HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
3430 Courthouse Drive ■ Ellicott City, Maryland 21043 ■ 410-313-2350
Voice/Relay

FAX 410-313-3467

January 6, 2020

7075 Cedar Lane, LLC
6800 Deerpath Road, Ste. 100
Elkridge, MD 21075

RE: WP-20-059, Lennox Park, Lots 458-465

Dear Sir or Madam:

The Director of the Department of Planning and Zoning considered your request for an alternative compliance from the Howard County Subdivision and Land Development Regulations.

As of the date of this letter, the Planning Director **approved** your request for an alternative compliance of **Section** 16.155(a)(2) subject to the following conditions:

1. The Alternative Compliance Petition exhibit shall serve as the substitute for a site development plan for development. All improvements shown on the exhibit must be constructed per the plan exhibits submitted dated December 19, 2019. The alternative compliance plan exhibit shall be submitted as an original mylar and receive signature approval from the Department of Planning and Zoning prior to applying for permits. The original mylar plan exhibit shall be submitted within 45 days of this letter (on or before February 20, 2020).
2. The developer shall have 1 year from the date of signature approval of the Alternative Compliance Exhibit to apply for initial building permits and all permits must be applied for within 2 years of the Alternative Compliance signature approval.
3. Compliance with all applicable County and State Regulations and obtain all necessary permits from the Department of Inspections, Licenses and Permits prior to initiating development on-site.

Extraordinary Hardship or Practical Difficulty – If the alternative compliance is not granted, the applicant will be required to prepare a site development plan for the development of 6 single family semi-detached residential units. The fact that this subdivision was recorded prior to February 7 ,1976 is a uniqueness of the Property that allows development of detached units without an SDP if the limit of disturbance is less than 5,000 square feet. DPZ has permitted waivers to Section 16.155 (a)(2)(ii) for similarly situated properties, causing an unreasonable hardship if this request was denied. DPZ agrees with the Petitioner's assertion that the distinction between detached and semi-detached is technical and not meaningful for purposes of applying this regulation.

Alternative Proposal – Based on a 2015 policy, DPZ permits alternative compliance to Section 16.155(a)()2(ii) for subdivisions recorded prior to February 7, 1976. Since these are recorded lots, they could be developed through a building permit plot plan as individual lots. This alternative process allows DPZ to review contiguous recorded lots (pre-1976) as a cohesive project to ensure specific requirements such as stormwater manager, environmental resource protection, noise, traffic, roads and floodplain management are met. The detailed plan exhibit submitted with this alternative compliance is a suitable substitute for the SDP and shows the information necessary to evaluate this request for compliance with the Regulations. The applicant is still required to comply with all building permits as well as other state/local requirements.

Not Detrimental to the Public Interest – Approval of the alternative compliance will not alter the essential character of the neighborhood and will not substantially impair the appropriate use or development of the surrounding properties. DPZ and various SRC agencies have reviewed the alternative compliance in accordance with the current requirements, including the Howard County Code.

Will not Nullify the Intent or Purpose of the Regulations – The alternative compliance proposal is an acceptable alternative to submitting a site development plan for standard review because the alternative compliance exhibit complies with the current Regulations. The proposed improvements were reviewed by the SRC agencies and are required to comply with all building permits.

Indicate this alternative compliance petition file number, request, section of the regulations, action, conditions of approval, and date on all related plats, and site development plans, and building permits.

This requested alternative compliance will remain valid for the time period specified in the conditions of approval.

If you have any questions, please contact Jennifer Wellen at (410) 313-2350 or email at jwellen@howardcountymd.gov.

Sincerely,

Acting Division Chief
Division of Land Development

JM/jw

cc: Research
DED
Real Estate Services
Marian Honeczy- DNR (if waiver to forest conservation sections)
H&H Rock Companies

DEPARTMENT OF PLANNING AND ZONING
DEVELOPMENT ENGINEERING DIVISION

January 2, 2020

TO: **Kent Sheubrooks, Chief** (Acting: Jill Manion)
Division of Land Development

FROM: **Chad Edmondson, Chief** CE
Development Engineering Division

Project Engineer: **Jim Witmer**

RE: **DP&Z File #:** **WP-20-059**

Lennox Park, lots 458-465

After review of the submitted information requesting a waiver of the Subdivision and Land Development Regulations, Section 16.155 (a)(2)(i), which requires a site development plan, approved by the Department of Planning and Zoning for new residential single family attached, apartment, and mobile home developments this Division recommends **APPROVAL** based on the following.

1. No building permits shall be approved for the proposed houses until water and sewer is available.
2. This approval is based upon the approved layout of the water and sewer plans.
3. The provided WP plan provided sufficient detail in accordance with our SDP requirements. All of the requirements for pavement width, utilities, SWM, and drainage have been addressed.

H:\James Witmer\COMMENTS\WAIVERS\LennoxPark.WP-20-059.1.approved.doc

GENERAL NOTES

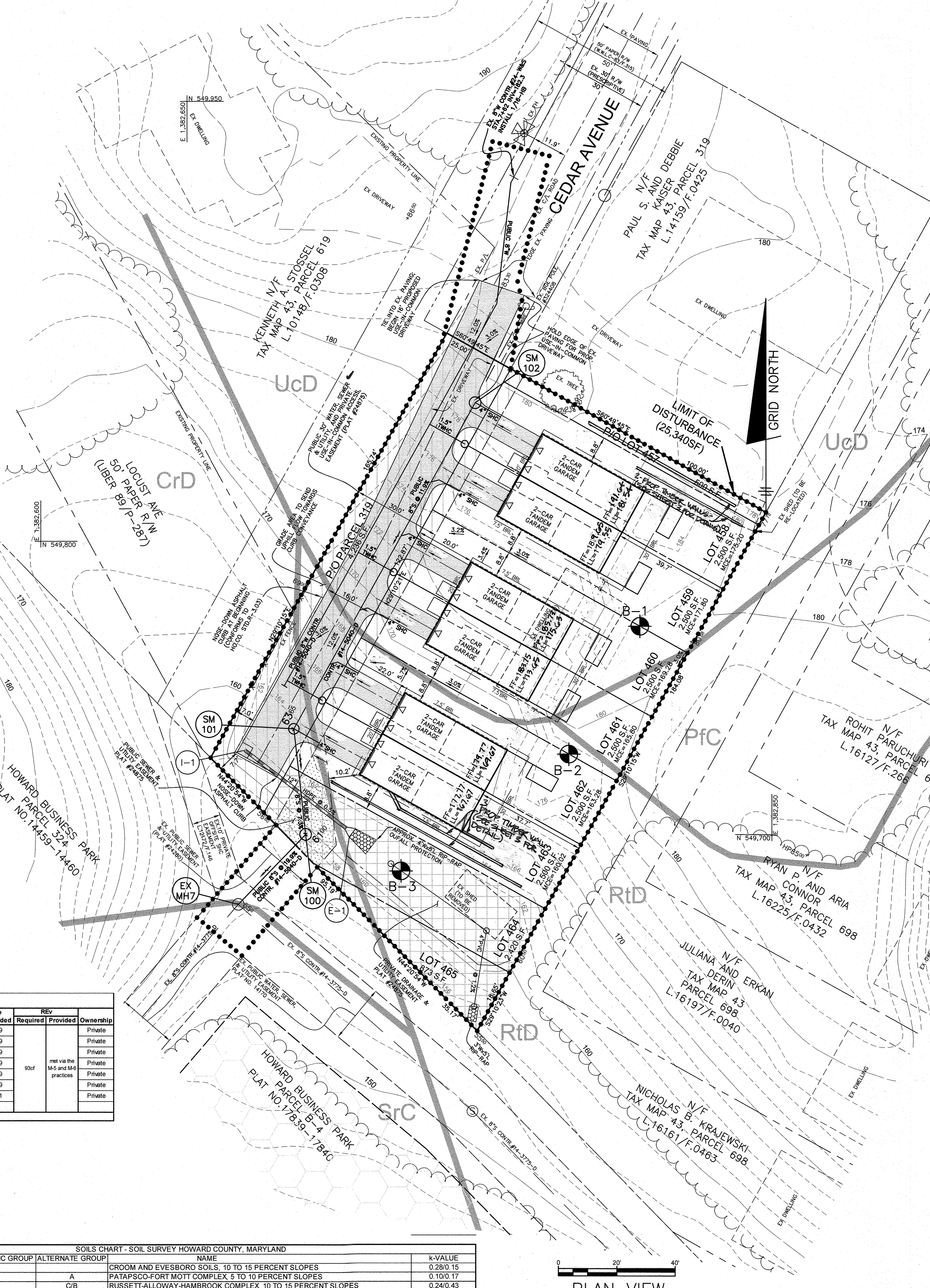
1. THE TOPOGRAPHY SHOWN HEREON IS BASED ON A FIELD RUN SURVEY DATED FEBRUARY, 2016 BY BENCHMARK ENGINEERING, INC. THE BOUNDARY SHOWN HEREON IS BASED ON BOUNDARY SURVEY PREPARED BY BENCHMARK ENGINEERING INC., DATED MARCH, 2016.
2. THE PROPERTY IS KNOWN AS TAX MAP 43, GRID 06, PARCEL 319. THIS INCLUDES LOTS 458–465, P/O LOT 457, AND A PORTION OF CEDAR AVENUE. THE TOTAL PROPERTY AREA IS APPROXIMATELY 0.53 ACRES.
3. THE PROPERTY IS ZONED R–12 PER THE 10.06.13 COMPREHENSIVE ZONING PLAN.
4. THE EXISTING HOUSE LOCATED ON THE PROPERTY IS TO BE REMOVED; THE EXISTING DRIVEWAY WILL BE IMPROVED TO A 16' WIDE USE–IN–COMMON DRIVE TO PROVIDE ACCESS FOR THE DEVELOPMENT. THE APPROXIMATE LIMIT OF DISTURBANCE = 25,420 SF
5. STORMWATER MANAGEMENT FOR THIS SITE WILL BE PROVIDED BY DRYWELLS FOR THE ROOFTOPS AND MICRO–BIORETENTION FOR THE DRIVEWAYS AND USE–IN–COMMON DRIVE.
6. THESE LOTS ARE EXISTING LOTS KNOWN AS LENNOX PARK RECORDED AS PLATBOOK 83 PAGE 315 DATED FEBRUARY 4, 1907.
7. A TRAFFIC STUDY IS NOT REQUIRED FOR THIS DEVELOPMENT SINCE THE LOTS ARE EXISTING AND NO NEW LOTS ARE TO BE CREATED.
8. TO THE BEST OF OUR KNOWLEDGE AND AVAILABLE DATA, THERE ARE NO FLOODPLAINS, STREAMS, OR STEEP SLOPES LOCATED ON THIS SITE.
9. THERE ARE NO WETLANDS ON–SITE PER AN ENVIRONMENTAL FIELD INVESTIGATION PERFORMED BY HILLIS–CARNES ENGINEERING ASSOCIATES, INC. ON JANUARY, 2017.
10. THERE ARE NO SPECIMEN TREES OR FORESTED AREAS ON–SITE PER A SIMPLIFIED FOREST STAND DELINEATION PERFORMED BY BENCHMARK ENGINEERING, INC ON FEBRUARY, 2017.
11. A GEOTECHNICAL INVESTIGATION WAS PERFORMED HILLIS–CARNES ENGINEERING ASSOCIATES, INC. WHICH DETERMINED THAT THE ONSITE SOILS ARE ACCEPTABLE FOR THE PROPOSED ESD PRACTICES.
12. A NOISE STUDY IN NOT REQUIRED FOR THIS PROPERTY SINCE IT IS NOT IN THE AIRPORT NOISE ZONE AND IS MORE THAN 500' FROM A RAIL LINE.
13. LOTS 458 THRU 463 WILL BE DEVELOPED WITH SINGLE–FAMILY SEMI–DETACHED UNITS; LOTS 464 TO 465 WILL BE UTILIZED FOR ESD–SWM; AND THE REMAINING PORTION OF PARCEL WILL BE UTILIZED FOR A USE–IN–COMMON DRIVEWAY AND UTILITIES.
14. THIS PLAN IS SUBJECT TO AN ALTERNATIVE COMPLIANCE WP–17–085 APPROVED NOVEMBER 14, 2017 TO SECTION 16.155(a)(2) RESIDENTIAL: NEW RESIDENTIAL DEVELOPMENT REQUIRING APPROVAL OF A SITE DEVELOPMENT PLAN FOR SIX SEMI–DETACHED DUPLEX UNITS APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:

   1. THE DED COMMENTS DATED NOVEMBER 13, 2017.

   2. THE ALTERNATIVE COMPLIANCE EXHIBIT SHALL SERVE AS A SUBSTITUTE FOR A SITE DEVELOPMENT PLAN FOR DEVELOPMENT. ALL IMPROVEMENTS SHOWN ON THE EXHIBIT MUST BE CONSTRUCTED PER THE PLAN EXHIBITS SUBMITTED DATED OCTOBER 7, 2017. THE REVISED ALTERNATIVE COMPLIANCE PLAN EXHIBIT SHALL BE SUBMITTED AS AN ORIGINAL MYLAR AND RECEIVE SIGNATURE APPROVAL FROM THE DEPARTMENT OF PLANNING & ZONING, PRIOR TO APPLYING FOR PERMITS. THE ORIGINAL MYLAR PLAN EXHIBIT SHALL BE SUBMITTED WITHIN 45 DAYS OF THIS LETTER (ON OR BEFORE DECEMBER 29, 2017)

   3. COMPLIANCE WITH ALL APPLICABLE COUNTY & STATE REGULATIONS, AND OBTAIN ALL NECESSARY PERMITS FROM THE DEPARTMENT OF INSPECTIONS, LICENSES & PERMITS, PRIOR TO INITIATING DEVELOPMENT ON–SITE

   – NOTE: WP–17–085 HAS SINCE EXPIRED AND A NEW ALTERNATIVE COMPLIANCE IS BEING REQUESTED VIA THIS PLAN EXHIBIT AND APPLICATION.

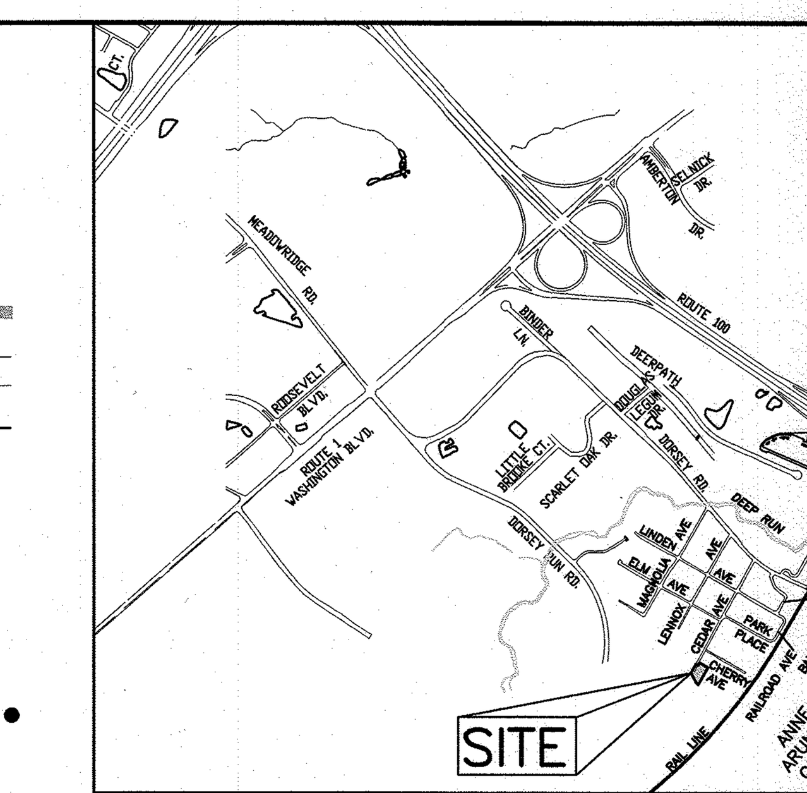


PLAN VIEW

SCALE: 1"=20'

LEGEND

SOILS CLASSIFICATION	AbC1
SOILS DELINEATION	
EXISTING CONTOURS	999
PROPOSED CONTOURS	999
EXISTING WOODS LINE	
PROPOSED WOODS LINE	
EXISTING STRUCTURE	
PROPOSED STRUCTURE	
LIMIT OF DISTURBANCE	
PUBLIC WATER, SEWER, & UTILITY AND PRIVATE USE–IN–COMMON ACCESS EASEMENT	
PUBLIC SEWER & UTILITY EASEMENT	
PRIVATE DRAINAGE & UTILITY EASEMENT	



VICINITY MAP

SCALE: 1" = 2000'
ADC MAP NO. 35 GRID B6

NARRATIVE

The Lennox Park, Crosby Property Lots 458-465, Elkridge, Maryland comprises approximately 0.53 acres. The property is zoned R-12 and is located on the southeast side of Cedar Avenue at its terminus point adjoining the Howard Business Park. Access will be provided by a Use-In-Common Drive constructed from the existing edge of paving of Cedar Avenue. The proposed development shall consist of 3 Semi-Detached Dwellings containing 6 units total. The project is located within an existing neighborhood known as Lennox Park. The site drains from the northeast to the southwest and is conveyed off site through an off swale on the adjoining property. The project lies within the Patapsco River watershed (02-13-09) and the use is I-P.

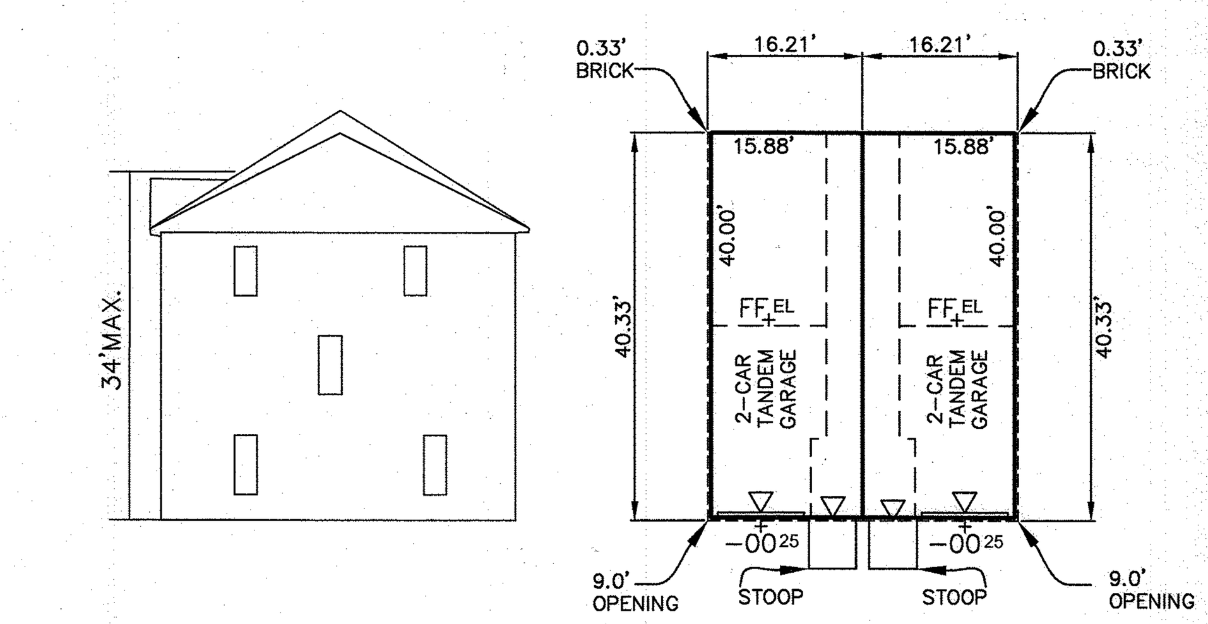
The NRCS soils in the location of this development are mostly Hydrologic Group 'C' & 'D'. Other Lots within close proximity of this site have indicated 'B' type soils. A Geotechnical Investigation was performed by Hillis-Carnes Engineering Associates, Inc. in July 2017 which determined that the on-site soils are acceptable for the proposed ESD practices.

To the best of our knowledge and available data, there are no Floodplains, Streams, or Steep Slopes located on this site. There are no Wetlands on-site per an Environmental Field Investigation performed by Hillis-Carnes Engineering Associates, Inc. on January, 2017.There are no Specimen Trees or Forested areas on-site per a Simplified Forest Stand Delineation performed by Benchmark Engineering, Inc., on February, 2017.

This site was analyzed as woods in good condition and a target RCN was determined. A target rainfall depth treatment (Pe) was determined based on the measured impervious areas and HSG soil types (mostly 'C' & 'D'). The target Pe for this site is 1.8 inches based on the overall proposed drainage area. Full treatment of the target 1.8"Pe will be provided using Environmental Site Design practices as outlined in Chapter 5 of the 2000 Maryland Stormwater Design Manual, as amended by Maryland's Stormwater Management Act of 2007. The selected methods include Drywells (M-5) for the entire rooftop for each unit and a Mico-Bioretention (M-6) for the driveways. The facilities will be privately owned and maintained.

To protect natural resources, it is important to minimize and adequately treat the stormwater runoff. The final design will incorporate adequate treatment and storage in order to create the least possible stormwater runoff in general compliance with this concept plan. The runoff will be treated on-site using approved methods. Outfalls generally correspond with the natural drainage patterns for the site.

