

October 5, 2023

Ms. Sterling Seay  
Anne Arundel County  
Office of Planning and Zoning  
2664 Riva Road, 3<sup>rd</sup> Floor  
Annapolis, MD 21401

**RE: VENTNOR LOTS 32-34**  
**Variance Request Article 18, Section 4-501**  
8195 Orchard Point Road  
Pasadena, Maryland 21122  
Tax Account # 03-887-07075600  
**G.P.#G02019808**

Dear Ms. Seay:

On behalf of the owners Mr. Paul A. Cummings & Bennett M. Cummings, please find the enclosed Variance Application. The owners are requesting a zoning variance to **Article 18 Section 4-501 Bulk Regulations** to provide relief of 5.1-ft to the required 15-ft side property line setback to demolish a portion of the existing structure down to the foundation and construct a new single-family home and other associated improvements. There are no Critical Area variances being requested.

The subject property is located off the east side of Orchard Point Road in Pasadena, Maryland. The property is rectangular in shape, 0.72 acres, is a legal building site consisting of (3) strip lots (to be merged) and is currently improved with a single-family dwelling. The property is zoned R-1 and has a split Chesapeake Bay Critical Area land use designation of LDA & RCA. Approximately 19% of the existing dwellings footprint is within the 100' Buffer Modified Area. The existing dwelling is located 81.4 feet from the shoreline and the proposed improvements are being proposed at or behind the façade of the existing principal structure. The site is currently served with a private water well and septic system.

There are several hardships and practical difficulties regarding the redevelopment of the subject property. First, the site is substandard in total surface area at 31,525 sq. ft. or roughly 78% of the lot size required. Per **Article 18, Section 4-501 Bulk Regulations**, the minimum lot size is 40,000 sq. ft. Secondly, approximately 47% of the site is encumbered by the 100' Modified Critical Area Buffer which extends from the east and crosses over the existing footprint. The practical difficulty related to the redevelopment of the site is the existing house foundation is 9.9-feet from the side property line. This was the existing condition of the property when the applicant purchased the home. The foundation walls within that setback are slated to remain, the only improvements being proposed is the removal and increase in height of the perimeter walls within that area.

The proposed new home has been sited entirely overtop of the existing dwellings foundation along the northern property line to minimize the disturbance to the buffer modified area, remaining as much as possible within existing cleared area and avoiding the contiguous wooded area on the southern portion of the site.

The site currently has 1,381 s.f. (0.03 Ac.) of impervious coverage within the BMA. Under proposed conditions, the BMA lot coverage will be reduced overall by 496 square feet. The proposed improvements have been sited to stay entirely behind the existing dwellings façade, the new driveway, garage, stormwater management and the parking pad are located entirely outside the BMA and developed woodland clearing is minimized. Forest Conservation Easement area is proposed to preserve the remaining 72% of the sites developed woodland and to protect new mitigation plantings.

Under existing conditions, stormwater runoff from the site is not currently managed, sheet flows east across the property and ultimately drains to the tidal waters of Bodkin Creek. The proposed redevelopment addresses Environmental Site Design to the Maximum Extent Practicable via partial Disconnection of Rooftop, Non-Rooftop Runoff and a single Micro-Bioretenion Facility sited ten feet off the southern property line. Stormwater management computations and narrative are included on the Concept Plans with this variance submittal.

This variance request represents the minimum buffer disturbance necessary to construct the improvements and reduces lot coverage in the buffer modified area. A buffer management plan will be provided for on-site mitigation plantings in accordance with code requirements. The implementation of onsite stormwater management, sediment and erosion controls, mitigation plantings and a forest conservation easement will not adversely affect water quality, impact fish, wildlife or plant habitat and be in harmony with the critical area program. We believe that this request meets all the requirements for a Zoning Variance.

Code Article 18-16-305(a)

**Requirements for Zoning Variances.** Practical difficulties prevent conformance with the strict letter of this article due to the unique physical conditions and exceptional circumstances.

1. Substandard Lot Size – Due to the substandard lot size for an R1 zoned property development of this property is limited because of the required property line setbacks.
2. The granting of the variance is necessary to avoid practical difficulties or unnecessary hardship and to enable the applicant to redevelop the lot. The lot is a legal buildable lot in the R-1 zoning district. Denial of the variance would constitute an unnecessary hardship to deny the applicant's rights commonly enjoyed by other property owners.
3. Will not confer special privilege - granting this variance would not confer a special privilege to the applicants. Nearby properties enjoy improvements larger in scale much closer to the shoreline than what is proposed for this project. The applicant has made

extensive efforts to lay this proposed project out in a responsible manner that places the majority of the proposed improvements over top of existing lot coverage, places the proposed improvements no closer to the shoreline than the existing dwelling façade, and reduces the ultimate lot coverage in the BMA.

**(c) Requirements for all variances.**

1. Minimum necessary to afford relief - The proposed variances allow for modest uses that not only meets the “significant and reasonable standard” but also are the minimal necessary development to afford relief.
2. The granting of the variance will not:
  - i. alter the essential character of the neighborhood, and all proposed development will be harmonious with the architectural styles and scale of the surrounding area.
  - ii. substantially impair the appropriate use or development of adjacent properties.
  - iii. reduce forest cover in the LDA. Vegetative clearing is reduced to the minimum necessary to construct the proposed improvements and will be mitigated appropriately during the permit process with a buffer management plan.
  - iv. be contrary to acceptable clearing or replanting practices required for development of the Critical Area or Bog Protection Area. Clearing is minimal and only for what is necessary for construction and access, and the property is not located within a Bog Protection Area.
  - v. be detrimental to the public welfare as constructing a single-family dwelling and associated improvements on a residentially zoned property will not impose harm to adjacent property owners or the public.

Denial of the requested variance and a strict implementation of the County’s Zoning and Critical Area Program would constitute an unwarranted hardship on the applicant and deprive them of the same rights and privileges others enjoy in the neighborhood and deny reasonable and significant use of the entire property.

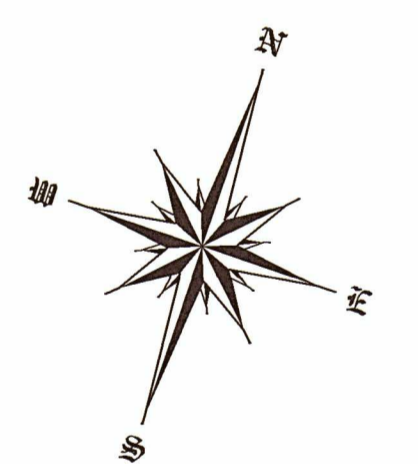
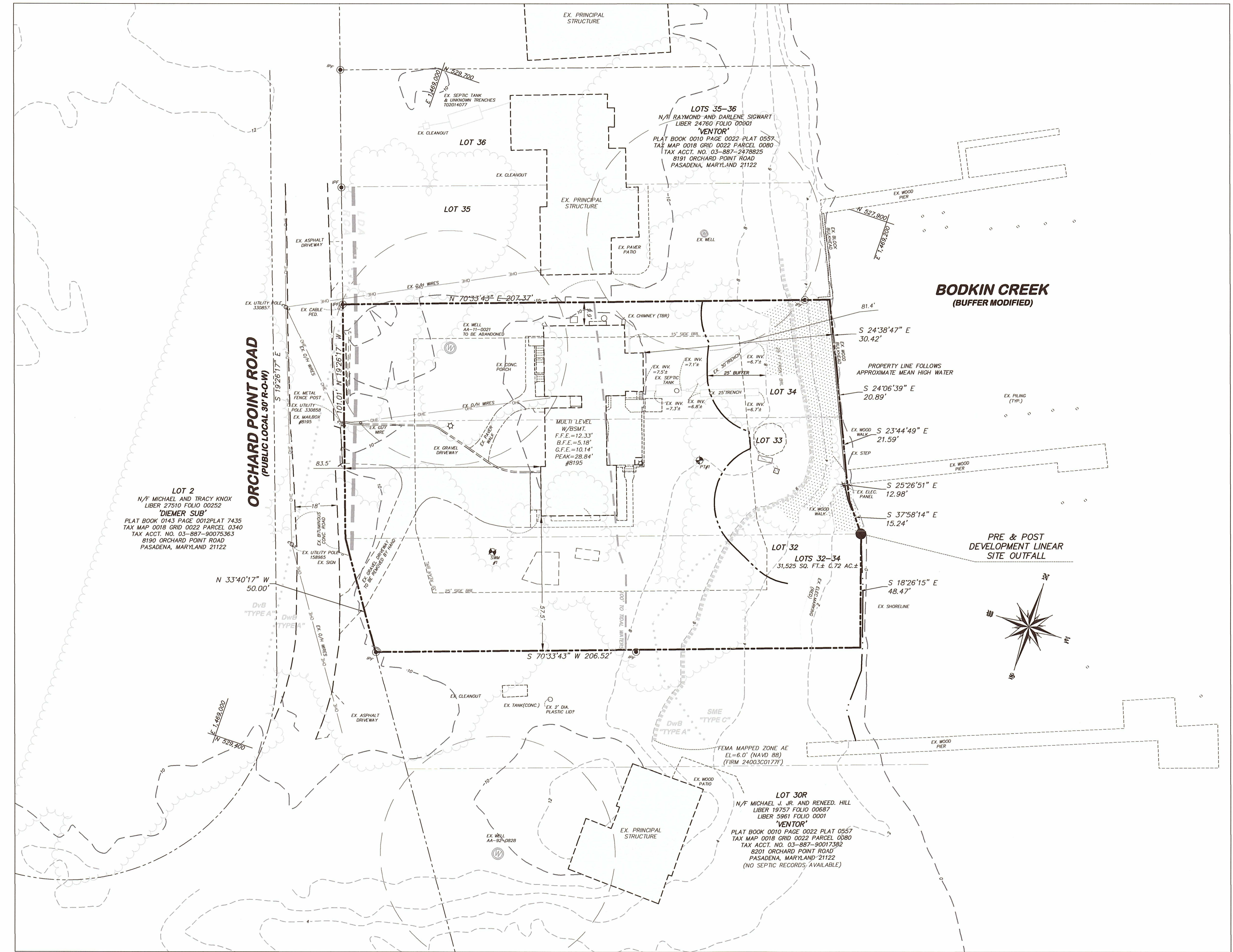
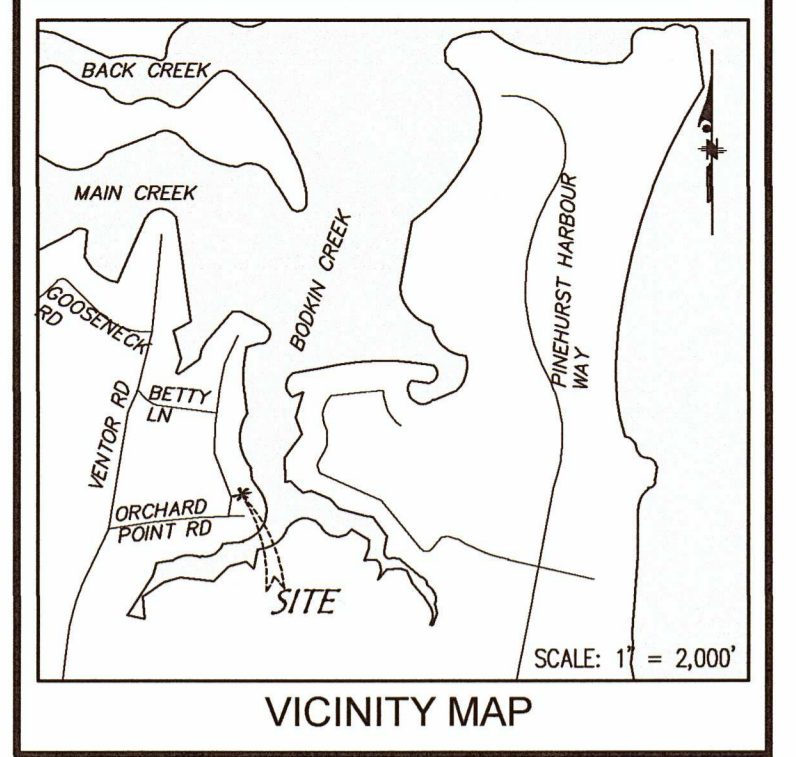
We appreciate your consideration of the enclosed variance request and we remain available to answer any questions you may have.

