factor to	o the disturbed are	Qpost without RR = Qpost with RR = Adjusted CN = a.	= 0.3 0.3 61.0	
Pre-Develo	ped Volume) / (Po	ost-Development Vol	ume + Offsite	Volume)]
harge				
oment Volur	ne + Offsite Volur	ne)		



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	0	0.00	0.00	0.00	0.00			0	0.00	0.00	0.00	0.00		
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		1												
	D.A. D	D.A. E	AREA											
╉	0.00	0.00	0	к. К.										
	0.00	0.00	0	к.										
╞	0.00	0.00	0	K.										
╋	0.00 OK.	<u>О.00</u>	0	<u>. </u>										
								REVISION	S		4805 Glen Alle	Dewell Dewberry Engi Lake Brook D en, VA 23060;	berry neers Inc. rive, Suite 200 (p) 804.290.75	9 57
	D.A. D	D.A. E	то	TAL									Adda.	
	0	0	35,3	135							ار ا	EALTH C	DF V	
╉	0.00	0.00	29.	43 55							0	1	PC.	
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+														
									BMP (COMPS	5			
(ac)	12.89	AREA CHECK: O	к.											
(ac)	3.29	AREA CHECK: O	К.											
но	SPHORUS REMOV	AL REQUIRED OI	N SITE (lb/yr)	27.32]									
				20.42	1									
ior F Ru	US AVAILABLE FO	R REMOVAL IN I	D.A. A (lb/yr)	29.43				1 16 11						
I RU	INOFF REDUCTION	V PRACTICES IN I	D.A. A (lb/yr)	5.55				UNI	114 20	B214	ION			
RUS PPL\	S LOAD REDUCTION YING BMP LOAD R	N ACHIEVED IN I REDUCTIONS IN I	D.A. A (lb/yr) D.A. A (lb/yr)	27.55 1.88			NENBUR	RG CO	UNTY			V	IRGIN	IA
ICE	TAB FOR SITE	E COMPLIAN	CE CALCULA	TIONS		OPERAT	ONAL REGION		B/M No.		SCA	ALE A	S SHOWN	
				04.00		PROJECT	5017950	NAME	DATE	SHEET:	17070		202	
1 KU F RU	INOFF REDUCTION	N PRACTICES IN I	D.A. A (Ib/yr) D.A. A (Ib/yr)	94.80 83.93		DE	SIGNER	EU/KZ	01/29/24]	1/0/9	00-U-1	002	
	TOTAL NITROGE	N REMOVED IN I	D.A. A (lb/yr)	178.73]	PROJEC	T ENGINEER	EU/KZ	01/29/24	DRAWING:				
						APP	ROVED BY	KAS	01/29/24	1 17()7908	-C-60	2.dwa	
						2					1			

Total Phosphorus Available for Removal in D.A. A (lb/yr) 29.43

CLEAR BMP AREAS

data input cells constant values calculation cells final results D Soils 0.05 0.25

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DRAINAGE AF

DRA	INAGE	ARE	A 1			
Workshe	et 2: Runoff curve n	umber and ru	unoff			
Project:	Unity Substation		Ву	: KAZ	Date	1/24/2024
Location:	Drainage Area 1, Onsit	e	Ch	ecked: EU	Date	1/24/2024
Chook ono:	X Present		ed.			

7

Location: Drainage	e Area 1, Onsite	rea 1, Onsite Checked: EU				/24/2024			
Check one:	X Present:	Developed:							
1. Runoff curve r	number								
Soil name and hydrologic group (Appendix A)	Cover descri condition; pe	Cover description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)			r description (cover type, treatment and hydrologic ition; percent impervious; unconnected/connected		d CN ¹	AREA	Product of
(, ppendix / t)				Table	(Acres)	CN X Area			
В		Pasture - Good C	ondition	61	2.72	166.1			
¹ Use only one CN so	urce per line		Totals \rightarrow		2.72	166.1			
					0.0043	sq. miles			
CN (weigh	ited) = total produc	t / total area =	Use CN \rightarrow		61.0				
2. Runoff									
	Storm #1	Storm #2	Storm #3	St	orm #4	Storm #5			
Frequency	Yr 1	2	10		100	500			
Rainfall, P (24-hour) .	In. 2.4	2.89	4.2		6.58	8.69			
Runoff, Q	ln. 0.17	0.32	0.92		2.40	3.98			
(Use P and CN	with table 2-1, Figure 2-1, or								

6 DRAINAGE AREA 1 FORESTED

Worksheet 2: Rund	off curve numb	er and runoff		
Project: Unity Su	bstation		By: KAZ	
Location: Drainage A	Location: Drainage Area 1, Onsite Forested			
Check one:	Present:	Developed:		
1. Runoff curve nu	mber			
Soil name and hydrologic group (Appendix A)	Cover description condition; percer	n (cover type, treatme nt impervious; unconr impervious area ratio	nt and hydrologi nected/connected	
В	v	loods - Good Conditio	on	
¹ Use only one CN sourc	e per line		Totals \rightarrow	
CN (weighted	t) = total product / to	tal area =	Use CN \rightarrow	
2. Runoff				
	Storm #1	Storm #2	Storm #3	
FrequencyYr	1	2	10	
Rainfall, P (24-hour) . In.	2.4	2.89	4.2	
Runoff, Q In.	0.17	0.32	0.92	
(Use P and CN with	table 2-1, Figure 2-1, or			

DRAINAGE AREA 3

rksheet 2: Runoff curve number and runoff

X Present: Developed:

impervious area ratio)

Forested - Good Condition

Pasture - Good Condition

Storm #2

2

2.89

0.32

Use CN \rightarrow

oject: Unity Substation

Runoff curve number

Soil name and

(Appendix A)

hydrologic group

в

в

Use only one CN source per line

CN (weighted) = total product / total area =

Storm #1

1

2.4

Use P and CN with table 2-1, Figure 2-1, or equations 2-3 and 2-4)

neck one:

ocation: Drainage Area 3, Onsite

DRAINAGE AREA 2 UNCONTROLLED UNDISTURBED

Worksheet 2: Rund	off curve num	ber and runoff				
Project: Unity Su	bstation		By: KAZ		Date:	1/24/2024
Location: Drainage A	rea 2, Onsite Un	cont. Undist.	Checked: EU		Date:	1/24/2024
Check one:	Present:	Developed:				
1. Runoff curve nu	mber					
Soil name and hydrologic group (Appendix A)	Cover description condition; percen	Cover description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)			AREA (Acres)	Product of CN x Area
В	P	Pasture - Good Condition				181.8
В	Woods - Good Condition			55	1.44	79.2
¹ Use only one CN sourc	e per line		Totals \rightarrow		4.42	261.0
					0.0069	sq. miles
CN (weighted) = total product / to	tal area =	Use CN \rightarrow		59.0	
2. Runoff						
	Storm #1	Storm #2	Storm #3	Sto	orm #4	Storm #5
FrequencyYr	1	2	10		100	500
Rainfall, P (24-hour) . In.	2.4	2.4 2.89 4.2				8.69
Runoff, Q In.	0.16	0.31	0.89	2	2.35	3.91
(Use P and CN with	table 2-1, Figure 2-1, or					

 \rightarrow

DRAINAGE AREA 4 SHEETFLOW

7

2. Runoff

Frequency ..

Runoff, Q.....

Rainfall, P (24-hour) . In.

Worksheet 2: Run	off curve num	ber and runoff				
Project: Unity Su	Ibstation		By: KAZ		Date:	1/24/2024
Location: Drainage A	Area 4, Onsite Sh	neetflow	Checked: EU		Date:	1/24/2024
Check one:	Present:	Developed:				
1. Runoff curve nu	mber					
Soil name and	Cover descriptio	on (cover type, treatme	ent and hydrologic	CN ¹		
hydrologic group	condition; perce	dition; percent impervious; unconnected/connected impervious area ratio)			AREA	Product of
(Appendix A)					(Acres)	CN x Area
В	Forested - Good Condition			55	0.18	10.1
В	Pasture - Good Condition			61	0.12	7.6
¹ Use only one CN source	e per line		Totals \rightarrow		0.31	17.6
					0.0005	sq. miles
CN (weighted	l) = total product / t	otal area =	Use CN \rightarrow		57.4	
2. Runoff						
	Storm #1	Storm #2	Storm #3	Sto	orm #4	Storm #5
Frequency Yr	1	2	10		100	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2	(6.58	8.69
Runoff, Q In.	0.17	0.32	0.91	:	2.39	3.97
(Use P and CN with	table 2-1, Figure 2-1, or	-	-	-		

6

DRAINAGE AREA 4 UNCONTROLLED UNDISTURBED

Project: Unity Su	bstation		By: KAZ	Y: KAZ Date: 1/24			
Location: Drainage A	rea 4, Onsite Un	cont. Undist.	Checked: EU		Date: 1/24/20		
Check one:	Present:	Developed:					
1. Runoff curve nu	mber						
Soil name and	Cover description	n (cover type, treatme	ent and hydrologic	CN ¹			
hydrologic group	condition; percer	nt impervious; uncon	nected/connected	5	AREA	Product o	
(Appendix A)		impervious area ratio)	e 2-	(Acres)	CN x Area	
				abl	. ,		
				-			
В	Pasture - Good Condition			61	0.40	24.4	
¹ Use only one CN sourc	e per line		Totals \rightarrow		0.40	24.4	
					0.0006	sq. miles	
CN (weighted) = total product / to	tal area =	Use CN \rightarrow		61.0		
	, i				••		
2. Runoff							
	Storm #1	Storm #2	Storm #3	Sto	orm #4	Storm #5	
FrequencyYr	1	2	10		100	500	
Rainfall, P (24-hour) . In.	2.4	2.89	4.2	e	6.58	8.69	
Runoff, Q In.	0.17	0.32	0.91	2	2.39	3.97	
(Use P and CN with	table 2-1, Figure 2-1, or		-	-			

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DRAINAGE AREA 1 SHEETFLOW

Date: 1/24/2024 Date: 1/24/2024 유 AREA Product of 은 (Acres) CN x Area 55 2.72 149.8 2.72 149.8 0.0043 sq. miles 55.0 Storm #4 Storm #5 100 500 6.58 8.69 2.40 3.98

Worksheet 2: Rund	off curve numb	per and runoff				
Project: Unity Su	bstation		By: KAZ		Date:	1/24/2024
Location: Drainage Area 1, Onsite		rea 1, Onsite Sheetflow Checked: EU			Date:	1/24/2024
Check one:	Present:	Developed:				
1. Runoff curve nu	mber					
Soil name and	Cover description	n (cover type, treatm	ent and hydrologic	CN ¹		
hydrologic group (Appendix A)	condition; percer	nt impervious; unco impervious area rat	nnected/connected	ole 2-2	AREA (Acres)	Product o CN x Area
				Tat		
В	Pa	Pasture - Good Condition				14.7
¹ Use only one CN sourc	e per line		Totals \rightarrow		0.24	14.7
					0.0004	sq. miles
CN (weighted) = total product / to	tal area =	Use CN \rightarrow		61.0	
2. Runoff						
	Storm #1	Storm #2	Storm #3	Sto	orm #4	Storm #5
Frequency Yr	1	2	10		100	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2		6.58	8.69
Runoff, Q In.	0.17	0.32	0.92		2.40	3.98
(Use P and CN with equations 2-3 and 2	table 2-1, Figure 2-1, or -4)					

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DRAINAGE AREA 2

Proiect: Unity Su	bstation		By: KAZ		Date: 1	/24/2024
Location: Drainage A	rea 2. Onsite		Checked: EU		Date: 1	/24/2024
Check one:	Present:	Developed:				
1. Runoff curve nu	mber					
Soil name and	Cover descriptio	n loover tune treat	pont and hydrologic	CN ¹		
hydrologic group (Appendix A)	condition; perce	nt impervious; unco impervious area rat	onnected/connected io)	ole 2-2	AREA (Acres)	Product of CN x Area
				Tat		
В	Fo	orested - Good Con	lition	55	0.60	33.0
В	Р	asture - Good Cond	ition	61 5.88		358.7
¹ Use only one CN sourc	e per line		Totals \rightarrow		6.48	391.8
					0.0101	sq. miles
CN (weighted) = total product / to	otal area =	Use CN \rightarrow		60.4	
2. Runoff						
	Storm #1	Storm #2	Storm #3	Ste	orm #4	Storm #5
Frequency Yr	1	2	10		100	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2		6.58	8.69
	0.40	0.01	0.00		0.05	2.04

Worksheet 2: Rund	off curve numb	per and runoff				
Project: Unity Su	bstation		By: KAZ		Date: 1/24/2024	
Location: Drainage A	rea 2, Onsite		Checked: EU Dat			/24/2024
Check one:	Present:	Developed:				
1. Runoff curve nu	mber					
Soil name and	Cover descriptio	n (cover type, treatme	nt and hydrologic	CN ¹		
hydrologic group	condition; perce	nt impervious; unconr	nected/connected	2-2	AREA	Product of
(Appendix A)		impervious area ratio		ble	(Acres)	CN x Area
				Та		
В	Fa	Forested - Good Condition			0.60	33.0
В	Pasture - Good Condition			61	5.88	358.7
¹ Use only one CN sourc	e per line		Totals \rightarrow		6.48	391.8
					0.0101	sq. miles
CN (weighted	l) = total product / to	tal area =	Use CN \rightarrow		60.4	
						J
2. Runoff						
	Storm #1	Storm #2	Storm #3	Sto	orm #4	Storm #5
Frequency Yr	1	2	10		100	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2		6.58	8.69
Runoff, Q In.	0.16	0.31	0.89	:	2.35	3.91
(Use P and CN with equations 2-3 and 2	table 2-1, Figure 2-1, or -4)					

DRAINAGE AREA 4

Project: Unity Su	hetation		Bv: KAZ		Date: 1	/24/2024
Frojeci. Onity Su	DStation				Dute.	127/2027
Location: Drainage A	rea 4, Onsite		Checked: EU		Date: 1	/24/2024
Check one: X	Present:	Developed:				
1. Runoff curve nu	mber					
Soil name and	Cover description	(cover type, treatm	ent and hydrologic	CN ¹		
hydrologic group	condition; percer	nt impervious; unco	nnected/connected	5		Product of
(Appendix A)		impervious area rati	o)	le 2-	(Acres)	CN x Area
				Tabl		
В	Fo	rested - Good Cond	ition	55	0.09	4.8
В	Pa	asture - Good Condi	tion	61	5.03	306.6
¹ Use only one CN sourc	e per line		Totals \rightarrow		5.11	311.4
					0.0080	sq. miles
CN (weighted) = total product / to	tal area =	Use CN \rightarrow		60.9	
						1
2. Runoff						
	Storm #1	Storm #2	Storm #3	St	orm #4	Storm #5
Frequency Yr	1	2	10		100	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2		6.58	8.69
, , ,				_		

Worksheet 2: Rund	off curve numb	per and runoff				
Project: Unity Su	bstation		By: KAZ		Date: 1	/24/2024
Location: Drainage A	vrea 4, Onsite		Checked: EU		Date: 1	/24/2024
Check one:	Present:	Developed:	ł			
1. Runoff curve nu	mber					
Soil name and	Cover description	ı (cover type, treatr	nent and hydrologic	CN ¹		
hydrologic group (Appendix A)	condition; perce	nt impervious; unco impervious area rat	onnected/connected io)	Table 2-2	Product of CN x Area	
В	Fo	rested - Good Con	dition	55	0.09	4.8
В	P	asture - Good Cond	ition	61	5.03	306.6
¹ Use only one CN source	e per line		Totals \rightarrow		5.11	311.4
					0.0080	sq. miles
CN (weighted	d) = total product / to	tal area =	Use CN \rightarrow		60.9	
2. Runoff						
	Storm #1	Storm #2	Storm #3	St	orm #4	Storm #5
Frequency Yr	1	2	10		100	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2		6.58	8.69
Runoff, Q In.	0.17	0.32	0.91		2.39	3.97
(Use P and CN with equations 2-3 and 2	table 2-1, Figure 2-1, or -4)					

DRAINAGE AREA	3
SHEETFLOW	

Worksheet 2: Runoff curve number and runoff						
Project [.] Unity Su	bstation		Bv: KAZ		Date:	1/24/2024
		a fflaur			Date: 1/24/2024	
Location: Drainage A	rea 3, Onsite She				Date.	1/24/2024
Check one:	Present:	Developed:				
1. Runoff curve number						
Soil name and	Cover description (cover type, treatment and hydrologic					
hydrologic group	condition; perce	nt impervious; unconi	nected/connected	Ŗ	AREA	Product of
(Appendix A)		impervious area ratio)	ole 2	(Acres)	CN x Area
В	Fo	rested - Good Condit	ion	55	0.10	5.6
В	Pasture - Good Condition			61	0.50	30.3
¹ Use only one CN sourc	e per line		Totals \rightarrow		0.60	35.9
					0.0009	sq. miles
CN (weighted	l) = total product / to	tal area =	Use CN \rightarrow		60.0	
2. Runoff						
	Storm #1	Storm #2	Storm #3	Sto	orm #4	Storm #5
Frequency Yr	1	2	10		100	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2	6	6.58	8.69
Runoff, Q In.	0.17	0.32	0.92	2	2.40	3.98
(Use P and CN with equations 2-3 and 2	table 2-1, Figure 2-1, or -4)					

DRAINAGE AREA 5

Worksheet 2: Rund	off curve numb	per and runoff				
Project: Unity Su	bstation		By: KAZ		Date: 1	/24/2024
Location: Drainage A	vrea 5, Onsite		Checked: EU		Date: 1	/24/2024
Check one:	Present:	Developed:				
1. Runoff curve nu	mber					
Soil name and	Cover descriptior	n (cover type, treatme	nt and hydrologic	CN ¹		
hydrologic group	condition; percer	nt impervious; unconr	ected/connected	2-2	AREA	Product of
(Appendix A)		impervious area ratio		ble	(Acres)	CN x Area
				Та		
В	Fo	Forested - Good Condition			0.18	9.8
В	Pasture - Good Condition		61	0.00	0.0	
¹ Use only one CN source	æ per line		Totals \rightarrow		0.18	9.8
					0.0003	sq. miles
CN (weighted	d) = total product / to	tal area =	Use CN \rightarrow		55.0	
						1
2. Runoff						
	Storm #1	Storm #2	Storm #3	Ste	orm #4	Storm #5
Frequency Yr	1	2	10		100	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2		6.58	8.69
Runoff, Q In.	0.07	0.17	0.61		1.86	3.27
(Use P and CN with equations 2-3 and 2	n table 2-1, Figure 2-1, or 2-4)					



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DRAINAGE AREA 1 – ONSITE

8

Unity Sub Station - Drainage Area 1 Onsite - Existing Conditions

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt) Time of Concentration Computations for Predeveloped Conditions

Sheet flow		A1 - B1
Surface description		Short Grass Prarie
Manning's roughness coeff., n		0.15
Flow length, L	(ft)	100
Two-yr 24-hr rainfall, P2	(in)	3.31
Land slope, s	(ft/ft)	0.07
Tt = [0.007(nL)^0.8]/[(P2^0.5)(s^0.4)]	(hr)	0.097
Shallow concentrated flow		B1 - C1
Surface description		Unpaved
Flow length, L	(ft)	709
Watercourse slope, s	(ft/ft)	0.04
Average velocity, V	(fps)	3.2
Tt = L/(3600*V)	(hr)	0.061
Watershed time of concentration, Tc	(hrs)	0.158
Lag Tc, Tlag = (0.6*Tc)	(hrs)	0.095

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DRAINAGE AREA 3 – ONSITE

8

Unity Sub Station - Drainage Area 3 Onsite - Existing Conditions

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt) **Time of Concentration Computations for Predeveloped Conditions**

Sheet flow		A - B
Surface description		Short Grass Prarie
Manning's roughness coeff., n		0.15
Flow length, L	(ft)	100
Two-yr 24-hr rainfall, P2	(in)	3.31
Land slope, s	(ft/ft)	0.05
Tt = [0.007(nL)^0.8]/[(P2^0.5)(s^0.4)]	(hr)	0.116
Shallow concentrated flow		B - C
Surface description		Unpaved
Flow length, L	(ft)	339
Watercourse slope, s	(ft/ft)	0.03
Average velocity, V	(fps)	3.0
Tt = L/(3600*V)	(hr)	0.032
Watershed time of concentration, Tc	(hrs)	0.148
Lag Tc, Tlag = (0.6*Tc)	(hrs)	0.089

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DRAINAGE AREA 2 -ONSITE

6

Unity Sub Station - Drainage Area 2 Onsite - Existing Conditions

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt) **<u>Time of Concentration Computations for Predeveloped Conditions</u>**

Sheet flow		A1 - B1
Surface description		Short Grass Prarie
Manning's roughness coeff., n		0.15
Flow length, L	(ft)	100
Two-yr 24-hr rainfall, P2	(in)	3.31
Land slope, s	(ft/ft)	0.06
Tt = [0.007(nL)^0.8]/[(P2^0.5)(s^0.4)]	(hr)	0.107
Shallow concentrated flow		B1 - C1
Surface description		Unpaved
Flow length, L	(ft)	789
Watercourse slope, s	(ft/ft)	0.04
Average velocity, V	(fps)	3.2
Tt = L/(3600*V)	(hr)	0.067
Watershed time of concentration, Tc	(hrs)	0.174
Lag Tc, Tlag = (0.6*Tc)	(hrs)	0.104

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DRAINAGE AREA 4 -ONSITE

5

Unity Sub Station - Drainage Area 4 Onsite - Existing Conditions Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt) **Time of Concentration Computations for Predeveloped Conditions**

Sheet flow		A1 - B1
Surface description		Short Grass Prarie
Manning's roughness coeff., n		0.15
Flow length, L	(ft)	100
Two-yr 24-hr rainfall, P2	(in)	3.31
Land slope, s	(ft/ft)	0.03
Tt = [0.007(nL)^0.8]/[(P2^0.5)(s^0.4)]	(hr)	0.137
Shallow concentrated flow		B1 - C1
Surface description		Unpaved
Flow length, L	(ft)	579
Watercourse slope, s	(ft/ft)	0.04
Average velocity, V	(fps)	3.4
Tt = L/(3600*V)	(hr)	0.047
Watershed time of concentration, Tc	(hrs)	0.184
Lag Tc, Tlag = (0.6*Tc)	(hrs)	0.110

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DRAINAGE AREA 2 -UNCONTROLLED UNDISTURBED

3 2

Unity Sub Station - Drainage Area 2 Onsite - Uncontrolled Undisturbed

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt) **Time of Concentration Computations for Predeveloped Conditions**

Sheet flow		A1 - B1	
Surface description		Short Grass Prarie	
Manning's roughness coeff., n		0.15	
Flow length, L	(ft)	100	
Two-yr 24-hr rainfall, P2	(in)	3.31	
Land slope, s	(ft/ft)	0.04	
t = [0.007(nL)^0.8]/[(P2^0.5)(s^0.4)]	(hr)	0.128	
Shallow concentrated flow		B1 - C1	
Surface description		Unpaved	
Flow length, L	(ft)	470	
Watercourse slope, s	(ft/ft)	0.06	
Average velocity, V	(fps)	3.9	
Tt = L/(3600*V)	(hr)	0.034	
tershed time of concentration, Tc	(hrs)	0.162	
Lag Tc, Tlag = (0.6*Tc)	(hrs)	0.097	



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8 DRAINAGE AREA 1

Worksheet 2: Rund	off curve numb	er and runoff				
Project: Unity Su	bstation		By: KAZ		Date:	1/24/2024
Location: Drainage A	rea 1, Onsite Trea	ated	Checked: EU		Date:	1/24/2024
Check one:	Present: X	Developed:	-			
1. Runoff curve nu	mber					
Soil name and	Cover description	l (cover type, treatme	nt and hydrologic	CN ¹		
hydrologic group (Appendix A)	condition; percen	it impervious; uncon impervious area ratio	nected/connected	e 2-2	AREA (Acres)	Product of CN x Area
				Tabl	Ì	
В	Оре	Open Space - Good Condition			3.13	190.9
В	Gravel		85	11.48	975.4	
		Impervious		98	0.30	29.3
		Water		98	1.12	109.6
¹ Use only one CN sourc	e per line		Totals \rightarrow		16.02	1305.3
					0.0250	sq. miles
CN (weighted	l) = total product / tot	al area =	Use CN \rightarrow		81.5	
						I
2. Runoff						
	Storm #1	Storm #2	Storm #3	Sto	rm #4	Storm #5
Frequency Yr	1	2	10	1	100	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2	6	i.58	8.69
Runoff, Q In.	0.90	1.26	2.33	4	.47	6.45
(Use P and CN with	table 2-1, Figure 2-1, or					