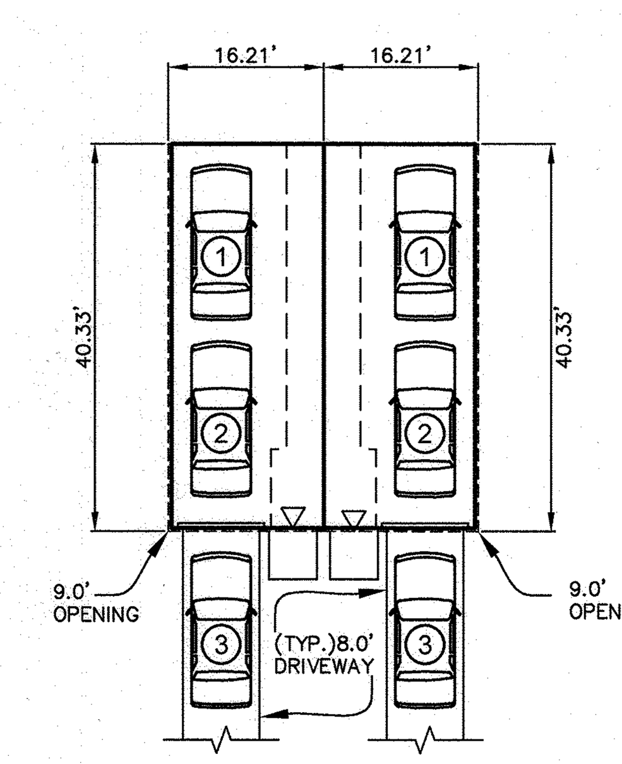
The proposed development and ESD implementation should have no affect on adjacent properties as treatment of the target Pe in the development runoff conditions meet the existing runoff. The proposed development is not expected to have adverse effects on downstream properties, utilities, public facilities or natural systems since natural drainage pathways are maintained. Preliminary ESD practices have been designed to address 1.8 inches of runoff, the target Pe, for all area which could be conveyed to a facility. We believe this plan provides environmental site design to the maximum extent possible.



CLARENDON
(MODIFIED DOUBLE END UNIT)

TYPICAL HOUSE FOOTPRINT

SCALE: 1" = 20'



TYPICAL UNIT PARKING

SCALE: 1" = 20'

ESD STORMWATER MANAGEMENT SUMMARY TABLE

Practice			DA (sf)	Imp Area (sf)	% Imp	Rv	Pe required	Af (sf) Required	Af (sf) Provided	Af (sf) 2% DA?	ESDv (cf) Required	ESDv (cf) Provided	Pe Provided	REv Required	REv Provided	Ownership
(M-5)	Drywell	LOT 458	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5)	Drywell	LOT 459	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5)	Drywell	LOT 460	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5)	Drywell	LOT 461	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9	93cf	met via the M-5 and M-6 practices	Private
(M-5)	Drywell	LOT 462	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5)	Drywell	LOT 463	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-6)	Micro-Bioretention	MB-1	18,384	4,490	24%	0.27	1.8	368	446	PASS	744	854	2.1			Private
Totals per individual Drainage Area			22,296	8,402	40%	0.41					1301	1454				
Totals per Overall Site			26,125	8,414	35%	0.37	1.8				1332	1454				

Notes:
1. The Pe required column is based on total site Pe calculation. The Rv is based on individual drainage area percent impervious (per DED)
2. The ESDv Required for the (M-6) pratices is based on 75% of ESDv.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] CHIEF, DIVISION OF LAND DEVELOPMENT	1/3/20 DATE
[signature] CHIEF, DEVELOPMENT ENGINEERING DIVISION	1.3.20 DATE
[signature] DIRECTOR	1-3-20 DATE

SOILS CHART - SOIL SURVEY HOWARD COUNTY, MARYLAND

SYMBOL	HYDRIC	HYDROLOGIC GROUP	ALTERNATE GROUP	NAME	k-VALUE
CrD		C		CROOM AND EVESBORO SOILS, 10 TO 15 PERCENT SLOPES	0.28/0.15
PfC		A	A	PATAPSCO-FORT MOTT COMPLEX, 5 TO 10 PERCENT SLOPES	0.10/0.17
RtD		C	C/B	RUSSETT-ALLOWAY-HAMBROOK COMPLEX, 10 TO 15 PERCENT SLOPES	0.24/0.43
SrC		B	C	SASSAFRAS AND CROOM SOIL, 5 TO 10 PERCENT SLOPES	0.37/0.28
UcD		D	B/C	URBAN LAND- CHILLUM-BELTSVILLE COMPLEX, 5 TO 15 PERCENT SLOPES	0.37

NO.	DATE	REVISION
3	12.21.20	REVISE FLOOR ELEV. PER AS-BUILT
2	9.11.20	ADD TIMBER WALL TO LOT 463
1	5.6.20	REVISE GRADES REAR OF LOTS 458 TO 463

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
WWW.BEI-CIVILENGINEERING.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. 22390, Expiration Date: 6/30/21.

[seal: STATE OF MARYLAND CHRISTOPHER ALAN MALAGARI No. 22390 PROFESSIONAL ENGINEER] [signature] 1-03-20

OWNER:
7075 CEDAR, LLC
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

DEVELOPER:
H&H ROCK COMPANIES
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

LENNOX PARK
CROSBY PROPERTY
LOTS 458-465

TAX MAP: 43 – GRID: 06 – PARCEL: p/o319
ZONED: R–12 (RESIDENTIAL)
ELECTION DISTRICT NO. 1 – HOWARD COUNTY, MARYLAND

ALTERNATIVE COMPLIANCE EXHIBIT & SIMPLIFIED ECP

DATE: JANUARY 03, 2020		BEI PROJECT NO. 2741	
DESIGN: MCR	DRAFT: MCR	SCALE: AS SHOWN	SHEET 1 OF 3

WP-20-059

J:\2741 Lennox Park\dwg\CONCEPT-V5.dwg, ECP, 1/3/2020 2:54:39 PM

CONSTRUCTION SPECIFICATIONS

B.4.C Specifications for Micro-Bioretention, Rain Gardens, Landscape Infiltration & Infiltration Berms

1. Material Specifications:

The allowable materials to be used in these practices are detailed in Table B.4.1.

2. Filtering Media or Planting Soil:

The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the micro-bioretention practice that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The planting soil shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds as specified under COMAR 15.08.01.05.

The planting soil shall be tested and shall meet the following criteria:

- Soil Component - Loamy Sand or Sandy Loam (USDA Soil Textural Classification)
- Organic Content - Minimum 10% by dry weight (ASTM D 2974). In general, this can be met with a mixture of loamy and(60%-65%) and compost (35% to 40%) or sandy loam (30%), coarse sand (30%), and compost (40%).
- Clay Content - Media shall have a clay content of less than 5%.
- pH Range - Should be between 5.5 - 7.0. Amendments (e.g., lime, iron sulfate plus sulfur) may be mixed into the soil to increase or decrease pH.

There shall be at least one soil test per project. Each test shall consist of both the standard soil test for pH, and additional tests of organic matter, and soluble salts. A textural analysis is required from the site stockpiled topsoil. If topsoil is imported, then a texture analysis shall be performed for each location where the topsoil was excavated.

3. Compaction:

It is very important to minimize compaction of both the base of bioretention practices and the required backfill. When possible, use excavation hoes to remove original soil. If practices are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high-pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure.

Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to refracture the soil profile through the 12 inch compaction zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfilling the optional sand layer. Pump any ponded water before preparing (rototilling) base.

When backfilling the topsoil over the sand layer, first place 3 to 4 inches of topsoil over the sand, then rototill the sand/topsoil to create a gradation zone. Backfill the remainder of the topsoil to final grade.

When backfilling the bioretention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bioretention basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

4. Plant Material:

Recommended plant material for micro-bioretention practices can be found in Appendix A, Section A.2.3.

5. Plant Installation:

Compost is a better organic material source, is less likely to float, and should be placed in the invert and other low areas. Mulch should be placed in surrounding to a uniform thickness of 2" to 3". Shredded or chipped hardwood mulch is the only accepted mulch. Pine mulch and wood chips will float and move to the perimeter of the bioretention area during a storm event and are not acceptable. Shredded mulch must be well aged (6 to 12 months) for acceptance.

Rootstock of the plant material shall be kept moist during transport and on-site storage. The plant root ball should be planted so 1/8th of the ball is above final grade surface. The diameter of the planting pit shall be at least six inches larger than the diameter of the planting ball. Set and maintain the plant straight during the entire planting process. Thoroughly water ground bed cover after installation.

Trees shall be braced using 2" by 2" stakes only as necessary and for the first growing season only. Stakes are to be equally spaced on the outside of the tree ball.

Grasses and legume seed should be drilled into the soil to a depth of at least one inch. Grass and legume plugs shall be planted following the non-grass ground cover planting specifications.

The topsoil specifications provide enough organic material to adequately supply nutrients from natural cycling. The primary function of the bioretention structure is to improve water quality. Adding fertilizers defeats, or at a minimum, impedes this goal. Only add fertilizer if wood chips or mulch are used to amend the soil. Rototill urea fertilizer at a rate of 2 pounds per 1000 square feet.

6. Underdrains:

Underdrains should meet the following criteria:

- Pipe- Should be 4" to 6" diameter, slotted or perforated rigid plastic pipe (ASTMF 758, Type PS 28, or AASHTO-M-278) in a gravel layer. The preferred material is slotted, 4" rigid pipe (e.g., PVC or HDPE).
- Perforations - If perforated pipe is used, perforations should be ⅜" diameter located 6" on center with a minimum of four holes per row. Pipe shall be wrapped with a ¼" (No. 4 or 4x4) galvanized hardware cloth.
- Gravel - The gravel layer (No. 57 stone preferred) shall be at least 3" thick above and below the underdrain
- The main collector pipe shall be at a minimum 0.5% slope.
- A rigid, non-perforated observation well must be provided (one per every 1,0000 square feet) to provide a clean-out port and monitor performance of the filter.
- A 4" layer of pea gravel (⅛" to ⅜" stone) shall be located between the filter media and underdrain to prevent migration of fines into the underdrain. This layer may be considered part of the filter bed when bed thickness exceeds 24".

The main collector pipe for underdrain systems shall be constructed at a minimum slope of 0.5%. Observation wells and/or clean-out pipes must be provided (one minimum per every 1000 square feet of surface area).

7. Miscellaneous:

These practices may not be constructed until all contributing drainage area has been stabilized

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED STORMWATER, DRY WELLS (M-5)

1. THE MONITORING WELLS AND STRUCTURES SHALL BE INSPECTED ON A QUARTERLY BASIS AND AFTER EVERY LARGE STORM EVENT.
2. WATER LEVELS AND SEDIMENT BUILD UP IN THE MONITORING WELLS SHALL BE RECORDED OVER A PERIOD OF SEVERAL DAYS TO INSURE TRENCH DRAINAGE.
3. A LOG BOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
4. WHEN THE FACILITY BECOMES CLOGGED SO THAT IT DOES NOT DRAIN DOWN WITHIN THE 72 HOUR TIME PERIOD, CORRECTIVE ACTION SHALL BE TAKEN.
5. THE MAINTENANCE LOG BOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
6. ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION FACILITY HAVE BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.