Sincerely,  
DRUM, LOYKA AND ASSOCIATES, LLC



Grant D. Mays  
Civil Engineering Technician

Cc: Paul Cummings



LEGEND	
	Existing Contour
	Existing Woods Line
	Existing fence Line
	Existing Power Pole
	Existing Overhead Electric Line
	Existing Septic System
	100' Tidal Water Line
	FEMA Floodline
	Existing Improvements
	Existing 15% Steep Slopes
	Existing 25' Steep Slope Buffer

**NATURE OF VARIANCE**  
-Requesting a zoning variance to Article 18, Section 4-501 Bulk Regulations of the Anne County Code of 5.1 feet to the required 15 foot side yard setback in an R-1 Zoning District.

DESIGNED: DRAWN: GDM  
ORIG. DATE: 4/20/2022  
MODIFIED BY/DATE:  
CADD DWG #: VC02822  
DLA PROJECT #: VC02822

REVISIONS TO APPROVED PLANS			
No.	DATE	BY	DESCRIPTION

**Drum, Loyka & Associates, LLC**  
CIVIL ENGINEERS - LAND SURVEYORS  
1410 Forest Drive, Suite 35  
Annapolis, Maryland 21403  
Phone: 410-280-3122 - Fax: 410-280-1952  
www.drumloyka.com | engineering@drumloyka.com

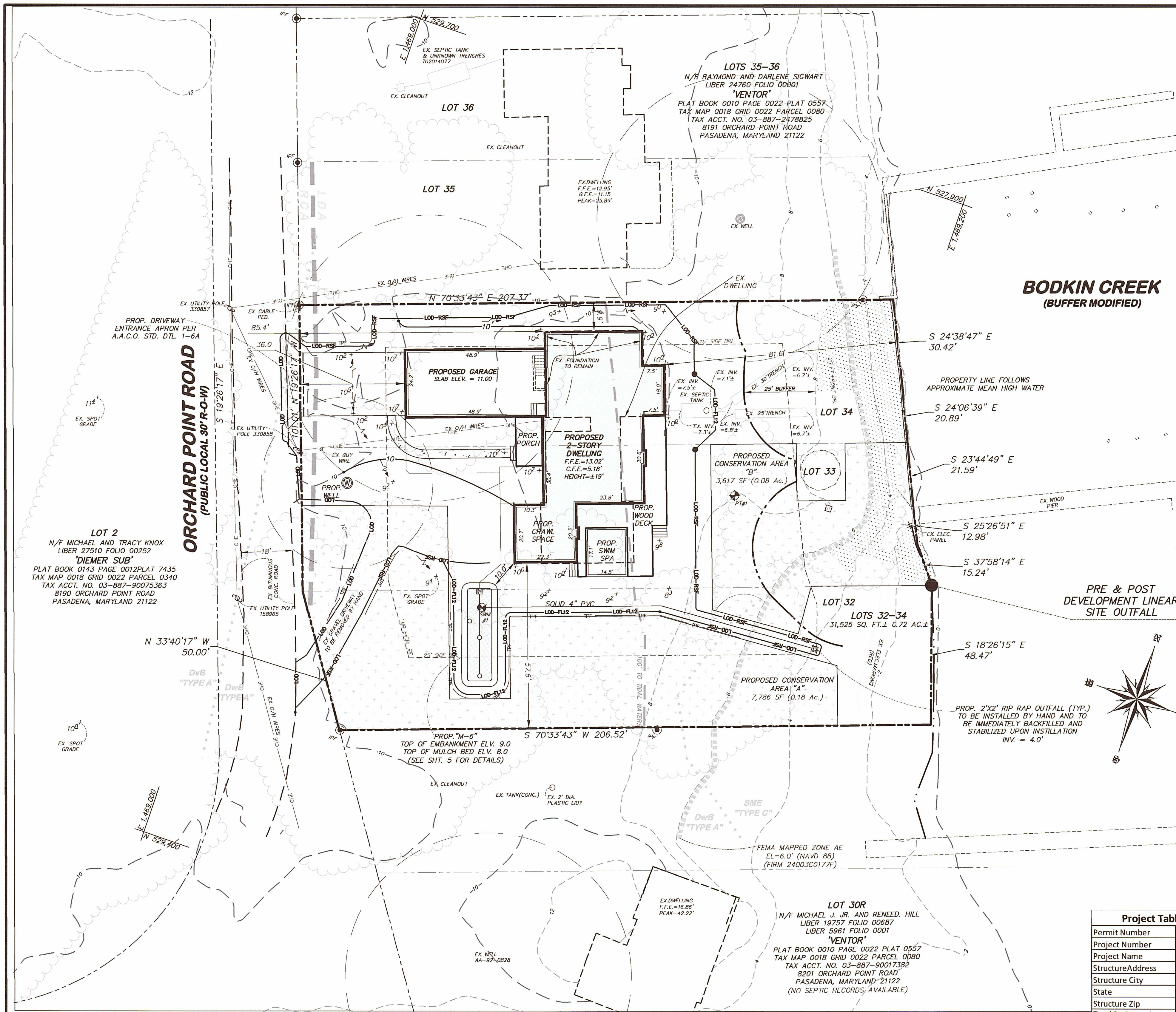
"Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed Professional Engineer under the laws of the State of Maryland, license no 18521, expiration date: 12-06-23"

**OWNER**  
PAUL A. CUMMINGS III & BENNETT M. CUMMINGS  
8195 ORCHARD POINT ROAD  
PASADENA, MARYLAND 21122

**EXISTING CONDITIONS & ENVIRONMENTAL FEATURES**  
**VENTOR~ORCHARD BEACH ~ LOTS 32-34**  
8195 ORCHARD POINT ROAD, PASADENA, MARYLAND 21122  
TAX ACCT. NO. 03-887-07075600 PERC. NO. T02050496 GP. NO. G02019808  
TAX MAP 18 GRID 22 PARCEL 80 DISTRICT 3RD  
ANNE ARUNDEL COUNTY, MARYLAND

SCALE: 1" = 20'    DATE: 10/5/2023    PROJ. NO: VC02822    SHEET 1 OF 2

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Drainage Area SITE						
DA Name	ESD Practice	Drainage Area	Total Storage	ESD Volume	Recharge Volume	P <sub>r</sub> Achieved
DA1	Micro-bioretentation	11207 sf	512 cf	512 cf	121 cf	1.44 in
DA2	RD1	410 sf	26 cf	26 cf	11 cf	0.80 in
DA3	RD2	519 sf	41 cf	41 cf	14 cf	1.00 in
DA4	RD3	578 sf	46 cf	46 cf	16 cf	1.00 in
DA5	Walk Disconnect	150 sf	12 cf	12 cf	4 cf	1.00 in
DA6	Drive Disconnect	805 sf	64 cf	64 cf	22 cf	1.00 in
Totals:		13669 sf	701 cf	701 cf	188 cf	1.91 in
Targets:				699 cf	125 cf	1.9 in

Target PE = 1.9 in      Achieved PE = 1.91 in  
 Target ESDv = 699 cf      Achieved ESDv = 701 cf  
 Target Rev = 125 cf      Achieved Rev = 188 cf

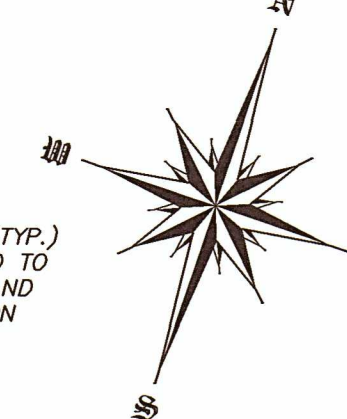
ESD Storage Provided is greater than the target volume. ESD has been applied to the MEP  
 An additional 0 cf of Peak Management storage has been provided.

SITE DATA	
Total Site Area	31,525 S.F.
Downer-Hammonton Urban Land Complex- Type 'A'	85.4%
Total Existing Lot Coverage	6,589 S.F.
Total Proposed Lot Coverage	5,476 S.F.
Percentage of Existing Lot Coverage to Total Lot Area	20.90%
Percentage of Proposed Lot Coverage to Total Lot Area	17.37%

**Outfall Statement**  
 ESD targets for development are based on the total site area of 31,525 square feet and the proposed impervious area of 5,476 square feet, subtracting 2,462 square feet of lot coverage being properly disconnected for a total net coverage of 3,014 square feet to be addressed. The target P<sub>e</sub> to be managed is 1.9 inches, generating a State required minimum ESD volume of 699 cubic feet.  
 The design provides 701 cubic feet of ESD volume via the proposed Micro-Bioretentation facility & Disconnect Credits. This is greater than the required 699 cf of ESD volume.  
 Channel Protection, Overbank Flood Protection, and Extreme Flood volumes are not required to be addressed as the site has direct tidal discharge to the shoreline of Bodkin Creek. See Stormwater Management Report for additional details and justification.

**FLOODPLAIN NOTES**  
 The property shown hereon lies in the FEMA Flood Zones AE (Base flood elevation 6.0) and X-Unshaded, as shown on the FEMA Flood Insurance Rate Maps, Community Panel Number FM24003C0177F bearing an effective date of 18 February 2015. Any flood zone lines shown hereon are depicted from the FEMA maps and are for interpretation only.