DRAINAGE AREA 2 UNCONTROLLED UNDISTURBED

Project: Unity Su	bstation		By: KAZ		Date: 1/24/202	
Location: Drainage A	rea 2, Onsite Uno	ont. Undist.	Checked: EU		Date:	1/24/2024
Check one:	Present: X	Developed:				
1. Runoff curve nu	mber					
Soil name and	Cover description	ı (cover type, treat	ment and hydrologic	CN ¹		
hydrologic group (Appendix A)	condition; percer	t impervious; unc mpervious area ra	onnected/connected tio)	ble 2-2	AREA (Acres)	Product o CN x Area
				Tal		
В	Pa	sture - Good Con	lition	61	2.98	181.8
В	W	oods - Good Cond	lition	55	1.44	79.2
¹ Use only one CN sourc	e per line		Totals \rightarrow		4.42	261.0
					0.0069	sq. miles
CN (weighted) = total product / tot	al area =	Use CN \rightarrow		59.0	
2. Runoff						
	Storm #1	Storm #2	Storm #3	Sto	rm #4	Storm #5
Frequency Yr	1	2	10	1	00	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2	6	.58	8.69
-			-	-		

DRAINAGE AREA 4

Project: Unity Su	bstation		By: KAZ		Date:	1/24/2024	
Location: Drainage A	vrea 4, Onsite		Checked: EU		Date:	1/24/2024	
Check one:	Present: X	Developed:	•				
1. Runoff curve nu	mber			•			
Soil name and	Cover descriptio	n (cover type, treatr	nent and hydrologic	CN ¹			
hydrologic group (Appendix A)	condition; perce	cover description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)			AREA (Acres)	Product o CN x Area	
				μ			
		Impervious		98	0.25	24.7	
В	Оре	en Space - Good Co	ndition	61	1.00	61.0	
¹ Use only one CN sourc	e per line		Totals \rightarrow		1.25	85.6	
					0.0020	sq. miles	
CN (weighted	d) = total product / to	otal area =	Use CN \rightarrow		68.4		
2. Runoff							
	Storm #1	Storm #2	Storm #3	Sto	rm #4	Storm #5	
Frequency Yr	1	2	10	1	100	500	
Rainfall, P (24-hour) . In.	2.4	2.89	4.2	6	.58	8.69	
Runoff Q In	0.36	0.59	1 36	3	12	4 87	

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6 DRAINAGE AREA 1 UNCONTROLLED DISTURBED

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Worksheet 2: Rund	off curve num	per and runoff	
Project: Unity Su	bstation		By: KAZ
Location: Drainage A	rea 1, Onsite Un	controlled	Checked: E
Check one:	Present: K	Developed:	
1. Runoff curve nu	mber		
Soil name and hydrologic group (Appendix A)	Cover description condition; percen	n (cover type, treatme nt impervious; unconi impervious area ratio	nt and hydrologic nected/connected)
В	Оре	n Space - Good Cond	lition
¹ Use only one CN sourc	e per line		Totals \rightarrow
CN (weighted) = total product / to	tal area =	Use CN \rightarrow
2. Runoff			
	Storm #1	Storm #2	Storm #3
Frequency Yr	1	2	10
Rainfall, P (24-hour) . In.	2.4	2.89	4.2
Runoff, Q In.	0.90	1.26	2.33
(Use P and CN with	table 2-1, Figure 2-1, or		

DRAINAGE AREA 3

Worksheet 2: Rund	off curve numb	per and runoff				
Project: Unity Su	bstation		By: KAZ		Date: 1/24/2024	
Location: Drainage A	rea 3, Onsite		Checked: EU		Date:	1/24/2024
Check one:	Present: X	Developed:				
1. Runoff curve nu	mber					
Soil name and	Cover description	n (cover type, treatme	ent and hydrologic	CN ¹		
hydrologic group (Appendix A)	condition; percer	nt impervious; uncon impervious area ratio	nected/connected)	ble 2-2	AREA (Acres)	Product of CN x Area
				Ta		
В		Gravel			0.05	4.0
		Impervious			0.29	28.7
В	Оре	n Space - Good Con	dition	61	1.25	76.4
¹ Use only one CN sourc	e per line		Totals \rightarrow		1.59	109.1
					0.0025	sq. miles
CN (weighted	l) = total product / to	tal area =	Use CN \rightarrow		68.5	
0. Dam off						
2. RUNOTT						
	Storm #1	Storm #2	Storm #3	Sto	rm #4	Storm #5
Frequency Yr	1	2	10	1	100	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2	6	5.58	8.69
Runoff, Q In. (Use P and CN with equations 2-3 and 2	0.36 table 2-1, Figure 2-1, or -4)	0.59	1.37	3	5.12	4.88

DRAINAGE AREA 4 UNCONTROLLED UNDISTURBED

Worksheet 2: Rund	off curve num	per and runoff							
Project: Unity Su	bstation		By: KAZ						
Location: Drainage A	rea 4, Onsite Un	cont. Undist.	Checked: E						
Check one:	Present: X	Developed:							
1. Runoff curve nu	1. Runoff curve number								
Soil name and hydrologic group (Appendix A)Cover description (cover type, treatment and hydrol condition; percent impervious; unconnected/connec impervious area ratio)									
В	P	asture - Good Conditi	on						
¹ Use only one CN source	e per line		Totals \rightarrow						
CN (weighted	l) = total product / to	tal area =	Use CN \rightarrow						
2. Runoff									
	Storm #1	Storm #2	Storm #3						
Frequency Yr	1	2	10						
Rainfall, P (24-hour) . In.	2.4	2.89	4.2						
Runoff, Q In.	0.36 0.59 1.36								
(Use P and CN with equations 2-3 and 2	(Use P and CN with table 2-1, Figure 2-1, or equations 2-3 and 2-4)								

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	Date:	1/24/2024
	Date:	1/24/2024
CN ¹		
Table 2-2	AREA (Acres)	Product of CN x Area
61	0.16	9.5
	0.16	9.5
	0.0002	sq. miles
	61.0	
Sto	rm #4	Storm #5
1	00	500
6	.58	8.69
4	.47	6.45

	Date:	1/24/2024
	Date:	1/24/2024
CN ¹		
Table 2-2	AREA (Acres)	Product of CN x Area
61	0.40	24.4
	0.40	24.4
	0.0006	sq. miles
	61.0	
		-
Sto	rm #4	Storm #5
1	00	500
6	.58	8.69
3	.12	4.87

77 5 DRAINAGE AREA 1 SHEETFLOW

Worksheet 2: Runoff curve number and runoff									
Project: Unity Su	bstation		By: KAZ		Date:	1/24/2024			
Location: Drainage A	rea 1, Onsite She	eetflow	Checked: EU		Date:	1/24/2024			
Check one:	Present: K	Developed:							
1. Runoff curve nu	mber								
Soil name and hydrologic group (Appendix A)	Cover description condition; percent	Cover description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)			AREA (Acres)	Product of CN x Area			
				Tabl					
В	Оре	n Space - Good Cond	ition	61	0.16	10.1			
		Impervious		98	0.08	7.6			
¹ Use only one CN sourc	e per line		Totals \rightarrow		0.24	17.6			
					0.0004	sq. miles			
CN (weighted) = total product / to	tal area =	Use CN \rightarrow		72.8				
2. Runoff									
	Storm #1	Storm #2	Storm #3	Sto	rm #4	Storm #5			
Frequency Yr	1	2	10	1	100	500			
Rainfall, P (24-hour) . In.	2.4	6	5.58	8.69					
Runoff, Q In.	0.90	1.26	2.33	4	.47	6.45			
(Use P and CN with table 2-1, Figure 2-1, or equations 2-3 and 2-4)									

3 DRAINAGE AREA 2

Project: Unity Su	roject: Unity Substation By: KAZ			Date:	1/24/2024	
Location: Drainage A	rea 2, Onsite		Checked: EU		Date:	1/24/2024
Check one:	Present: X	Developed:				
1. Runoff curve nu	mber					
Soil name and	Cover description	ı (cover type, treatr	nent and hydrologic	CN ¹		
hydrologic group (Appendix A)	condition; percen i	nt impervious; unco impervious area rat	onnected/connected io)	Table 2-2	AREA (Acres)	Product of CN x Area
В	Open Space - Good Condition			61	1.22	74.2
¹ Use only one CN sourc	e per line		Totals \rightarrow		1.22	74.2
					0.0019	sa. miles
CN (weighted) = total product / tot	al area =	llse CN →		61.0	
(··ig	, p				01.0	
2. Runoff						
	Storm #1	Storm #2	Storm #3	Sto	rm #4	Storm #5
Frequency Yr	1	2	10	1	100	500
Rainfall, P (24-hour) . In.	2.4	2.89	4.2	6	5.58	8.69

DRAINAGE AREA 3 UNCONTROLLED DISTURBED

4

Worksheet 2: Runoff curve number and runoff								
Project: Unity Su	bstation		By: KAZ		Date:	1/24/2024		
Location: Drainage A	rea 3, Onsite Ur	ncontrolled	Checked: EU		Date:	1/24/2024		
Check one:	Present:	Developed:						
1. Runoff curve number								
Soil name and hydrologic group (Appendix A)	Cover description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)				AREA (Acres)	Product of CN x Area		
				Tal				
В		Gravel		85	0.21	18.1		
-		Impervious		98	0.11	10.9		
В	Ор	en Space - Good Conc	lition	61	0.34	20.7		
¹ Use only one CN sourc	e per line		Totals \rightarrow		0.66	49.7		
					0.0010	sq. miles		
CN (weighted) = total product / t	otal area =	Use CN \rightarrow		74.9			
2. Runoff								
	Storm #1	Storm #2	Storm #3	Sto	rm #4	Storm #5		
Frequency Yr	1	2	10	1	100	500		
Rainfall, P (24-hour) . In.	2.4 2.89 4.2 6.58					8.69		
Runoff, Q In.	0.36	0.59	1.37	3	5.12	4.88		
(Use P and CN with equations 2-3 and 2	table 2-1, Figure 2-1, or -4)							

DRAINAGE AREA 4 SHEETFLOW

Norksheet 2: Rund	off curve numb	er and runoff				
Project: Unity Su	bstation		By: KAZ		Date:	1/24/2024
.ocation: Drainage A	rea 4, Onsite She	etflow	Checked: EU		Date:	1/24/2024
Check one:	Present: X	Developed:				
I. Runoff curve nu	mber					
Soil name and	Cover description	(cover type, treatme	nt and hydrologic	CN ¹		
hydrologic group (Appendix A)	condition; percer	nt impervious; uncon impervious area ratio	nected/connected	able 2-2	AREA (Acres)	Product of CN x Area
				μ		
		Impervious		98	0.14	13.2
В	Оре	n Space - Good Conc	lition	61	0.17	10.5
¹ Use only one CN sourc	e per line		Totals \rightarrow		0.31	23.7
					0.0005	sq. miles
CN (weighted) = total product / tot	al area =	Use CN \rightarrow		77.3	
2. Runoff						
	Storm #1	Storm #2	Storm #3	Sto	rm #4	Storm #5
Frequency Yr	1	2	10	1	100	500
Rainfall, P (24-hour) . In.	2.4 2.89 4.2				5.58	8.69
Runoff, Q In.	0.36	0.59	1.36	3	5.12	4.87
(Use P and CN with equations 2-3 and 2	table 2-1, Figure 2-1, or -4)					

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DRAINAGE AREA 3 SHEETFLOW

Worksheet 2: Rund	off curve num	ber and runoff							
Project: Unity Su	Ibstation		By: KAZ		Date:	1/24/2024			
Location: Drainage A	Area 3, Onsite She	eetflow	Checked: EU		Date:	1/24/2024			
Check one:	Present: X	Developed:	-						
1. Runoff curve nu	mber								
Soil name and	Cover description	n (cover type, treatm	ent and hydrologic	CN ¹					
hydrologic group	condition; perce	nt impervious; uncor	nected/connected	⁵	AREA	Product of			
(Appendix A)		impervious area ratio))	ole 2	(Acres)	CN x Area			
				Tat					
		Impervious		9 8	0.20	19.8			
В	Оре	n Space - Good Con	dition	61	0.35	21.4			
¹ Use only one CN sourc	e per line		Totals →		0.55	41.1			
					0.0009	sq. miles			
CN (weighted	l) = total product / to	otal area =	Use CN \rightarrow		74.5				
						1			
2. Runoff									
	Storm #1	Storm #2	Storm #3	Sto	orm #4	Storm #5			
Frequency Yr	1	2	10	-	100	500			
Rainfall, P (24-hour) . In.	2.4	2.89	4.2	6	5.58	8.69			
Runoff, Q In.	0.36	0.59	1.37	3	3.12	4.88			
(Use P and CN with equations 2-3 and 2	1 table 2-1, Figure 2-1, or 2-4)		•						

Norksheet 2: Runoff curve number and runoff									
Project: Unity Su	bstation		By: KAZ		Date:	1/24/2024			
Location: Drainage A	rea 3, Onsite She	eetflow	Checked: EU		Date:	1/24/2024			
Check one:	Present: X	Developed:							
1. Runoff curve nu	mber								
Soil name and	Cover description	n (cover type, treatme	ent and hydrologic	CN ¹					
hydrologic group	condition; percer	nt impervious; uncon	nected/connected	2-2	AREA	Product of			
(Appendix A)		impervious area ratio	>)	ble	(Acres)	CN x Area			
				Та					
		Impervious		98	0.20	19.8			
В	Оре	n Space - Good Cond	dition	61	0.35	21.4			
¹ Use only one CN sourc	e per line		Totals \rightarrow		0.55	41.1			
					0.0009	sq. miles			
CN (weighted) = total product / to	tal area =	Use CN \rightarrow		74.5				
				l					
2. Runoff									
	Storm #1	Storm #2	Storm #3	Sto	rm #4	Storm #5			
Frequency Yr	1	2	10	1	100	500			
Rainfall, P (24-hour) . In.	2.4 2.89 4.2				.58	8.69			
Runoff, Q In.	0.36	0.59	1.37	3	.12	4.88			
(Use P and CN with equations 2-3 and 2	table 2-1, Figure 2-1, or -4)								

DRAINAGE AREA 5

Worksheet 2: Rung	off curve numb	oer and runoff				
Project: Unity Su	By: KA7		Date:	1/24/2024		
					Date.	1/24/2024
Location: Drainage A	vrea 5, Onsite	-	Cnecked: EU		Date:	1/24/2024
Check one:	Present: X	Developed:				
1. Runoff curve nu	mber					
Soil name and	Cover description	n (cover type, treatm	ent and hydrologic	CN ¹		
hydrologic group	condition; perce	nt impervious; uncor	nected/connected	2-2	AREA	Product of
(Appendix A)		Impervious area ratio)	ble	(Acres)	CN x Area
				Та		
		Impervious		98	0.1398	13.7
В	Оре	n Space - Good Con	dition	61	0.33	20.0
¹ Use only one CN source	e per line		Totals \rightarrow		0.47	33.7
					0.0007	sq. miles
CN (weighted	d) = total product / to	tal area =	Use CN \rightarrow		72.1	
2. Runoff						
	Storm #1	Storm #2	Storm #3	Sto	rm #4	Storm #5
Frequency Yr	1	2	10	1	00	500
Rainfall, P (24-hour) . In.	2.4	6	.58	8.69		
Runoff, Q In.	0.48	0.75	3	.48	5.31	
(Use P and CN with equations 2-3 and 2	n table 2-1, Figure 2-1, or -4)					

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Worksheet 2: Rund	off curve numb	er and runoff				
Project: Unity Su	bstation		By: KAZ		Date:	1/24/2024
Location: Drainage A	rea 5, Onsite			Date:	1/24/2024	
Check one:	Present: X	Developed:				
1. Runoff curve nu	mber					
Soil name and	Cover description	n (cover type, treatme	ent and hydrologic	CN ¹		
hydrologic group	condition; percer	nt impervious; uncon	nected/connected	-2	AREA	Product of
(Appendix A)	i	impervious area ratio)	ole 2	(Acres)	CN x Area
				Tat		
		Impervious		98	0.1398	13.7
В	Оре	Impervious Open Space - Good Condition				20.0
¹ Use only one CN sourc	e per line		Totals →		0.47	33.7
					0.0007	sq. miles
CN (weighted	l) = total product / tot	tal area =	Use CN \rightarrow		72.1	
2. Runoff						
	Storm #1	Storm #2	Storm #3	Sto	rm #4	Storm #5
FrequencyYr	1	2	10	1	00	500
Rainfall, P (24-hour) . In.	2.4 2.89 4.2				.58	8.69
Runoff, Q In.	0.48	0.75	1.61	3	.48	5.31
(Use P and CN with	table 2-1, Figure 2-1, or				-	
	·/					

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		REVISIONS			Dewber 4805 Lake E Glen Allen, VA	WDERTY ry Engineers Inc. 3rook Drive, Suite 200 23060; (p) 804.290.7957				
PEV			ESCRIPTION		EDWARD Distriction EDWARD	TH OF URBRELL R. UMBRELL No. 038388 9/2024 NAL ENG				
			De	ominia nergy°						
	POST DEVELOPMENT CN COMPS									
111			FY SUI INTY	BSTAT	ION	VIRGINIA				
PROIFC	T 5017050	ΝΔΜΕ								
	FSIGNER	FU/K7	01/29/24	1	707908-	-C-610				
PROJE	CT ENGINEER	EU/KZ	01/29/24	DRAWING:						
API	PROVED BY	KAS	01/29/24	170)7908-C-	-610.dwa				
			•		1	<u> </u>				

DRAINAGE AREA 1 – Controlled

8

Unity Sub Station - Drainage Area 1 Onsite Controlled

Worksheet 3: Time of Concentration (Tc) or Travel Time (Tt) Time of Concentration Computations for Postdeveloped Conditions 7

Sheet flow		A - B
Surface description		Smooth Surfaces (Gravel)
Manning's roughness coeff., n		0.03
Flow length, L	(ft)	100
Two-yr 24-hr rainfall, P2	(in)	3.31
Land slope, s	(ft/ft)	0.010
Tt = [0.007(nL)^0.8]/[(P2^0.5)(s^0.4)]	(hr)	0.051
Shallow concentrated flow		B - C
Surface description		Paved
Flow length, L	(ft)	263
Watercourse slope, s	(ft/ft)	0.02
Average velocity, V	(fps)	2.7
Tt = L/(3600*V)	(hr)	0.027
Pipe flow		C - D
Pipe Diameter	(in)	
Channel Data		
bottom width	(ft)	4
side slope	z:1	3
depth	(ft)	1
Cross sectional flow area, a		7.000
Wetted perimeter, Pw		10.325
Hydraulic radius, r = a/Pw		0.678
Channel slope, s		0.0130
Manning's roughness coeff., n		0.030
V =(1.49*r^2/3*s^1/2)/n; Compute V		4.375
Flow length, L	(ft)	690.8
Tt = L/(3600*V); Compute Tt	(hr)	0.044
Watershed time of concentration, Tc	(hrs)	0.122
Lag Tc, Tlag = (0.6*Tc)	(hrs)	0.073

DRAINAGE AREA 2 – UNCONTROLLED UNDISTURBED

Jnity Sub Station - Drainage Area 2 Worksheet 3: Time of Concentra <u>Fime of Concentration Computatio</u>	Onsite Unco Ition (Tc) or <u>ns for Postd</u>	ontrolled Undisturbed [.] Travel Time (Tt) <u>eveloped Conditions</u>
Sheet flow		A1 - B1
Surface description		Short Grass Prarie
Manning's roughness coeff., n		0.15
Flow length, L	(ft)	100
Two-yr 24-hr rainfall, P2	(in)	3.31
Land slope, s	(ft/ft)	0.04
Tt = [0.007(nL)^0.8]/[(P2^0.5)(s^0.4)]	(hr)	0.128
Shallow concentrated flow		B1 - C1
Surface description		Unpaved
Flow length, L	(ft)	470
Watercourse slope, s	(ft/ft)	0.06
Average velocity, V	(fps)	3.9
Tt = L/(3600*V)	(hr)	0.034
Watershed time of concentration, Tc	(hrs)	0.162
Lag Tc, Tlag = (0.6*Tc)	(hrs)	0.097

DRAINAGE AREA 4 – Controlled

Unity Sub Station - Drainage Area 4	Onsite	
Worksheet 3: Time of Concentra Time of Concentration Computatio	ntion (Tc) or Tra ns for Postdeve	avel Time (Tt) loped Conditions
Sheet flow		A - B
Surface description		Short Grass Prarie
Manning's roughness coeff., n		0.15
Flow length, L	(ft)	76.91
Two-yr 24-hr rainfall, P2	(in)	3.31
Land slope, s	(ft/ft)	0.052
Tt = [0.007(nL)^0.8]/[(P2^0.5)(s^0.4)]	(hr)	0.089
Pipe flow/Channel flow		B-C
Pipe Diameter	(in)	
Channel Data		
bottom width	(ft)	0.1
side slope	z:1	3
depth	(ft)	0.51
Cross sectional flow area, a		0.831
Wetted perimeter, Pw		3.326
Hydraulic radius, r = a/Pw		0.250
Channel slope, s		0.0405
Manning's roughness coeff., n		0.030
V =(1.49*r^2/3*s^1/2)/n; Compute V		3.965
Flow length, L	(ft)	222.42
Tt = L/(3600*V);	(hr)	0.016
Watershed time of concentration, Tc	(hrs)	0.105
Lag Tc, Tlag = (0.6*Tc)	(hrs)	0.063

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DRAINAGE AREA 3 – Controlled

4

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A - B Grass 0.24 39 3.31 0.051 0.076 C - D 0.1 3 0.73 1.658	
0.24 39 3.31 0.051 0.076 C - D 0.1 3 0.73 1.658	
0.24 39 3.31 0.051 0.076 C - D 0.1 3 0.73 1.658	i
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771.3	
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(ft) hrj	(ft) 2.297 hr) 0.093 hrs) 0.169 hrs) 0.101

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DRAINAGE AREA 3 – UNCONTROLLED DISTURBED

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Unity Sub Station - Drainage Area 3	Onsite Uncont	trolled	
Worksheet 3: Time of Concentra	ation (Tc) or T	ravel Time (Tt)	
Time of Concentration Computatio	ns for Postdev	eloped Conditions	
Sheet flow		A - B	
Surface description		Smooth Surfaces (Gravel)	
Manning's roughness coeff., n		0.03	
Flow length, L	(ft)	100	
Two-yr 24-hr rainfall, P2	(in)	3.31	
Land slope, s	(ft/ft)	0.010	
Tt = [0.007(nL)^0.8]/[(P2^0.5)(s^0.4)]	(hr)	0.057	
Shallow concentrated flow		B - C	
Surface description		Unpaved	
Flow length, L	(ft)	198	
Watercourse slope, s	(ft/ft)	0.02	
Average velocity, V	(fps)	2.0	
Tt = L/(3600*V)	(hr)	0.028	
Pipe flow/Channel flow		C - D	
Pipe Diameter	(in)		
Channel Data			
bottom width	(ft)	0.1	
side slope	z:1	3	
depth	(ft)	0.65	
Cross sectional flow area, a		1.333	
Wetted perimeter, Pw		4.211	
Hydraulic radius, r = a/Pw		0.316	
Channel slope, s		0.0153	
Manning's roughness coeff., n		0.035	
V =(1.49*r^2/3*s^1/2)/n; Compute V		2.446	
Flow length, L	(ft)	555.17	
Tt = L/(3600*V); Compute Tt	(hr)	0.063	
Watershed time of concentration, Tc	(hrs)	0.148	
Lag Tc, Tlag = (0.6*Tc)	(hrs)	0.089	

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Dewberry Engineers Inc. 4805 Lake Brook Drive, Suite 200 Glen Allen, VA 23060; (p) 804.290.7957 REVISIONS EDWARD R. UMBREL Lic. No. 038388 29/2020 REV DATE DESCRIPTION DEWBERRY PROJECT NO.: 50157950 **Dominion** Energy° POST DEVELOPMENT TC COMPS UNITY SUBSTATION LUNENBURG COUNTY VIRGINIA SCALE AS SHOWN OPERATIONAL REGION B/M No. PROJECT5017950NAMEDATESHEET:1707908-C-611DESIGNEREU/KZ01/29/2401/29/2401/29/2401/29/24 PROJECT ENGINEER EU/KZ 01/29/24 DRAWING: KAS 01/29/24 1707908-C-611.dwg APPROVED BY 1

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DA 1 ROUTING RESULTS SUMMARY

DA 1						
Return Event	Q _{pre} ⁼ _{outfall}	Q _{post-pond}	Q _{post-uncont}	Q post-outfall		
	CFS	CFS	CFS	CFS		
1-year	0.40	0.19	0.03	0.19		
10-year	4.07	1.14	0.28	1.15		

NOTE: POST-DEVELOPMENT PEAK OUTFLOWS ARE NON-COINCIDENT.