TABLE B.3.2 MATERIALS AND SPECIFICATIONS FOR SWM FACILITIES (DRYWELLS)

MATERIAL	SPECIFICATION	SIZE	NOTES:
PLANTINGS (IF REQUIRED)	SEE APPENDIX A: TABLE A.4	N/A	PLANTINGS ARE SITE SPECIFIC
PLANTING SOIL (2.5' TO 4.0' DEEP)	SAND: 35-60% SILT: 30-35% CLAY: 10-25%	N/A	USDA SOIL TYPES: LOAMY SAND, SANDY LOAM OR LOAM
MULCH	SHREDDED HARDWOOD	N/A	2" TO 3" DEPTH, AGED 6 MONTHS, MINIMUM
GEOTEXTILE (CLASS "C")	APPARENT OPENING SIZE: (ASTM D-4751) GRAB TENSILE STRENGTH: (ASTM D-4632) PUNCTURE RESISTANCE: (ASTM D-4833)	N/A	FOR USE AS NECESSARY BENEATH UNDERDRAINS ONLY
UNDERDRAIN GRAVEL	AASHTO M-43	0.375" TO 0.750"	
UNDERDRAIN PIPING	ASTM, THICK, PR28 OR AASHTO M-278	4" TO 6" RIGID SCH.40 PVC OR SDR35	3/8" PERF. @ 6" O/C, 4 HOLES PER ROW, MINIMUM OF 3" OF GRAVEL OVER PIPES, NOT NECESSARY UNDERNEATH PIPES
POURED-IN-PLACE CONC. (IF REQUIRED)	MSHA MIX NO.3, F'c=3500psi @ 28 DAYS, NORMAL WEIGHT, AIR ENTRAINED, REINFORCING TO MEET ASTM 615-60	N/A	ON-SITE TESTING OF POURED-IN-PLACE CONC. REQUIRED; 28 DAY STRENGTH TEST AND SLUMP TEST; ALL CONC. DESIGN (CAST -IN-PLACE or PRE-CAST) NOT USING PREVIOUSLY APPROVED STATE OR LOCAL STANDARDS REQUIRES DESIGN DRAWINGS SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND. -- DESIGN TO INCLUDE MEETING ACI CODE 350.R/88: VERTICAL LOADING (H=10 or H=20) ALLOWABLE HORIZONTAL LOADING (BASED ON SOIL PRESSURES); AND ANALYSIS OF POTENTIAL CRACKING
CHECK: DAM (TREATED WOOD)	AWPA STANDARD C6	6"X6" OR 8"X8"	DO NOT COAT WITH CREOSOTE. EMBED AT LEAST 3' INTO SIDE SLOPES

OPERATION & MAINTENANCE SCHEDULE FOR (M-6) MICRO-BIORETENTION

a. The Owner shall maintain the plant material, mulch layer and soil layer annually. Maintenance of mulch and soil is limited to correcting areas of erosion or wash out. Any mulch replacement shall be done in the spring. Plant material shall be checked for disease and insect infestation and maintenance will address dead material and pruning. Acceptable replacement plant material is limited to the following: 2000 Maryland Stormwater Design Manual Volume II, Table A.4.1 and 2.

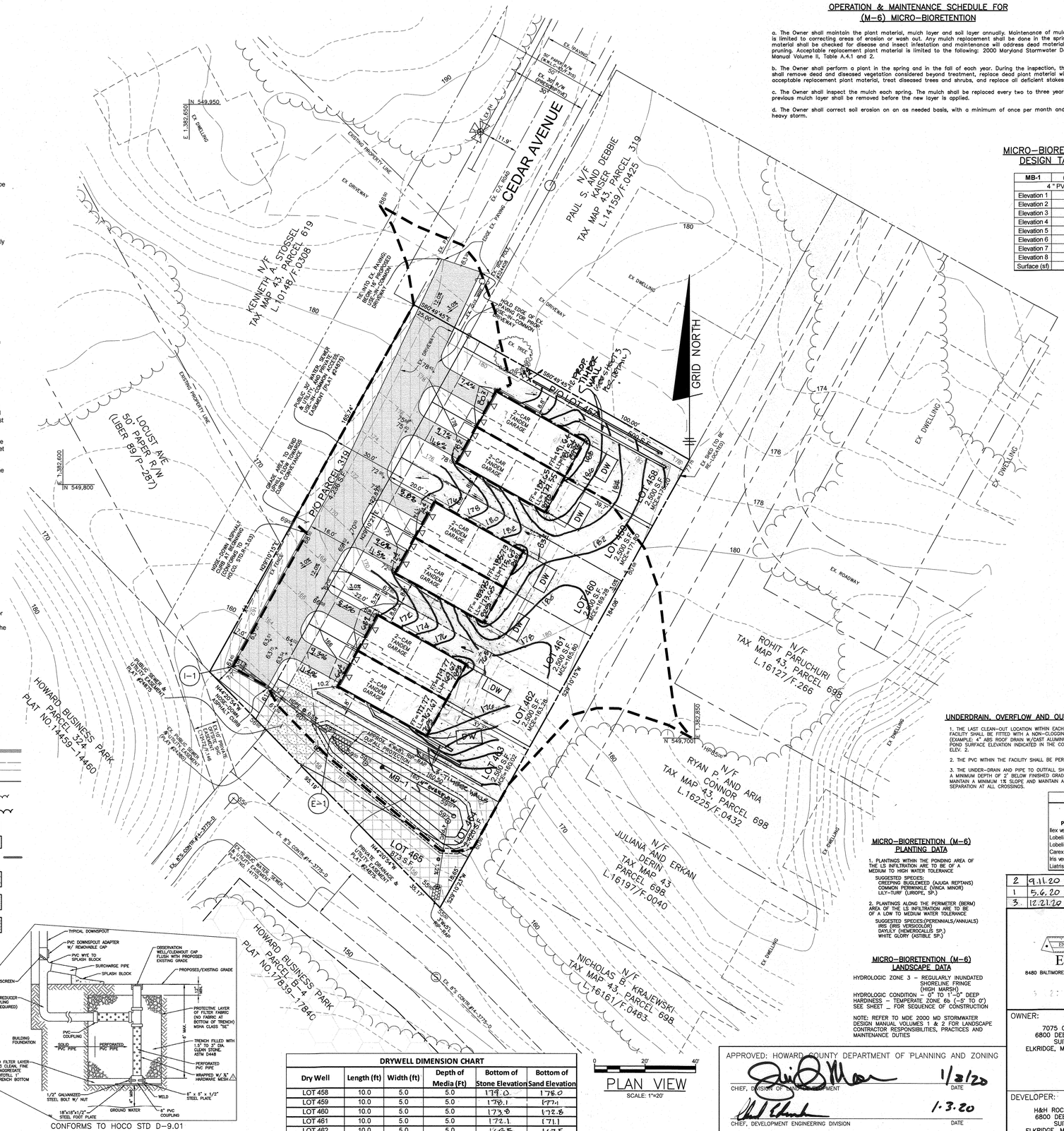
b. The Owner shall perform a plant in the spring and in the fall of each year. During the inspection, the Owner shall remove dead and diseased vegetation considered beyond treatment, replace dead plant material with acceptable replacement plant material, treat diseased trees and shrubs, and replace all deficient stakes and wires.

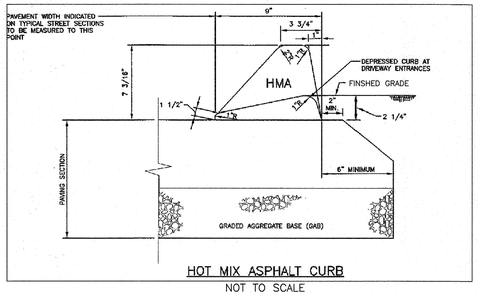
c. The Owner shall inspect the mulch each spring. The mulch shall be replaced every two to three years. The previous mulch layer shall be removed before the new layer is applied.

d. The Owner shall correct soil erosion on an as needed basis, with a minimum of once per month and after each heavy storm.

MICRO-BIORETENTION DESIGN TABLE

MB-1	(M-6)
	4" PVC
Elevation 1	160.00
Elevation 2	159.75
Elevation 3	159.00
Elevation 4	158.83
Elevation 5	156.83
Elevation 6	156.50
Elevation 7	155.92
Elevation 8	155.40
Surface (sf)	889.8

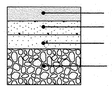

CEDAR AVENUE
GRID NORTH
PROP. 5' MASONRY RETAINING WALL (SEE SHEET 3 FOR DETAILS)
PROP. 6' WOOD FENCE
PROP. 4' WOOD FENCE
PROP. 3' WOOD FENCE
PROP. 4' WOOD GATE
PROP. 5' WOOD GATE
PROP. 6' WOOD GATE
PROP. 3' WOOD GATE
PROP. 2' WOOD GATE
PROP. 1' WOOD GATE
PROP. 2' WOOD FENCE
PROP. 1' WOOD FENCE
PROP. 5' WOOD FENCE
PROP. 6' WOOD FENCE
PROP. 3' WOOD FENCE
PROP. 4' WOOD FENCE