**STORMWATER MANAGEMENT REGULATION NOTE**  
 This grading permit #G02019808 was reviewed under the 2010 regulations for stormwater management. Stormwater management practices will be provided for this site in accordance with Article 16, Section 4 and the Final Plan on file with the Office of Planning and Zoning. ESD to the MEP was achieved through: Disconnect of Rooftop, Non-Rooftop runoff & (1) "M-6" Micro-Bioretentation facility.



LEGEND	
	Existing Contour
	Existing Woods Line
	Reinforced Silt Fence
	Limit of Disturbance
	Limit of Disturbance / Filter Log
	Tree Protection Fence
	Existing Power Pole
	Existing Overhead Electric Line
	Existing Septic System
	Proposed Contour
	100' Tidal Water Line
	FEMA Floodline
	Soil Boring Location
	Existing Dwelling
	Existing 15% Steep Slopes
	Existing 25' Steep Slope Buffer
	Proposed Forest Conservation Easment

Project Table for Each Drainage Area	
Permit Number	G02019808
Project Number	VC02822
Project Name	Ventnor Lots 32-34
Structure Address	8195 Orchard Point Road
Structure City	Pasadena
State	Maryland
Structure Zip	21122
Total Drainage Area (Acres)	0.72
RCN - Pre Construction	52
RCN - Post Construction	52
RCN - Woods	43
Total Number of BMPs	6
PE Required (see Note 1)	1.9
PE Addressed (see Note 2)	1.91
MD 8-Digit HUC (see Note 4)	2130902
USGS 12-Digit HUC	

For Each Practice in the Drainage Area		E, S, or A		New development (NEWD), Redevelopment (REDE), or Restoration (REST)		MDP Code		NEW		Maintenance Responsibility		
STORM_ID	STRU_NAME	MDE BMP CLASS	MDE BMP TYPE	CONSTRUCTION PURPOSE	ON or OFF SITE	LAND USE	DEVICE DRAINAGE AREA (sq.ft.)	IMPERVIOUS DRAINING TO DEVICE (sq.ft.)	IMPERVIOUS ACRES RESTORED (See Note 3)	MD NORTH COORD (NAD83 - FT)	MD EAST COORD (NAD83 - FT)	WQ <sub>v</sub> (cu-ft) (See Note 5)
	Disconnection of Non-Rooftop Runoff	E	NDNR	NEWD	On Site	AA11	150	150	N/A	529,560	1,469,061	12
	Disconnection of Non-Rooftop Runoff	E	NDNR	NEWD	On Site	AA11	805	805	N/A	529,572	1,469,030	64
	Micro-Bioretentation	E	MMBR	NEWD	On Site	AA11	11,207	4,160	N/A	529,503	1,469,089	958
	Disconnection of Rooftop Runoff	E	NDRR	NEWD	On Site	AA11	410	410	N/A	529,622	1,469,109	26
	Disconnection of Rooftop Runoff	E	NDRR	NEWD	On Site	AA11	519	519	N/A	529,611	1,469,076	41
	Disconnection of Rooftop Runoff	E	NDRR	NEWD	On Site	AA11	578	578	N/A	529,589	1,469,032	46

SITE TABULATIONS	
Total Site Area:	31,525 S.F.
Predominant soil type:	Downer-Hammonton Urban land complex (DwB)
Site Zoning:	R1
-R1 Setbacks:	Front=40'; Rear=35'; Sides=15' Combined Sides=40'
Critical Area Designation:	LDA & RCA
-LDA Site Area:	31,053 S.F.
-RCA Site Area:	472 S.F.
Critical Area Lot Coverage:	
-Existing Coverage:	6,589 S.F. (0.15 Ac.)
-Allowable Coverage (\$17-8-403):	6,475 S.F. (0.15 Ac.)
-Proposed Coverage:	5,476 S.F. (0.13 Ac.)
Existing Canopy On Site:	15,808 S.F. (0.36 Ac.)
-Proposed Canopy Disturbance:	4,189 S.F. (0.10 Ac.)
Total Disturbed Area:	14,539 S.F. (0.33 Ac.)
Earthwork:	
Cut:	150 CY
Fill:	100 CY
Spill:	50 CY

DESIGNED: DRAWN: GDM  
 ORIG. DATE: 4/20/2022  
 MODIFIED BY/DATE:  
 CADD DWG #: VC02822  
 DLA PROJECT #: VC02822  
 © Drum, Loyka & Associates, LLC  
 These drawings are the property of Drum, Loyka & Associates, LLC. Unauthorized reproduction for any purpose is not permitted and is an infringement upon copyright laws. Violators will be subject to prosecution to the fullest extent of the law.

REVISIONS TO APPROVED PLANS			
No.	DATE	BY	DESCRIPTION

**Drum, Loyka & Associates, LLC**  
 CIVIL ENGINEERS - LAND SURVEYORS  
 1410 Forest Drive, Suite 35  
 Annapolis, Maryland 21403  
 Phone: 410-280-3122 · Fax: 410-280-1952  
 www.drumlloyka.com | engineering@drumlloyka.com

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed Professional Engineer under the laws of the State of Maryland, license no 18521, expiration date: 12-06-23

OWNER  
**PAUL A. CUMMINGS III & BENNETT M. CUMMINGS**  
 8195 ORCHARD POINT ROAD  
 PASADENA, MARYLAND 21122

**DEVELOPED CONDITIONS VARIANCE SITE PLAN**  
**VENTNOR~ORCHARD BEACH ~ LOTS 32-34**  
 8195 ORCHARD POINT ROAD, PASADENA, MARYLAND 21122  
 TAX ACCT. NO. 03-887-07075600 PERC. NO. T02050496 GP. NO. G02019808  
 TAX MAP 18 GRID 22 PARCEL 80 DISTRICT 3RD  
 ANNE ARUNDEL COUNTY, MARYLAND

SCALE: 1" = 20'      DATE: 10/5/2023      PROJ. NO: VC02822      SHEET 2 OF 2

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CRITICAL AREA COMMISSION  
 FOR THE CHESAPEAKE AND ATLANTIC COASTAL BAYS  
 1804 WEST STREET, SUITE 100  
 ANNAPOLIS, MD 21401

PROJECT NOTIFICATION APPLICATION

**GENERAL PROJECT INFORMATION**

Jurisdiction: Anne Arundel County

Date October, 4<sup>th</sup> 2023

Tax Map #	Parcel #	Block #	Lot #	Section
18	22		32-34	

**FOR RESUBMITTAL ONLY**

- Corrections
- Redesign
- No Change
- Non-Critical Area

\* Complete only Page 1  
 General Project Information

Tax ID 03-887-07075600

Project Name (site name, subdivision name, or other) Ventnor ~ Lots 32-34

Project location/Address 8195 Orchard Point Road

City Pasadena, Maryland Zip 21122

Local case number

Applicant: Last name Cummings First name Paul A. & Bennett M.

Company n/a

**Application Type (check all that apply):**

Building Permit		Variance	X
Buffer Management Plan		Rezoning	
Conditional Use		Site Plan	
Consistency Report		Special Exception	
Disturbance > 5,000 sq ft	X	Subdivision	
Grading Permit	X	Other	

**Local Jurisdiction Contact Information:**

Last name: \_\_\_\_\_ First name \_\_\_\_\_

Phone # \_\_\_\_\_ Response from Commission Required By \_\_\_\_\_

Fax # \_\_\_\_\_ Hearing date \_\_\_\_\_

**SPECIFIC PROJECT INFORMATION**

Describe Proposed use of project site:

To raze existing single-family dwelling and reconstruct a single-family dwelling and associated improvements.

	Yes		Yes
Intra-Family Transfer		Growth Allocation	
Grandfathered Lot	X	Buffer Exemption Area	X

**Project Type (check all that apply)**

Commercial Consistency Report Industrial Institutional Mixed Use Other _____	Recreational Redevelopment <span style="float: right;">X</span> Residential <span style="float: right;">X</span> Shore Erosion Control Water-Dependent Facility
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**SITE INVENTORY (Enter acres or square feet)**

	Acres	Sq Ft		Acres	Sq Ft
			Total Disturbed Area	0.33	14,539
IDA Area	0.00	0			
LDA Area	0.32	13,990	# of Lots Created	n/a	
RCA Area	0.01	549			
Total Disturbed Area	0.33	14,539			

	Acres	Sq Ft		Acres	Sq Ft
Existing Forest/Woodland/Trees	0.36	15,808	Existing Lot Coverage	0.15	6,589
Created Forest/Woodland/Trees	0.11	4,625	New Lot Coverage		
Removed Forest/Woodland/Trees	0.10	4,189	Removed Lot Coverage	0.02	1,383
			Total Lot Coverage	0.13	5,476

**VARIANCE INFORMATION (Check all that apply)**

	Acres	Sq Ft		Acres	Sq Ft
Buffer Disturbance	0.07	3,058	Buffer Forest Clearing	0.00	0
Non-Buffer Disturbance	0.26	11,481	Mitigation	0.11	4,625

Variance Type

Buffer  
 Forest Clearing  
 HPA Impact  
 Impervious Surface  
 Expanded Buffer  
 Nontidal Wetlands  
 Steep Slopes  
 Setback X  
 Other \_\_\_\_\_

Structure

Acc. Structure Addition  
 Barn  
 Deck  
 Dwelling X  
 Dwelling Addition  
 Garage  
 Gazebo  
 Patio  
 Pool  
 Shed  
 Other \_\_\_\_\_

# Chesapeake Bay Critical Area Report

Ventnor ~ Lots 32-34

Tax Map 18, Grid 22, Parcel 80

Tax Account No. 03-887-07075600

**Property Address:** 8195 Orchard Point Road  
Pasadena, Maryland 21122

**Property Owner & Variance Applicant:** Mr. Paul Cummings

**Critical Area Designation:** LDA & RCA      **Zoning:** R-1      **Lot Area:** 0.72 Ac.

## Site Description

The subject property is located off the east side of Orchard Point Road in Pasadena, Maryland. The property is rectangular in shape, 0.72 acres, is a legal building site consisting of (3) strip lots (to be merged) and is currently improved with a single-family dwelling. The property is zoned R-1 and has a split Chesapeake Bay Critical Area land use designation of LDA & RCA. Approximately 19% of the existing dwellings footprint is within the 100' Buffer Modified Area. The existing dwelling is located 81.4 feet from the shoreline and the proposed improvements are being proposed at or behind the façade of the existing principal structure. The site is currently served with a private water well and septic system.

## Description and Purpose of Variance Request

The owners are requesting a zoning variance to **Article 18 Section 4-501** Bulk Regulations to provide relief of 5.1-ft to the required 15-ft side property line setback to demolish a portion of the existing structure down to the foundation and construct a new single-family home and other associated improvements. There are no Critical Area variances being requested.