I

Catchments Sumn	nary				
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Drainage Area 1	Pre-Development 1 year	1	0.061	12.200	0.40
Drainage Area 1	Post-Development 1 year	1	0.737	12.150	9.53
Drainage Area 1	Forested	1	0.030	12.550	0.09
Drainage Area 1	Pre-Development 2 year	2	0.111	12.150	1.06
Drainage Area 1	Post-Development 2 year	2	1.162	12.150	16.09
Drainage Area 1	Pre-Development 10 year	10	0.319	12.150	4.07
Drainage Area 1	Post-Development 10 year	10	2.727	12.150	39.25
Drainage Area 1	Pre-Development 100 year	100	0.807	12.150	11.08
Drainage Area 1	Post-Development 100 year	100	6.058	12.150	87.54
DA 1: Uncont. Dist.	Post-Development 1 year	1	0.004	12.150	0.03
DA 1: Uncont. Dist.	Post-Development 2 year	2	0.007	12.100	0.07
DA 1: Uncont. Dist.	Post-Development 10 year	10	0.019	12.100	0.28
DA 1: Uncont. Dist.	Post-Development 100 year	100	0.047	12.100	0.77

C Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
0-1	Pre-Development 1 year	1	0.061	12.200	0.40
O-1	Post-Development 1 year	1	0.171	24.000	0.19
0-1	Forested	1	0.030	12.550	0.09
O-1	Pre-Development 2 year	2	0.111	12.150	1.06
O-1	Post-Development 2 year	2	0.236	24.000	0.26
0-1	Pre-Development 10 year	10	0.319	12.150	4.07
0-1	Post-Development 10 year	10	0.921	17.400	1.15
0-1	Pre-Development 100 year	100	0.807	12.150	11.08
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
0-1	Post-Development 100 year	100	3.852	12.650	14.43

Pond Sumn	nary						
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximu Pond Stor (ac-ft)
Wet Pond (IN)	Post- Development 1 year	1	0.737	12.150	9.53	(N/A)	(N
Wet Pond (OUT)	Post- Development 1 year	1	0.168	24.000	0.19	379.81	0.
Wet Pond (IN)	Post- Development 2 year	2	1.162	12.150	16.09	(N/A)	(N
Wet Pond (OUT)	Post- Development 2 year	2	0.229	24.000	0.25	380.30	0.9
Wet Pond (IN)	Post- Development 10 year	10	2.727	12.150	39.25	(N/A)	(N
Wet Pond (OUT)	Post- Development 10 year	10	0.902	17.250	1.14	381.58	1.9
Wet Pond (IN)	Post- Development 100 year	100	6.058	12.150	87.54	(N/A)	(N
Wet Pond (OUT)	Post- Development 100 year	100	3.804	12.650	14.32	383.04	3.

DA 1A SHEETFLOW ROUTING RESULTS SUMMARY

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Dewberry						
Water Resources Engineering						
	OUTFALL 1A - Sheet F	low Comp	utations			
			Computed By:	KZ	Date:	25-Jan-24
			Checked By:	EU	Date:	25-Jan-24
	Drainage Area		CN Value		2-Year Flow	10-Year Flow
Fristian Chast Flow	(ac)		61.0		(CJS)	(CJS)
Existing Sneet Flow	0.24		61.0		0.11	0.43
Proposed Sheet Flow	0.24		72.8		0.33	0.74
		Existing Sh	neet Flow	>	Proposed Shee	t Flow
	2-Year Flow	0.11		<	0.33	
	10-Year Flow	0.43		<	0.74	

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ELEVATION-VOLUME TABLE

MAIN CELL

STAGE VS. STORAGE USING CONIC METHOD

PROJECT:		Unity Substatic	on Wet Pond	
ENGINEER / DA	TE:		KZ	7/
Main Cell				
ELEVATION	AREA	AREA	INCREMENTAL	٦
			VOLUME	V V
(FEET)	(SQ FEET)	(ACRES)	(ACRE-FEET)	(AC
375	10189.5	0.2339	0	
376	19805.1	0.4547	0.3382	
377	21486.1	0.4933	0.4738	
378	23225.5	0.5332	0.5131	
378.5	24118.6	0.5537	0.2717	
378.5	28865.7	0.6627	0.0000	
379	29830.8	0.6848	0.3369	
380	31803.4	0.7301	0.7073	
381	33832.6	0.7767	0.7533	
382	35918.3	0.8246	0.8005	
383	38060.5	0.8737	0.8490	
384	40788.8	0.9364	0.9049	
385	42983.4	0.9868	0.9615	
386	45569.6	1 0461	1 0163	

FOREBAY

STAGE VS. STORAGE USING CONIC METHOD

PROJECT:		on Wet Pond		
ENGINEER / DA	TE:	TE: KZ		
Forebay				
ELEVATION	AREA	AREA	INCREMENTAL	· ·
			VOLUME	V
(FEET)	(SQ FEET)	(ACRES)	(ACRE-FEET)	(AC
379	3153.0	0.0724	0	
380	3910.8	0.0898	0.0809	
381	4732.9	0.1087	0.0991	
382	5619.3	0.1290	0.1187	
382.5	6086.6	0.1397	0.0672	
382.5	8257.4	0.1896	0.0000	
383	9161.3	0.2103	0.0999	
384	10649.4	0.2445	0.2272	
385	11781.5	0.2705	0.2574	
386	13546.5	0.3110	0.2905	

WETLAND CELL Stage vs. storage using conic method

PROJECT:	Unity Substation Wet Pond						
ENGINEER / DA	TE:		7/				
Wetland Cell							
ELEVATION	AREA	AREA	INCREMENTAL	-			
			VOLUME	V			
(FEET)	(SQ FEET)	(ACRES)	(ACRE-FEET)	(AC			
381.5	1831.1	0.0420	0				
382	2755.4	0.0633	0.0261				
382.5	5332.2	0.1224	0.0456				
382.5	6771.9	0.1555	0.0000				
383	7754.7	0.1780	0.0833				
384	9271.2	0.2128	0.1952				
385	10645.9	0.2444	0.2284				
386	12048.2	0.2766	0.2603				

TOTAL VOLUME

STAGE VS. S	TORAGE USI	NG CONIC MI	ETHOD	
PROJECT:		Unity Substatic	on Wet Pond	_
ENGINEER / DA	TE:		KZ	- 71
Total Volume				
ELEVATION	AREA	AREA	INCREMENTAL	
				V
(FEET)	(SQ FEET)	(ACRES)	(ACRE-FEET)	(AC
375	10189.50	0.234	0.000	
376	19805.05	0.455	0.338	
377	21486.10	0.493	0.474	
378	23225.45	0.533	0.513	
378.5	24118.59	0.554	0.272	
378.5	28865.65	0.663	0.000	
379	32983.71	0.757	0.337	
380	35714.16	0.820	0.788	
381	38565.42	0.885	0.852	
382	41537.53	0.954	0.919	
382.5	47337.06	1.087	0.913	
382.5	50947.55	1.170	0.801	
383	54976.55	1.262	1.032	
384	60709.37	1.394	1.327	
385	65410.73	1.502	1.447	
386	71164.34	1.634	1.567	

MODEL SCHEMATIC

DRAINAGE AREA 1A, SHEETFLOW

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	(Computed) No Infiltration	
	Initial Conditions	
	Elevation (Water Surface, 379.00 ft Initial)	
	Volume (Initial) 0.000 ac-ft Flow (Initial Outlet) 0.00 ft ³ /s	
	Flow (Initial Infiltration) 0.00 ft ³ /s	
	Flow (Initial, Total)0.00 ft ³ /sTime Increment0.050 hours	
	Inflow/Outflow Hydrograph Summary	
e to Peak (Flow, In) 12.150 hours e to Peak (Flow, Outlet) 24.000 hours	Flow (Peak In)39.25 ft³/sTime to Peak (Flow, In)12.150 hoursFlow (Peak Outlet)1.14 ft³/sTime to Peak (Flow, Outlet)17.250 hours	
	Elevation (Water Surface,	
	Peak) 381.58 ft Volume (Peak) 1 923 ac-ft	
	Mass Balance (ac.ff)	
	Volume (Initial) 0.000 ac-ft	
	Volume (Total Inflow)2.727 ac-ftVolume (Total Infiltration)0.000 ac-ft	
	Volume (Total Outlet 0.902 ac-ft 0.902 ac-ft	
	Volume (Retained) 1.821 ac-ft Volume (Inrouted) -0.003 ac-ft	
	Error (Mass Balance) 0.1 %	
		- I
Return Event: 2 years	Subsection: Level Pool Pond Routing Summary Return Event: 100 years	
Stoffi Lvent. 2 Tear	Scenario: Post-Development 100 year	
	Infiltration	
	(Computed) No Infiltration	
	Initial Conditions	
	Elevation (Water Surface, 379.00 ft Initial) 379.00 ft	
	Volume (Initial)0.000 ac-ftFlow (Initial Outlet)0.00 ft³/s	
	Flow (Initial Infiltration)0.00 ft³/sFlow (Initial, Total)0.00 ft³/s	
	Time Increment 0.050 hours	
	Inflow/Outflow Hydrograph Summary	
e to Peak (Flow, In) 12.150 hours e to Peak (Flow, Outlet) 24.000 hours	Flow (Peak In)87.54 ft3/sTime to Peak (Flow, In)12.150 hoursFlow (Peak Outlet)14.32 ft3/sTime to Peak (Flow, Outlet)12.650 hours	
	Elevation (Water Surface, 383.04 ft	
	Volume (Peak) 3.145 ac-ft	
	Mass Balance (ac-ft)	
	Volume (Initial)0.000 ac-ftVolume (Total Inflow)6.058 ac-ft	₹
	Volume (Total Infiltration) 0.000 ac-ft	
	Volume (rotal oddet 3.804 ac-ft Outflow) 2.245 ac ft	
	Volume (Verained)2:243 ac-rtVolume (Unrouted)-0.009 ac-ft	
Tailwater Elevation Conver	ence Error	
(ft)	ft)	
		B
00 (N/A)	0.00	В
00 (N/A) 14 (N/A)	0.00 0.00	В
00 (N/A) 14 (N/A) 22 (N/A)	0.00 0.00 0.00	В
00 (N/A) 14 (N/A) 22 (N/A) 28 (N/A) 32 (N/A)	0.00 0.00 0.00 0.00	В
00 (N/A) 14 (N/A) 22 (N/A) 28 (N/A) 32 (N/A) 34 (N/A)	0.00 0.00 0.00 0.00 0.00 0.00	
00 (N/A) 14 (N/A) 22 (N/A) 28 (N/A) 32 (N/A) 34 (N/A) 97 (N/A)	0.00 0.00 0.00 0.00 0.00 0.00 0.00 REVISIONS Dewberr Dewberry Engineers Inc 4805 Lake Brook Drive, Suit	FY [•] 200
00 (N/A) 14 (N/A) 22 (N/A) 28 (N/A) 32 (N/A) 34 (N/A) 97 (N/A) 10 (N/A) 84 (N/A)	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 REVISIONS Dewberr Dewberr Dewberr Engineers Inc 4805 Lake Brook Drive, Suit Glen Allen, VA 23060; (p) 804.2	E Fy° ≥ 200 !90.7957
00 (N/A) 14 (N/A) 22 (N/A) 28 (N/A) 32 (N/A) 34 (N/A) 97 (N/A) 10 (N/A) 84 (N/A) 14 (N/A)	0.00 0.00 0.00 0.00 0.00 0.00 0.00 REVISIONS 0.00 Dewberry Engineers Inc. 4805 Lake Brook Drive, Suit. Glen Allen, VA 23060; (p) 804.2 0.00 0.00	FY° ⇒ 200 290.7957
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00 (N/A) 14 (N/A) 22 (N/A) 28 (N/A) 32 (N/A) 34 (N/A) 97 (N/A) 10 (N/A) 14 (N/A) 15 (N/A) 16 (N/A) 17 (N/A) 18 (N/A) 38 (N/A) 84 (N/A) 84 (N/A)	0.00 0.00 0.00 0.00 0.00 0.00 0.00 REVISIONS 0.00 Dewberry Engineers Inc. 4805 Lake Brook Drive, Suit. Glen Allen, VA 23060; (p) 804.2 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	₽ 200 290.7957
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00 (N/A) 14 (N/A) 22 (N/A) 28 (N/A) 32 (N/A) 34 (N/A) 97 (N/A) 10 (N/A) 84 (N/A) 14 (N/A) 14 (N/A) 38 (N/A) 38 (N/A) 38 (N/A) 38 (N/A) 68 (N/A) 68 (N/A) Comparison of the second sec	0.00 0.00 0.00	E 200 290.7957 0157950 A
00 (N/A) 14 (N/A) 22 (N/A) 28 (N/A) 32 (N/A) 34 (N/A) 97 (N/A) 10 (N/A) 84 (N/A) 14 (N/A) 41 (N/A) 38 (N/A) 38 (N/A) 38 (N/A) 84 (N/A) 68 (N/A) 68 (N/A) 68 (N/A)	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	200 290.7957 0157950 A
00 (N/A) 14 (N/A) 22 (N/A) 28 (N/A) 32 (N/A) 34 (N/A) 97 (N/A) 10 (N/A) 84 (N/A) 14 (N/A) 14 (N/A) 38 (N/A) 38 (N/A) 38 (N/A) 84 (N/A) 17 (N/A) 45 (N/A) 68 (N/A) CDDFADED	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	200 290.7957 0157950 A
00 (N/A) 14 (N/A) 22 (N/A) 28 (N/A) 32 (N/A) 34 (N/A) 97 (N/A) 10 (N/A) 84 (N/A) 14 (N/A) 41 (N/A) 38 (N/A) 38 (N/A) 38 (N/A) 45 (N/A) 68 (N/A) CRAINA UNCON	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 REVISIONS Dewber 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 </td <td>200 290.7957 0157950 A INIA VVN</td>	200 290.7957 0157950 A INIA VVN
00 (N/A) 14 (N/A) 22 (N/A) 32 (N/A) 34 (N/A) 97 (N/A) 10 (N/A) 84 (N/A) 14 (N/A) 38 (N/A) 38 (N/A) 38 (N/A) 38 (N/A) 41 (N/A) 38 (N/A) 68 (N/A) Contraction of the second secon	0.00 0.00 0.00	E 200 290.7957 0157950 ■ INIA WN
00 (N/A) 14 (N/A) 22 (N/A) 32 (N/A) 32 (N/A) 34 (N/A) 97 (N/A) 10 (N/A) 84 (N/A) 14 (N/A) 41 (N/A) 38 (N/A) 38 (N/A) 84 (N/A) 17 (N/A) 45 (N/A) 68 (N/A) CRAINA UNCON DRAINA UNCON	0.00 0.00 Rev Date Description EXEAREA 1, ROUTING COMPS UNITY SUBSTATION UNITY SUBSTATION LUNENBURG COUNTY VIRG OPERATIONAL REGION B/M No. SCALE AS SHO PROJECT ENGINER EU/K2 01/29/24 <td>E 200 290.7957 0157950 0157950 A INIA WN INIA VN</td>	E 200 290.7957 0157950 0157950 A INIA WN INIA VN

Subsection: Level Pool Pond Routing Summary

Scenario: Post-Development 10 year

Label: Wet Pond (IN)

Infiltration

Return Event: 1 years

Storm Event: 1 Year

Return Event: 10 years

Storm Event: 10 Year

DRAINAGE AREA 2

8

DA 2										
Return Event	Q _{pre} -outfall	Q _{allowable}	Q _{undist.}	Q _{post-outfall}						
	CFS	CFS	CFS	CFS						
1-year	0.79	0.79		0.22						
10-vear	14.64	14.64	5.76	7.65						

tchments Summary										
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)					
A2	Post-Development 1 year	1	0.027	12.150	0.22					
A2	Pre-Development 1 year	1	0.137	12.250	0.79					
A2	Pre-Development 10 year	10	0.738	12.150	8.89					
A2	Post-Development 10 year	10	0.143	12.100	2.16					
A2 Uncont. Undist.	Pre-Development 10 year	10	0.468	12.150	5.76					
A2 Uncont. Undist.	Post-Development 10 year	10	0.468	12.150	5.76					
_			·							
ode Summary										
Label	Scenario	Return	Hydrograph	Time to Peak	Peak Flow					

		Event (years)	Volume (ac-ft)	(hours)	(ft³/s)
0-2	Post-Development 1 year	1	0.027	12.150	0.22
0-2	Pre-Development 1 year	1	0.137	12.250	0.79
0-2	Pre-Development 10 year	10	1.206	12.150	14.64
0-2	Post-Development 10 year	10	0.611	12.150	7.65