HOT MIX ASPHALT CURB

NOT TO SCALE

THIS DETAIL CONFORMS TO HO.CO. DMV IV R-3.03

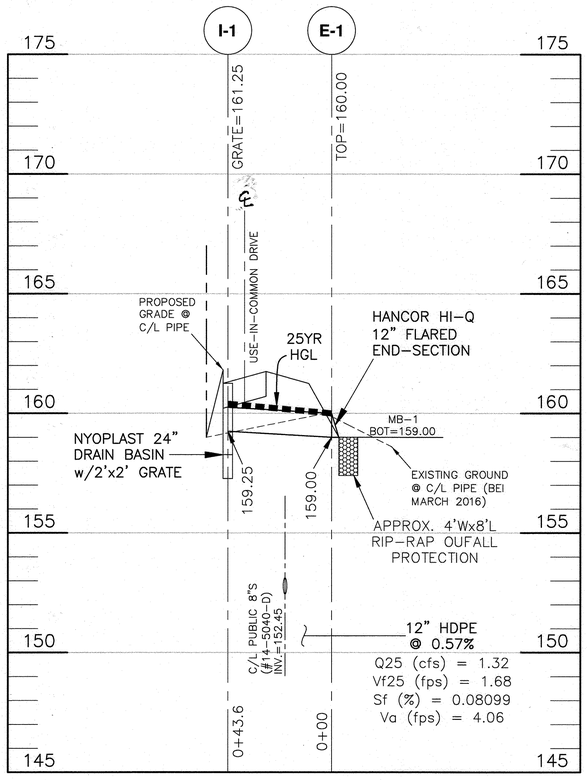


SCHEMATIC PAVING DETAIL

NOT TO SCALE

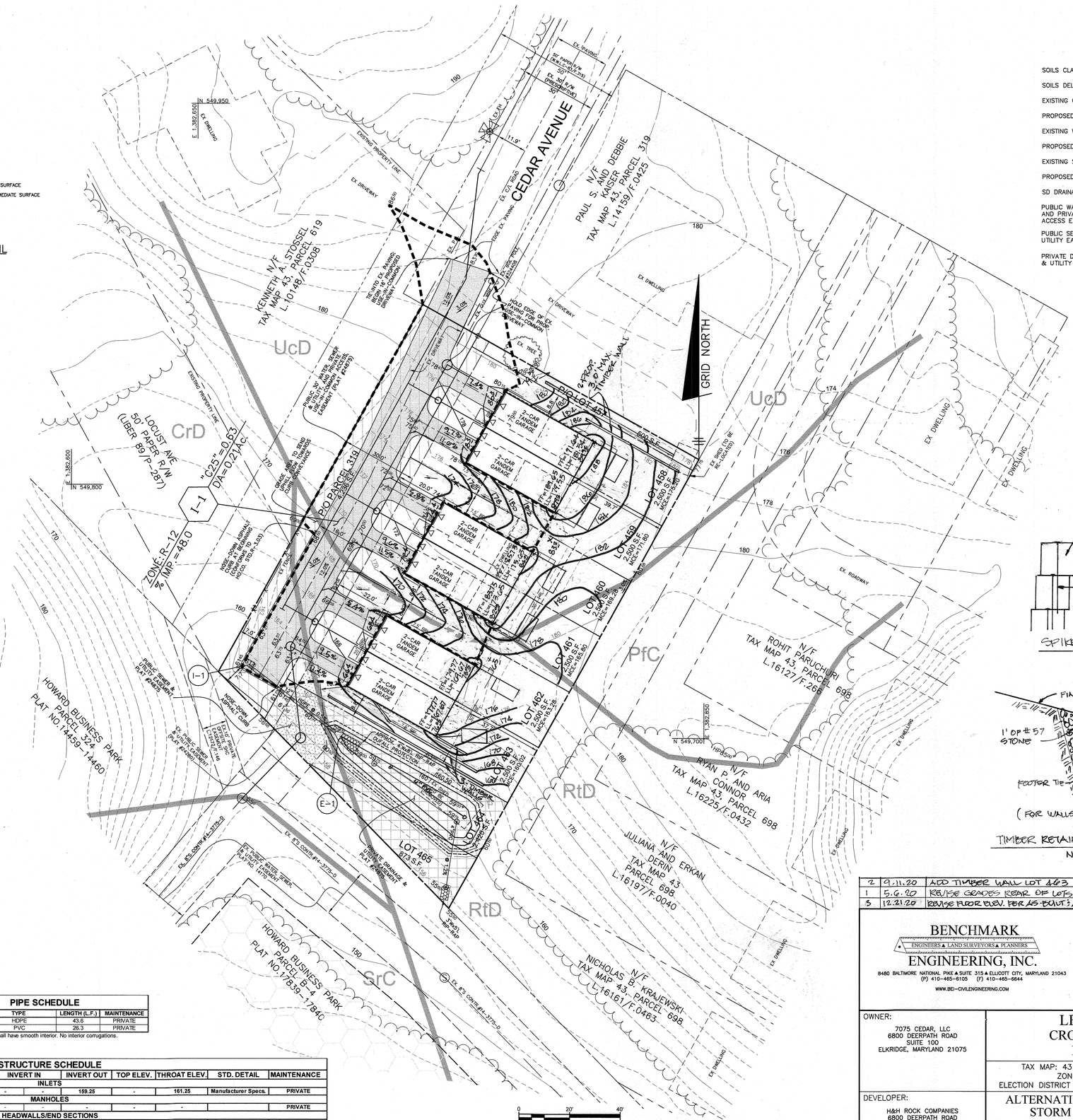
SECTION NUMBER	ROAD AND STREET CLASSIFICATION	CALIFORNIA BEARING RATIO (CBR)	3 to <5	5 to <7	≥7	3 to <5	5 to <7	≥7
		PAVEMENT MATERIAL (INCHES)	MIN. HMA WITH GAB			HMA WITH CONSTANT GAB		
P-2	PARKING DRIVE AISLES: RESIDENTIAL AND NON-RESIDENTIAL WITH NO MORE THAN 10 HEAVY TRUCKS PER DAY LOCAL ROADS: ACCESS PLACE, ACCESS STREET CUL-DE-SAC: RESIDENTIAL	HMA SUPERPAVE FINAL SURFACE 9.5 MM PG 64-22, LEVEL 1 (LOW ESAL)	1.5	1.5	1.5	1.5	1.5	1.5
		HMA SUPERPAVE INTERMEDIATE SURFACE 9.5 MM PG 64-22, LEVEL 1 (LOW ESAL)	1.0	1.0	1.0	1.0	1.0	1.0
		HMA SUPERPAVE BASE 9.0 MM PG 64-22, LEVEL 1 (LOW ESAL)	2.0	2.0	2.0	3.5	2.0	2.0
		GRADED AGGREGATE BASE (GAB)	8.0	4.0	3.0	4.0	4.0	4.0

PAVING SPECIFICATIONS (HO.CO. STD R-2.01)



SD PROFILE

HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 3'

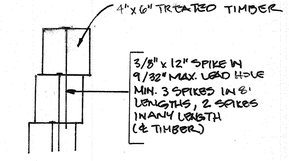


PLAN VIEW

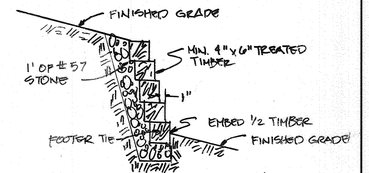
SCALE: 1"=20'

LEGEND

- SOILS CLASSIFICATION — AbC1
- SOILS DELINEATION
- EXISTING CONTOURS — 999
- PROPOSED CONTOURS — 999
- EXISTING WOODS LINE
- PROPOSED WOODS LINE
- EXISTING STRUCTURE
- PROPOSED STRUCTURE
- SD DRAINAGE AREA
- PUBLIC WATER, SEWER, & UTILITY AND PRIVATE USE-IN-COMMON ACCESS EASEMENT
- PUBLIC SEWER & UTILITY EASEMENT
- PRIVATE DRAINAGE & UTILITY EASEMENT



SPIKE DETAIL



(FOR WALLS LESS THAN 3' HIGH)

TIMBER RETAINING WALL DETAIL

NOT TO SCALE

2	9.11.20	ADD TIMBER WALL LOT 463
1	5.6.20	REVISE GRADES REAR OF LOTS 458 TO 463 & ADD TIMBER WALL
3	12.21.20	REVISE FLOOR ELEV. PER AS-BUILT; ADJUST REAR GRADES

PIPE SCHEDULE			
SIZE	TYPE	LENGTH (L.F.)	MAINTENANCE
12"	HDPE	43.6	PRIVATE
4" (MB-1)	PVC	26.3	PRIVATE

All pipes shall have smooth interior. No interior corrugations.

STRUCTURE SCHEDULE								
STRUCTURE	TYPE	LOCATION	INVERT IN		INVERT OUT	TOP ELEV.	THROAT ELEV.	STD. DETAIL	MAINTENANCE
INLETS									
I-1	NDS 24"x24"	N 549,728.7314 E 1,382,669.8137	-	-	159.25	-	161.25	Manufacturer Specs.	PRIVATE
MANHOLES									
-	-	-	-	-	-	-	-		PRIVATE
HEADWALLS/END SECTIONS									
ES-1	HDPE End Section	N 549,702.1827 E 1,382,704.3474	-	-	159.00	160.00	-	Manufacturer Specs.	PRIVATE

STRUCTURE LOCATION FOR MANHOLES IS AT THE CENTER OF THE MANHOLE RIM.
STRUCTURE LOCATION FOR END SECTIONS IS AT THE MIDPOINT OF THE END OF THE STRUCTURE
PRECAST STRUCTURES MEETING HS-20 LOADING MAY BE USED.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 1/3/20

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 1.3.20

DIRECTOR — DATE 1-3-20

BENCHMARK
ENGINEERING, INC.
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
WWW.BEI-CIVILENGINEERING.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. 22590, Expiration Date: 6/30/21.

1-03-20

OWNER:
7075 CEDAR, LLC
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

DEVELOPER:
H&H ROCK COMPANIES
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