The homeowners propose to construct a new single-family dwelling, porch, attached garage, side entry deck, walk, and associated improvements. There are several hardships and practical difficulties regarding the redevelopment of the subject property. First, the site is substandard in total surface area at 31,525 sq. ft. or roughly 78% of the lot size required. Per Article 18, Section 4-501 Bulk Regulations, the minimum lot size is 40,000 sq. ft. Secondly, approximately 47% of the site is encumbered by the 100' Modified Critical Area Buffer which extends from the east and crosses over the existing footprint. Lastly, the practical difficulty related to the redevelopment of the site is the existing house foundation is 9.9-feet from the northern side property line. This was the existing condition of the property when the applicant purchased the home. The foundation walls within that setback are slated to remain, the only improvements being proposed is the removal and increase in height of the perimeter walls within that area.

A pre-filing review was not required for this project at the direction of Ms. Sterling Seay as this is a setback variance for which a grading permit had previously been applied for and reviewed by the County's engineering department. A copy of the associated email is included with this submittal.



### **Vegetative Coverage and Clearing**

The subject property is stabilized with various native evergreen & hardwood trees. In addition to the native species there are a handful of ornamental shrubs and trees along with a large portion of dense grass. The undeveloped southern portion of the site is entirely encumbered with existing woodlands, majority of the species in this area are native. This property is vegetatively stabilized with developed woodland, in a variety of stages of life allowing for succession to take place. Preservation of the existing woods on site is of utmost importance preserving various sources of habitat for the native flora and fauna. The existing on-site wooded area totals roughly 15,808 s.f. (0.36 Ac.). Removal of vegetation has been minimized to only that is necessary to construct the proposed improvements, the dwelling has been sited to minimize woodland clearing and disturbance to the BMA. Removal of vegetation onsite for the proposed redevelopment is approximately 4,189 s.f. (0.10 Ac.). While there is disturbance to the existing canopy on site it has been minimized to the maximum extent practical. Additionally, through the redevelopment process mitigation plantings are being proposed in the amount of 4,625 s.f., which is 436 s.f. more than what is required. Forest Conservation Easement area is proposed to preserve the remaining 72% of the sites developed woodland and to protect new mitigation plantings.

### **Lot Coverage**

The site currently has 6,589 s.f. (0.15 Ac.) of impervious coverage, of which 1,381 s.f. (0.03 Ac.) is within the Buffered Modified Area. The proposed impervious area for this property is 5,476 s.f. (0.13 Ac.), this represents a decrease of 1,113 s.f. from the existing impervious with a reduction of 496 s.f. of lot coverage within the BMA. Additionally, the proposed lot coverage amount is well below the allowable 6,475 (0.15) s.f. of lot coverage for this site.

### **Lot Size**

Per **Article 18, Section 4-501**, the minimum lot size for an R1 zoned lot is 40,000 square feet. The subject property is only 31,525 square feet, roughly 78% of the lot size required. The existing dwelling is located 9.9' feet off the northern property line, the proposed re-development will encroach no further into the side yard setback than what already exists. The foundation walls within that area are slated to remain, the only improvements being proposed is to increase the height of the walls within that area. The proposed improvements have been sited to stay at or behind the existing dwellings façade, the new driveway, garage, stormwater management and the parking pad are located entirely outside the BMA and developed woodland clearing is minimized.

### **Predominant Soils**

The predominant soil type is Downer-Hammonton Urban Land complex, 0 to 5 percent slopes (DwB). This soil has a type "A" hydrologic classification and is not a hydric soil.

### **Drainage and Rainwater Control**

Runoff from the site sheet flows across the site and ultimately drains to the tidal waters of Bodkin Creek. The proposed redevelopment addresses stormwater management environmental site design to the maximum extent practicable via “N-1” rooftop disconnect credits, “N-2” non-rooftop disconnect credits and (1) “M-6” Micro-Bioretenion facility sited ten feet off the southern property line.

Stormwater management and sediment and erosion control will be further addressed during the permitting phase of the project in order to meet Anne Arundel County design criteria.

### **Conclusions – Variance Standards**

The applicant proposes to construct a new single-family dwelling, porch, reconfigured drive, waterside yard deck, walk, and associated improvements. The need for the requested Zoning Variance arises from the existing unique nature and constraints of this property, specifically the location of the existing structure to the northern property line, the proximity to the 100’ buffer modified area, substandard lot size for R1 zoning, presence of developed woodlands on the southern portion of the property and the irregular shape of the lot. It is not possible to complete this project without disturbance to the BMA or existing woodlands on site. The proposed improvements are consistent in size and nature with other homes in the area and therefore will not alter the essential character of the neighborhood, impair development of adjacent properties, or be detrimental to the public welfare. To deny the requested variance would deprive the applicant of rights commonly enjoyed by other properties in the immediate area. With the implementation of mitigation, and sediment and erosion control practices, to be addressed during permitting, the proposed development will not cause adverse impacts to fish, wildlife, or water quality in the Critical Area.

### **Reference:**

ADC: The Map People, 2002 Anne Arundel County, Maryland, Street Map Book

Anne Arundel County Office of Planning & Zoning , 2007 Critical Area Map

Anne Arundel County Office of Planning & Zoning, 2007 Buffer Exemption Map

Anne Arundel County, Maryland; Chesapeake Bay Critical Area Mapping Program, 2007, Critical Area Map

Federal Emergency Management Agency , 2016. Flood Insurance Rate Map

First American Real Estate Solutions, 2002, Realty Atlas: Anne Arundel County Maryland

Drum, Loyka and Associates LLC, 2023 Variance Plan

U.S. Department of Agriculture, Natural Resource Conservation Service –2016 Soil Survey of Anne Arundel County Maryland.

State Highway Administration of Maryland, 1989. Generalized Comprehensive Zoning Map: Third Assessment District

**From:** Sterling Seay <pzseay16@aacounty.org>  
**Sent:** Tuesday, October 3, 2023 9:53 AM  
**To:** Robert Baxter <rbaxter@drumloyka.com>  
**Cc:** Darren Quillen <pzquil22@aacounty.org>; Grant Mays <gmays@drumloyka.com>; Sara Anzelmo <pzanze99@aacounty.org>  
**Subject:** Re: G02019808 Ventnor

Bob,

Since this is a setback variance and Darren has reviewed the grading permit. a pre-file will not be required.

Sterling

On Tue, Oct 3, 2023 at 9:00 AM Robert Baxter <[rbaxter@drumloyka.com](mailto:rbaxter@drumloyka.com)> wrote:

Sterling and Co.,

Do we need to have a **Pre-File** for a Zoning Variance? The above referenced project based on my consult with Sterling and Darren, needs a zoning variance of 5.1' to the side setback.

Utilizing the existing foundation. No CA variances needed.

Thanks!

Bobby

**Robert E. Baxter, Jr.**

Drum, Loyka, & Associates, LLC

1410 Forest Drive, Suite 35

Annapolis, MD 21403  
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STEUART PITTMAN, COUNTY EXECUTIVE  
JESSICA LEYS, DIRECTOR  
RECREATION AND PARKS  
1 HARRY S. TRUMAN PKWY  
ANNAPOLIS, MD 21401  
AACOUNTY.ORG/RECPARKS



## MEMORANDUM

TO: Sadé Medina, Zoning Division  
Office of Planning and Zoning

FROM: Pat Slayton  
Capital Projects Division

SUBJECT: Variance Case 2023-0180-V

DATE: October 16, 2023

---

The Department of Recreation and Parks has reviewed the above plans to determine if there may be impacts to the Anne Arundel County Green Infrastructure Network, parks, and trails. Please note our recommendations according to those findings below.

- This site is contiguous to an Anne Arundel County Green Infrastructure Network in the Bodkin Creek watershed.

The Department of Recreation and Parks has no further comments.

cc: File



1410 Forest Drive, Suite 35  
Annapolis MD 21403  
Phone: 410-280-3122  
Fax: 410-280-1952

## Ventnor ~ Lot 32

# Stormwater Management Narrative & Computations

Tax Map: 18, Grid 22, Parcel 80

Prepared for: Mr. Paul Cummings

Date: August, 2023

Grading Permit Number G02019808



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## **I. Introduction**

The subject site is located at 8195 Orchard Point Road in Pasadena, Maryland. The property is rectangular in shape and is approximately 0.72 acres. The zoning designation for the property is R1. The property was purchased by the current property owner in 2021. The property is located on the east side of Orchard Point Road. The subject property is located entirely within the critical area with LDA & RCA designations. The subject property is occupied by an existing dwelling and associated improvements on the site. The property is currently served by private water and private septic. The majority of the onsite tree canopy is along the eastern and southern portions of the property. Disturbance to the onsite canopy has been minimized to the maximum extent practical.

## II. Existing Conditions

First, resource mapping of the site was completed.

(a) **Primary Environmental Features identified on-site:**

- (i) **Streams** – No streams located on the subject property.
- (ii) **Stream Buffers** – There are no stream buffers on site.
- (iii) **Wetlands & Wetland Buffers** - There are no wetlands or wetland buffers present on site.
- (iv) **Floodplain** – The subject property is affected by a floodplain. The site is within Zone AE Elv. 6.0, as established by the Federal Emergency Management Agency (FEMA) and shown on FEMA FIRM Map Panel 24003C0177F.
- (v) **Steep Slopes** - There are steep slopes on site & their associated buffers on site.

(b) **Secondary Environmental Features identified on-site:**

- (i) **Critical Area** - The subject property is located within the Chesapeake Bay Critical Area, with LDA & RCA designations.
- (ii) **Soils** - The subject property is comprised of:
  - Downer-Hammonton Urban Land Complex, 0 to 5% slopes (DvB) Type A Soils,
  - Downer-Hammonton Urban Land Complex, 2 to 5% slopes (DwB) Type A Soils
  - & Sassafras and Croom Soils, 15 to 25% slopes (SME) Type C Soils.
- (iii) **Forests** – The subject property has approximately 15,808 square feet of developed woodland located on site
- (iv) **Cultural Resources** – The subject property does not have any cultural resources.
- (v) **Miscellaneous** – No miscellaneous topographic features are known to exist on-site.



### **III. Proposed Condition**

The goal of the design is to provide SWM to meet the requirements. A single-family dwelling and associated improvements will be the main development on site. There are miscellaneous impervious areas associated with the main proposed improvements, including a covered porch and walkway. The existing woods on the site will be minimally disturbed. Runoff from the proposed dwelling will be treated via a Micro-Bioretenention system. The remaining ESDv requirements will be addressed through the use of both rooftop and non-rooftop disconnection credits, soil amendments are not required as the site has sandy soil suitable for infiltration to a depth of 3' as shown on the boring log and perc results.