MODEL SCHEMATIC



DRAINAGE AREA 3

Dr. U Dr. V Event Ors				П	Δ.3			Г	
Event Type Type <thtype< th=""> Type Type <th< th=""><th>Return</th><th>0.</th><th></th><th>0</th><th></th><th>0</th><th>0</th><th>1</th><th></th></th<></thtype<>	Return	0.		0		0	0	1	
Line Line Line Line Line Line 10.53 10.53 2.18 1.91 3.42 Section 10.53 2.18 1.91 3.42 Section 10.53 2.18 1.91 3.42 Section Network Hydrograph Time to Peak Rev Peak Rev DA3 Model Section 1 0.03 2.230 0.77 DA3 Model Section 1 0.03 2.230 0.75 DA3 Model Section 1 0.03 2.230 0.77 DA3 Model Section 1 0.03 2.230 0.73 DA3 Uncontrolled Section Model Section 1 0.137 2.230 0.83 DA3 Uncontrolled Section Model Section Time to Peak Reve 1 0.131 17.220 1.81 OA3 Uncontrolled Section Model Section 1.93 2.230 1.93 2.230 1.93 2.230 <td>Event</td> <td></td> <td>tfall</td> <td></td> <td>vepost-culvert</td> <td></td> <td></td> <td>-</td> <td></td>	Event		tfall		vepost-culvert			-	
10-year 10.53 2.19 1.91 3.42 Extriments Summary Libel Scenario Return Hydrograph Using Time to Peak (Sound) Peak Peak (Sound) Peak Peak (Sound) DA3 Proc-Development 1 (see the peak Peak Power Report 1 (see the peak Peak Peak Power Report 1 (see the peak Peak Peak Peak Power Report 1 (see the peak Peak Peak Peak Power Report 1 (see the peak Peak	1-year	1.01		1.01	0.73	0.58	1.01	-	
Label Scenario Petaturi (verity) Hydrograph (norm) Time to Peak (Norm) Peak (Norm) 0x3 Inst. Development 1 (verity) 0.058 12.150 0.73 0x3 Inst. Development 1 verity 1 0.151 12.200 1.01 0x3 Inst. Development 1 verity 1 0.152 12.150 1.03 0x3 Inst. Development 1 verity 1 0.058 12.150 1.03 0x3 Inst. Development 1 verity 1 0.051 12.150 1.03 0x3 Uncontrolled verity Scenario Return Verity Hydrograph verity Time to Peak Peak (Now Verity) 0x3 Scenario Return Verity Hydrograph verity Time to Peak Peak (Now Verity) 1.01 0x3 Scenario Return Verity Hydrograph (verity) Time to Peak Peak (Now Verity) 1.01 0x3 Peobelopment 1 1 0.053 1.02 1.01 0x3 Peobelopment 10 10 0.056 3.66.77 0.033	10-year	10.53	3	10.53	2.19	1.91	3.42]	
Label Scenario Petern Hydrogan Time to Peter Peter Peter Peter Peter DA3 Peter Development 1 1 0.03 12.150 0.73 DA3 Peter Development 1 1 0.03 12.150 0.73 DA3 Peter Development 1 1 0.133 12.20 0.33 DA3 Peter Development 1 1 0.137 12.150 10.33 DA3 Decomponent 10 10 0.043 12.150 10.33 DA3 Uncontrolled Peeter Development 1 1 0.043 12.150 1.51 DA3 Uncontrolled Peeter Development 1 1 0.137 12.150 1.51 A Uncontrolled Peeter Development 1 1 0.133 12.200 1.61 O-3 Peeter Development 1 1 0.333 12.200 1.61 O-3 Peeter Development 1 1 0.366 12.200 3.60 O-3 Peeter Devevelopment 1 1 0.066	Catchmen	ts Summ	arv						
DA3 Peet-Development 1 year 1 is performed to the segment 1 is 1 is 0.058 is 12.150 is 0.72 is DA3 Peet-Development 1 year 10 is 0.800 is 12.150 is 10.151 is 10.035 is 10.035 is 10.035 is 10.035 is 10.035 is 12.150 is 10.151 is 10.035 is 10.03	Lab	el	 ,	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time t (ho	o Peak urs)	Peak Flow (ft³/s)
DA3 pre-bestportment 1 year 1 10 0.133 0.850 12.200 1.2150 1.01 0.033 DA3 Pre-Development 10 year 10 0.0480 12.150 1.01 0.035 DA3 Uncontrolled 0.3 Uncontrolled 0.3 Uncontrolled 0.3 Uncontrolled year Scenario Pre-bestportment 10 10 0.049 12.150 1.01 0.037 Node Summary Label Scenario Return Event Hydrograph (er/ty) Time to Pask (er/ty) Pask Pow (th/y) O-3 Post-Overlopment 1 1 0.111 12.200 1.01 O-3 Post-Overlopment 1 1 0.111 12.200 1.01 O-3 Post-Overlopment 1 1 0.111 12.200 1.01 O-3 Post-Overlopment 10 10 0.800 12.150 10.35 O-3 Post-Overlopment 10 10 0.366 12.200 3.60 Fond Summary Label Scenario Return Volume Three to Pask Post (er/ty) Material (er/ty) Material (er/ty) Backwater Post-Overlopment (er/ty) 10 0.260	DA3		Post year	-Development	1 1	0.	068	12.150	0.73
DA3 Pro-Development 10 10 0.800 12.150 10.33 DA3 Post-Development 10 10 0.260 12.150 3.42 DA3 Uncontrolled Post-Development 1 1 0.033 12.150 0.34 DA3 Uncontrolled Post-Development 1 1 0.033 12.150 0.38 DA3 Uncontrolled Scenario Return Hydrograph Time to Peak Prov Peak Prov 0-3 Post-Development 1 1 0.137 12.200 1.01 0-3 Peak Povelopment 1 1 0.153 12.200 1.01 0-3 Peak-Development 1 1 0.153 12.200 1.01 0-3 Peak-Development 1 10 0.336 12.200 1.01 0-3 Peak-Development 1 10 0.336 12.200 1.01 0-3 Peak-Development 1 0.068 12.250 0.36 388.77 0.003 Backwater Post Peak-Development 1	DA3		Pre-l	Development 1	1 1	0.	153	12.200	1.01
DA3 Impact Development 10 prot-Development 1 prot-Development 1 prot-Development 1 prot-Development 10 prot-Development 10 0.0137 0.043 12.150 1.42 12.150 3.42 0.58 Node Summary Label Scinario Return (vers) Return (vers) Hydrograph (oct10 0.113 Time to Peak (bef) (bef) 0.111 Peak Flow (th/s) 0.3 Prot-Development 1 1 1 0.113 12.200 1.01 0.3 Prot-Development 1 1 0.113 12.200 1.01 0.3 Prot-Development 1 1 0.113 12.200 1.01 0.3 Prot-Development 1 1 0.133 12.200 1.01 0.3 Prot-Development 1 1 0.133 12.200 1.01 0.3 Prot-Development 1 1 0.133 12.200 1.01 0.3 Prot-Development 1 1 0.035 12.150 3.60 0.42 Scinario Return (vers) Prot-Development (vers) 10 0.300 12.150 10 Backwater Prot-Development 1 10 0.260 12.150	DA3		Pre-l	Development 1	10 10	0.	800	12.150	10.53
DA 3 Uncontrolled Dest-Development 1 1 0.043 12.150 0.58 DA 3 Uncontrolled Peer Development 10 30 0.137 12.150 0.58 Node Summary Label Scenario Return Hydrograph Time to Peak Peer Peerlopment 1 1 0.137 12.200 1.01 0-3 Peer-Development 1 1 0.131 12.200 1.01 0-3 Peer-Development 1 1 0.131 12.200 1.01 0-3 Peer-Development 1 1 0.133 12.200 1.01 0-3 Peer-Development 1 1 0.133 12.200 1.01 0-3 Peer-Development 1 1 0.030 12.200 1.01 0-3 Peer-Development 1 1.0 0.330 12.200 1.00 0-3 Peer-Development 1 1.0 0.306 12.200 1.00 0-3 Peer-Development 1 0.068 12.200 0.56 388.77 0.003 0-000000000000000	DA3		Post	-Development	10 10	0.	260	12.150	3.42
DA 3 Uncentrolled Pear-Development 10 10 0.137 12.150 1.91 Node Summary Label Scenario Return Hydrograph (verb Ture to Peak Peak Flow (th/s) 0-3 Iper Development 1 1 0.113 12.200 1.01 0-3 Iper Development 1 1 0.133 12.200 1.01 0-3 Iper Development 10 10 0.300 12.150 10.33 0-3 Iper Development 10 10 0.300 12.150 10.33 0-3 Iper Development 10 10 0.300 12.150 10.33 0-3 Iper Development 10 10 0.300 12.150 0.73 Intervent Plond Stamper Surface Poid Scrinter Poid Intervent Values Intervent (overlap Poid Stamper Intervent (overlap Intervent (ov	DA 3 Uncont	rolled	Post	-Development	1 1	0.	043	12.150	0.58
Node Summary Uabel Scinario Return Hydrograph Time to Plask Plask Flow 0-3 Hydrograph 1 0.111 12.200 1.01 0-3 Hydrograph 1 0.113 12.200 1.01 0-3 Hydrograph 1 0.133 12.200 1.01 0-3 Hydrograph 10 0.339 12.200 3.60 0-3 Hydrograph Time to Plask Plast Flow Madmum Madmum 0-3 Hydrograph Time to Plask Plast Flow Madmum	DA 3 Uncont	rolled	Post year	-Development	10 10	0.	137	12.150	1.91
Label Scenario Return (vers) Pydrograph (ser.ft) Time to Peak (thors) Peak Row (thors) 0-3 Post-Development 1 1 0.111 12.200 1.01 0-3 Post-Development 1 1 0.113 12.200 1.01 0-3 Post-Development 10 10 0.580 12.150 10.53 0-3 Post-Development 10 10 0.396 12.200 3.60 0-3 Post-Development 10 10 0.396 12.200 3.60 0-3 Post-Development 10 10 0.396 12.200 3.60 Post-Development 1 1 0.068 12.150 0.73 (N/A) (N/A) Ruxwater Post-Development 1 0.068 12.150 0.73 (N/A) (N/A) Backwater Post-Development 1 0.260 12.150 0.73 (N/A) (N/A) Isexwater Post-Development 1 0.260 12.150 0.42 (N/A) (N/A) Isexwater Post-Development	Node Sum	mary							
O-3 Post-Development 1 1 0.111 12.200 1.01 O-3 Pre-Development 1 1 0.153 12.200 1.01 O-3 Pre-Development 10 10 0.800 12.150 10.53 O-3 Per-Development 10 10 0.396 12.200 3.60 O-3 Per-Development 10 10 0.396 12.200 3.60 Post-Development 1 10 0.396 12.200 3.60 Post-Development 1 10 0.396 12.200 3.60 Beclowater Post-Development 1 0.068 12.250 0.56 388.77 0.003 Iserver Post-Development 1 0.260 12.150 3.42 (W/A) (W/A) Iserver Post-Development 1 0 0.259 12.300 2.19 389.29 0.032 Iserver Post-Development 10 0.259 12.300 2.19 389.29 0.032 Iserver Post-Development 10 0.259 12.300 <	Lab	el		Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time t (ho	o Peak urs)	Peak Flow (ft ³ /s)
0-3 Per-Development 1 1 0.153 12.200 1.01 0-3 Per-Development 10 10 0.800 12.150 10.53 0-3 Post-Development 10 10 0.396 12.200 3.60 Backwater Post- (verst) Valuer Time to Peak Peak Flow Maximum Maximum Backwater Post- (00 10 0.068 12.150 0.73 (VVA) (VVA) Backwater Post- Post- (00 10 0.260 12.150 3.42 (VVA) (VVA) Backwater Post- Post- (00 10 0.259 12.300 2.19 389.29 0.032 SCHEMATIC DRAINAGE AREA 3, CONTROLLED OUTFALL 3 <td>O-3</td> <td></td> <td>Post year</td> <td>-Development</td> <td>1 1</td> <td>0.</td> <td>111</td> <td>12.200</td> <td>1.01</td>	O-3		Post year	-Development	1 1	0.	111	12.200	1.01
0-3 ip-e-Development 10 10 0.800 12.150 10.53 0-3 ip-error 10 0.336 12.200 3.60 Pond Summary Label Scenario Return Hydrograph Time to Peak Flow Maximum Maximum Backwater Post- Event Hydrograph Time to Peak Flow Maximum Maximum Backwater Post- 1 0.068 12.250 0.56 388.77 0.003 Backwater Post- 1 0.068 12.250 0.56 388.77 0.003 Bodowater Post- 10 0.259 12.300 2.19 389.29 0.032 SCHEMATIC	0-3		Pre-l year	Development 1	1 1	0.	153	12.200	1.01
0-3 peer Development 10 10 0.396 12.200 3.60 Pond Summary Label Scenario Return Hydrograph Time to Peak Retwork Maximum Maximum Backwater Post- (VUN) Development 1 0.068 12.250 0.56 388.77 0.003 Backwater Post- (VUN) 10 0.259 12.300 2.19 389.29 0.032 COUTY Development 10 0.259 12.300 2.19 389.29 0.032 Backwater Post- (CUT) 10 vear 10 0.259 12.300 2.19 389.29 0.032 SCHEMATIC Vear Development 10 0.259 12.300 2.19 389.29 0.032 SCHEMATIC Vear Development 10 0.259 12.300 2.19 389.29 0.032 Backwater Post- not vear 10 0.259 12.300 2.19 389.29 0.032 Backwater Post- not vear 10 0.257 CUTVERT OUTFALL 3	0-3		Pre-l	Development 1	10 10	0.	800	12.150	10.53
Pond Summary Label Scenario Return Hydrograph Time to Peak Flow Maximum Water Maximum Backwater Post- 1 0.068 12.150 0.73 (N/A) (N/A) Backwater Post- 1 0.068 12.250 0.56 388.77 0.003 Ivear Development 10 0.260 12.150 3.42 (N/A) (N/A) Backwater Post- 10 0.259 12.300 2.19 389.29 0.032 INN Backwater Post- 10 0.259 12.300 2.19 389.29 0.032	O-3		Post year	-Development	10 10	0.	396	12.200	3.60
Label Scenario Return (years) Hydrograph (ac-ft) Time to Peak (hours) Peak Flow (ft ³ /s) Maximum Pairmum (ft) Pood Storage (ac-ft) Backwater Post- Development 1 0.068 12.150 0.73 (fV/A) (fV/A) Backwater Post- 1 year 10 0.260 12.150 3.42 (fV/A) (fV/A) Backwater Post- 1 year 10 0.259 12.300 2.19 369.29 0.032 SCHEMATIC Development 10 year 10 0.259 12.300 2.19 369.29 0.032 SCHEMATIC Development 10 year 10 0.259 12.300 2.19 369.29 0.032 SCHEMATIC DRAINAGE AREA 3, CONTROLLED OUTFALL 3 MUTFALL 3	Pond Sum	mary							
Backwater (N) Post- Development J year 1 1 Vear 0.068 12.150 0.73 (N/A) (N/A) Backwater (N) Post- Development J year 1 0.068 0.250 0.56 388.77 0.003 Backwater (N) Post- Development J0 year 10 0.260 12.150 3.42 (N/A) (N/A) Backwater (OT) Post- Development J0 year 10 0.259 12.300 2.19 389.29 0.032 SCHEMATIC Development J0 year 10 0.259 12.300 2.19 389.29 0.032 SCHEMATIC DRAINAGE AREA AREA J OUTFAIL J	Label	Scena	irio	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Backwater (OUT) Backwater (IN) Backwater (IN) Backwater (IN) Backwater Post- Development 10 0.260 12.150 0.56 388.77 0.003 0.032 0.0	Backwater (IN)	Post- Developn	nent	1	0.068	12.150	0.73	(N/A)	(N/A)
Backwater (IN) Backwater (OUT) Backwater (OUT) Backwater Post- Development 10 vear 10	Backwater (OUT)	1 year Post- Developn	nent	1	0.068	12.250	0.56	388.77	0.003
Backwater Post- Development 10 0.259 12.300 2.19 399.29 0.032 SCHEMATIC	Backwater (IN)	1 year Post- Developn	nent	10	0.260	12.150	3.42	(N/A)	(N/A)
SCHEMATIC DRAINAGE AREA 3, CONTROLLED BACKWATER AREA DRAINAGE AREA 3, CONTROLLED UTFALL 3 DR DR DR DR DR DR DR DR DR DR	Backwater (OUT)	10 year Post- Developn 10 year	nent	10	0.259	12.300	2.19	389.29	0.032
BACKWATER AREA DUTFALL 3 DR	SCHEM	ATIC			DRAI	NAGE AREA TROLLED	A 3,		
Unity Dewn Wate	BA AR	CKWATEI REA	R			15" RCP	CULVERT	- <u>/</u> c	DUTFALL 3
Unit Dew Wat									UK
Wate									Unity Dew
									Wate

DRAINAGE AREA 3A SHEETFLOW

Unity Substation Dewberry Water Resources Engineering						
	OUTFALL 3A - Sheet Fle	ow Computations				
		Computed E Checked By.	By: <u>KZ</u> EU	Date: Date:	25-Jan-24 25-Jan-24	
	Drainage Area (ac)	CN Valu	e	2-Year Flow (cfs)	10-Year Flow (cfs)	
Existing Sheet Flow	0.60	60.0		0.24	1.00	MODEL SCHEMATIC
Proposed Sheet Flow	0.55	74.5		0.83	1.81	
	l	Existing Sheet Flow	>	Proposed Shee	et Flow	
	2-Year Flow	0.24	<	0.83		(
	10-Year Flow	1.00	<	1.81		
*Assuming Tc=5 mins						DRAINAGE AREA 3A,

7

Catchments Summary											
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)						
DA 3A	Post-Development 2 year	2	0.052	12.100	0.83						
DA 3A	Pre-Development 2 year	2	0.023	12.150	0.24						
DA 3A	Pre-Development 10 year	10	0.067	12.100	1.00						
DA 3A	Post-Development 10 year	10	0.113	12.100	1.81						

8

GE AREA 3A, SHEETFLOW

6

DA 4										
Return Event	Q _{pre} ⁼ _{outfall}	Q _{allowable}	Q _{undist.}	Q _{post-outfall}						
	CFS	CFS	CFS	CFS						
1-year	0.68	0.68		0.68						
10-year	7.61	7.61	0.71	3.67						

4

Catchments Sum	mary				
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
DA4	Pre-Development 1 year	1	0.114	12.250	0.68
DA4	Post-Development 1 year	1	0.053	12.150	0.68
DA4	Pre-Development 10 year	10	0.595	12.150	6.99
DA4	Post-Development 10 year	10	0.204	12.100	2.96
DA4 Uncont. Undist.	Pre-Development 10 year	10	0.047	12.100	0.71
DA4 Uncont. Undist.	Post-Development 10 year	10	0.047	12.100	0.71
Node Summary					
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
0-4	Pre-Development 1 year	1	0.114	12.250	0.68
0-4	Post-Development 1 year	1	0.053	12.150	0.68
0-4	Pre-Development 10	10	0.642	12.150	7.61

10

year Post-Development 10 year

0.251

12.100

7.61

3.67

MODEL SCHEMATIC





5

RAINAGE AREA 4A SHEETFLOW

Unity Substation						1	
Dewberry							
Water Resources Engineering							
	OUTFALL 4A - Sheet Flo	ow Computations					
		Computed By:	KZ	Date:	25-Jan-24		
		Checked By:	EU	Date:	25-Jan-24		
	Drainage Area	CN Value		2-Year Flow	10-Year Flow		
	(ac)			(cfs)	(cfs)		
Existing Sheet Flow	0.31	57.4		0.09	0.43	MODEL	SCHEN
Proposed Sheet Flow	0.31	77.3		0.54	1.12		
	E	Existing Sheet Flow	>	Proposed Shee	et Flow		
	2-Year Flow	0.09	<	0.54			
	10-Year Flow	0.43	<	1.12			
*Assuming Tc=5 mins						DRAINA	GE AREA
*Assuming Tc=5 mins						DRAINA	GE ∟⊃

4A, SHEETFLOW

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Catchments Summary													
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)								
DA 4A	Post-Development 2 year	2	0.034	12.100	0.54								
DA 4A	Pre-Development 2 year	2	0.009	12.150	0.09								
DA 4A	Pre-Development 10 year	10	0.030	12.100	0.43								
DA 4A	Post-Development 10 year	10	0.070	12.100	1.12								

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4

OUTFALL 3A

DRAINAGE AREA 5

DA 5													
Return Event	Q _{pre-dev}	Q _{post-dev}											
	CFS	CFS											
1-year	0.01	0.38											
10-year	0.21	1.42											

Catchments Sur	mmary				
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
DA5	Pre-Development 1 year	1	0.002	12.500	0.01
DA5	Post-Development 1 year	1	0.026	12.100	0.38
DA5	Pre-Development 10 year	10	0.015	12.100	0.21
DA5	Post-Development 10 year	10	0.088	12.100	1.42
Node Summary					
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
0-5	Pre-Development 1 year	1	0.002	12.500	0.01
0-5	Post-Development 1 year	1	0.026	12.100	0.38
O-5	Pre-Development 10 year	10	0.015	12.100	0.21
O-5	Post-Development 10 year	10	0.088	12.100	1.42

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MODEL SCHEMATIC



DA 3 BACKWATER AREA ELEVATION-VOLUME TABLE

STAGE VS. S	TORAGE USI	NG CONIC M	ETHOD	
PROJECT:		Unity Substatio	n DA 3 Backwater A	rea
ENGINEER / DA	TE:		KZ	1/25/2024
Main Cell				
ELEVATION	AREA	AREA	INCREMENTAL	TOTAL
			VOLUME	VOLUME
(FEET)	(SQ FEET)	(ACRES)	(ACRE-FEET)	(ACRE-FEET)
388.37	0.0	0.000	0.000	0.000
389	2700.7	0.062	0.013	0.013
390	3702.6	0.085	0.073	0.086
391	4530.2	0.104	0.094	0.181
392	5445.0	0.125	0.114	0.295







SWM 1 - LVL 2 WET POND PROFILE VIEWS



4

OUTLET STRUCTURE - SWM 1													
OP OF RISE RISER DIMENS		LOW FLOW	LOW FLOW	MID	MID								
		ORIFICE	ORIFICE	ORIFICE	ORIFICE								
	DIVIENSIONS	INV	SIZE	INV	SIZE								
(FT)	(FT)	(FT)	(IN)	(FT)	(SF)								
82.75	6 X 6	379.00	3	381.25	0.5								

5 4

						SSIONAL ENGINE							
RE	EV	DATE	D	ESCRIPTIO	N	DEWBEF	RRY PF	ROJECT NO.: 501579	950				
					ominio nergy°	n							
			SWM	BASIN	N PROF	FILES	6		A				
				IY SU	BSTAT	ION							
		ENBUR	GUUU	JNTY				VIRGINI	A				
OPE	ERATIC	NAL REGION		B/M No.		SCA	ALE	AS SHOWN					
PRC	DJECT	5017950	NAME	DATE	SHEET: 1	7070		C_615					
	DES	SIGNER	EU/KZ	01/29/24		1013	00-	-0-013					
PF	ROJECT		EU/KZ	01/29/24				615 dura					
	APPR		KAS	01/29/24	<u> </u>	1	<u>-U-</u>	<u></u>					

REVISIONS

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Dewberry*

EDWARD R. UMBRELL

Lic. No. 038388

Dewberry Engineers Inc. 4805 Lake Brook Drive, Suite 200 Glen Allen, VA 23060; (p) 804.290.7957

SWM 1 - RISER SCHEMATIC

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INFORMATION ONLY!!

INFORMATION SHOWN ON THIS SHEET IS FOR HYDRAULIC INFORMATION ONLY AND IS NOT TO BE USED FOR CONSTRUCTION, ONLY HYDRAULIC DIMENSIONS ARE SHOWN.

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SEE SHEET 1707908-C-618 FOR BUOYAI

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								EDWARD Lic.	R. UMBRELL No. 038388	10000A
			REV	DATE	D	ESCRIPTION	ominion rergy °	EWBERRY PF	OJECT NO.: 501579	50
					SWM	I RISE	R DETAI	LS		
					UNI	ry su	BSTATIC	N		
			LU	NENBUR	G COL	JNTY			VIRGINI	A
ANCY	COMPUTATIONS.		OPERAT	IONAL REGION		B/M No.		SCALE	AS SHOWN	
			PROJEC D	T 5017950 ESIGNER	NAME EU/KZ	DATE 01/29/24	SHEET: 170)7908-	-C-616	
			PROJE		EU/KZ	01/29/24	DRAWING:		616 dwg	
		2	l alt		KAS	01/29/24	<u> 1/0/3</u>	-0-00	<u>.o.io.uwg</u>	
I	1	2			I		T			

NORMAL POOL ELEV. = 379.00' 1-YR WSE = 379.81'

REVISIONS

10-YR WSE = 381.58' 100-YR WSE = 383.04'

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Dewberry*

Dewberry Engineers Inc. 4805 Lake Brook Drive, Suite 200 Glen Allen, VA 23060; (p) 804.290.7957

Г	8	7		6
D	VDOT CULVERT OUTLET PROTECTION DE EC-1 - 113.01 https://www.virginiadot.org/business/resources/LocDes/VD0T2016_Road_and_Bridge_Standards	TAIL s/Section100/113_01.pdf		VDC https://www.virginiadot.org/
С				
\square	VDOI SIANDARD SIEP DEIAIL ST-1 - 106.09 https://www.virginiadot.org/business/resources/LocDes/VD0T2016_Road_and_Bridge_Stand	ards/Section100/106_09.pdf		TRASH RA
В	Level Spreader Design Spreadsheet			
	Step # Step Description 1 10-Year Discharge (Q) Output Pipe Size (D) 10YR Velocity (V) from SWMF Outfall Outfall Slope (S)	<u>Units</u> cfs ft fps ft/ft	<u>DA 1*</u> 1.2 2 0.37 0.035	DA 5 1.4 1.25 1.16 0.047
	Allowable Velocity (Chart) Is Calculated Above Allowable?	fps	Small Grains 1.7 Yes	1.7 Yes
	 Verify sheet flow depth less than 0.1 ft N-value (n) (from chart) L_{SF} (Maximum Length of Sheetflow) Required Sheetflow Length (Clearinghouse) Length to down-gradient SW Convenance System 	ft ft ft	0.10 0.24 78.0 50.0 75.0	0.10 0.24 90.3 20.0
A	4 Discharge from Levelspreader no adverse impacts 5 Any necessary remediation 6 Discharging into conserved forested/open space 7 Weir Coefficient (CW) (3.3 if rect.) Depth of Water Upslope (H) (0.1 ft) Level Spreader Required Design Length (LLS) (GM 22-2012) Level Spreader Required Design Length (LLS) (Clearinghouse) Level Spreader Actual Length (LLS)	ft ft ft ft	Yes No Yes 3.3 0.10 11.0 15	Yes No Yes 3.3 0.10 13.6 15
	8 DS 10YR Velocity (V) from Level Spreader	fps	0.25	0.32
	↑ Level Spreader is being designed using both the 22-2012 Guidance Memo and the I	אבע Stormwater Design Specificatic	ons to take credit for w	ater quality treatment



References to specific VDOT Road and Bridge Standards are shown. VDOT no longer allows the insertion of Road and Bridge Standard Drawings in plan assemblies. Contractor shall use specified VDOT Road and Bridge Standards as referenced.







GENERAL NOTES:

1. ALL PLANT MATERIALS SHALL BE SPECIFIED TO BE EQUAL TO OR BETTER THAN THE STANDARDS FOR NURSERY STOCK, BY THE AMERICAN NURSERY AND LANDSCAPERS ASSOCIATION (ANLA).

2. TREES AND SHRUBS SHALL BE NURSERY GROWN, UNLESS OTHERWISE APPROVED, AND SHALL BE HEALTHY AND VIGOROUS PLANTS, FREE FROM DEFECTS, DECAY, DISFIGURING ROOTS SUN-SCALD, INJURIES, ABRASIONS OF THE BARK, PLANT DISEASES, INSECT PEST EGGS, BORERS AND ALL FORMS OF INFESTATIONS OR OBJECTIONABLE DISFIGUREMENTS, AS DETERMINED BY THE DIRECTOR OF PUBLIC WORKS. PLANTS SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN NURSERY AND LANDSCAPE ASSOCIATION AND CONFORM IN GENERAL TO REPRESENTATIVE SPECIES.

3. PLANT MEASUREMENTS: ALL PLANTS SHALL CONFORM TO THE MEASUREMENTS SPECIFIED IN THE PLANT SCHEDULE OF THE LANDSCAPE PLAN. ALL PLANT SIZES SPECIFIED IN THE PLANS SHALL GENERALLY BE THE MEDIAN FOR THE SIZE RANGES INDICATED IN THE ANLA STANDARDS AND, AT A MINIMUM, SHALL COMPLY WITH THE FOLLOWING.

A. CALIPER MEASUREMENTS SHALL BE TAKEN SIX (6) INCHES ABOVE GRADE FOR TREES UNDER FOUR (4) INCHES CALIPER, AND TWELVE (12) INCHES ABOVE GRADE FOR TREES FOUR (4) INCHES IN CALIPER AND OVER.

B. MINIMUM BRANCHING HEIGHT FOR ALL SHADE TREES SHALL BE SIX (6) FEET.

C. MINIMUM SIZE FOR PLANTING LARGE DECIDUOUS TREES SHALL BE TWO TO TWO AND ONE-HALF (2-2¹/₂) INCH CALIPER, TWELVE (12) FEET TO FOURTEEN (14) FEET IN HEIGHT.

D. MINIMUM SIZE FOR PLANTING ALL OTHER DECIDUOUS TREES SHALL BE ONE TO ONE AND ONE-HALF $(1-1\frac{1}{2})$ INCH CALIPER, SIX (6) FEET TO EIGHT (8) FEET IN HEIGHT.

4. PLANTS SHALL BE PROTECTED DURING DELIVERY TO PREVENT DESICCATION OF LEAVES.

5. INSOFAR AS IS PRACTICABLE, TREES AND SHRUBS SHALL BE PLANTED ON DAY OF DELIVERY. IF THIS IS NOT POSSIBLE, THE CONTRACTOR SHALL PROTECT UNPLANTED TREES BY KEEPING THEM IN SHADE, WELL PROTECTED WITH SOIL, MULCH OR OTHER ACCEPTABLE MATERIAL AND SHALL KEEP TREES WELL WATERED. TREES AND SHRUBS SHALL NOT REMAIN UNPLANTED FOR MORE THAN TWO (2) WEEKS.

6. ALL TREES AND SHRUBS SHALL BE PLANTED IN SUCH A MANNER AS TO ENSURE THEIR SURVIVAL. THIS SHALL INCLUDE THE PLANTING OF INTACT BALLS, PLANTING AT PROPER DEPTH, PROPERLY BACKFILLING AND WATERING, AND CONSTRUCTION OF A PLANTING SAUCER. ALL PLANTING AREAS SHALL CONTAIN SOILS SUITABLE FOR PLANTING. SOILS SHALL BE CLEAN AND FREE OF ALL CONSTRUCTION MATERIALS. (SEE PLANTING PROCEDURES FOR TREES AND PLANTING PROCEDURES FOR SHRUBS IN THE LATEST EDITION OF LANDSCAPE SPECIFICATION GUIDELINES FOR BALTIMORE, WASHINGTON METROPOLITAN AREA, PREPARED BY THE LANDSCAPE CONTRACTORS ASSOCIATION OF METROPOLITAN WASHINGTON AND AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS FOR ADEQUATE SPECIFICATIONS.)

7. ANY ROPE OR WIRE BINDING THE BALL SHALL BE CUT PRIOR TO THE CONCLUSION OF BACKFILLING OPERATIONS TO PREVENT GIRDLING OF THE TREE TRUNK.