LENNOX PARK
CROSBY PROPERTY
LOTS 458-465

TAX MAP: 43 – GRID: 06 – PARCEL: p/o319
ZONED: R-12 (RESIDENTIAL)
ELECTION DISTRICT NO. 1 – HOWARD COUNTY, MARYLAND

ALTERNATIVE COMPLIANCE EXHIBIT STORM DRAINAGE MAP AND PROFILES, NOTES & DETAILS

DATE: JANUARY 03, 2020 — BEI PROJECT NO. 2741
DESIGN: MCR — DRAFT: MCR — SCALE: AS SHOWN — SHEET 3 OF 3

J:\2741 Lennox Park\dwg\CONCEPT-V5.dwg, SD&DETAILS, 1/3/2020 2:58:15 PM

WP-20-059

GENERAL NOTES

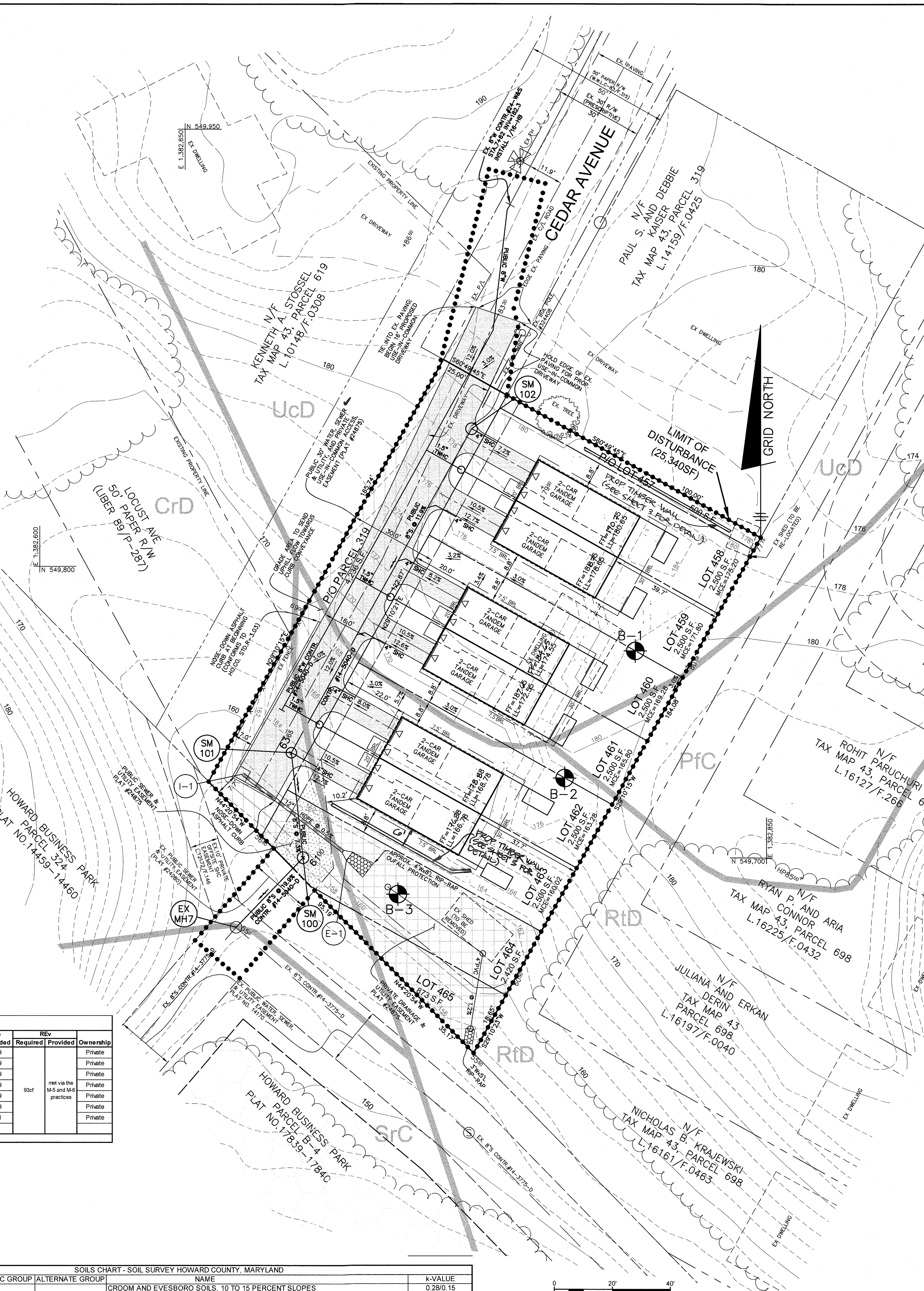
1. THE TOPOGRAPHY SHOWN HEREON IS BASED ON A FIELD RUN SURVEY DATED FEBRUARY, 2016 BY BENCHMARK ENGINEERING, INC. THE BOUNDARY SHOWN HEREON IS BASED ON BOUNDARY SURVEY PREPARED BY BENCHMARK ENGINEERING INC., DATED MARCH, 2016.
2. THE PROPERTY IS KNOWN AS TAX MAP 43, GRID 06, PARCEL 319. THIS INCLUDES LOTS 458–465, P/O LOT 457, AND A PORTION OF CEDAR AVENUE. THE TOTAL PROPERTY AREA IS APPROXIMATELY 0.53 ACRES.
3. THE PROPERTY IS ZONED R–12 PER THE 10.06.13 COMPREHENSIVE ZONING PLAN.
4. THE EXISTING HOUSE LOCATED ON THE PROPERTY IS TO BE REMOVED; THE EXISTING DRIVEWAY WILL BE IMPROVED TO A 16' WIDE USE–IN–COMMON DRIVE TO PROVIDE ACCESS FOR THE DEVELOPMENT. THE APPROXIMATE LIMIT OF DISTURBANCE = 25,420 SF
5. STORMWATER MANAGEMENT FOR THIS SITE WILL BE PROVIDED BY DRYWELLS FOR THE ROOFTOPS AND MICRO–BIORETENTION FOR THE DRIVEWAYS AND USE–IN–COMMON DRIVE.
6. THESE LOTS ARE EXISTING LOTS KNOWN AS LENNOX PARK RECORDED AS PLATBOOK 83 PAGE 315 DATED FEBRUARY 4, 1907.
7. A TRAFFIC STUDY IS NOT REQUIRED FOR THIS DEVELOPMENT SINCE THE LOTS ARE EXISTING AND NO NEW LOTS ARE TO BE CREATED.
8. TO THE BEST OF OUR KNOWLEDGE AND AVAILABLE DATA, THERE ARE NO FLOODPLAINS, STREAMS, OR STEEP SLOPES LOCATED ON THIS SITE.
9. THERE ARE NO WETLANDS ON–SITE PER AN ENVIRONMENTAL FIELD INVESTIGATION PERFORMED BY HILLIS–CARNES ENGINEERING ASSOCIATES, INC. ON JANUARY, 2017.
10. THERE ARE NO SPECIMEN TREES OR FORESTED AREAS ON–SITE PER A SIMPLIFIED FOREST STAND DELINEATION PERFORMED BY BENCHMARK ENGINEERING, INC ON FEBRUARY, 2017.
11. A GEOTECHNICAL INVESTIGATION WAS PERFORMED HILLIS–CARNES ENGINEERING ASSOCIATES, INC. WHICH DETERMINED THAT THE ONSITE SOILS ARE ACCEPTABLE FOR THE PROPOSED ESD PRACTICES.
12. A NOISE STUDY IN NOT REQUIRED FOR THIS PROPERTY SINCE IT IS NOT IN THE AIRPORT NOISE ZONE AND IS MORE THAN 500' FROM A RAIL LINE.
13. LOTS 458 THRU 463 WILL BE DEVELOPED WITH SINGLE–FAMILY SEMI–DETACHED UNITS; LOTS 464 TO 465 WILL BE UTILIZED FOR ESD–SWM; AND THE REMAINING PORTION OF PARCEL WILL BE UTILIZED FOR A USE–IN–COMMON DRIVEWAY AND UTILITIES.
14. THIS PLAN IS SUBJECT TO AN ALTERNATIVE COMPLIANCE WP–17–085 APPROVED NOVEMBER 14, 2017 TO SECTION 16.155(a)(2) RESIDENTIAL: NEW RESIDENTIAL DEVELOPMENT REQUIRING APPROVAL OF A SITE DEVELOPMENT PLAN FOR SIX SEMI–DETACHED DUPLEX UNITS APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:

    1. THE DED COMMENTS DATED NOVEMBER 13, 2017.

    2. THE ALTERNATIVE COMPLIANCE EXHIBIT SHALL SERVE AS A SUBSTITUTE FOR A SITE DEVELOPMENT PLAN FOR DEVELOPMENT. ALL IMPROVEMENTS SHOWN ON THE EXHIBIT MUST BE CONSTRUCTED PER THE PLAN EXHIBITS SUBMITTED DATED OCTOBER 7, 2017. THE REVISED ALTERNATIVE COMPLIANCE PLAN EXHIBIT SHALL BE SUBMITTED AS AN ORIGINAL MYLAR AND RECEIVE SIGNATURE APPROVAL FROM THE DEPARTMENT OF PLANNING & ZONING, PRIOR TO APPLYING FOR PERMITS. THE ORIGINAL MYLAR PLAN EXHIBIT SHALL BE SUBMITTED WITHIN 45 DAYS OF THIS LETTER (ON OR BEFORE DECEMBER 29, 2017)

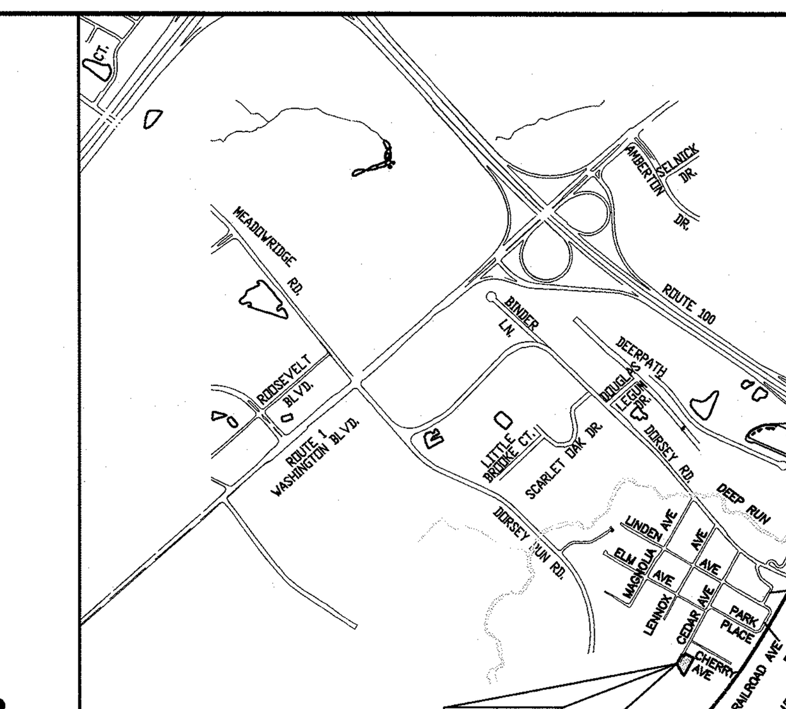
    3. COMPLIANCE WITH ALL APPLICABLE COUNTY & STATE REGULATIONS, AND OBTAIN ALL NECESSARY PERMITS FROM THE DEPARTMENT OF INSPECTIONS, LICENSES & PERMITS, PRIOR TO INITIATING DEVELOPMENT ON–SITE

    – NOTE: WP–17–085 HAS SINCE EXPIRED AND A NEW ALTERNATIVE COMPLIANCE IS BEING REQUESTED VIA THIS PLAN EXHIBIT AND APPLICATION.



LEGEND

SOILS CLASSIFICATION	AbC1
SOILS DELINEATION	
EXISTING CONTOURS	999
PROPOSED CONTOURS	999
EXISTING WOODS LINE	
PROPOSED WOODS LINE	
EXISTING STRUCTURE	
PROPOSED STRUCTURE	
LIMIT OF DISTURBANCE	
PUBLIC WATER, SEWER, & UTILITY AND PRIVATE USE–IN–COMMON ACCESS EASEMENT	
PUBLIC SEWER & UTILITY EASEMENT	
PRIVATE DRAINAGE & UTILITY EASEMENT	



VICINITY MAP
SCALE: 1" = 2000'
ADC MAP NO. 35 GRID B6

NARRATIVE

The Lennox Park, Crosby Property Lots 458-465, Elkridge, Maryland comprises approximately 0.53 acres. The property is zoned R-12 and is located on the southeast side of Cedar Avenue at its terminus point adjoining the Howard Business Park. Access will be provided by a Use-In-Common Drive constructed from the existing edge of paving of Cedar Avenue. The proposed development shall consist of 3 Semi-Detached Dwellings containing 6 units total. The project is located within an existing neighborhood known as Lennox Park. The site drains from the northeast to the southwest and is conveyed off site through an off swale on the adjoining property. The project lies within the Patapsco River watershed (02-13-09) and the use is I-P.