Sediment and Erosion control is accomplished through perimeter controls, specifically reinforced silt fence and a stabilized construction entrance. The limits of disturbance are the minimum necessary to construct the improvements. The perimeter controls are adequate to treat the sheet flow within the limits of disturbance area. Temporary stabilizing measures will be utilized during construction to aid the perimeter controls. At the end of the project, permanent stabilizing measures shall be installed.

#### **IV. SWM Concept**

The overall concept for stormwater management and Environmental Site Design is to minimize or eliminate the impact of the development on the existing environmental equilibrium.

The design concept for the property is to minimize the disturbance to the property, and to manage runoff generated by the development at or near the source. This will maintain, to the extent practical, the existing drainage patterns of the site.

The design accomplishes this goal in several ways. The design includes qualitative stormwater management to mitigate for the development of the site.

Managing the ESD target PE and storage volume begins by examining the options available to the design, starting with non-structural practices, and then graduating to micro-scale practices.

Alternative surfaces are impractical for the site. The high-water table does not support Infiltration.

Sheetflow to the proposed micro-bioretenion facility will be utilized where the proposed grades allow.

A Micro-Bioretenion was identified as a viable practice to treat roughly half of roof area of the proposed dwelling and a portion of the associated improvements.

Rooftop and Non-Rooftop disconnect credits will be utilized where applicable.

The list of acceptable practices, and why they were or were not utilized for this project:

##### **A. Alternative surfaces:**

1. Green Roofs were not included as part of the architectural design.
2. Pervious pavements shall not be utilized for the proposed development. There is no practical use for it on this project.
3. Reinforced turf will not be utilized. There is no practical use for it on this project.

**B. Non-Structural Practices:**

1. The Disconnection of Rooftop Runoff will be utilized for this project. Soil amendments will not be required as native soil supports infiltration.
2. The Disconnection of Non-Rooftop Runoff will be utilized for this project. Soil amendments will not be required as native soils to support infiltration.
3. Sheetflow to Conservation Areas shall not be utilized for this project. There is no existing conservation area.

**C. Micro-Scale Practices:**

1. Rainwater Harvesting shall not be utilized. It is not considered for the project.
2. A submerged gravel wetland was not considered for this project.
3. Landscape infiltration will not be utilized, as other practices will provide ESDv needed.
4. Infiltration berms will not be utilized, as other practices will provide ESDv needed.
5. Drywells will not be utilized. The native high-water table does not support infiltration.
6. Micro-Bioretenion will be utilized as a primary treatment for this project.
7. Rain Gardens and Rain Swales will not be considered for this project.
8. An enhanced filter is not utilized. It is not considered for the project.

In conclusion, it is our opinion that the proposed design represents the best solution to achieve ESD on the subject property. The development minimizes disturbance and maintains existing topography. Runoff from the majority of the development is captured and stored, discharging at a non-erosive velocity in large storm events. Qualitative stormwater management is provided where previously none existed, providing treatment of runoff at the source, maintaining the amount of runoff to the site outfall.

We feel that the proposed design minimizes the development footprint, maximizes groundwater recharge, and captures and treats stormwater runoff to remove non-point pollution.

#### **IV. Environmental Site Design (ESD<sub>v</sub>)**

Environmental Site Design requirements for the proposed development were computed in accordance with Article 16, Title 4 of the Anne Arundel County Code, COMAR 26.17.02, and the Maryland Stormwater Design Manual, Volumes I & II.

The disturbed area is 14,539 square feet, and soils in the development area have type “A” & “C” hydrologic classifications; the Target RCN for “woods in good condition” is 43. ESD targets for development are based on the total site area of 31,525 square feet and the proposed impervious area of 5,476 square feet, subtracting 2,462 square feet of lot coverage being properly disconnected for a total net coverage of 3,014 square feet to be addressed. The proposed imperviousness is 9.56%. Utilizing Table 5.3 from the State Manual, a target rainfall depth ( $P_E$ ) of 1.9” and a target runoff depth ( $Q_E$ ) of 0.27” were determined. From these initial computations, a minimum Environmental Site Design Volume (ESD<sub>v</sub>) of 699 c.f. of runoff would need to be managed, of which 125 c.f. would need to be Recharge Volume (Rev).

ESD is achieved through the use of a micro-bioretenention facility combined with rooftop & non-rooftop disconnect credits. The ESD<sub>v</sub> provided is 701 c.f. The ESD volume is greater than the target; therefore, ESD is achieved to the MEP. The proposed development mimics “woods in good condition” and satisfies channel protection obligations through the Reduced Runoff Curve Number Method.

### Environmental Site Design Worksheet

ESD computations:      Drainage Area      SITE

**Step 1: Determine ESD Implementation Goals**

**A. Drainage Area Data:**

Drainage Area	=	31,525 sf	±	0.724 Ac.	
*Total Hard Surfaces in DA	=	3,014 sf	±	0.069 Ac.	or 9.56 % of DA

\* Subtracted adequate rooftop & non-rooftop disconnect areas

Soil Breakdown, Drainage Area      SITE      & Target RCN for "Woods in good condition"

HSG 'A'	=	26,913 sf	or	0.618 Ac.	or	85.37 % of DA	RCN:	38
HSG 'B'	=	0 sf	or	0.000 Ac.	or	0.00 % of DA	RCN:	55
HSG 'C'	=	4,612 sf	or	0.106 Ac.	or	14.63 % of DA	RCN:	70
HSG 'D'	=	0 sf	or	0.000 Ac.	or	0.00 % of DA	RCN:	77

\*For RCNs less than 30, use RCN = 38

Composite RCN for "woods in good condition"

$$RCN_{woods} = [ (38 \times 0.618 \text{ ac}) + (55 \times 0.000 \text{ ac}) + (70 \times 0.106 \text{ ac}) + (77 \times 0.000 \text{ ac}) ] / 0.724$$

$$RCN_{woods} = \boxed{43}$$

**B. Determine Target P<sub>E</sub> Using Table 5.3**

P<sub>E</sub> = Rainfall used to size ESD practices

Proposed Imperviousness (%), for the Drainage Area (SITE)

$$I = \boxed{9.56 \%} \text{ from table above}$$

See Table 5.3 on the following two pages.

- Determine P<sub>E</sub> from Table

Hydrologic Soil Group 'A'										
% I	RCN*	P <sub>E</sub>								
		1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6
0%	40									
5%	43									
10%	46									
15%	48	38								
20%	51	40	38	38						
25%	54	41	40	39						
30%	57	42	41	39	38					
35%	60	44	42	40	39					
40%	61	44	42	40	39					
45%	66	48	46	41	40					
50%	69	51	48	42	41	38				
55%	72	54	50	42	41	39				
60%	74	57	52	44	42	40	38			
65%	77	61	55	47	44	42	40			
70%	80	66	61	55	50	45	40			
75%	84	71	67	62	56	48	40	38		
80%	86	73	70	65	60	52	44	40		
85%	89	77	74	70	65	58	49	42	38	
90%	92	81	78	74	70	65	58	48	42	38
95%	95	85	82	78	75	70	65	57	50	39
100%	98	89	86	83	80	76	72	66	59	40

Use P<sub>E</sub> =  inches of rainfall as the target for ESD implementation.

Hydrologic Soil Group 'B'										
% I	RCN*	P <sub>E</sub>								
		1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6
0%	61									
5%	63									
10%	65									
15%	67	55								
20%	68	60	55	55						
25%	70	64	61	58						
30%	72	65	62	59	55					
35%	74	66	63	60	56					
40%	75	66	63	60	56					
45%	78	68	66	62	58					
50%	80	70	67	64	60					
55%	81	71	68	65	61	55				
60%	83	73	70	67	63	58				
65%	85	75	72	69	65	60	55			
70%	87	77	74	71	67	62	57			
75%	89	79	76	73	69	65	59			
80%	91	81	78	75	71	66	61			
85%	92	82	79	76	72	67	62	55		
90%	94	84	81	78	74	70	65	59	55	
95%	96	87	84	81	77	73	69	63	57	
100%	98	89	86	83	80	76	72	66	59	55

Use P<sub>E</sub> =  inches of rainfall as the target for ESD implementation.

Hydrologic Soil Group 'C'										
% I	RCN*	P <sub>E</sub>								
		1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6
0%	74									
5%	75									
10%	76									
15%	78									
20%	79	70								
25%	80	72	70	70						
30%	81	73	72	71						
35%	82	74	73	72	70					
40%	84	77	75	73	71					
45%	85	78	76	74	71					
50%	86	78	76	74	71					
55%	86	78	76	74	71	70				
60%	88	80	78	76	73	71				
65%	90	82	80	77	75	72				
70%	91	82	80	78	75	72				
75%	92	83	81	79	75	72				
80%	93	84	82	79	76	72				
85%	94	85	82	79	76	72				
90%	95	86	83	80	77	73	70			
95%	97	88	85	82	79	75	71			
100%	98	89	86	83	80	76	72	70		

Use P<sub>E</sub> =  inches of rainfall as the target for ESD implementation.

Hydrologic Soil Group 'D'										
% I	RCN*	P <sub>E</sub>								
		1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6
0%	80									
5%	81									
10%	82									
15%	83									
20%	84	77								
25%	85	78								
30%	85	78	77	77						
35%	86	79	78	78						
40%	87	82	81	79	77					
45%	88	82	81	79	78					
50%	89	83	82	80	78					
55%	90	84	82	80	78					
60%	91	85	83	81	78					
65%	92	85	83	81	78					
70%	93	86	84	81	78					
75%	94	86	84	81	78					
80%	94	86	84	82	79					
85%	95	86	84	82	79					
90%	96	87	84	82	79	77				
95%	97	88	85	82	80	78				
100%	98	89	86	83	80	78	77			

Use P<sub>E</sub> =  inches of rainfall as the target for ESD implementation.