8. IF A NONBIODEGRADABLE MATERIAL IS USED AROUND THE BALL. IT SHALL BE COMPLETELY REMOVED PRIOR TO BACKFILLING.

9. ALL AREA WITHIN THE HIGH MARSH AND LOW MARSH LANDSCAPING SHALL BE COVERED BY COIR FIBER MATTING AND SECURED WITH LANDSCAPING BIODEGRADABLE (NON-METALLIC) STAPLES (MIN. 4"-6" STAPLES).

10. WHEN THE HIGH MARSH SEED MIX IS APPLIED. MIX WITH TEMPORARY SEED MIX TO HELP STABILIZE THE MIX UNTIL IT HAS HAD TIME TO GERMINATE (UNLESS THE MIX IS PRE-GERMINATED)

11. CONTRACTOR IS SOLELY RESPONSIBLE TO PROVIDE ONLY THE PLANTS SPECIFIED IN THIS PLAN SET. PLANT CULTIVARS SHALL NOT BE ACCEPTED WITHOUT PRIOR WRITTEN APPROVAL FROM PROJECT ENGINEER

THIS SHEET IS FOR LANDSCAPE PURPOSES ONLY!!

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SEEDING NOTES:

AND INSTALLING ALL HERBACEOUS PERMANENT AND TEMPO

B. ALL AREAS WILL BE SEEDED WITH THE SEED MIXES IN SPECIFIED IN THE SEEDING PLANS.

C. ALL SEED AND SEED VARIETIES SHALL BE FREE FROM NOXIOUS WEED SEEDS LISTED AS ALIEN INVASIVE SPECIES CONSERVATION AND RECREATION NATURAL HERITAGE PRO AGRICULTURE AND THE MID-ATLANTIC EXOTIC PEST PLANT (

E. STORAGE AND HANDLING: SEED STORAGE SHOULD FOR HARRINGTON): RELATIVE HUMIDITY + TEMPERATURE IN DEG EQUAL TO OR LESS THAN 100 DEGREES

F. ALL NATIVE SEED MIXES MUST BE OBTAINED FROM ERM MEADVILLE, PA OR AN OWNER APPROVED ALTERNATE VENDO SHOULD BE APPLIED AT 60LBS PER ACRE. THE ERNMX-128 MI PER ACRE.

G. INSTALLATION

2. PRIOR TO SEEDING CONTRACTOR SHALL VERIFY THAT CONFORM TO THE FINISHED GRADES AS SPECIFIED ON THE DISTURBED AREAS THAT DEVELOP SUBSEQUENT TO FINAL D PRIOR TO SEEDING.

NATIVE SEED MIXES. ALL SEEDING EQUIPMENT SHALL BE CAI TO THE SATISFACTION OF OWNER SO THAT THE MATERIAL IS EVENLY TO AVOID MISSES AND OVERLAPS.

SPECIFIED COVER CROP AND SEEDED AT THE RATES SPECIF DOCUMENTS.

	ADDITIONAL NOTES - LOW MARSH PLUGS:	
, TRANSPORTING, STOCKPILING, DRARY SEEDING. THE APPROPRIATE ZONES AS	 A. GENERAL: 1. THIS WORK SHALL CONSIST OF PROVIDING, INSTALLING, WATERING AND MAINTAINING COMMERCIALLY SUPPLIED HERBACEOUS PLANT MATERIAL AS SPECIFIED IN THE CONTRACT DOCUMENTS. 	
STATE AND FEDERAL PROHIBITED BY THE VIRGINIA DEPARTMENT OF GRAM, THE US DEPARTMENT OF COUNCIL.	2. ALL PLANT MATERIAL WILL MEET THE SPECIFICATIONS AS DEFINED BY CONTRACT DOCUMENTS. UNLESS OTHERWISE SPECIFIED, THE MINIMUM SIZE FOR PLANT MATERIAL UNDER THIS SECTION SHALL CONSIST OF EITHER	
SS, ERAGROSTIS CURVULA, UNEATE), CHINESE LESPEDEZA. LLOW THE JAMES RULE (JAMES	 a. 4-INCHES (2.2 INCHES WIDE, 4 INCHES DEEP, 10.07 CUBIC INCHES ROOT VOLUME, 32 PLANTS PER TRAY) OR b. 5-INCHES (2 INCHES WIDE, 5 INCHES DEEP, 11.9 CUBIC INCHES ROOT VOLUME, 50 PLANTS PER TRAY) c. NOTE THAT VERNALIZED PLUGS ARE PREFERRED FOR SPRING PLANTING AND IS A BEST 	LC SC
REES FAHRENHEIT, MUST BE	ADAPTED TO SITE CONDITIONS AND THEREFORE BE HARDIER AND SURVIVE BETTER. 3. SUBSTITUTIONS FOR ANY OTHER PLUG SIZE WILL REQUIRE WRITTEN APPROVAL OF THE	<u>Car</u> Eur
OR. THE ERNMX-865 SEED MIX IX SHOULD BE APPLIED AT 20LBS	OWNER PRIOR TO DELIVERY ON SITE. 4. PLANT MATERIALS SHALL BE NURSERY GROWN UNLESS OTHERWISE OWNER APPROVED AND SHALL BE HEALTHY AND VIGOROUS. PLANTS SHALL BE FREE FROM DEFECTS, DECAY, DISFIGURING ROOTS, SUN-SCALD, INJURIES, ABRASIONS, DISEASES, INSECT PESTS, AND FORMS OF INFESTATIONS	Hib Jur Pel Por Scr
EEDED IN ACCORDANCE WITH THE IANENT SEEDING IS SPECIFIED ON RACT DOCUMENTS. AREAS NOT	OR OBJECTIONABLE DISFIGUREMENT AS DETERMINED BY THE OWNER. B. DELIVERY, STORAGE AND HANDLING:	<u>NC</u>
ALL AREAS TO BE SEEDED SHALL PLANS. ALL GULLIES, WASHES OR RESSING SHALL BE REPAIRED	 PLANTS SHALL BE PROTECTED DURING DELIVERY TO PREVENT DESICCATION OF LEAVES. PLANTS SHOULD BE PLANTED ON DAY OF DELIVERY. IF THIS IS NOT POSSIBLE, THE CONTRACTOR SHALL PROTECT UNPLANTED PLANTS BY KEEPING THEM IN SHADE, WATERED AND PROTECTED. 	1,3 2) RE 3)
IST 15 AND JUNE 15.	3. PLANTS SHALL NOT REMAIN UNPLANTED FOR MORE THAN TWO WEEKS, SHOULD NOT SHOW SIGNS OF STRESS BEFORE PLANTING.	SF
IST BE APPROVED BY OWNER TO SOW COVER CROPS. SEED OF PLACING SEED AT THE	4. ORINGTALLED PLANTS WILL BE SUBJECT TO RE-INSPECTED AND MAY BE REJECTED IF THEY HAVE DETERIORATED.C. INSTALLATION:	OT SF SF EA
YPE SEED DRILL INTENDED FOR LIBRATED BEFORE APPLICATION S APPLIED ACCURATELY AND	DRY CONDITIONS: i. PLUGS SHALL BE INSTALLED AS DIRECTED IN THE CONTRACT DOCUMENTS. ii. PLUGS WILL BE ANCHORED SO THAT THEY WILL NOT FLOAT WHEN THE POOL AREA BECOMES INUNDATED (BIO-DEGRADABLE STAPLES).	4) AF AL TH
HALL BE INSTALLED WITH FIED IN THE CONTRACT	 iii. IF POOL IS EMPTY, WATER THE PLUGS IMMEDIATELY AFTER PLANTING PER ABOVE. iv. ADDITIONAL WATERING MAY BE REQUIRED IF THE POOL IS NOT TO BE FILLED WITHIN 48 HOURS OF PLANTING. v. NOTIEX OWNER OF ALL WATERING EVENTS. 	OF
. BE APPLIED ON TOP OF THE FERENT DIRECTIONS. SHALL RAKE THE AREA TO MIX THE OIL.	vi. SUPPLY, INSTALL AND MAINTAIN GOOSE FENCING AS NEEDED TO PROTECT PLANTS IN PONDED AREAS FROM DISTURBANCE FROM AQUATIC BIRDS.	
REAS WITH STRAW MULCH AT A	WET CONDITIONS: i. PLUGS INSTALLED IN WET CONDITIONS IN PERMANENT POOLS SHALL BE PLANTED AS PER THE PROJECT DOCUMENTS OR IN 12 INCHES OF WATER OR LESS AS DIRECTED BY THE OWNER. ii. PLUGS INSTALLED IN WET CONDITIONS IN TEMPORARY POOLS SHALL BE INSTALLED AS	
	DETAILED IN THE CONTRACT DOCUMENTS AND ANCHORED SO THAT THEY WILL NOT FLOAT AWAY WHILE INUNDATED (BIO-DEGRADABLE STAPLES). iii. SUPPLY, INSTALL AND MAINTAIN GOOSE FENCING AS NEEDED TO PROTECT PLANTS FROM DISTURBANCE FROM AQUATIC BIRDS.	

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1. ALL AREA WITHIN THE HIGH MARSH AND

______ _______ , ^k k k k k | | ^k k k k ,

WETLAND MEADOW MIX (ERNMX-865)

HIGH MARSH SEED MIX (ERNMX-128)

LOW MARSH PLUGS

ES-3 SOIL STABILIZATION MAT

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FENCE POST* CONCRETE FOUNDATION*

FENCE DETAIL FOR ILLUSTRATIVE PURPOSES ONLY

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Source: DOMINION

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LD-269 Rev. May 2016												
Project UNITY SUBSTA ACCESS ROAD	FION STA 23	+31.5		¢				F	Plan \$ Rev. D	Sheet ate	No	
$\begin{array}{c} \text{CULVERT #1} \\ \text{Hydrological data:} \\ \hline \text{D.a.} = \underline{27.55} \text{ac.} \\ \hline \end{array}$	- Tc i10 i10 C=	= 22 m = 4.03 0=5.38 0.38	ins								100 yi Desig Struct	r, Floo n AH' ures
		RISK				Shoulder elev. 383.3						
$\begin{array}{c} 10 \\ 100 \\ \hline \\ 100 \\ \hline \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	S S S S	Detou Overto Flood Criteri	rs Availat opping St Plain Mai a and Sig	ailable,Length) Stage,Length Management Significant ImpactOrig								
CULVERT TYPE & SIZE	Q	Q/B	INLET C	HE CONT	НЖ	CON HW						
(2) - 24" RCP*	42.19	21.1	1.55	3.1	0.5	1.6	1.8	1.8	1.35	0.4	2.75	381.
(2) - 24" RCP*	56.32	28.16	2.35	4.7	0.5	1.9	1.95	1.95	2.55	0.4	4.1	383
*NOTE: THERE ARE I 6", THEREFOR THE C	DUAL (CALCU	BO" CU	LVERTS NS ARE	THAT BASEI	ARE (D ON 2	- COUN 24" CU	TERSUNI	< _				
	6											
SUMMARY & RECOMM	ENDA ⁻	FIONS	6 M									
LD-269 Rev. May 2016												

Project UNITY SUBSTAT	ION			ŝ				~	Plan \$	Sheet I	No	
ACCESS ROAD S	STA 35-	+12						I	Rev. D	ate	-	D
$\begin{array}{c} \text{COLVERT #4} \\ \text{HYDROLOGICAL DATA:} \\ \text{D.A} = 11.04 \text{AC.} \\ \hline \end{array}$	- Tc i10: i10(C=(= 22 m =4.03 0=5.38 0.29	iins				100 yr. Flo Design Al- Structures					
DISCHARGES USED		RISK	ASSESSI								Shoul elev.	der 392.59
$\begin{array}{c} 10 \\ -100$	S S S S	Detou Overto Flood Criteri	rs Availat opping Sta Plain Mai a and Sig	ole age nagem nificar	ent t Impa			ength		9	inv. É Orig. i	387 Gr. El
CULVERT TYPE & SIZE	Q	Q/B	INLET C				OUTL			DL		HW.
24" RCP	12 90	12 90	HW/D	1 9	Ke 0.5		(dc+D)/2	ho 1 7	н 06	LSO	1 4	ELEV
24" RCP	17 22	17 22	1.2	24	0.5	1.4	1.7	1.7	1.0	0.9	1.4	
					0.0	1.0		1.0		0.0		
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SUMMARY & RECOMMENDATIONS:

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POINT	DOWNSTREAM	DRAIN	RUNOFF		CA	INLET	RAIN	RUNOFF	INV	ÆRT	LENGTH	SLOPE	DIA	CAPA-	VEL	FLOW	REMARKS	HYD	ROLO	JOLVE		#/ ATA:		- 12	TTT T	T
	STRUCTURE	AREA	COEFF.	INCR	ACCUM	TIME	FALL	Q	ELEVA	ATIONS				CITY		TIME		D.A.	= <u>0.</u>	<u>,3</u>	AC.	ΤT	+ i10)=5.16	11115	+
		ACRES	С			MIN	IN/HR	C.F.S.	UPPER	LOWER	FEET	FT./FT.	INCHES	C.F.S.	F.P.S.	SEC							$\mp i10$)0=6.7	7	1
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14		0.96	0.90	0.86	0.86	5.00	7.02	61													₽	╊╋		┿╋	+	╡
	13								395.00	394 19	161.50	0.0050	18	80	5.0	32.4					P	<u> </u>		\mp	\square	7
13	10	0.70	0.90	0.63	1 49	5 54	6.85	10.2	575.00	551.15	101.50	0.0000	10	0.0	0.0	52.1		ab			t	tt			世	土
15	12	0.70	0.50	0.05	1.12	5.51	0.05	10.2	303 69	302.00	1/10 00	0.0050	24	173	57	24.4			nscr 0	HARG	3ES 02	USEL	9 	RISK	ASS	<u>ES</u>
12	12	0.00	0.00	0.00	1.49	5.05	6.72	10.2	575.07	572.77	140.00	0.0050	21	17.5	5.1	21.1		o a	00	= 2.0	<u>64</u>	$\underline{-}^{c}$	FS FS	Over	urs Av toppii	vai ng
12	11	0.00	0.00	0.00	1.42	5.95	0.72	10.2	202.90	280.20	245.06	0.0147	24	27.4	01	20.4				Ā 🗌	_	$\underline{}$	XFS XFS	Crite	l Plair ria an	n N Id S
11	11	0.00	0.00	0.00	2 77	6.45	6.57	10.2	392.89	369.29	243.00	0.0147	24	27.4	0.1	30.4		Q	~				ifs T			
11	10	0.00	0.00	0.00	2.11	0.45	0.37	16.2	200.10	200.04	220.17	0.0050	20	20.0	()	26.0		CUL	VERT	TYPE	Ξ& ξ	SIZE	Q	Q/B	INL	ET
	10								389.19	388.04	229.17	0.0050	30	29.0	6.2	36.8	24 x 38 ELLIPTICAL PIPE	15"	RCP	,			2.02	2.02	0.6	<u></u> ;
16	1	0.04	0.00	0.74	0.74	- 00		50			1	1	1					15"	RCP				2.64	2.64	0.7	,
16		0.84	0.90	0.76	0.76	5.00	7.02	5.3																+	+	_
	15								392.60	391.87	147.00	0.0050	18	8.0	4.9	30.3		!├──						┼──	+	_
15		0.58	0.90	0.52	1.28	5.50	6.86	8.8																+	┢	
	11								<u>391.37</u>	390.60	154.00	0.0050	24	17.3	5.5	27.9							6	+	┢	
	1		1					1	T		1		1	1										+	┢	
24		0.96	0.90	0.86	0.86	5.00	7.02	6.1										∥—			—			<u> </u>	<u> </u>	
	23								395.00	394.19	161.50	0.0050	18	8.0	5.0	32.4		SUN	IMAF	7Y & F	REC				£	
23		0.69	0.90	0.62	1.49	5.54	6.85	10.2																		
	22								393.69	393.00	138.20	0.0050	24	17.3	5.7	24.1							S	UBS	TA	TI
22		0.00	0.00	0.00	1.49	5.94	6.72	10.2											IN	IFT	bu	TIFT	WATI			Τ
	21								392.90	389.29	224.08	0.0161	24	28.7	8.4	26.8			STA	TION	I SU	JRFAC	E ELE	V		0
21		0.00	0.00	0.00	2.75	6.39	6.59	18.1													-			FT	n	1 (
	20								389.19	388.04	229.38	0.0050	30	29.0	6.2	36.9	24 x 38 ELLIPTICAL PIPE									
	•	•			•				•				- r .								\perp	392	2.20	152.	20 24	4
26		0.84	0.90	0.76	0.76	5.00	7.02	5.3											1	25	+	307	3 07	147	00 1	8
	25								392.60	391.87	147.00	0.0050	18	8.0	4.9	30.3				26	+	393).07	147.	00 10	3
25		0.57	0.90	0.51	1.27	5.50	6.86	8.7																		
	21								391 37	390.60	152.20	0.0050	24	173	55	27.6						389).64	229	38 2	4
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Plan Sheet No Designer Sheet of Rev. Date Date STATION:	Project UNITY SUBSTATION ACCESS ROAD STA 26+16.8	Plan Sheet No Designer Sheet of Rev. Date Date STATION	Project UNITY SUBSTATION ACCESS ROAD STA 31+32	Plan Sheet NoDesignerSheetof Rev. DateDateSTATION:
AHW Controls 100 yr, Flood plain Design AHW depth	HYDROLOGICAL DATA: Tc = 17 mins D.A. = 3.49 AC. T10=4.58	AHW Controls	HYDROLOGICAL DATA: Tc = 14 mins D.A = 0.74 AC i10=5.16	AHVV Controls
Image: Structures	i100=6.06 C=0.29	Image: Structures	i100=6.77 C=0.29	Image: Structures in the struct
Shoulder elev. 383.35		Shoulder elev. 386.72		Shoulder elev. 398.1
	DISCHARGES USED RISK ASSESSMENT	DTSkewCoverft	DISCHARGES USED RISK ASSESSMENT	DTSkewCoverft
	Q 100 = 4.04 CFS Detours Available Q 100 = 6.13 CFS Overtopping Stage Q CFS Flood Plain Management Q CFS Criteria and Significant Imp	Inv. El. 382.14 So= 0.01 Inv. El. 381.72 orig. Gr. Elev L= 42' Orig. Gr. Elev	Q 100 = 1.11 CFS Detours Available Q 100 = 1.45 CFS Overtopping Stage Q = CFS Flood Plain Management Q = CFS Criteria and Significant Impa	
COMPUTATIONS CONT. OUTLET End. OUTLET CONTROL HW. VELOCITY Treat. COMMENTS		ATER COMPUTATIONS CONT OUTLET End. OUTLET CONTROL HW VELOCITY Treat. COMMENTS	Q = CFS CULVERT TYPE & SIZE Q Q/B INLET CONT. INLET CONT.	ATER COMPUTATIONS CONT. OUTLET End OUTLET CONTROL HW VELOCITY Treat. COMMENTS
1.8 1.8 1.35 0.4 2.75 381.7 1.95 1.95 2.55 0.4 4.1 383.3	15" RCP 4.64 4.64 1.1 1.4 0.5 15" RCP 6.13 6.13 1.3 1.6 0.5	0.6 0.9 0.4 0.4 0.9 0.9 1.1 1.1 0.8 0.4 1.5	15" RCP 1.11 1.11 0.4 0.5 0.5 15" RCP 1.45 1.45 0.5 0.6 0.5	0.5 0.9 0.9 0 0.5 0.4 0.5 0.9 0.9 0 0.5 0.4
ITERSUNK ULVERTS.				
Design Flood Exceed, Prob. Elev.		Design Flood Exceed, Prob. Elev.		Design Flood Exceed, Prob. Elev.
Overtop Flood Exceed, Prob. Elev. Elev. Elev.	SUMMARY & RECOMMENDATIONS:	Overtop Flood Exceed Prob. Elev. Base Flood 1% Exceed Prob. Elev.	SUMMARY & RECOMMENDATIONS	Overtop Flood Exceed, Prob. Elev. Base Flood 1% Exceed, Prob. Elev.
Plan Sheet No. Designer Sheet of	LD-269 Rev. May 2016 Project UNITY SUBSTATION	Plan Sheet No. Designer Sheet of	LD-269 Rev. May 2016	Plan Sheet No. (Designer)
Rev. Date	WEST ACCESS ROAD STA 00+69.8 CULVERT #5 HYDROLOGICAL DATA	Rev. Date Date STATION:	WEST ACCESS ROAD STA 11+35 CULVERT #6	Rev. DateSTATION:
100 yr. Flood plainelev Design AHW depthelev Structureselev	D.A.= 0.15 AC. IC = 5 mins i10=7.06 i100=9.15	Image:	D.A.= <u>1.77</u> AC i10=4.58 i100=6.06	Image: Structures Image: Structures
	C=0.46		C=0.51	
CL_elev_392.79		Shoulder elev. 398.55 CL elev. 398.69		Shoulder elev. 392.16
	DISCHARGES USED RISK ASSESSMENT Q 10 = 0.49 CFS Detours Available	DTSkew Cover ft	DISCHARGES USED RISK ASSESSMENT Q 10 = 4.13 CFS Detours Available	DTLength Skew Cover ft
Inv. El. 387.64 Orig. Gr. Elev L= 49.5' Orig. Gr. Elev	O O O O O = CFS Flood Plain Management O = CFS Criteria and Significant Imp	Inv. El. 394.11 Orig. Gr. Elev L= 43.50' Orig. Gr. Elev	Q 100 5.4/ CFS Overtopping Stage Q CFS Flood Plain Management Q CFS Criteria and Significant Impa Q CFS Criteria and Significant Impa	Inv. El. 388.37 Orig. Gr. Elev L= 39' Orig. Gr. Elev
COMPUTATIONS CONT OUTLET End OUTLET CONTROL HW. VELOCITY Treat. COMMENTS (dc+D)/2 ho H LSo HW ELEV. C.M. Smooth	CULVERT TYPE & SIZE Q Q/B INLET CONT. HW/D HW Ke	ATER COMPUTATIONS CONT OUTLET End OUTLET CONTROL HW, VELOCITY Treat. COMMENTS dc (dc+D)/2 ho H LSo HW ELEV. C.M. Smooth	CULVERT TYPE & SIZE Q Q/B HEADW INLET CONT. HW/D HW Ke	ATER COMPUTATIONS CONT. OUTLET End OUTLET CONTROL HW VELOCITY Treat. COMMENTS COMMENTS
1.7 1.7 0.6 0.9 1.4 1.8 1.8 1.0 0.9 1.9	15" RCP 0.49 0.49 0.4 0.5 0.5 15" RCP 0.63 0.63 0.4 0.5 0.5	0.5 0.9 0.9 0 0.6 0.3 0.5 0.9 0.9 0 0.6 0.3	15" RCP4.134.131.01.250.515" RCP5.475.471.31.630.5	0.9 1.08 1.08 0.4 0.35 1.13 1.0 1.13 1.13 0.7 0.35 1.48
Design Flood Exceed, Prob. Elev.		Design Flood Exceed, Prob. Elev.		Design Flood Exceed. ProbElev
Base Flood 1% Exceed. Prob. Elev.	SUMMARY & RECOMMENDATIONS:	Base Flood 1% Exceed. Prob. Elev.	SUMMARY & RECOMMENDATIONS	Overtop Flood Exceed, Prob. Elev. Base Flood 1% Exceed, Prob. Elev.
269 May 2016 ect UNITY SUBSTATION Plan Sheet NoDe	signer Sheet of	LD-269 Rev. May 2016 Project UNITY SUBSTATION Plan Sheet No. Des	signerof	
SWM ACCESS ROAD STA 05+56 Rev. Date Date Date Date Date Date Date Date	AHW Controls	SWM BASIN Rev. Date CULVERT #8 HYDROLOGICAL DATA: D.A.= 0.23 AC Tc = 12 mins	AHW Controls	
i10=5.16 i10=6.77 C=0.42	/ depthelev elevfreq. TWelev.	i10=5.33 i100=6.99 C=0.39	depthelevfreqTWelev	
	CL elev 383.15		CL_elev_386.10	
IDSCHARGES USED RISK ASSESSMENT ADT 10 = 2.02 CFS Detours Available 100 = 2.64 CFS Overtopping Stage	Skew Cover ft	Q 10 = 0.48 CFS Detours Available	50 0.0172	
= CFS Flood Plain Management Inv. El. 513. = CFS Criteria and Significant Impact Orig. Gr. Ele = CFS HEADWATER COMPUTATIONS Cont	So= 0.011 Inv. Et. 3/8./3 V. U= Orig. Gr. Elev. OUTLET End	Q CFS Flood Plain Management Q CFS Criteria and Significant Impact Q CFS Criteria and Significant Impact HEADWATER COMPUTATIONS CONT	Sol Sol Inv. EL. 303.00 L=_29' Orig. Gr. Elev. OUTLET End	
VERT TYPE & SIZE Q G/B INLET CONT. OUTLET CONTROL HW. HW/D HW/D HW Ke dc (do+D)/2 ho H LSo HW ELEV. RCP 2.02 2.02 0.6 0.8 0.5 0.6 1.2 1.2 0 0.4 0.8	VELOCITY Treat. COMMENTS C.M. Smooth	CULVERT TYPE & SIZE Q Q/B INLET CONT. OUTLET CONTROL HW. HW/D HW Ke dc (dc+D)/2 ho H LSo HW ELEV 12" RCP 0.48 0.48 0.4 0.4 0.5 0.4 0.7 0.7 0 0.4 0.3	VELOCITY Treat. COMMENTS C.M. Smooth	В
RCP 2.64 2.64 0.7 0.9 0.5 0.6 1.2 1.2 0 0.4 0.8		12" RCP 0.63 0.63 0.4 0.4 0.5 0.4 0.7 0.7 0 0.4 0.3		
	Design Flood Exceed, Prob. Elev. Overtop Flood Exceed, Prob. Elev. Base Flood 1% Exceed, Prob. Elev.	SUMMARY & RECOMMENDATIONS	Design Flood Exceed, ProbElev Overtop Flood Exceed, ProbElev Base Flood 1% Exceed, ProbElev	REVISIONS Dewberry Engineers Inc.
SUBSTATION INTERIOR STORM SEWER HYDR	AULIC GRADE LINE			4805 Lake Brook Drive, Suite 200 Glen Allen, VA 23060; (p) 804.290.7957
INLET OUTLET WATER L. D. Q. S _{fo} H _f JUNCTION LOSS	FINAL INLET WATER RIM	Project UNITY SUBSTATION Plan Sheet No. Des ACCESS ROAD STA 37+58.61 Rev. Date Dat CULVERT #9	Station:	NNEALTH OF 410
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	HYDROLOGICAL DATA: D.A.= 0.58 AC. 100 yr. Flood 100 r. Flood Design AHW	AHW Controls	KEITH A SCHOLTEN
392.20 152.20 24 8.71 0.001 0.19 5.5 0.1	0 0.00 0.25 0.32 N/A 0.51 392.72 395.15	i100=9.15 C=0.58	freq. TWelev.	Lic. No. 036569
393.07 147.00 18 5.31 0.002 0.32 4.9 0.1 0.00 26 0 0 0 0 0.00 0.00 0.00	0 0.00 0.09 N/A N/A 0.41 393.48 395.44	Shoulder elev. 396.97	397 15	1/29/24 2 555/0101 ENGINE
389.64 229.38 24 18.14 0.006 1.48 6.2 0.2 10.2 10.2 11.0 0.38 21 10.2 8.4 84.9 1.1 0.38	0 0.00 0.53 0.69 N/A 216 391 80 304 33	DISCHARGES USED RISK ASSESSMENT ADT	Skew Cover ft.	REV DATE DESCRIPTION DEWBERRY PROJECT NO 1 50157950
391.80 224.08 24 10.17 0.002 0.45 8.4 0.3 10.2 5.7 58.3 0.5 0.18 9 22	90 0.36 0.81 N/A N/A 1.26 393.06 397.45	Q 10 = 2.37 CFS Detours Available	65 So= 0.01 Inv. EL 393.33	
394.60 138.20 24 10.17 0.002 0.24 5.7 0.1 1000000000000000000000000000000000000	0 0.00 0.26 0.34 N/A 0.58 395.18 397.90	Q = CFS CULVERT TYPE & SIZE Q Q/B INLET CONT OUTLET CONTROL	OUTLET End VELOCITY Treat, COMMENTS	Energy°
395.39 161.50 18 6.07 0.003 0.46 5.0 0.1 24 0.00	0 0.00 0.10 N/A N/A 0.56 395.95 397.90	HW/D HW Ke dc (dc+D)/2 ho H LSo HW ELEV. 15" RCP 2.37 2.37 0.65 0.81 0.5 0.6 0.93 0.93 0 0.32 0.61	G.M. Smooth	
392.20 154.00 24 8.77 0.001 0.20 5.5 0.1 Image: Constraint of the second s	0 0.00 0.25 0.32 N/A 0.52 392.71 395.15	15" RCP 3.08 3.08 0.75 0.75 0.6 0.93 0 0.32 0.61		DRAINAGE CALCULATIONS
393.07 147.00 18 5.31 0.002 0.32 4.9 0.1 16 0.00 0.00 0.00 0.00 0.00 0.00	0 0.00 0.09 N/A N/A 0.41 393.48 395.44			
389.64 229.17 24 18.21 0.006 1.48 6.2 0.2 11 10.2 8.1 82.6 1.0 0.25	0 0 00 0 50 0 66 N/A 2 14 201 79 204 22			
391.78 245.06 24 10.23 0.002 0.50 8.1 0.3 0.57 58.7 0.5 0.18 9 12 10 10.2 5.7 58.7 0.5 0.18 9	0.00 0.00 0.00 10/11 2.14 391.76 394.33 90 0.36 0.79 N/A N/A 1.29 393.07 397.45	SUMMARY & RECOMMENDATIONS	Overtop Flood Exceed, ProbElev, Overtop Flood Exceed, ProbElev, Base Flood 1% Exceed, ProbElev,	LUNENBURG COUNTY VIRGINIA
394.59 140.00 24 10.23 0.002 0.24 5.7 0.1 6.1 5.0 30.2 0.4 0.13 13 295.52 140.00	0 0.00 0.26 0.34 N/A 0.59 395.18 397.90			OPERATIONAL REGION B/M No. SCALE AS SHOWN
395.39 161.50 18 6.07 0.003 0.46 5.0 0.1 14 0.00	0 0 0.10 N/A N/A 0.56 395.95 397.90			PROJECT 5017950 NAME DATE SHEET: 1707908-C-901 DESIGNER MFR 8/18/23 5500000000000000000000000000000000000
	*			PROJECT ENGINEERGA8/18/23DRAWING:APPROVED BYKAS8/18/231707908-C-901.dwg
6 I 5	<u> </u>	4 I 3	I 2	ı 1