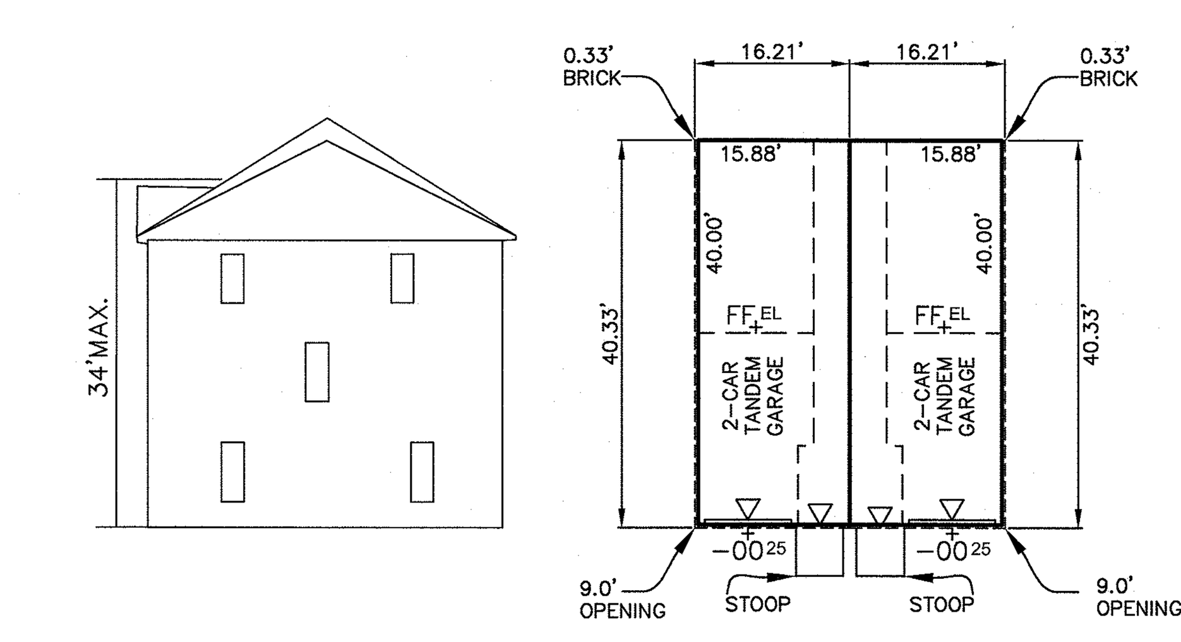
The NRCS soils in the location of this development are mostly Hydrologic Group 'C' & 'D'. Other Lots within close proximity of this site have indicated 'B' type soils. A Geotechnical Investigation was performed by Hillis-Carnes Engineering Associates, Inc. in July 2017 which determined that the on-site soils are acceptable for the proposed ESD practices.

To the best of our knowledge and available data, there are no Floodplains, Streams, or Steep Slopes located on this site. There are no Wetlands on-site per an Environmental Field Investigation performed by Hillis-Carnes Engineering Associates, Inc. on January, 2017.There are no Specimen Trees or Forested areas on-site per a Simplified Forest Stand Delineation performed by Benchmark Engineering, Inc., on February, 2017.

This site was analyzed as woods in good condition and a target RCN was determined. A target rainfall depth treatment (Pe) was determined based on the measured impervious areas and HSG soil types (mostly 'C' & 'D'). The target Pe for this site is 1.8 inches based on the overall proposed drainage area. Full treatment of the target 1.8"Pe will be provided using Environmental Site Design practices as outlined in Chapter 5 of the 2000 Maryland Stormwater Design Manual, as amended by Maryland's Stormwater Management Act of 2007. The selected methods include Drywells (M-5) for the entire rooftop for each unit and a Mico-Bioretention (M-6) for the driveways. The facilities will be privately owned and maintained.

To protect natural resources, it is important to minimize and adequately treat the stormwater runoff. The final design will incorporate adequate treatment and storage in order to create the least possible stormwater runoff in general compliance with this concept plan. The runoff will be treated on-site using approved methods. Outfalls generally correspond with the natural drainage patterns for the site.

The proposed development and ESD implementation should have no affect on adjacent properties as treatment of the target Pe in the development runoff conditions meet the existing runoff. The proposed development is not expected to have adverse effects on downstream properties, utilities, public facilities or natural systems since natural drainage pathways are maintained. Preliminary ESD practices have been designed to address 1.8 inches of runoff, the target Pe, for all area which could be conveyed to a facility. We believe this plan provides environmental site design to the maximum extent possible.



CLARENDON
(MODIFIED DOUBLE END UNIT)

TYPICAL HOUSE FOOTPRINT
SCALE: 1" = 20'

ESD STORMWATER MANAGEMENT SUMMARY TABLE

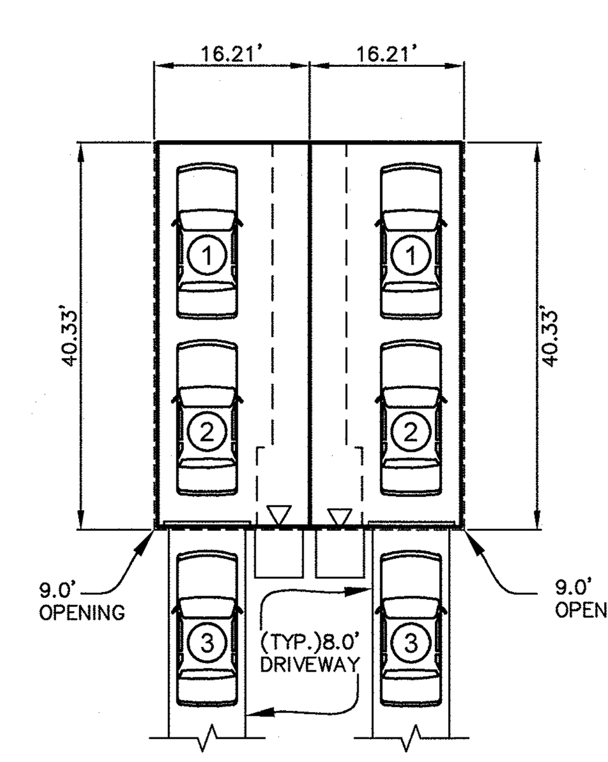
Practice			DA (sf)	Imp Area (sf)	% Imp	Rv	Pe required	Af (sf) Required	Af (sf) Provided	Af (sf) 2% DA?	ESDv (cf) Required	ESDv (cf) Provided	Pe Provided	REv Required	REv Provided	Ownership
(M-5)	Drywell	LOT 458	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5)	Drywell	LOT 459	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5)	Drywell	LOT 460	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5)	Drywell	LOT 461	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9	93cf	met via the M-5 and M-6 practices	Private
(M-5)	Drywell	LOT 462	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5)	Drywell	LOT 463	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-6)	Micro-Bioretention	MB-1	18,384	4,490	24%	0.27	1.8	368	446	PASS	744	854	2.1			Private
Totals per individual Drainage Area			22,296	8,402	40%	0.41					1301	1454				
Totals per Overall Site			26,125	8,414	35%	0.37	1.8				1332	1454				

Notes:
1. The Pe required column is based on total site Pe calculation. The Rv is based on individual drainage area percent impervious (per DED)
2. The ESDv Required for the (M-6) pratices is based on 75% of ESDv.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 1/3/20
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 1.3.20
DIRECTOR	DATE 1-3-20

SOILS CHART - SOIL SURVEY HOWARD COUNTY, MARYLAND					
SYMBOL	HYDRIC	HYDROLOGIC GROUP	ALTERNATE GROUP	NAME	k-VALUE
CrD		C		CROOM AND EVESBORO SOILS, 10 TO 15 PERCENT SLOPES	0.28/0.15
PfC		A	A	PATAPSCO-FORT MOTT COMPLEX, 5 TO 10 PERCENT SLOPES	0.10/0.17
RtD		C	C/B	RUSSETT-ALLOWAY-HAMBROOK COMPLEX, 10 TO 15 PERCENT SLOPES	0.24/0.43
SrC		B	C	SASSAFRAS AND CROOM SOIL, 5 TO 10 PERCENT SLOPES	0.37/0.28
UcD		D	B/C	URBAN LAND- CHILLUM-BELTSVILLE COMPLEX, 5 TO 15 PERCENT SLOPES	0.37



TYPICAL UNIT PARKING
SCALE: 1" = 20'

NO.	DATE	REVISION
2	9.11.20	ADD TIMBER WALL TO LOT 463
1	5.6.20	REVISE GRADES REAR OF LOTS 458 TO 463

BENCHMARK ENGINEERING, INC.
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410–465–6105 (F) 410–465–6644
WWW.BEI–CIVILENGINEERING.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. 22390, Expiration Date: 6/30/21.
1-03-20

OWNER:
7075 CEDAR, LLC
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

DEVELOPER:
H&H ROCK COMPANIES
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

LENNOX PARK CROSBY PROPERTY LOTS 458-465

TAX MAP: 43 – GRID: 06 – PARCEL: p/o319
ZONED: R–12 (RESIDENTIAL)
ELECTION DISTRICT NO. 1 – HOWARD COUNTY, MARYLAND

ALTERNATIVE COMPLIANCE EXHIBIT & SIMPLIFIED ECP

DATE: JANUARY 03, 2020		BEI PROJECT NO. 2741	
DESIGN: MCR	DRAFT: MCR	SCALE: AS SHOWN	SHEET 1 OF 3

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WP-20-059

CONSTRUCTION SPECIFICATIONS

B.4.C Specifications for Micro-Bioretention, Rain Gardens, Landscape Infiltration & Infiltration Berms

1. Material Specifications:

The allowable materials to be used in these practices are detailed in Table B.4.1.

2. Filtering Media or Planting Soil:

The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the micro-bioretention practice that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The planting soil shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds as specified under COMAR 15.08.01.05.

The planting soil shall be tested and shall meet the following criteria:

- Soil Component - Loamy Sand or Sandy Loam (USDA Soil Textural Classification)
- Organic Content - Minimum 10% by dry weight (ASTM D 2974). In general, this can be met with a mixture of loamy and(60%-65%) and compost (35% to 40%) or sandy loam (30%), coarse sand (30%), and compost (40%).
- Clay Content - Media shall have a clay content of less than 5%.
- pH Range - Should be between 5.5 - 7.0. Amendments (e.g., lime, iron sulfate plus sulfur) may be mixed into the soil to increase or decrease pH.

There shall be at least one soil test per project. Each test shall consist of both the standard soil test for pH, and additional tests of organic matter, and soluble salts. A textural analysis is required from the site stockpiled topsoil. If topsoil is imported, then a texture analysis shall be performed for each location where the topsoil was excavated.

3. Compaction:

It is very important to minimize compaction of both the base of bioretention practices and the required backfill. When possible, use excavation hoes to remove original soil. If practices are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high-pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure.

Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to refracture the soil profile through the 12 inch compaction zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfilling the optional sand layer. Pump any ponded water before preparing (rototilling) base.