Compute Composite PE:

HSG	Area (Ac)	Target PE	Net PE
A	0.618	1.0	$0.618 \text{ ac} \times 1.0 / 0.724 \text{ ac} = 0.85$
B	0.000	0.0	$0.000 \text{ ac} \times 0.0 / 0.724 \text{ ac} = 0.00$
C	0.106	1.0	$0.106 \text{ ac} \times 1.0 / 0.724 \text{ ac} = 1.00$
D	0.000	0.0	$0.000 \text{ ac} \times 0.0 / 0.724 \text{ ac} = 0.00$
			Composite PE = 1.85

PE = 1.9 inches

**C. Compute Q<sub>E</sub>:**

Q<sub>E</sub> = Runoff depth used to size ESD practices

Q<sub>E</sub> = P<sub>E</sub> x R<sub>v</sub>, where:

P<sub>E</sub> = 1.9 inches, (Composite P<sub>E</sub>, above)

R<sub>v</sub> = 0.05 + (0.009)(I); I = 9.56 (from above)

= 0.05 + (0.009)(9.56):

R<sub>v</sub> = 0.14

Q<sub>E</sub> = 1.9 x 0.14

Q<sub>E</sub> = 0.27 inches

**ESD Targets for the Project**

P<sub>E</sub> = 1.9 inches

Q<sub>E</sub> = 0.27 inches



**D. Compute Minimum ESDv & Rev for Drainage Area: ( SITE )**

Required Environmental Site Design Volume (ESDv) for DA: ( SITE )

$$\begin{aligned} \text{ESDv} &= [(P_E) \times (R_v) \times (\text{AREA})] / 12 \\ P_E &= 1.9 \text{ inches} \\ R_v &= 0.14 \\ \text{Area} &= 31,525 \text{ square feet} \\ \text{ESDv} &= [(1.9 \text{ in.}) \times (0.14) \times (31,525 \text{ sf})] / 12 \\ \text{ESDv} &= 699 \text{ cf} \end{aligned}$$

Required Recharge Volume (Rev) for DA: ( SITE )

$$\text{Rev} = [(S) \times (R_v) \times (\text{AREA})] / 12$$

Where 'S' = the soil specific recharge factor. A Composite 'S' is calculated based on the soil breakdown for the Drainage Area.

HSG	Area	Re Factor	Net 'S'
A	0.618	0.38	0.618 ac x 0.38 / 0.724 ac = <b>0.32</b>
B	0.000	0.26	0.000 ac x 0.26 / 0.724 ac = <b>0.00</b>
C	0.106	0.13	0.106 ac x 0.13 / 0.724 ac = <b>0.02</b>
D	0.000	0.07	0.000 ac x 0.07 / 0.724 ac = <b>0.00</b>
			Composite 'S' = <b>0.34</b>

$$\begin{aligned} \text{Rev} &= [(S) \times (R_v) \times (\text{AREA})] / 12 \\ S &= 0.34 \\ R_v &= 0.14 \\ \text{Area} &= 31,525 \text{ square feet} \\ \text{Rev} &= [(0.3) \times (0.14) \times (31,525 \text{ sf})] / 12 \\ \text{Rev} &= 125 \text{ cf} \\ \text{ESDv} &= 699 \text{ cf} \\ \text{Rev} &= 125 \text{ cf} \end{aligned}$$

By using ESD practices that meet these targets, ESDv, Rev, and CPv requirements will be met.

**E. Compute PE Value & ESDv for Drainage Area: ( SITE )**

See ESD practices on the following pages

DA1

ESD Practice M-6 Micro-bioretentation

Drainage Area to Micro-bioretentation = 11,207 sf

Impervious Surfaces in Drainage Area = 4,160 sf      %I = 37.12%

ESDv constraints for sizing of device:

Target ESDv = [(Pe) x (Rv) x (Area)] / 12

Pe = 15 x (Af / DA)

Af = Surface Area of device  
\*minimum 2% of DA, or 224 sf\*

Af = 273 sf

Pe = 15 x (273 / 11,207)

Pe = 0.37 in.

Rv = 0.05 + (0.009 x %I)

= 0.05 + (0.009 x 37.12)

Rv = 0.38

Area = 11,207 sf

Target ESDv = [(0.37) x (0.38) x (11,207)] / 12

Target ESDv = 131 cf

Rev = [(S) x (Rv) x (Area)] / 12

S = 0.34 composite 'S' for DA

Rv = 0.05 + (0.009 x %I)

= 0.05 + (0.009 x 37.12)

Rv = 0.38

Area = 11,207 sf

Rev = [(0.34) x (0.38) x (11,207)] / 12

Rev = 121 cf

Max allowable ESDv credit for device, based on 1-year Storm Pe of 2.7 inches, 958 cf

Micro-bioretentation design:

Media Storage Volume:

Filter Media Depth = 1.50 ft

Bridge Layer Depth = 0.75 ft

Gravel Layer Depth = 1.00 ft

Media Porosity = 0.40

Media Storage Volume = [273 x (1.50 + 0.75 + 1.00) x 0.40]

Media Storage Volume = 355 cf

Ponding Storage Volume:

Ponding Depth = 0.50 ft

Side Slopes = 3 : 1

Water Surface Area = 356 sf

Ponding Storage Volume = [((273 + 356)/2) x 0.50]

Ponding Storage Volume = 157 cf

Total Storage provided = (355 cf + 157 cf)

Total Storage provided = 512 cf      Max Allowable ESDv = 958 cf

ESDv = 512 cf

Pe managed = [(ESDv \* 12) / (Rv \* Area)]

= [(512cf x 12) / (0.38 x 11,207sf)]

Pe managed = 1.44 in

DA2 ESD Practice N-1 Disconnection of Rooftop Runoff

Surface Description	Rooftop Area	Disconnect Grade	Disconnect Length	P <sub>E</sub>	ESDv	Rev
RD1	410 sf	3.2 %	62 ft	0.8	26 cf	11 cf
RD2	519 sf	1.3 %	75 ft	1.0	41 cf	14 cf
RD3	578 sf	1.5 %	75 ft	1.0	46 cf	16 cf

DA3 ESD Practice N-2 Disconnection of Non-Rooftop Runoff

Surface Description	Surface Area	Surface Length	Discon. Length	Discon. Grade	P <sub>E</sub>	ESDv	Rev
Walk	150 sf	3 ft	3 ft	1.0 %	1.0	12 cf	4 cf
Driveway	805 sf	22 ft	22 ft	2.0 %	1.0	64 cf	22 cf

**E. Compute PE Value & ESDv for Drainage Area: ( SITE )**

Drainage Area SITE						
DA Name	ESD Practice	Drainage Area	Total Storage	ESD Volume	Recharge Volume	PE Achieved
DA1	Micro-bioretenion	11207 sf	512 cf	512 cf	121 cf	1.44 in
DA2	RD1	410 sf	26 cf	26 cf	11 cf	0.80 in
DA3	RD2	519 sf	41 cf	41 cf	14 cf	1.00 in
DA4	RD3	578 sf	46 cf	46 cf	16 cf	1.00 in
DA5	Walk	150 sf	12 cf	12 cf	4 cf	1.00 in
DA6	Driveway	805 sf	64 cf	64 cf	22 cf	1.00 in
Totals:		13669 sf	701 cf	701 cf	188 cf	1.91 in
Targets:				699 cf	125 cf	1.9 in

Target PE = 1.9 in      Achieved PE = 1.91 in  
 Target ESDv = 699 cf      Achieved ESDv = 701 cf  
 Target Rev = 125 cf      Achieved Rev = 188 cf

ESD Storage Provided is greater than the target volume. ESD has been applied to the MEP

An additional 0 cf of Peak Management storage has been provided.

## **V. Peak Management (Analysis of $Q_p$ )**

The site drains east towards Bodkin Creek. The site outfall is considered adequate outfall to receive runoff from a residential lot improved with a single-family dwelling. Peak Management is not required for the development.

## **VI. Channel Protection and Extreme Flood Volumes**

Management of the Channel Protection Storage Volume ( $C_{pv}$ ) is not necessary, as the micro-scale practice manages the target  $ESD_v$ , and therefore channel protection obligations are met.

Management of the Extreme Flood Volume ( $Q_F$ ) is not necessary, as the site outfall is deemed adequate, and there are no unprotected flood plain areas downstream of the development. There are no historical flooding problems downstream of the development. Analysis and management of the  $Q_F$  are not necessary.

**Appendix A- SWM Data Summary Sheet**

**STORMWATER MANAGEMENT DATA v1.1/2020**

**Project Table for Each Drainage Area**

Permit Number	GD2019B06
Project Number	VC02822
Project Name	Ventnor Lots 32-34
Structure Address	8195 Orchard Point Road
Structure City	Pasadena
State	Maryland
Structure Zip	21122
Total Drainage Area (Acres)	0.72
RCN - Pre Construction	52
RCN - Post Construction	52
RCN - Woods	43
Total Number of BMPs	6
PE Required (see Note 1)	1.9
PE Addressed (see Note 2)	1.91
MD 8-Digit HUC (see Note 4)	2130902
USGS 12-Digit HUC	

**For Each Practice in the Drainage Area**

New development (NEWD), Redevelopment (REDE), or Restoration (REST)

STORM ID	STFU NAME	MDE BMP CLASS	MDE BMP TYPE	CONSTRUCTION PURPOSE	ON or OFF SITE	LAND USE	DEVICE DRAINAGE AREA (sq.ft.)	IMPERVIOUS AREA DRAINING TO DEVICE (sq.ft.)	IMPERVIOUS ACRES RESTORED (See Note 3)	MD NORTH COORD (NAD83 - FT)	MD EAST COORD (NAD83 - FT)	WQ <sub>y</sub> (cu-ft) (See Note 5)	Maintenance Responsibility
	Disconnection of Non-Rooftop Runoff	E	NDNR	NEWD	On Site	AA11	150	150 N/A	150 N/A	529,560	1,469,061	12	Individual Homeowner
	Disconnection of Non-Rooftop Runoff	E	NDNR	NEWD	On Site	AA11	805	805 N/A	805 N/A	529,572	1,469,080	64	Individual Homeowner
	Micro-Bioretenion	E	MMBR	NEWD	On Site	AA11	11,207	4,160 N/A	4,160 N/A	529,503	1,469,089	98	Individual Homeowner
	Disconnection of Rooftop Runoff	E	NDNR	NEWD	On Site	AA11	410	410 N/A	410 N/A	529,672	1,469,109	26	Individual Homeowner
	Disconnection of Rooftop Runoff	E	NDNR	NEWD	On Site	AA11	519	519 N/A	519 N/A	529,611	1,469,076	41	Individual Homeowner
	Disconnection of Rooftop Runoff	E	NDRR	NEWD	On Site	AA11	578	578 N/A	578 N/A	529,589	1,469,032	46	Individual Homeowner

**NOTES**

- 1 - Rainfall target (from Table 5.3, Design Manual pp.5.21-22) used to determine ESD goals and site practices (for new development or redevelopment), if practice is for restoration, then PE\_REQ is 1 inch.
- 2 - Rainfall addressed (using both ESD techniques and practices, and structural practices) by the BMPs within the drainage area
- 3 - Equals Impervious Area Draining to Device, when PE\_ADR = 1 inch (for restoration only)
- 4 - Maryland 8-Digit HUC (Hydrologic Unit Code) can be found by using the map at: <https://data.maryland.gov/EnergyandEnvironment/Marylands-8-Digit-Sub-Watersheds/89g-yv8k>
- 5 - Water Quality volume, the smaller of the volume of the actual storage volume in the device or the volume from the 1-year 24-hour storm for the drainage area to the device (2.7' x Rv x A)/12)