Access Road From To Station LT RT Inv 0+75.00 001+00.00 LT 450.39 1+00.00 002+00.00 LT 448.21 2+00.00 003+00.00 LT 448.21 2+00.00 003+00.00 LT 443.30 4+00.00 005+00.00 LT 439.30 4+00.00 005+00.00 LT 435.02 6+00.00 007+00.00 LT 435.02 6+00.00 007+00.00 LT 433.39 7+00.00 008+00.00 LT 430.28 9+00.00 010+00.00 LT 422.64 1+00.00 012+00.00 LT 422.94 2+00.00 012+50.00 LT 422.94 2+00.00 012+50.00 LT 385.66	vert Area C Downstream 1 0.9 (acres) 448.21 0.041 0.90 442.16 0.039 0.90 439.30 0.046 0.90 436.97 0.045 0.90	Area C Area C 2 0.5 3 0. (acres) (acres) (acres) 0.052 0.052 0.50 0.253 0. 0.143 0.50 0.039 0.	Hydro C Incr Total .3 CA CA .30 0.138 0.138	ology T _C 10 yr (min) (T _C 10 yr 2 yr <i>i</i> min) (in/hr)	2 yr 10 yr <i>i</i> Q	2 yr Q	Bottom B	Depth Left Y Slope	D Right Slope	Ditch Geometry Lining	y Lining n	Ditch	Ditch	TE: 2023.07.24 10 yr 10 yr	2 yr	Hydrau 2 yr Tracti	ENGINEER: lics /e Lining	GKA/Dewberry Engine	ers Inc.	-
From Station To Station LT RT Upstream 00+75.00 001+00.00 LT 450.39 1+00.00 002+00.00 LT 448.21 2+00.00 003+00.00 LT 448.21 2+00.00 003+00.00 LT 448.21 3+00.00 004+00.00 LT 439.30 4+00.00 005+00.00 LT 436.97 5+00.00 007+00.00 LT 435.02 6+00.00 007+00.00 LT 431.90 8+00.00 009+00.00 LT 430.28 9+00.00 011+00.00 LT 422.64 1+00.00 012+00.00 LT 422.94 2+00.00 012+50.00 LT 420.14 5+50.00 026+25.00 LT 385.66	vert Area C Downstream 1 0.9 (acres) (acres) 448.21 0.041 0.90 442.16 0.039 0.90 439.30 0.046 0.90 436.97 0.045 0.90	Area C Area C 2 0.5 3 0. (acres) (acres) (acres) 0. 0.052 0.50 0.253 0. 0.143 0.50 0.039 0.	Incr Iotal 3 CA CA 30 0.138 0.138	T _C 10 yr (min) (T _C 10 yr 2 yr <i>i</i> min) (in/hr)	$\begin{array}{c c} 2 \text{ yr} & 10 \text{ yr} \\ i & Q \\ (in / hr) & (of r) \end{array}$	2 yr Q	Bottom	Y Slope	Right	Lining	Lining n	Ditch	Ditch	10 yr 10 yr	2 yr	2 yr Tracti	/e Lining	Lining Free	- Capacity	
00+75.00 001+00.00 LT 450.39 01+00.00 002+00.00 LT 448.21 02+00.00 003+00.00 LT 448.21 02+00.00 003+00.00 LT 448.21 02+00.00 003+00.00 LT 442.16 03+00.00 004+00.00 LT 439.30 04+00.00 005+00.00 LT 436.97 5+00.00 006+00.00 LT 435.02 6+00.00 007+00.00 LT 433.39 7+00.00 008+00.00 LT 430.28 9+00.00 010+00.00 LT 427.72 0+00.00 011+00.00 LT 422.94 2+00.00 012+00.00 LT 420.14 5+50.00 026+25.00 LT 385.66	448.21 0.041 0.90 442.16 0.039 0.90 439.30 0.046 0.90 436.97 0.045 0.90	0.052 0.50 0.253 0.3 0.143 0.50 0.039 0.3	30 0.138 0.138	10.00			(cfs)	(ft)	(ft) (H/V)	(H/V)	туре	(ft)	Curve? R _d (ft)	Slope (ft/ft)	Depth Velocity (ft) (ft/sec)	Depth Ve (ft) (f	locity Force' /sec) (lbs/ft	τ" Adeq? ²) (Max V)	Adeq? boar (Max tallow) (ft'	d Adeq?	
02+00.00 003+00.00 LT 442.16 03+00.00 004+00.00 LT 439.30 04+00.00 005+00.00 LT 436.97 05+00.00 006+00.00 LT 435.02 6+00.00 007+00.00 LT 433.39 7+00.00 008+00.00 LT 431.90 8+00.00 009+00.00 LT 430.28 9+00.00 010+00.00 LT 427.72 0+00.00 011+00.00 LT 425.64 1+00.00 012+00.00 LT 420.14 5+50.00 026+25.00 LT 385.66 2+00.00 026+25.00 LT 385.66	439.300.0460.90436.970.0450.90		30 0.119 0.257	13.00 1 8.00	.3.00 5.16 8.00 6.18	3.90 0.71 4.73 1.59	0.54	0.00	1.50 3.00 1.50 3.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	2 0.04 3 0.04	5 NA 5 NA	0.087	0.30 2.66 0.43 2.83	0.27 0.39	2.46 0.77 2.64 0.78	YES	YES 1.20 YES 1.0) YES 7 YES	-
4+00.00 005+00.00 LT 436.97 5+00.00 006+00.00 LT 435.02 6+00.00 007+00.00 LT 433.39 7+00.00 007+00.00 LT 431.90 3+00.00 009+00.00 LT 430.28 9+00.00 010+00.00 LT 427.72 0+00.00 011+00.00 LT 425.64 1+00.00 012+00.00 LT 422.94 2+00.00 012+50.00 LT 420.14 5+50.00 026+25.00 LT 385.66		0.285 0.50 0.262 0.1 0.431 0.50 0.364 0.1	30 0.263 0.520 30 0.366 0.885	13.00 1 12.00 1	3.00 5.16 2.00 5.33	3.90 2.68 4.04 4.72	2.03	0.00	1.50 3.00 1.50 3.00	3.00	2-EC-2 Ty2	4 0.04 5 0.04	5 NA 5 NA	0.029	0.61 2.44 0.78 2.61	0.54	2.26 0.51 2.42 0.54	YES	YES 0.85 YES 0.7	YES YES	
+00.00 007+00.00 LT +33.32 +00.00 007+00.00 LT 433.39 +00.00 008+00.00 LT 431.90 +00.00 009+00.00 LT 430.28 +00.00 010+00.00 LT 427.72 +00.00 011+00.00 LT 425.64 +00.00 012+00.00 LT 422.94 +00.00 012+50.00 LT 420.14 +50.00 026+25.00 LT 385.66	435.02 0.041 0.90 433.39 0.028 0.90	0.605 0.50 0.316 0. 0.391 0.50 0.075 0	30 0.434 1.319 30 0.243 1.563	13.00 1	3.00 5.16	<u>3.90</u> 6.81 3.90 8.06	5.15	0.00	1.50 3.00 1.50 3.00	3.00	2-EC-2 Ty2	6 0.04 6 0.04	5 NA 5 NA	0.020	0.92 2.65	0.83	2.47 0.53	YES	YES 0.58	3 YES	-
HOLOG OCOLOGIO LT HOLOG +00.00 009+00.00 LT 430.28 +00.00 010+00.00 LT 427.72 +00.00 011+00.00 LT 425.64 +00.00 012+00.00 LT 422.94 +00.00 012+50.00 LT 420.14 +50.00 026+25.00 LT 385.66	431.90 0.025 0.90 430.28 0.025 0.90	0.142 0.50 0.000 0.1 0.028 0.50 0.000 0.1	30 0.094 1.657 30 0.037 1.693	9.00	9.00 5.94	4.53 9.84 5.44 11.95	7.51	0.00	1.50 3.00 1.50 3.00	3.00	2-EC-2 Ty2	7 0.04	5 NA 5 NA	0.015	1.12 2.64 1.18 2.86	1.01	2.47 0.49	YES	YES 0.38	3 YES	
+00.00 010+00.00 L1 427.72 +00.00 011+00.00 LT 425.64 +00.00 012+00.00 LT 422.94 +00.00 012+50.00 LT 420.14 +50.00 026+25.00 LT 385.66	430.28 0.025 0.90 427.72 0.025 0.90 425.64 0.025 0.90	0.025 0.50 0.000 0.1 0.025 0.50 0.000 0.1	30 0.037 1.033 30 0.035 1.729 30 0.040 1.760	5.00	5.00 7.06	5.44 11.95 5.44 12.20 5.44 12.40	9.41	0.00	1.50 3.00 1.50 3.00 1.50 3.00	3.00	2-EC-2 Ty2 2-EC-2 Ty2	7 0.04	5 NA	0.026	1.18 2.80 1.09 3.41 1.14 2.16	0.99	3.20 0.83 0.6 0.70	YES	YES 0.4.	I YES	
00.00 012+00.00 L1 422.94 00.00 012+50.00 LT 420.14 50.00 026+25.00 LT 385.66	425.64 0.025 0.90 422.94 0.025 0.90	0.036 0.50 0.000 0. 0.030 0.50 0.005 0.	30 0.040 1.769 30 0.039 1.808 20 0.037 1.045	5.00	5.00 7.06	5.44 12.49 5.44 12.76 5.44 12.02	9.83	0.00	1.50 3.00 1.50 3.00	3.00	2-EC-2 Ty2 2-EC-2 Ty2	7 0.04	5 NA 5 NA	0.021	1.14 3.16 1.10 3.52	1.03	2.96 0.70 3.30 0.88	YES	YES 0.36 YES 0.4() YES	-
5+50.00 026+25.00 LT 385.66	420.14 0.025 0.90 419.05 0.013 0.90	0.029 0.50 0.000 0.1 0.003 0.50 0.000 0.1	30 0.037 1.845 30 0.013 1.858	5.00	5.00 7.06 5.00 7.06	5.44 13.03 5.44 13.12	10.04 10.11	0.00	1.50 3.00 1.50 3.00	3.00	2-EC-2 Ty2 2-EC-2 Ty2	7 0.04 7 0.04	5 NA 5 NA	0.028	1.10 3.58 1.16 3.27	1.00	3.36 0.91 3.06 0.75	YES	YES 0.40 YES 0.3	4 YES	_
3+25.00 027+00.00 L1 385.71	382.18 0.025 0.90 382.18 0.018 0.90	0.039 0.50 0.461 0. 0.038 0.50 0.557 0.	30 0.180 0.180 30 0.202 1.051	15.00 1 15.00 1	.5.00 4.85 .5.00 4.85	3.65 0.87 3.65 5.10	0.66 3.84	0.00	1.50 3.00 1.50 3.00	3.00	2-EC-2 Ty2 2-EC-2 Ty2	3 0.04 5 0.04	5 NA 5 NA	0.046 0.047	0.37 2.22 0.70 3.44	0.33	2.05 0.50 3.21 0.98	YES	YES 1.13 YES 0.80	YES J YES	_
7+00.00 028+00.00 LT 387.32 8+00.00 029+00.00 LT 388.93	385.71 0.025 0.90 387.32 0.025 0.90	0.043 0.50 0.146 0. 0.035 0.50 0.616 0.	30 0.088 0.849 30 0.225 0.761	12.00 1 15.00 1	.2.00 5.33 .5.00 4.85	4.04 4.53 3.65 3.69	3.43 2.78	0.00 0.00	1.50 3.00 1.50 3.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	5 0.04 5 0.04	5 NA 5 NA	0.016 0.016	0.83 2.24 0.76 2.12	0.74	2.09 0.39 1.98 0.36	YES YES	YES 0.68 YES 0.7	4 YES	
9+00.00 030+00.00 LT 390.67 0+00.00 031+00.00 LT 393.37	388.93 0.025 0.90 390.67 0.025 0.90	0.037 0.50 0.278 0.30 0.044 0.50 0.280 0.30	30 0.124 0.536 30 0.128 0.412	12.00 1 11.00 1	.2.00 5.33 1.00 5.52	4.04 2.86 4.19 2.27	2.17 1.73	0.00 0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	4 0.04 4 0.04	5 NA 5 NA	0.017 0.027	0.68 2.06 0.58 2.28	0.62 0.52	1.92 0.35 2.12 0.46	YES YES	YES 0.82 YES 0.9	YES 3 YES	
1+00.00 032+00.00 LT 394.88 2+00.00 033+00.00 LT 397.09	393.37 0.025 0.90 394.88 0.023 0.90	0.070 0.50 0.409 0.70 0.037 0.50 0.213 0.70	30 0.180 0.284 30 0.103 0.103	15.00 1 15.00 1	.5.00 4.85 .5.00 4.85	3.65 1.38 3.65 0.50	1.04 0.38	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	4 0.04 2 0.04	5 NA 5 NA	0.015 0.022	0.53 1.62 0.34 1.46	0.48	L.52 0.24 L.36 0.22	YES YES	YES 0.97 YES 1.1	YES 6 YES	
3+00.00 034+00.00 LT 397.09 4+00.00 035+00.00 LT 391.63	391.63 0.026 0.90 387.64 0.026 0.90	0.053 0.50 0.248 0.3 0.067 0.50 0.019 0.3	30 0.125 0.125 30 0.063 0.188	15.00 1 11.00 1	.5.00 4.85 .1.00 5.52	3.65 0.60 4.19 1.04	0.46 0.79	0.00 0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	2 0.04 3 0.04	5 NA 5 NA	0.055 0.040	0.31 2.14 0.40 2.18	0.28	1.98 0.50 2.02 0.47	YES YES	YES 1.19 YES 1.1	YES 0 YES	_
5+00.00 036+00.00 LT 391.45 6+00.00 000+50.00 LT 393.28	387.64 0.025 0.90 391.45 0.035 0.90	0.065 0.50 0.007 0.1 0.040 0.50 0.078 0.1	30 0.057 0.248 30 0.075 0.191	5.00	5.00 7.06 5.00 7.06	5.44 1.75 5.44 1.35	1.35 1.04	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	3 0.04 3 0.04	5 NA 5 NA	0.038 0.036	0.492.440.452.23	0.44	2.27 0.55 2.09 0.48	YES YES	YES 1.01 YES 1.0	YES 5 YES	-
0+50.00001+50.00LT400.001+50.00002+50.00LT403.00	393.28 0.025 0.90 400.00 0.028 0.90	0.054 0.50 0.007 0.1 0.075 0.50 0.008 0.1	30 0.051 0.116 30 0.064 0.064	5.00	5.00 7.06 5.00 7.06	5.44 1.31 5.44 0.45	1.01 0.35	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	3 0.04 2 0.04	5 NA 5 NA	0.067 0.030	0.392.790.311.59	0.36	2.63 0.78 1.50 0.27	YES YES	YES 1.17 YES 1.1	9 YES	-
Stationing is from Western Access Ro Access Road	Road Flow from culvert a	at STA 000+70.00 included	Hydro	ology						D	Pitch Geometry	y					Hydrau	ics			
From To Station RT Upstream	vert Area C Downstream 1 0.9 (acres)	Area C Area C 2 0.5 3 0. (acres) (acres) (acres) (acres)	C Incr Total 3 CA CA	T _C 10 yr (min) (1	T _c 10 yr 2 yr i min) (in/hr)	2 yr 10 yr <i>i</i> Q (in/hr) (cfs)	2 yr Q (cfs)	Bottom I B (ft)	Depth Left Y Slope (ft) (H/V)	Right Slope (H/V)	Lining Type	Lining n Width (ft)	Ditch Curve? R _d (ft)	Ditch Slope (ft/ft)	10 yr10 yrDepthVelocity(ft)(ft/sec)	2 yr Depth Ve	ocity Force" /sec) (lbs/ft	e Lining t" Adeq?	Lining Free- Adeq? boar (Max t _{allow}) (ft)	d Adeq?	-
J+50.00 011+00.00 RT 424.56 1+00.00 012+00.00 RT 422.94	422.94 0.020 0.90 420.14 0.025 0.90	0.021 0.50 0.000 0.3 0.035 0.50 0.032 0.3	30 0.029 0.029 30 0.050 0.079	5.00 5 7.00 7	5.00 7.06 7.00 6.45	5.44 0.20 4.94 0.51	0.16 0.39	0.00	1.50 3.00 1.50 3.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	2 0.04 2 0.04	5 NA 5 NA	0.032	0.23 1.34 0.33 1.59	0.21	.27 0.22 .48 0.27	YES YES	YES 1.28 YES 1.15	YES YES	-
2+00.00 013+00.00 RT 420.14 3+00.00 014+00.00 RT 417.47	417.470.0250.90413.490.0250.90	0.024 0.50 0.095 0.3 0.071 0.50 0.274 0.3	30 0.063 0.142 30 0.141 0.282	9.00 9 12.00 1	0.005.942.005.33	4.53 0.84 4.04 1.51	0.64 1.14	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	3 0.04 3 0.04	5 NA 5 NA	0.027 0.040	0.40 1.78 0.46 2.38	0.36	.66 0.32 .24 0.54	YES YES	YES 1.10 YES 1.04	YES YES	-
4+00.00 015+00.00 RT 413.49 5+00.00 016+00.00 RT 411.47	411.47 0.025 0.90 408.96 0.025 0.90	0.153 0.50 0.061 0.3 0.263 0.50 0.397 0.3	30 0.117 0.399 30 0.273 0.673	13.00 1 14.00 1	3.00 5.16 4.00 5.00	3.90 2.06 3.77 3.36	1.56 2.54	0.00 0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	4 0.04 4 0.04	5 NA 5 NA	0.020 0.025	0.58 1.99 0.68 2.45	0.53	.86 0.35 .28 0.50	YES YES	YES 0.92 YES 0.85	YES YES	-
5+00.00017+00.00RT408.967+00.00018+00.00RT403.54	403.54 0.025 0.90 399.23 0.025 0.90	0.268 0.50 0.107 0.3 0.258 0.50 0.012 0.3	30 0.189 0.862 30 0.155 1.017	11.00 1 12.00 1	1.005.522.005.33	4.194.764.045.42	3.61 4.11	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	4 0.04 5 0.04	5 NA 5 NA	0.054 0.043	0.67 3.57 0.73 3.39	0.60	.33 1.07 .16 0.94	YES YES	YES 0.83 YES 0.77	YES YES	-
3+00.00 019+00.00 RT 399.23 9+00.00 020+00.00 RT 396.23	396.23 0.025 0.90 393.23 0.025 0.90	0.643 0.50 0.003 0.3 0.059 0.50 0.147 0.3	30 0.345 1.362 30 0.097 1.459	13.00 1 13.00 1	3.005.163.005.16	3.907.033.907.53	5.32 5.69	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	5 0.04 6 0.04	5 NA 5 NA	0.030 0.030	0.86 3.14 0.88 3.20	0.78 0.80	.94 0.76 .00 0.78	YES YES	YES 0.64 YES 0.67	YES YES	-
J+00.00021+00.00RT393.231+00.00022+00.00RT390.17	390.17 0.025 0.90 386.29 0.026 0.90	0.135 0.50 0.097 0.310 0.310 0.50 0.000 0.310	30 0.119 1.578 30 0.179 1.757	12.00 1 12.00 1	2.00 5.33 2.00 5.33	4.04 8.42 4.04 9.37	6.38 7.10	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	6 0.04 6 0.04	5 NA 5 NA	0.031 0.039	0.923.320.923.73	0.83 3 0.83 3	.09 0.83 .48 1.05	YES YES	YES 0.58 YES 0.58	YES YES	-
2+00.00 023+00.00 RT 386.29 West Access Road	379.19 0.026 0.90	0.282 0.50 0.019 0.3	30 0.170 1.928 Hydro	12.00 1 ology	2.00 5.33	4.04 10.28	7.79	0.00	1.50 3.00	3.00 D	5-EC-3 Ty1 Pitch Geometry	5 0.030	5 NA	0.071	0.78 5.64	0.70	.27 1.63 Hydrau	YES	YES 0.73	YES	-
rom To Station RT Upstream	vert Area C Downstream 1 0.9	Area C Area C 2 0.5 3 0.	Incr Total GACA	Тс 10 yr	T _C 10 yr 2 yr <i>i</i>	2 yr 10 yr <i>i</i> Q	2 yr Q	Bottom I B	Depth Left Y Slope	Right Slope	Lining Type	Lining n Width	Ditch Curve?	Ditch Slope	10 yr 10 yr Depth Velocity	2 yr Depth Ve	yr Tractiv ocity Force	e Lining t" Adeq?	Lining Free Adeq? boar	Capacity d Adeq?	-
0+70.00 001+50.00 RT 400.20	(acres) 394.16 0.02 0.90	(acres) (acres) 0.08 0.50 0.00 0.3	30 0.060 0.092	(min) (1 9.00 9	min) (in/hr) 9.00 5.94	(in/hr) (cfs) 4.53 0.55	(cfs) 0.42	(ft) 0.00	(tt) (H/V) 1.50 3.00	(H/V) 3.00	2-EC-2 Ty2	(ft) 2 0.04	R _d (ft) 5 NA	(ft/ft) 0.078	(tt) (ft/sec) 0.28 2.37	(ft) (ft 0.25	/sec) (lbs/ft .23 0.63) (Max V) YES	(Max τ _{allow}) (ft) YES 1.25	; YES	-
+50.00 001+85.00 RT 401.14 +50.00 004+00.00 RT 399.43	400.20 0.02 0.90 398.21 0.04 0.90	0.03 0.50 0.00 0.3 0.02 0.50 0.00 0.3	30 0.032 0.032 30 0.046 0.046	5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00	5.00 7.06 5.00 7.06	5.44 0.23 5.44 0.32	0.18 0.25	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	2 0.04 2 0.04	5 NA 5 NA	0.027 0.024	0.241.280.281.35	0.23	.22 0.19 .27 0.20	YES YES	YES 1.26 YES 1.27	YES YES	-
I+00.00 005+00.00 RT 398.21 5+00.00 006+00.00 RT 396.97	396.97 0.05 0.90 395.96 0.05 0.90	0.03 0.50 0.00 0.3 0.04 0.50 0.00 0.3	30 0.057 0.103 30 0.061 0.164	5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00	5.00 7.06 5.00 7.06	5.44 0.73 5.44 1.16	0.56 0.89	0.00	1.503.001.503.00	3.00 3.00	1-Bare Earth 1-Bare Earth	3 0.030 3 0.030	D NA D NA	0.012 0.010	0.381.740.471.82	0.34	64 0.14 69 0.14	YES YES	YES 1.13 YES 1.05	YES YES	-
+00.00 007+00.00 RT 395.96 +00.00 008+00.00 RT 394.96	394.96 0.05 0.90 394.00 0.05 0.90	0.04 0.50 0.00 0.3 0.05 0.50 0.00 0.3	30 0.065 0.229 30 0.068 0.298	5.00 S	5.00 7.06 5.00 7.06	5.44 1.62 5.44 2.10	1.25 1.62	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	4 0.04 4 0.04	5 NA 5 NA	0.010 0.010	0.61 1.44 0.68 1.51	0.56 1 0.61 1	.36 0.18 .41 0.19	YES YES	YES 0.89 YES 0.85	YES YES	-
3+00.00 009+00.00 RT 394.00 9+00.00 010+00.00 RT 392.94	392.940.050.90392.000.050.90	0.06 0.50 0.00 0.3 0.06 0.50 0.00 0.3	30 0.072 0.370 30 0.075 0.445	5.00 S	5.00 7.06 5.00 7.06	5.44 2.61 5.44 3.14	2.01 2.42	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	5 0.04 5 0.04	5 NA 5 NA	0.011 0.009	0.72 1.66 0.80 1.68	0.65 2 0.73	.55 0.22 .57 0.22	YES YES	YES 0.78 YES 0.70	YES) YES	-
D+00.00011+00.00RT392.001+00.00011+35.00RT391.00	391.00 0.05 0.90 388.41 0.01 0.90	0.07 0.50 0.00 0.3 0.03 0.50 0.00 0.3	30 0.076 0.521 30 0.024 0.545	5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00	5.00 7.06 5.00 7.06	5.44 3.68 5.44 3.85	2.83 2.97	0.00	1.503.001.503.00	3.00	2-EC-2 Ty2 2-EC-2 Ty2	5 0.04 4 0.04	5 NA 5 NA	0.010 0.074	0.83 1.78 0.58 3.81	0.75	.66 0.25 .56 1.28	YES YES	YES 0.67 YES 0.97	YES 2 YES	-
1+35.00 012+00.00 RT 391.21 2+00.00 013+00.00 RT 392.75	388.410.030.90391.210.080.90	0.15 0.50 0.00 0.30 0.34 0.50 0.00 0.30	30 0.101 0.865 30 0.238 0.764	5.00 S 12.00 1	5.00 7.06 2.00 5.33	5.44 6.11 4.04 4.07	4.71 3.09	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	5 0.04 5 0.04	5 NA 5 NA	0.043	0.773.490.802.15	0.69	.26 0.98 .01 0.36	YES	YES 0.73 YES 0.7(YES YES	-
3+00.00014+00.00RT394.00.4+00.00015+00.00RT394.84	392.75 0.03 0.90 394.00 0.02 0.90	0.15 0.50 0.00 0.3 0.06 0.50 0.00 0.3	30 0.100 0.526 30 0.052 0.426	10.00 1 5.00 1	0.00 5.72 5.00 7.06	4.36 3.01 5.44 3.01	2.29 2.32	0.00	1.50 3.00 1.50 3.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	5 0.04 5 0.04	5 NA 5 NA	0.013	0.731.830.801.59	0.66	.70 0.27 .49 0.20	YES	YES 0.77 YES 0.7(YES) YES	-
5+00.00 015+65.00 RT 395.32 .1+35.00 012+00.00 LT 391.21	394.84 0.25 0.90 395.32 0.02 0.90	0.31 0.50 0.00 0.3 0.02 0.50 0.00 0.3	30 0.374 0.374 30 0.027 0.247	5.00	5.00 7.06 5.00 7.06	5.44 2.64 5.44 1.74	2.03 1.34	0.00	1.50 3.00 1.50 3.00	3.00 3.00	1-Bare Earth 2-EC-2 Tv2	4 0.030 3 0.04	D NA 5 NA	0.007	0.68 1.99 0.44 2.93	0.61	.86 0.15	YES	YES 0.83 YES 1.0/	YES 5 YFS	-
2+00.00 013+00.00 LT 392.75 3+00.00 014+00.00 LT 394.00	391.21 0.03 0.90 392.75 0.03 0.90	0.02 0.50 0.00 0.3 0.03 0.50 0.00 0.3	30 0.035 0.220 30 0.039 0.184	5.00	5.00 7.06 5.00 7.06	5.44 1.55 5.44 1.30	1.20 1.00	0.00 0.00	1.50 3.00 1.50 3.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	4 0.04	5 NA 5 NA	0.015 0.013	0.56 1.69 0.53 1.48	0.51	.59 0.25 .38 0.20	YES	YES 0.94 YES 0.91	YES 7 YES	-
1+00.00 015+00.00 LT 394.84 5+00.00 01 5+65.00 LT 395.32	394.00 0.03 0.90 394.84 0.05 0.90	0.07 0.50 0.00 0.3 0.07 0.50 0.00 0.3	30 0.061 0.146 30 0.084 0.084	5.00	5.00 7.06 5.00 7.06	5.44 1.03 5.44 0.60	0.79	0.00	1.50 3.00 1.50 3.00	3.00	1-Bare Earth 1-Bare Earth	<u>3</u> 0.030	D NA D NA	0.008 0.007	0.46 1.64 0.38 1.37	0.42	.54 0.11 .29 0.08	YES	YES 1.04 YES 1.17	YES 2 YES	_
SWM Access Road	vert Area C	Area C Area C	E Incr Total	ology T _C	T _C 10 yr	2 yr 10 yr	2 yr	Bottom [Depth Left	Di Right	itch Geometry	Lining n	Ditch	Ditch	10 yr 10 yr	2 yr 2	yr Tractiv	cs Lining	Lining Free	Capacity	f
To Station L1 Upstream I tation 0+75.00 001+00.00 LT 396.05	Downstream 1 0.9 (acres) 395.00 0.011 0.90	2 0.5 3 0. (acres) (acres) 0.031 0.50 0.000 0.50	3 CA CA 30 0.025 0.025	10 yr 2 (min) (r 5.00	2 yr i nin) (in/hr) 5.00 7.06	i Q (in/hr) (cfs) 5.44 0.18	Q (cfs) 0.14	B (ft) 0.00	Y Slope (ft) (H/V) 1.50 3.00	Slope (H/V) 3.00	Type 2-EC-2 Tv2	Width (ft) 2 0.045	Curve? R _d (ft) NA	Slope (ft/ft) 0.039	Depth Velocity (ft) (ft/sec) 0.21 1.39	Depth Vel (ft) (ft, 0.19 1	sec) (Ibs/ft ² 31 0.24	" Adeq? (Max V) YES	Adeq? board (Max t _{allow}) (ft) YES 1 29	Adeq?	-
1+00.00 002+00.00 LT 395.00 2+00.00 003+00.00 LT 390.45	390.45 0.025 0.90 386.02 0.025 0.90	0.107 0.50 0.000 0.3 0.119 0.50 0.000 0.3	30 0.076 0.102 30 0.082 0.184	9.00 9 6.00 6	0.00 5.94 6.00 6.74	4.53 0.60 5.18 1.24	0.46 0.95	0.00	1.50 3.00 1.50 3.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	2 0.045 3 0.045	NA NA	0.046 0.044	0.32 1.99 0.48 2.60	0.28 1 0.38 2	85 0.43 20 0.63	YES YES	YES 1.18 YES 1.02	YES YES	
3+00.00 004+00.00 LT 386.02 4+00.00 005+00.00 LT 383.49	383.49 0.025 0.90 381.99 0.025 0.90	0.107 0.50 0.000 0.3 0.094 0.50 0.000 0.3	30 0.076 0.260 30 0.070 0.330	5.00 5	5.00 7.06 5.00 7.06	5.44 1.84 5.44 2.33	1.42 1.80	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	4 0.045 4 0.045	NA NA	0.025 0.015	0.54 2.12 0.65 1.85	0.49 1 0.59 1	990.41730.29	YES YES	YES 0.96 YES 0.85	YES YES	
5+00.00 005+60.00 LT 381.99 5+60.00 006+00.00 LT 381.79	379.17 0.014 0.90 379.17 0.010 0.90	0.044 0.50 0.000 0.3 0.036 0.50 0.000 0.3	30 0.034 0.365 30 0.027 0.174	5.00 5 5.00 5	5.00 7.06 5.00 7.06	5.442.575.441.23	1.98 0.95	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	4 0.045 3 0.045	NA NA	0.058 0.089	0.53 3.14 0.37 3.06	0.48 2 0.33 2	94 0.90 87 0.96	YES YES	YES 0.98 YES 1.13	YES YES	REVISIONS Dewberry En
5+00.00 007+00.00 LT 385.39 7+00.00 007+75.00 LT 387.64	381.79 0.025 0.90 385.39 0.022 0.90	0.141 0.50 0.000 0.3 0.068 0.50 0.000 0.3	30 0.093 0.147 30 0.054 0.054	9.00 9 7.00 7	0.00 5.94 7.00 6.45	4.530.874.940.35	0.67 0.27	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	3 0.045 2 0.045	NA NA	0.038 0.023	0.38 2.03 0.29 1.35	0.34 1 0.27 1	91 0.42 27 0.20	YES YES	YES 1.13 YES 1.21	YES YES	Glen Allen, VA 23060
7+75.00 008+00.00 LT 387.64 8+00.00 009+00.00 LT 387.55	387.55 0.005 0.90 384.38 0.029 0.90	0.017 0.50 0.000 0.3 0.142 0.50 0.000 0.3	30 0.013 0.013 30 0.097 0.110	8.00 8 12.00 1	8.006.182.005.33	4.730.084.040.58	0.06 0.44	0.00	1.503.001.503.00	3.00 3.00	1-Bare Earth 2-EC-2 Ty2	2 0.030 2 0.045	NA NA	0.005 0.039	0.19 0.71 0.33 1.88	0.18 0 0.29 1	67 0.03 75 0.38	YES YES	YES 1.31 YES 1.18	YES YES	WEALTH
1+04.53005+00.00RT384.925+00.00005+60.00RT380.76	380.76 0.025 0.90 378.67 0.015 0.90	0.032 0.50 0.000 0.3 0.020 0.50 0.000 0.3	30 0.038 0.038 30 0.023 0.062	5.00 5 5.00 5	5.00 7.06 5.00 7.06	5.44 0.27 5.44 0.43	0.21 0.33	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	2 0.045 2 0.045	NA NA	0.063 0.031	0.23 1.86 0.30 1.58	0.20 1 0.28 1	72 0.42 49 0.27	YES YES	YES 1.28 YES 1.20	YES YES	And A.
5+60.00 006+00.00 RT 381.55 5+00.00 007+00.00 RT 385.39	378.670.0130.90381.550.0250.90	0.021 0.50 0.000 0.3 0.025 0.50 0.000 0.3	30 0.022 0.084 30 0.035 0.062	5.00 5 5.00 5	5.00 7.06 5.00 7.06	5.440.595.440.44	0.46 0.34	0.00	1.503.001.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	2 0.045 2 0.045	NA NA	0.043 0.042	0.32 1.93 0.28 1.78	0.29 1 0.26 1	82 0.40 67 0.35	YES YES	YES 1.18 YES 1.22	YES YES	SKEITH A. S Lic. No. /
+00.00 007+75.00 RT 387.65	[385.39 0.020 0.90	0.018 0.50 0.000 0.3	30 0.027 0.027 Hydro	5.00 5 ology	5.00 7.06	5.44 0.19	0.15	0.00	1.50 3.00	3.00 D	2-EC-2 Ty2	2 0.045 y	NA	0.034	0.22 1.34	0.20 1	27 0.22 Hydrau	YES	YES 1.28	YES	1/29
From To Station LT Upstream	Vert Area C Downstream 1 0.9 (acres)	Area C Area C 2 0.5 3 0. (acres) (acres) (acres)	3 CA CA	T _C 10 yr (min)	Ic 10 yr 2 yr i min) (in/hr)	2 yr 10 yr i Q (in/hr) (cfc)	2 yr Q (cfs)	Bottom B (ft)	Vepth Left Y Slope (ft) (нАЛ)	Right Slope (H/V)	Lining Type	Lining n Width (ft)	Ditch Curve?	Ditch Slope (ft/ft)	LU yr10 yrDepthVelocity(ft)(ft/sec)	2 yr Depth Ve (ft) /f	zyr Tracti locity Force (/sec)	ve Lining 'τ" Adeq? ²) (Max V)	Lining Free Adeq? boar (Max Tallar) (ft	- Capacity d Adeq?	
D+00.00 001+00.00 NA 393.15 1+00.00 002+00.00 NA 391.95	391.95 0.40 0.90 390.75 0.24 0.90	0.11 0.50 0.00 0.1 0.05 0.50 0.00 0.1	30 0.416 0.416 30 0.242 0.658	5.00	5.00 7.06	5.44 2.94 5.44 4.64	2.26	4.00	2.50 3.00 2.50 3.00	3.00	2-EC-2 Ty2 2-EC-2 Ty2	6 0.04 7 0.04	5 NA 5 NA	0.012	0.36 1.59 0.47 1.84	0.31	L.46 0.27	YES	YES 2.14 YES 2.0	4 YES 3 YES	REV DATE DESCRIPTION DEWBERRY PROJECT
2+00.00 003+00.00 NA 390.75 3+00.00 0.04+00.00 NA 390.75	389.55 0.35 0.90 388.42 0.25 0.00	0.05 0.50 0.00 0. 0.05 0.50 0.00 0.	30 0.335 0.993 30 0.244 1.227	5.00	5.00 7.06	5.44 7.01 5.44 9.72	5.40	4.00	2.50 3.00 2.50 3.00	3.00	2-EC-2 Ty2 2-EC-2 Ty2	8 0.04	5 NA 5 NA	0.012	0.58 2.08 0.68 2.10	0.51	L.93 0.33	YES	YES 1.9 VES 1.9	2 YES	
100.00 004100.00 NA 389.55 1+00.00 005+00.00 NA 388.42 5+00.00 006+00.00 NA 387.40	303.42 0.25 0.90 387.40 0.51 0.90 386.38 0.47 0.90	0.07 0.50 0.00 0. 0.15 0.50 0.00 0.	30 0.498 4.484 30 0.500 4.994	5.00	5.00 7.06 5.00 7.06	5.44 31.66 5.44 25.10	24.40 27.12	4.00	3.00 3.00 3.00 3.00	3.00	2-EC-2 Ty2 2-EC-2 Ty2	12 0.04 12 0.04	5 NA 5 NA	0.010	1.33 3.01 1.40 2.00	1.17	2.80 0.55 2.89 0.57	YES	YES 1.6 VES 1.6	7 YES 0 VEC	Energy [®]
5+00.00 006+80.00 NA 386.38 Includes flow from internal d	385.50 0.47 0.90 385.50 0.25 0.90 drainage system 0.90	0.12 0.50 0.00 0.	30 0.280 5.264	5.00	5.00 7.06	5.44 37.17	27.12 28.65	4.00	3.00 3.00	3.00	2-EC-2 Ty2 2-EC-2 Ty2	12 0.04	5 NA 5 NA	0.010	1.41 3.09	1.23	3.00 0.62	YES	YES 1.50) YES	
Substation Ditch South	vert Area C	Area C Area C	Hydro C Incr Total	ology T _C	T _C 10 yr	2 yr 10 yr	2 yr	Bottom	Depth Left	D Right	Ditch Geometry	y Lining n	Ditch	Ditch	10 yr 10 yr	2 yr	Hydrau 2 yr Tractiv	ics ve Lining	Lining Free	- Capacity	
tation To Station RT Upstream	Downstream 1 0.9 (acres)	2 0.5 3 0. (acres) (acres)	3 CA CA	10 yr (min) (1	2 yr i min) (in/hr)	i Q (in/hr) (cfs)	Q (cfs)	B (ft)	Y Slope (ft) (H/V)	Slope (H/V)	Туре	Width (ft)	Curve? R _d (ft)	Slope (ft/ft)	Depth Velocity (ft) (ft/sec)	Depth Ve (ft) (ft	locity Force' /sec) (lbs/ft	τ" Adeq?	Adeq? boar (Max τ _{allow}) (ft)	d Adeq?	-
)+00.00001+00.00NA398.521+00.00002+00.00NA395.84	395.84 0.04 0.90 393.88 0.17 0.90	0.14 0.50 0.00 0.3 0.10 0.50 0.00 0.3	30 0.11 0.11 30 0.21 0.31	5.00	5.00 7.06 5.00 7.06	5.44 0.76 5.44 2.22	0.59 1.71	4.00 4.00	2.503.002.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	5 0.04 6 0.04	5 NA 5 NA	0.027 0.020	0.13 1.32 0.27 1.71	0.12	22 0.22 58 0.33	YES YES	YES 2.37 YES 2.27	YES 3 YES	_
2+00.00 003+00.00 NA 393.88 3+00.00 004+00.00 NA 392.88	392.88 0.20 0.90 391.88 0.30 0.90	0.08 0.50 0.00 0.3 0.08 0.50 0.00 0.3	30 0.22 0.53 30 0.31 0.84	5.00 S	5.00 7.06 5.00 7.06	5.44 3.76 5.44 5.93	2.90 4.57	4.00 4.00	2.503.002.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	7 0.04 8 0.04	5 NA 5 NA	0.010 0.010	0.43 1.61 0.56 1.85	0.38 0.48	49 0.21 71 0.26	YES YES	YES 2.07 YES 1.9	YES 4 YES	UNITY SUBSTATION
4+00.00005+00.00NA391.885+00.00006+00.00NA390.88	390.880.200.90389.880.310.90	0.05 0.50 0.00 0.3 0.05 0.50 0.00 0.3	30 0.21 1.05 30 0.30 1.35	5.00 5.00	5.00 7.06 5.00 7.06	5.44 7.40 5.44 9.54	5.70 7.36	4.00 4.00	2.503.002.503.00	3.00 3.00	2-EC-2 Ty2 2-EC-2 Ty2	8 0.04 9 0.04	5 NA 5 NA	0.010 0.010	0.63 1.99 0.73 2.14	0.55 0.63	84 0.29 99 0.33	YES YES	YES 1.87 YES 1.7	YES 3 YES	LUNENBURG COUNTY V
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 7