## **Appendix B- Soil Boring Log**

# BORING LOG



Date: 8/17/2023

Client: Paul & Bennett Cummings

Project: 8195 Orchard Point Road, Pasadena, Anne Arundel County, MD

Project No. 123-100

Boring No.: B-1 (1 of 1) Total Depth (feet) 8 Elev. 10.0 +/-

Location: See Boring Location Plan

Type of Boring: Hand Auger

Started: 8/14/2023

Completed: 8/14/2023






Driller: D. Rockwood

Elevation	Depth	DESCRIPTION OF MATERIALS (classification)	*Sample Blows	Sample Depth (Feet)	Moisture Content	REMARKS
10	0.0	Grass with root (organic) matter and sandy topsoil				Groundwater was not encountered during drilling or at completion.
9.25	0.75	Tan fine to medium SAND with trace silt and trace to little gravel, damp to dry (USCS: SP, USDA: Sand)		2.0	4.8	
				2.5		
7	3.0	Off-white and light brown fine to medium SAND with little silt and little to trace gravel, damp to moist (USCS: SP-SM, USDA: Loamy Sand)		4.0	7.3	
				4.5		
5.5	4.5	Light brown fine to medium SAND with little clay, trace silt and little to trace gravel, moist (USCS: SM-SC, USDA: Sandy Loam)		5.0		
				5.5		
4.25	5.75	Light brown, off-white and light orange-brown clayey fine to medium SAND with some silt, damp to moist (USCS: SM-SC, USDA: Sandy Clay Loam)		6.0	18.8	
				6.5		
				7.0		
				7.5		
2	8.0	End of Boring		7.5		
				8		

**Appendix C- Resource Mapping**



**Features**

-  Parcels
- Critical Areas**
-  IDA - Intensely Developed Area
-  LDA - Limited Development Area
-  RCA - Resource Conservation Area
-  FED - Federal Land
-  County Boundary

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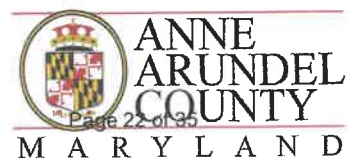
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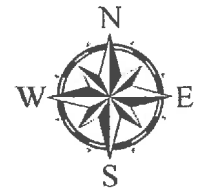
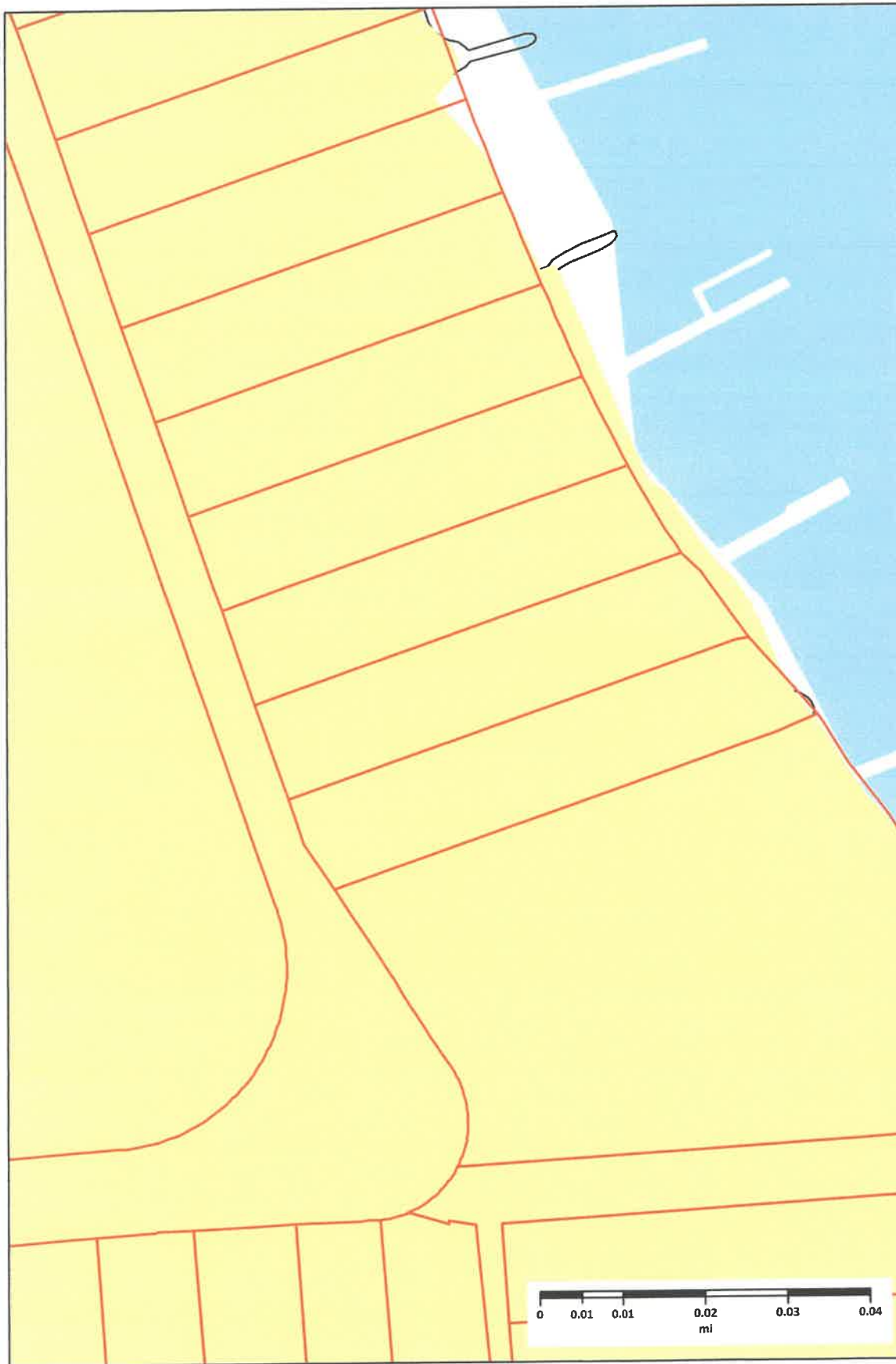
# 8195 Orchard Point Road CA Map

Date: 2/16/2023

Time: 4:12 PM

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere





- Features**
- Parcels
  - O-IND Odenton Industrial
  - O-NOD North Odenton
  - O-TRA Odenton Transition
  - C1 Commercial - Local
  - C2 Commercial - Office
  - C3 Commercial - General
  - C4 Commercial - Highway
  - City of Annapolis
  - MA1-Community Marina
  - MA2-Light Commercial Marina
  - MA3-Yacht Club
  - MB-General Commercial Marina
  - MC-Heavy Commercial Marina
  - MXD-C Mixed Use Commercial
  - MXD-R Mixed Use Residential
  - MXD-T Mixed Use Transit
  - MXD-E Mixed Use Employment
  - O-COR Odenton Core
  - O-EOD East Odenton
  - O-HIS Odenton Historic
  - OS Open Space
  - R1 Residential
  - R10 Residential
  - R15 Residential
  - R2 Residential
  - R22 Residential
  - RS Residential
  - RA Rural Agricultural
  - RLD Residential Low Density
  - SB Small Business
  - TC Town Center
  - W1 Industrial Park
  - W2 Industrial - Light
  - W3 Industrial - Heavy
  - Water
  - County Boundary

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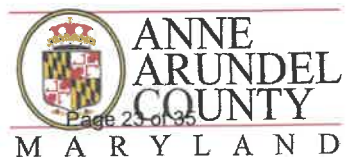
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# 8195 Orchard Point Road R-1 Zoning

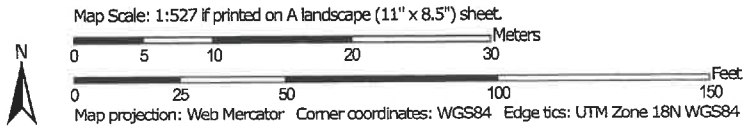
Date: 2/16/2023

Time: 4:11 PM

































Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere



Hydrologic Soil Group—Anne Arundel County, Maryland  
(8195 Orchard Point Road)



### MAP LEGEND

- Area of Interest (AOI)**
  -  Area of Interest (AOI)
- Soils**
  - Soil Rating Polygons**
    -  A
    -  A/D
    -  B
    -  B/D
    -  C
    -  C/D
    -  D
    -  Not rated or not available
  - Soil Rating Lines**
    -  A
    -  A/D
    -  B
    -  B/D
    -  C
    -  C/D
    -  D
    -  Not rated or not available
  - Soil Rating Points**
    -  A
    -  A/D
    -  B
    -  B/D
- Soils**
  -  C
  -  C/D
  -  D
  -  Not rated or not available
- Water Features**
  -  Streams and Canals
- Transportation**
  -  Rails
  -  Interstate Highways
  -  US Routes
  -  Major Roads
  -  Local Roads
- Background**
  -  Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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: Anne Arundel County, Maryland  
Survey Area Data: Version 21, Sep 14, 2022

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

Date(s) aerial images were photographed: May 21, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DvB	Downer-Hammonton complex, 2 to 5 percent slopes	A	0.0	0.5%
DwB	Downer-Hammonton-Urban land complex, 0 to 5 percent slopes	A	0.7	87.3%
SME	Sassafras and Croom soils, 15 to 25 percent slopes	C	0.1	12.2%
<b>Totals for Area of Interest</b>			<b>0.8</b>	<b>100.0%</b>



## Description

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

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

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

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

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

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

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

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

# National Flood Hazard Layer FIRMette



76°27'10"W 39°7'24"N



## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- |                                    |  |   |
|------------------------------------|--|---|
| <b>SPECIAL FLOOD HAZARD AREAS</b>  |  | Without Base Flood Elevation (BFE)<br>Zone A, V, A99  |
|                                    |  | With BFE or Depth Zone AE, AO, AH, VE, AR   |
|                                    |  | Regulatory Floodway   |
| <b>OTHER AREAS OF FLOOD HAZARD</b> |  | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X |
|                                    |  | Future Conditions 1% Annual Chance Flood Hazard Zone X  |
|                                    |  | Area with Reduced Flood Risk due to Levee. See Notes. Zone X  |
|                                    |  | Area with Flood Risk due to Levee Zone D  |
|                                    |  | NO SCREEN Area of Minimal Flood Hazard Zone X   |
| <b>OTHER AREAS</b>                 |  | Effective LOMRs   |
|                                    |  | Area of Undetermined Flood Hazard Zone D  |
| <b>GENERAL STRUCTURES</b>          |  | Channel, Culvert, or Storm Sewer  |
|                                    |  | Levee, Dike, or Floodwall   |
| <b>OTHER FEATURES</b>              |  | Cross Sections with 1% Annual Chance Water Surface Elevation  |
|                                    |  | Coastal Transect  |
|                                    |  | Base Flood Elevation Line (BFE)   |
|                                    |  | Limit of Study  |
|                                    |  | Jurisdiction Boundary   |
| <b>MAP PANELS</b>                  |  | Digital Data Available  |
|                                    |  | No Digital Data Available   |
|                                    |  | Unmapped  |
- The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/16/2023 at 2:24 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

## **Appendix D- TR-55 Computations**

**Worksheet 2: Runoff curve number and runoff**

Location: Ventnor Orchard Beach Lots 32-34 By: REB Date: 5/5/2023  
8195 Orchard Point Road Pasadena, MD. 21122 Checked: \_\_\_\_\_ Date: \_\_\_\_\_

Circle one: Present  Developed

Notes: **PRE Development Conditions for Drainage Area to "Linear" Site Outfall**

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition)	CN			Area acres	Product of CN x area
		Table 2-2	Fig. 2-3	Fig. 2-4		
(A)	Lawn	39			0.15	5.85
(B)	Lawn	61				0
(C)	Lawn	74			0.06	4.44
(D)	Lawn	80				0
(A)	Woods	30			0.32	9.6
(B)	Woods	55				0
(C)	Woods	70			0.04	2.8
(D)	Woods	77				0
(A)	Impervious	98			0.15	14.7
(B)	Impervious	98				0
(C)	Impervious	98				0
Totals =					0.72	37.39

1/ Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area (acres)}} = \frac{37.39}{0.72} = 51.93$$

Use CN = 52

2. Runoff

Frequency..... yr  
 Rainfall, P ( 24-hour)..... in  
 Runoff, Q..... in

Storm #1	Storm #2	Storm #3
1	10	100
2.7	5.2	7.4
0.07	0.89	2.08

( Use P and Cn with table 2-1, fig. 2-1 or equ. 2-3 and 2-4)  
 ( 210-VI-TR-55, Second Ed., June 1986)

**Worksheet 3: Time of concentration (Tc) or travel time (Tt)**

Project: Ventnor Orchard Beach Lots 32-3 By: REB Date: 5/5/2023  
 Location: 8195 Orchard Point Road Pasadena, MD. 21122 Checked: \_\_\_\_\_ Date: \_\_\_\_\_

Circle one: Present  Developed

Circle one: Tc  Tt  trough subarea  Notes: PRE Development Conditions for Drainage Area to "Linear" Site Outfall

Sheet flow (Applicable to Tc only)		Segment ID	AB/CD	BC		
1	surface description ( table 3-1)		Grass	Smooth		
2	Manning's roughness coeff., n (table 3-1)		0.24	0.01		
3	Flow length, L (total L ≤ 300 ft)	ft	90	10		
4	two-yr 24-hr rainfall, P <sub>2</sub>	in	3.3	3.3		
5	Land slope, s	ft/ft	0.02	0.02		
6	$T_t = 0.007(nL)^{0.8} / P_2^{0.5} s^{0.4}$	hr	0.215	0.003	+	= 0.218

Shallow concentrated flow		Segment ID	DE		
7	Surface description ( paved(P) or unpaved(UP))		Unpaved		
8	Flow length, L	ft	123		
9	Watercourse slope, s	ft/ft	0.07		
10	Average Velocity, V (figure 3-1)	ft/s	4.3		
11	$T_t = L / 3600 V$	hr	0.008	+	0 = 0.008

Channel Flow		Segment ID			
12	Cross sectional flow area, a	ft <sup>2</sup>			
13	Wetted perimeter, Pw	ft			
14	Hydraulic radius, $r = a / Pw$ compute r	ft			
15	Channel slope, s	ft/ft			
16	Manning's roughness coeff. , n				
17	$V = 1.49 r^{2/3} s^{1/2} / n$	ft/s			
18	Flow length , L	ft			
19	$T_t = L / 3600 V$	hr	0	+	0 = 0.000
20	Watershed or subarea Tc or Tt ( add Tt in steps 6,11,and 19)				
					0.23

**Worksheet 4: Graphical Peak Discharge Method**

Project: Ventnor Orchard Beach Lots 32-34 By: REB Date: 5/5/2023  
 Location: 8195 Orchard Point Road Pasadena, MD. 21122

Circle one:  Present  Developed  
 Checked: \_\_\_\_\_ Date: \_\_\_\_\_  
 Notes: **PRE Development Conditions for  
 Drainage Area to "Linear" Site Outfall**

1. Data:

Drainage area ..... Am = 0.00113 mi<sup>2</sup> ( acres / 640)  
 Runoff curve number ... CN = 52 ( from worksheet 2)  
 Time of concentration .Tc = 0.23 hr (from worksheet 3)  
 Rainfall distribution type = II ( I, IA, II, III )  
 Pond and swamp areas spread  
 through watershed..... = \_\_\_\_\_ percent of Am ( \_\_\_\_\_ acra or mi<sup>2</sup> covered)

		Storm # 1	Storm # 2	Storm # 3
2. Frequency.....	yr	1	10	100
3. Rainfall, P ( 24-hour)	in	2.7	5.2	7.4
4. Initial abstraction, Ia (Use CN with table 4-1)	in	1.851	1.851	1.851
5. Compute Ia / P		0.69	0.36	0.25
6. Unit peak discharge, q <sub>u</sub> ( use Tc and Ia/ P with exhibit 4-6)	csm/in	0	580	0
7. Runoff, Q ( from worksheet 2)	in	0.07	0.89	2.08
8. Pond and swamp factor , Fp (use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area		1	1	1
9. Peak discharge, q <sub>p</sub> (where q <sub>p</sub> = q <sub>u</sub> Am Q F <sub>p</sub> )	cfs	0.00	0.58	0.00

**Worksheet 2: Runoff curve number and runoff**

Location: Ventnor Orchard Beach Lots 32-34 By: REB Date: 5/5/2023  
8195 Orchard Point Road Pasadena, MD. 21122

Circle one: Present  Developed  Checked: \_\_\_\_\_ Date: \_\_\_\_\_

Notes: **POST Development Conditions for Drainage Area to "Linear" Site Outfall**

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition)	CN			Area acres	Product of CN x area
		Table 2-2	Fig. 2-3	Fig. 2-4		
(A)	Lawn	39			0.29	11.31
(B)	Lawn	61				0
(C)	Lawn	74			0.06	4.44
(D)	Lawn	80				0
(A)	Woods	30			0.2	6
(B)	Woods	55				0
(C)	Woods	70			0.04	2.8
(D)	Woods	77				0
(A)	Impervious	98			0.13	12.74
(B)	Impervious	98				0
(C)	Impervious	98				0
Totals =					0.72	37.29

1/ Use only one CN source per line

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area (acres)}} = \frac{37.29}{0.72} = 51.79$$

Use CN = 52

2. Runoff

Frequency..... yr  
 Rainfall, P ( 24-hour)..... in  
 Runoff, Q..... in

Storm #1	Storm #2	Storm #3
1	10	100
2.7	5.2	7.4
0.07	0.88	2.07

( Use P and Cn with table 2-1, fig. 2-1 or equ. 2-3 and 2-4)  
 ( 210-VI-TR-55, Second Ed., June 1986)

### Worksheet 3: Time of concentration (Tc) or travel time (Tt)

Project: Ventnor Orchard Beach Lots 32-3 By: REB Date: 5/5/2023  
 Location: 8195 Orchard Point Road Pasadena, MD. 21122 Checked: \_\_\_\_\_ Date: \_\_\_\_\_

Circle one: Present    Developed

Circle one: Tc  Tt  trough subarea  Notes: POST Development Conditions for Drainage Area to "Linear" Site Outfall

Sheet flow (Applicable to Tc only)	Segment ID					
1	surface description ( table 3-1)		AB			
2	Manning's roughness coeff., n (table 3-1)		Grass			
3	Flow length, L (total L ≤ 300 ft)	ft	0.24			
4	two-yr 24-hr rainfall, P <sub>2</sub>	in	100			
5	Land slope, s	ft/ft	3.3			
6	$T_t = 0.007(nL)^{0.8} / P_2^{0.5} s^{0.4}$	hr	0.02			
			0.234	+		+
						0.234

Shallow concentrated flow	Segment ID					
7	Surface description ( paved(P) or unpaved(UP))		BC			
8	Flow length, L	ft	Unpaved			
9	Watercourse slope, s	ft/ft	123			
10	Average Velocity, V (figure 3-1)	ft/s	0.07			
11	$T_t = L / 3600 V$	hr	4.3			
			0.008	+	0	
						0.008

Channel Flow	Segment ID					
12	Cross sectional flow area, a	ft <sup>2</sup>				
13	Wetted perimeter, Pw	ft				
14	Hydraulic radius, r = a / Pw compute r	ft				
15	Channel slope, s	ft/ft				
16	Manning's roughness coeff. , n					
17	$V = 1.49 r^{2/3} s^{1/2} / n$	ft/s				
18	Flow length , L	ft				
19	$T_t = L / 3600 V$	hr				
			0	+	0	
						0.000
20	Watershed or subarea Tc or Tt ( add Tt in steps 6,11,and 19)					0.24



### Worksheet 4: Graphical Peak Discharge Method

Project: Ventnor Orchard Beach Lots 32-34 By: REB Date: 5/5/2023  
 Location: 8195 Orchard Point Road Pasadena, MD. 21122

Circle one: Present  **Developed**  Checked: \_\_\_\_\_ Date: \_\_\_\_\_  
 Notes: **POST Development Conditions for  
 Drainage Area to "Linear" Site Outfall**

1. Data:

Drainage area .....  $A_m = \frac{0.00113}{640}$  mi<sup>2</sup> ( acres / 640)  
 Runoff curve number ...CN = 52 ( from worksheet 2)  
 Time of concentration .Tc = 0.24 hr (from worksheet 3)  
 Rainfall distribution type = II ( I, IA, II, III )  
 Pond and swamp areas spread  
 through watershed..... = \_\_\_\_\_ percent of  $A_m$  ( \_\_\_\_\_ acera or mi<sup>2</sup> covered)

		Storm # 1	Storm # 2	Storm # 3
2. Frequency.....	yr	1	10	100
3. Rainfall, P ( 24-hour)	in	2.7	5.2	7.4
4. Initial abstraction, Ia (Use CN with table 4-1)	in	1.862	1.862	1.862
5. Compute Ia / P		0.69	0.36	0.25
6. Unit peak discharge, q <sub>u</sub> ( use Tc and Ia/ P with exhibit 4-6)	csf/in	0	570	0
7. Runoff, Q ( from worksheet 2)	in	0.07	0.88	2.07
8. Pond and swamp factor , Fp (use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area		1	1	1
9. Peak discharge, q <sub>p</sub> (where q <sub>p</sub> = q <sub>u</sub> A <sub>m</sub> Q F <sub>p</sub> )	cfs	0.00	0.57	0.00