Aŗ	Lunenburg Planning Office oplication for Conditional Use Permit for Solar Facilities Case Number: (Office Use Only)
Applicant Name: Owner Name: Owner Signature:	Section 1 Virginia Electric and Power Company dba Dominion Energy Virginia Kevin L. Fields - Authorized Representative
Contact Name for Appl Physical and Mailing A	ication: <u>Chuck Weil</u> ddress: 5000 Dominion BLVD, 3rd Floor, Glen Allen, VA 23060
Phone Number: <u>(804)</u> Email Address: <u>Charle</u>	239-6450 es.H.Weil@Dominionenergy.com
Power of Attorney Nan Power of Attorney Sigr As owner or authorized ag my knowledge, and I auth reviewing this application	bill Kevin L Fields nature: Kulue gent of this property, I certify that this application is complete and accurate to the best of norize the Lunenburg County representative(s) entry on the property for purposes of
Parcel Number(s): 059-01-0-2 (ACCESS	Section 2 Property Information Portion of 059-0A-0-18A (SITE) ROAD)
059-03-0-6 (ACCESS Area (ac./sq. ft.): Magisterial District: Address:	ROAD) Portion of 059-0A-0-18A (49.65ac/2,162,869sf) COLUMBIAN GROVE 3832 LAUREL BRANCH ROAD, LUNENBURG COUNTY, VA
Existing Zoning: Requested Use:	A-1 : Agriculture Electrical Substation
Does this property have a	historical designation? If yes, describe: <u>NO</u>

Parcel number(s), acreage, magisterial district and existing zoning can be located at: <u>https://lunenburggis.timmons.com/#/mwl</u>. The address can be typed into the "*By Parcel Address*" search bar followed by selecting search. This will pull up the information pertaining to the parcel. The application deadline is the 1^{st} of the month proceeding the month in which the public hearing by the Planning Commission is to be held. The Planning Commission meeting is held on the 1^{st} Thursday of the month at 7:00 p.m. Applications must be submitted in completed form a minimum of forty-five (45) days prior to scheduling a public hearing by the Planning Commission. Notice of incomplete applications will be sent to the applicant at the listed address in Section 1.

The site plan must be submitted as described in the site plan requirements at the time of the application.

Application fee is \$2,500.00, which must be paid at the time of application submission. The applicant will be invoiced for any costs incurred, including but not limited to advertising, postage, legal fees, third-party consulting fees, etc.

Incomplete applications will be returned to the applicant and not docketed for a public hearing

Section 3 Certification of Adjoining Property Owners, Board of Supervisors, and Planning Commissioners

Applicants Certification:

I certify that I have notified all adjacent property owners, to the property which is the subject of this application request, that this application is being filed. Notifications were sent via first class mail.

Adjacent property includes all property touching the project parcel, across roadways, watercourses, railroads, and/or municipal boundaries.

I further certify that the names and addresses below are those of the adjacent property owners as listed in the tax records of the Commissioner of Revenue of Lunenburg County.

Applicant's Signature:	
State of:	
County of:	
Before me,	, on this day of
Name of Notary Public	
, 20,Applicant(s) Name	, personally appeared, and
Given under my hand and seal of office this day of	, 20
Notary Public's Signature	
Location of Commission	
Registration #:	
Commission Expiration:	
Verification of Identity []Driver's License or Govt./State Identification Card: State:	(Seal)

Α	djacent Parcel (Property) Own	ers
Parcel Number	Name(s)	Address
		PO BOX 1288
059-01-0-3	FBJ GRAT-98 FORESTS LLC,	MOBILE AL 36633
		3173 BRICKLAND ROAD
059-02-0-1	LONG RANDALL S	SOUTH HILL VA 23970
		3502 LAUREL BRANCH ROAD
059-02-0-2A	LONG JOHNNY K	KENBRIDGE VA 23944
	RAGSDALE DOUGLAS	12113 CREEKWOOD TERRACE
059-03-0-5	INGRAM JR,	KNOXVILLE TN 37934
	RAGSDALE DOUGLAS	12113 CREEKWOOD TERRACE
059-03-0-6	INGRAM JR,	KNOXVILLE TN 37934
		3173 BRICKLAND ROAD
059-03-0-9	LONG RANDALL S.	SOUTH HILL VA 23970
		3899 LAUREL BRANCH ROAD
059-04-0-3	ARD CHRISTOPHER P	KENBRIDGE VA 23944
		3899 LAUREL BRANCH ROAD
059-04-0-4	CURLEY GEORGE W & SARA L	KENBRIDGE VA 23944
059-04-0-4		3173 BRICKLAND ROAD
059-0A-0-18A	LONG RANDALL S.	SOUTH HILL VA 23970
	YEATTS CLAUDE WESLEY & JAMES	4525 BRICKLAND ROAD
059-0A-0-39	WILEY &, JAMES ELLIOTT NASH &	KENBRIDGE VA 23944
	HARVILICZ RONALD M OR	3963 LAUREL BRANCH ROAD
059-0A-0-41	PATRICIA I	KENBRIDGE VA 23944
		3832 LAUREL BRANCH ROAD
059-0A-0-41A	BOAZ DAVID A,	KENBRIDGE VA 23944
	CURLEY SARA L OR GEORGE	3883 LAUREL BRANCH ROAD
059-0A-0-41B	W CURLEY	KENBRIDGE VA 23944
	REESE MARK S SR OR CONNIE	8507 CRAIG MILL ROAD
059-0A-0-41C	W,	KENBRIDGE VA 23944
		3502 LAUREL BRANCH ROAD
059-0A-0-41D	LONG JOHNNY K	KENBRIDGE VA 23944
		251 DUSTY LANE
059-0A-0-42	HOLMES CHARLIE ESTATE	KENBRIDGE VA 23944
	REESE MARK S SR OR	8507 CRAIG MILL ROAD
059-0A-0-43	CONNIE W,	KENBRIDGE VA 23944
		3832 LAUREL BRANCH ROAD
059-0A-0-43A	BOAZ DAVID A	KENBRIDGE VA 23944
	LONG RONALD F OR	3589 LAUREL BRANCH ROAD
059-0A-0-44	PATRICIA A	KENBRIDGE VA 23944
	LONG RONALD E OR	3589 LAUREL BRANCH ROAD
059-0A-0-44A	PATRICIA A	KENBRIDGE VA 23944

*If there are additional adjacent property owners, please include them on a separate sheet. Also, the letter that follows can be completed and mailed to adjacent property owners.

Parcel Number Name(s) Address					
REESE MARK S SR OR 8507 CRAIG MILL ROAD					
059-0A-0-44A1 CONNIE W KENBRIDGE VA 23944					
REESE MARK S SR OR 8507 CRAIG MILL ROAD					
059-0A-0-44B1 CONNIE W KENBRIDGE VA 23944					
3441 LAUREL BRANCH F	ROAD				
059-0A-0-44C NOBLIN AMANDA R KENBRIDGE VA 23944					
REESE MARK S SR OR 8507 CRAIG MILL ROAD					
059-0A-0-44C1 CONNIE W, KENBRIDGE VA 23944					
HERRINGTON BRENDA 603 WINDSOR AVE					
059-0A-0-46 REESE ET A LAWRENCEVILLE VA 23	868				
3502 LAUREL BRANCH F	3502 LAUREL BRANCH ROAD				
059-0A-0-53A LONG JOHNNIE K, KENBRIDGE VA 23944					
RAGSDALE DOUGLAS 12113 CREEKWOOD TEF	RRACE				
059-0A-0-54 INGRAM JR, KNOXVILLE TN 37934					
LONG JOHNNY K OR 3502 LAUREL BRANCH F	ROAD				
059-0A-0-54A LUCILLE S, KENBRIDGE VA 23944					
059-0A-0-55 CEMETERY					
YANCEY ROSA LEE OR CARSON W &, 3653 BRICKLAND ROAD					
071-0A-0-9 GINGER LEE & JEAN ELIZABETH SOUTH HILL VA 23970					
PO BOX 1288					
059-01-0-3 FBJ GRAT-98 FORESTS LLC, MOBILE AL 36633					
3173 BRICKLAND ROAD					
059-02-0-1 LONG RANDALL S SOUTH HILL VA 23970					
3502 LAUREL BRANCH F	ROAD				
059-02-0-2A LONG JOHNNY K, KENBRIDGE VA 23944					
RAGSDALE DOUGLAS	RACE				
059-03-0-5 INGRAM JR, KNOXVILLE IN 37934					
31/3 BRICKLAND ROAD					
059-03-0-9 LONG RANDALL S SOUTH HILL VA 23970					
351 RUBIN LANE					
059-0A-0-18 MOORE ANN D, KENBRIDGE VA 23944					
059-0A-0-19 MARTIN DOROTHY S MIDLOTHIAN VA 2311					
<u> </u>					

*If there are additional adjacent property owners, please include them on a separate sheet. Also, the letter that follows can be completed and mailed to adjacent property owners.

Notification of Application Submittal to Adjacent Property Owners

To: Adjacent Property Owner of Parcel(s)

From: Dominion Energy Virginia

Date:

The following application will be submitted for review to the Lunenburg County Planning Office:

- [] Rezoning
- [X] Conditional Use Permit
- [] Special Exception

Requested Use or Exception:

This application is for a Conditional Use Permit to construct a 230/500kV Electric Transmission Substation (a major public utility) on a parcel that is zoned A-1 Agricultural.

The application will be available for viewing at the Lunenburg County Planning Office. The Planning Office shall notify all adjacent property owner(s) of the time, day, and location of the public hearing(s) to be held on this application. Should you have questions and/or comments, please contact the Planning Office at 434.696.2142 or <u>taylor@lunenburgva.gov</u>.

Section 4 Applicant's Report Section 8.3(b) of Lunenburg Zoning Ordinance

Every application for a Conditional Use Permit shall be accompanied by a report from the applicant describing the proposed Conditional Use and explaining the manner which it complies with the requirements and standards of this article.

The following questions address the basic issues. The Planning Commission and/or Board of Supervisors may request additional information.

Des The equ con	scrib e site uipmo nstruo	e how you plan to develop the property for the proposed use and any associated uses. will be cleared and graded for the installation of the substation and associate electrical ent. A wet pond will be constructed to address stormwater management. An access road will be cted from Laurel Branch Road to the substation.	
Des assu The	scrib ure tl	e why the proposed use is desirable and appropriate for the area. What measures will be taken to hat the proposed use will not have a negative impact on the surrounding vicinity?	
The obso	e regi serve	ulations of all local, state, or federal governmental bodies having jurisdiction over the project shall be d at all times.	
The obso Also	so, ad	ulations of all local, state, or federal governmental bodies having jurisdiction over the project shall be d at all times.	
The obso Also	so, ad	ulations of all local, state, or federal governmental bodies having jurisdiction over the project shall be id at all times. id at all tid at all tid at all times.	
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The obso Also	so, ad a. b. c. d.	ulations of all local, state, or federal governmental bodies having jurisdiction over the project shall be id at all times. id at all times. iddenses the following: Details of Operations: The substation will be unmanned with personnel on site only when needed. Hours of Operation: 24/7 Traffic: Because the substation is unmanned there will be no increase in traffic and will only have personnel on site when maintenance is needed. Noise: We always work to design a new substation to meet the sound ordinance requirements of the locality w	vhere
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Also	so, ad a. b. c. d. su e. f. g. h.	Idress the following: Details of Operations: <u>The substation will be unmanned with personnel on site only when needed.</u> Hours of Operation: <u>24/7</u> Traffic: <u>Because the substation is unmanned there will be no increase in traffic and will only have</u> personnel on site when maintenance is needed. Noise: <u>We always work to design a new substation to meet the sound ordinance requirements of the locality w</u> bstation resides which is typically specified as a specific "A" weighted sound level measured at the substation pro Dust/Smoke: <u>There will be no generation of dust or smoke from the proposed substation once</u> <u>constructed</u> . Runoff: <u>This project was analyzed for the 1-year and 10-year storm events to show compliance with</u> VA DEQ IIB Stormwater Management Water Quantity Requirements. There is one wet pond on site. Intensity of Use: <u>The substation will have be low intensity due to it being an unmanned</u> station. Hazardous Materials: SF6 is the medium for the installed circuit breakers in the substation and has	vhere
Also	≥ regi serve so, ad a. b. c. d. su e. f. g. h.	Idations of all local, state, or federal governmental bodies having jurisdiction over the project shall be d at all times. Id at all times. Identified at all times. I	vhere opert

6.)	Has a survey of the parcel(s) been conducted to include project parcel, property boundaries, existing
	roadways and structures, and adjoining parcels, as well as, the parcel owner? If so, is it included in the
	application packet? A combination of field run survey and GIS was used to show the existing conditions of the
	parcels. Site plan is included in submission packet.

7.)	Has a site plan been included to note the information required on the survey, but also any new construction
	parking, clearing, planting, etc.? A site plan is included with this application.

8.) Has a business plan been established? If so, please provide it with application submittal. N/A

9.) Describe how the proposed project complies or refutes the goals and objectives noted in the Kenbridge-Victoria-Lunenburg Comprehensive Plan. This can be located the Lunenburg County, Virginia website. The construction of the electrical utility substation will help meet growing power demands. This complies with goals such as "Promote the expansion of a diversified economy"

Requirements for telecom site plans can be found in Section 22 Article III, items 22-81 thru 22-112 of the Lunenburg County Code.

Section 5 Construction Traffic Management Plan (CTMP)

VDOT and the County have identified that the construction phase of solar energy projects have an increased impact on VDOT's secondary road network. These impacts occur as VDOT's secondary road system was not designed to accommodate large numbers of truck traffic that results from the transport of the needed materials for the solar project to the construction sites. The increase in number of employees, also, impacts the roadways. To assist VDOT and the County in mitigating the increased maintenance costs associated with the increased traffic, the County requires the submission and approval of a CTMP. The outline below includes the needed elements for the required CTMP.

Construction Traffic Haul Routes

- Identify the routes to be used to transport supplies to the construction site. The plan shall begin at a VDOT maintained primary route and include all secondary routes to be used to access the site.
- The plan shall, also, include any truck routes that may be used to dispose of excess materials, clearing and grubbing debris, timber harvesting, or other activities that generate truck traffic leaving the site.

Roadway Condition Survey

- The applicant shall document by either photos, videos, or other method acceptable to VDOT and the County, the condition of the secondary roadways identified as haul routes. This condition survey will be utilized to identify areas damaged by the construction traffic that will be required to be repaired to the pre-existing conditions or better.

On-Site Storage, Unloading, and Turn-Around Areas

- The applicant shall demonstrate that they have adequate areas available on-site to unload trucks, store the materials on-site, and provide an area where trucks can turn around on-site prior to entering the VDOT roadway.

On-Site Parking Areas for Construction Employees

- The applicant shall provide an estimated number of employees to be on-site during construction and demonstrate that adequate on-site parking areas are available for the anticipated employees. Employees will not be allowed to park along roadways or within VDOT Right-of-Way (ROW) adjacent to the construction areas.

Staff Report

Report on Conditional Use Permit CUP-11-23 Unity Substation (Dominion Virginia Energy) with Respect to Article 15.2-2232 of the Code of Virginia

Purpose of Review and Scope of Hearing

Purpose: To determine whether the application of Dominion Virginia Energy ("the Applicant"), for a Substation, major public utility, under Virginia Code Section 15.2-2232(A), is substantially in accord with the *Lunenburg/Kenbridge/ Victoria Joint Comprehensive Plan 2019-2024* ("the Comprehensive Plan") relative to the general or approximate location, character, and extent of the proposed facility.

Scope of Hearing: Staff has recommended that the Planning Commission review the request for determination under Virginia Code Section 15.2-2232 prior to any review of a Conditional Use Permit (CUP) application. Therefore, the subject hearing is limited in scope to the determination of whether the request made in the Application, file number CUP-11-23, is 'substantially in accord' with the Comprehensive Plan. During this hearing phase, only those facts that pertain to the broader issues of the Comprehensive Plan will be discussed. Should the request be found to be in accord with the Comprehensive Plan, detailed examination of the Application as a Conditional Use Permit will be addressed in additional hearings before the Planning Commission, with a subsequent hearing before the Board of Supervisors. Should the request be found not to be in accord with the Comprehensive Plan, the Application will be dismissed, and no further hearing nor consideration of the Conditional Use Permit will be conducted; the facility proposed in the Application will not receive approval or permissions to build. The Applicant may appeal this action to the Board of Supervisors.

Project Description and Existing Conditions

Description: As per the conditional use permit application and site plans submitted August 18, 2023, with revisions submitted November 16, 2023, and then again January 29, 2024, (the "Application"), the proposed public facility will be a public utility substation (the "Substation") located on an approximately 213-acre portion of the property located at 3832 Laurel Branch Road (accessed from Dusty Lane). The proposed Substation will be located on a single parcel, with 2-3 other parcels being used for access roads. The total disturbed acreage is 26.25 acres.

Preexisting Site Use/Economic Considerations: Preexisting or recent use of the site is undeveloped grassy field.

Existing Topography: The Application contains an *Erosion and Stormwater Control Plan* indicating slopes 0% to 15%.

Soils: According to the Application, on-site soils are moderately fine-grained sands, humus, and clay, including Appling sandy loam, 2 to 7 percent slopes, moderately eroded; Appling sandy loam, 7 to 15 percent slopes, moderately eroded; Cecil sandy loam, 2 to 7 percent slopes, eroded.
Transportation: The Project will have a limited impact on existing transportation infrastructure during construction. It is estimated that approximately eight (8) worker vehicles, plus any required for subcontracted work, will be anticipated to be on-site per day.

Existing Air Quality: Given the sparseness of development and traffic, existing air quality should be acceptable. While no sampling has been done, one can expect low levels of degradation in the area due to its limited accessibility and use.

Existing Demand for Emergency Services: The site and existing use poses no unique demands on emergency services at present.

Adjacent and Surrounding Uses: The areas surrounding the proposed project area share the same land use and zoning characteristics – rural, agricultural, residential uses – as well as the same land use classifications.

Comprehensive Plan Citations

The Comprehensive Plan includes a *Special Policy Areas* chapter (Chapter V, *Special Policy Areas*) which provides several topics of discussion and recommendations related to the subject application, as follows:

Chapter V, *Special Policy Areas*, *Policy Area: Loss of Agricultural Land and Open Space*, references that "Future residential, commercial and industrial development should be encouraged to locate in areas where adequate public services are available or planned. Any development that does occur in the rural areas should be designed to incorporate significant open spaces and designed to minimize environmental impacts on the land and water resources," and that "Environmental impacts of any newly planned development area should be considered. It is essential to maintain a balance between development and preservation objectives throughout the area." This section recommends that "Commercial and/or industrial developments that are approved in the rural portions of the County should be consistent with the best interest of the community."

Chapter V, *Special Policy Areas*, *Policy Area: Protection of Water Resources*, references that surface water resources within the County "provide recreational opportunities and are a critical component of the County's infrastructure and quality of life. As such, protection and enhancement of these water resources should be a primary object of the County and the Towns."

Additionally, Chapter VI, *Goals, Objectives, and Strategies*, provide policies relevant to the subject application, as follows:

Chapter VI, Goals, Objectives, and Strategies, B., Economy and Employment:

• Goal: Promote the expansion of a diversified economy.

- Objective 1: Encourage quality industries to locate within the County and Towns.
 - Strategy 4: County Government, and other parties, to promote the area to environmentally friendly industries.
- Objective 2: Provide adequate land and resources for commercial and industrial uses.
 - Strategy 5: Guide community and industrial uses into areas with adequate public utilities and transportation access.

Chapter VI, Goals, Objectives, and Strategies, C., Land Use:

- Goal: Promote a balance of land uses that meet economic and demographic needs of Lunenburg County, the Town of Kenbridge and the Town of Victoria.
 - Objective 4: Encourage quality industries to locate within the County and Towns.
 - Strategy 1: Encourage industries to locate in the County and Towns' industrial parks or in areas where they are compatible to adjacent uses.
 - Strategy 2: Guide community and industrial uses into areas with adequate public utilities and transportation access.
 - Strategy 3: Work with interest groups to attract new industries to the locality. Encourage industries to locate in the industrial parks or in areas where they are compatible to adjacent uses.
 - Strategy 4: Liaise with the Chamber of Commerce, and other parties, to promote the area to environmentally friendly industries.

Chapter VI, Goals, Objectives, and Strategies, F., Natural Resources:

- Goal: Protect and preserve the natural resources of the community.
 - Objective 1: Prevent development in areas of critical environmental importance.
 - Strategy 1: Restrict development in flood plains, swamps and drainage ways.
 - Strategy 2: Restrict development on soils that will not adequately support structures.

- Strategy 4: Identify and protect all open spaces which have recreational potential or which would enhance the environment in Lunenburg County, the Town of Kenbridge and the Town of Victoria.
- Strategy 5: Promote the preservation and planting of trees, shrubs and other natural foliage.

Staff Analysis and Comments

Staff has reviewed and analyzed the Application and the above referenced Comprehensive Plan citations to determine whether the project is substantially in accord with the Comprehensive Plan.

With respect to the *Loss of Agricultural Land and Open Space* policy area, significant areas of the project will remain undeveloped, and the project is designed to minimize environmental impacts, and/or such impacts will be minimized through reasonable conditions. It is also important to note that none of the leased lands comprising the Project rank as having suitability (high or otherwise) under the Agricultural Model used for the Virginia Department of Conservation and Recreation's (DCR's) Virginia Natural Heritage Data Explorer.

With respect to the *Protection of Water Resources* policy area, Staff is of the opinion that the project will be subject to Virginia Department of Environmental Quality regulations and permitting, which will work to ensure protection of the County's water resources. It is important to note that there are areas along streams within the Project that rank low impact under the Watershed Impact Model used for the Virginia DCR's Virginia Natural Heritage Data Explorer.

With respect to applicable *Economy and Employment* goals, objectives, and strategies. Staff is of the opinion that the proposed development works to expand a diversified economy within the County and would constitute an environmentally friendly industrial use.

With respect to applicable *Land Use* goals, objectives, and strategies, while the area has adequate and necessary access and constitutes a more environmentally friendly industrial use, it is not inherently compatible with adjacent uses, which are almost entirely residential and agricultural. Setbacks and buffers/screening work to mitigate for this incompatibility.

With respect to applicable *Natural Resources* goals, objectives, and strategies, Staff is of the opinion that the proposed development does not negatively impact natural resources of the County, especially areas of critical environmental importance. Staff acknowledges that the project works to promote the preservation of existing trees by retaining existing vegetated areas along the periphery of the site and would suggest that additional reasonable conditions to support the long-term maintenance of these areas be considered as part of the review of the Conditional Use Permit. It is important to note that while some areas of the Project rank as Moderate for Forest Conservation Value on Virginia DCR's Virginia Natural Heritage Data Explorer, most forested areas rank as Moderate or Average. Further, areas of the Project rank as Low or

Moderate for Ecological Cores on Virginia DCR's Virginia Natural Heritage Data Explorer, with no areas ranking as High, Very High, or Outstanding.

Staff Conclusions and Recommendations

Staff has analyzed the applicable elements of the Comprehensive Plan referenced above. The project's proposed location, character, and extent appear to be consistent with the overall policies, goals, objectives, and strategies of the Comprehensive Plan (or reasonably expected with the imposition of conditions as part of the review of the Conditional Use Permit). <u>Based</u> upon this, Staff is of the opinion and recommends that the proposed Substation facility is substantially in accord with the Comprehensive Plan, or parts thereof. It is expected that details of the design will be further evaluated for suitability as part of the consideration of the Conditional Use Permit.

As noted at the beginning of this Report, the question before the Planning Commission with this 2232 review is whether the general location or approximate location, character, and extent of the proposed facility <u>is substantially in accord</u> with the Comprehensive Plan or part thereof. Staff suggests that the Planning Commission consider all relevant portions of the Comprehensive Plan in its analysis, and carefully and thoroughly document the reasons and basis for the action which the Commission takes. Options for Commission action are as follows:

- 1. By motion, determine that the application is substantially in accord with the Comprehensive Plan, with written reasons for the decision;
- 2. By motion, determine that the application is not substantially in accord with the Comprehensive Plan, with written reasons for the decision; or
- 3. By motion, defer action on the review at this time and continue for further discussion and consideration (within the 60-day window).

Planning Commission Actions

Option 1 - Applicant's proposal is substantially in accord with the Comprehensive Plan

I move that Dominion Virginia Energy's proposed Substation facility, as described in the conditional use permit application CUP-11-23, is substantially in accord with the Lunenburg County Comprehensive Plan, or parts thereof, for the following reasons:

- 1. The project will be subject to Virginia Department of Environmental Quality regulations and permitting, which will work to ensure protection of the County's water resources.
- 2. The proposed development works to expand a diversified economy within the County, and would constitute an environmentally friendly industrial use, primarily

due to the proposed scale of operation, generally sited in an area with adequate and necessary utility access.

- 3. The area of the proposed project has adequate and necessary utility access and the project constitutes a more environmentally friendly industrial use; while not inherently compatible with adjacent uses, which are almost entirely residential and agricultural, setbacks and buffers/screening will work to mitigate for this incompatibility and additional conditions can considered as part of the review of the Conditional Use Permit.
- 4. The proposed development does not negatively impact natural resources of the County, especially areas of critical environmental importance. Further, the project works to promote the preservation of existing trees by retaining existing vegetated areas along the periphery of the site.

The Secretary of the Planning Commission is directed to communicate the Planning Commission's findings to the Board of Supervisors.

Option 2 - Applicant's proposal is not substantially in accord with the Comprehensive Plan

I move that Dominion Virginia Energy's proposed Substation facility, as described in the conditional use permit application CUP-11-23, is not substantially in accord with the Lunenburg County Comprehensive Plan, or parts thereof, for the following reasons:

- 1. The proposed development does not work to expand a diversified economy within the County, and given the scale of the proposal, would not constitute an environmentally friendly industrial use; furthermore, utility and transportation access to support the development are inadequate.
- 2. The proposed project is not compatible with adjacent residential and agricultural uses; setbacks and buffers/screening are insufficient and cannot be improved in a manner that would improve the compatibility of the project with adjacent uses.
- 3. The proposed development negatively impacts the natural resources of the County, especially areas of critical environmental importance such as existing stands of trees and the isolated wetland to the east of the project site.

The Secretary of the Planning Commission is directed to communicate the Planning Commission's findings to the Board of Supervisors.

Option 3 – Deferral of the application

I move that the Planning Commission defer a decision on Dominion Virginian Energy's request under Va. Code § 15.2-2232 regarding its proposed Substation facility, as described in the conditional use permit application CUP-11-23, until the Planning Commission meeting scheduled to begin at _______p.m. on _______, in the meeting room.

Public Comments Received

Other Business

County Attorney Update

Next Meeting





The next meeting is scheduled for Thursday, May 2nd, 2024, at 7:00 p.m.

(Meeting time could change contingent on agenda items.)