When backfilling the topsoil over the sand layer, first place 3 to 4 inches of topsoil over the sand, then rototill the sand/topsoil to create a gradation zone. Backfill the remainder of the topsoil to final grade.

When backfilling the bioretention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bioretention basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

4. Plant Material:

Recommended plant material for micro-bioretention practices can be found in Appendix A, Section A.2.3.

5. Plant Installation:

Compost is a better organic material source, is less likely to float, and should be placed in the invert and other low areas. Mulch should be placed in surrounding to a uniform thickness of 2" to 3". Shredded or chipped hardwood mulch is the only accepted mulch. Pine mulch and wood chips will float and move to the perimeter of the bioretention area during a storm event and are not acceptable. Shredded mulch must be well aged (6 to 12 months) for acceptance.

Rootstock of the plant material shall be kept moist during transport and on-site storage. The plant root ball should be planted so 1/8th of the ball is above final grade surface. The diameter of the planting pit shall be at least six inches larger than the diameter of the planting ball. Set and maintain the plant straight during the entire planting process. Thoroughly water ground bed cover after installation.

Trees shall be braced using 2" by 2" stakes only as necessary and for the first growing season only. Stakes are to be equally spaced on the outside of the tree ball.

Grasses and legume seed should be drilled into the soil to a depth of at least one inch. Grass and legume plugs shall be planted following the non-grass ground cover planting specifications.

The topsoil specifications provide enough organic material to adequately supply nutrients from natural cycling. The primary function of the bioretention structure is to improve water quality. Adding fertilizers defeats, or at a minimum, impedes this goal. Only add fertilizer if wood chips or mulch are used to amend the soil. Rototill urea fertilizer at a rate of 2 pounds per 1000 square feet.

6. Underdrains:

Underdrains should meet the following criteria:

- Pipe- Should be 4" to 6" diameter, slotted or perforated rigid plastic pipe (ASTMF 758, Type PS 28, or AASHTO-M-278) in a gravel layer. The preferred material is slotted, 4" rigid pipe (e.g., PVC or HDPE).
- Perforations - If perforated pipe is used, perforations should be ⅜" diameter located 6" on center with a minimum of four holes per row. Pipe shall be wrapped with a ¼" (No. 4 or 4x4) galvanized hardware cloth.
- Gravel - The gravel layer (No. 57 stone preferred) shall be at least 3" thick above and below the underdrain
- The main collector pipe shall be at a minimum 0.5% slope.
- A rigid, non-perforated observation well must be provided (one per every 1,0000 square feet) to provide a clean-out port and monitor performance of the filter.
- A 4" layer of pea gravel (⅛" to ¾" stone) shall be located between the filter media and underdrain to prevent migration of fines into the underdrain. This layer may be considered part of the filter bed when bed thickness exceeds 24".

The main collector pipe for underdrain systems shall be constructed at a minimum slope of 0.5%. Observation wells and/or clean-out pipes must be provided (one minimum per every 1000 square feet of surface area).

7. Miscellaneous:

These practices may not be constructed until all contributing drainage area has been stabilized

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED STORMWATER, DRY WELLS (M-5)

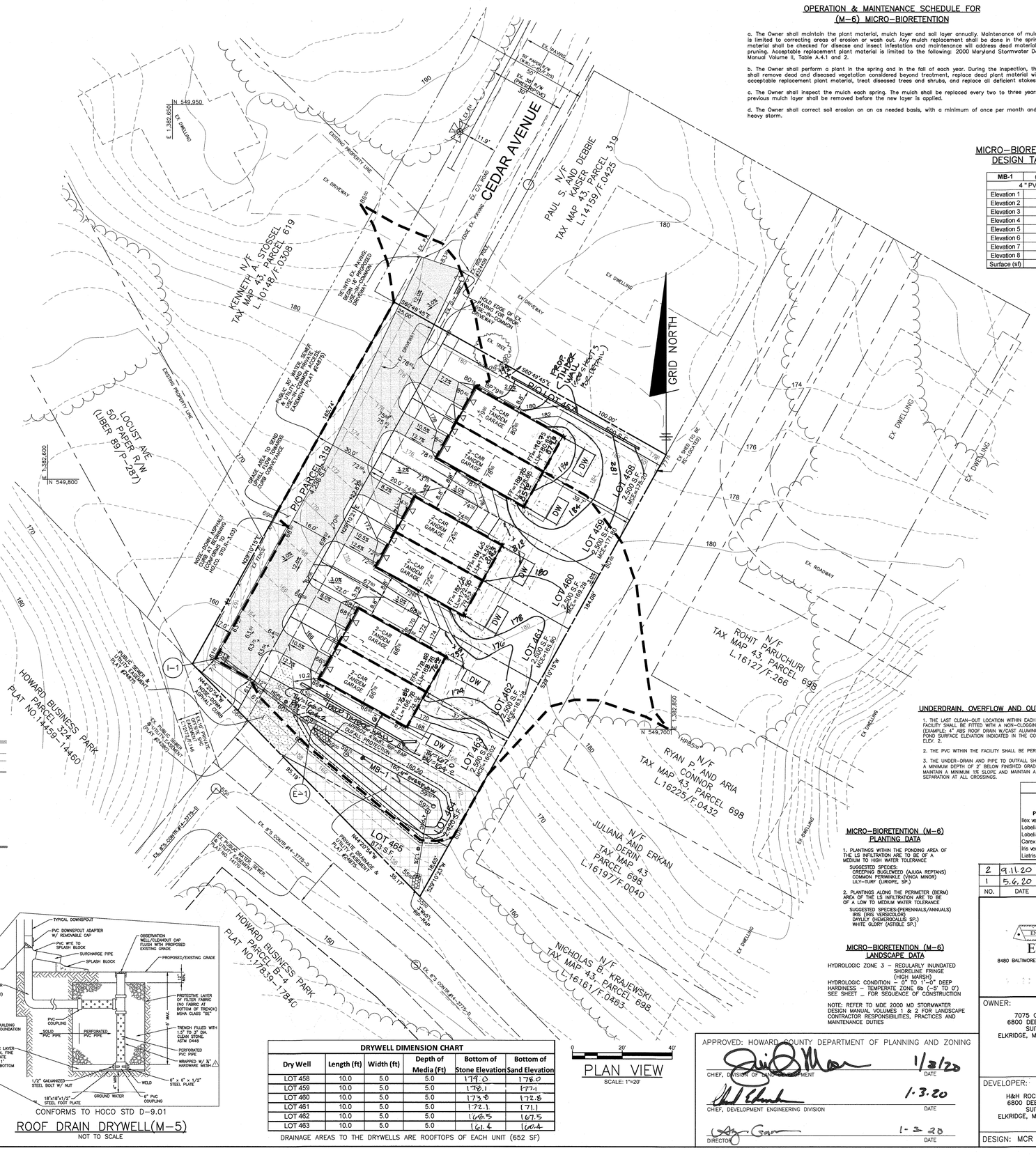
1. THE MONITORING WELLS AND STRUCTURES SHALL BE INSPECTED ON A QUARTERLY BASIS AND AFTER EVERY LARGE STORM EVENT.
2. WATER LEVELS AND SEDIMENT BUILD UP IN THE MONITORING WELLS SHALL BE RECORDED OVER A PERIOD OF SEVERAL DAYS TO INSURE TRENCH DRAINAGE.
3. A LOG BOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
4. WHEN THE FACILITY BECOMES CLOGGED SO THAT IT DOES NOT DRAIN DOWN WITHIN THE 72 HOUR TIME PERIOD, CORRECTIVE ACTION SHALL BE TAKEN.
5. THE MAINTENANCE LOG BOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
6. ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION FACILITY HAVE BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.

TABLE B.3.2 MATERIALS AND SPECIFICATIONS FOR SWM FACILITIES (DRYWELLS)

MATERIAL	SPECIFICATION	SIZE	NOTES:
PLANTINGS (IF REQUIRED)	SEE APPENDIX A; TABLE A.4	N/A	PLANTINGS ARE SITE SPECIFIC
PLANTING SOIL (2.5' TO 4.0' DEEP)	SAND: 35-60% SILT: 30-35% CLAY: 10-25%	N/A	USDA SOIL TYPES: LOAMY SAND, SANDY LOAM OR LOAM
MULCH	SHREDDED HARDWOOD	N/A	2" TO 3" DEPTH, AGED 6 MONTHS, MINIMUM
GEOTEXTILE (CLASS "C")	APPARENT OPENING SIZE: (ASTM D-4751) GRAB TENSILE STRENGTH: (ASTM D-4632) PUNCTURE RESISTANCE: (ASTM D-4833)	N/A	FOR USE AS NECESSARY BENEATH UNDERDRAINS ONLY
UNDERDRAIN GRAVEL	AASHTO M-43	0.375" TO 0.750"	
UNDERDRAIN PIPING	F758, TYPE PS28 OR AASHTO M-278	4" TO 6" RIGID SCH.40 PVC OR SDR35	3/8" PERF. @ 6" O/C, 4 HOLES PER ROW, MINIMUM OF 3" OF GRAVEL OVER PIPES, NOT NECESSARY UNDERNEATH PIPES
POURED-IN-PLACE CONC. (IF REQUIRED)	MSHA MIX NO.3; f'c=3500psi @ 28 DAYS, NORMAL WEIGHT, AIR ENTRAINED; REINFORCING TO MEET ASTM 615-60	N/A	ON-SITE TESTING OF POURED-IN-PLACE CONC. REQUIRED; 28 DAY STRENGTH TEST AND SLUMP TEST; ALL CONC. DESIGN (CAST-IN-PLACE or PRE-CAST) NOT USING PREVIOUSLY APPROVED STATE OR LOCAL STANDARDS REQUIRES DESIGN DRAWINGS SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND. - DESIGN TO INCLUDE MEETING ACI CODE 350.R/89: VERTICAL LOADING (H-10 or H-20) ALLOWABLE HORIZONTAL LOADING (BASED ON SOIL PRESSURES); AND ANALYSIS OF POTENTIAL CRACKING
CHEESY DAM (TREATED WOOD)	AWPA STANDARD C6	6"X6" OR 8"X8"	DO NOT COAT WITH CREOSOTE. EMBED AT LEAST 3' INTO SIDE SLOPES

LEGEND

SOILS CLASSIFICATION — AbC1
SOILS DELINEATION
EXISTING CONTOURS — 999
PROPOSED CONTOURS — 999
EXISTING WOODS LINE
PROPOSED WOODS LINE
EXISTING STRUCTURE
PROPOSED STRUCTURE
ESD DRAINAGE AREA
PUBLIC WATER, SEWER, & UTILITY AND PRIVATE USE-IN-COMMON ACCESS EASEMENT
PUBLIC SEWER & UTILITY EASEMENT
PRIVATE DRAINAGE & UTILITY EASEMENT



OPERATION & MAINTENANCE SCHEDULE FOR (M-6) MICRO-BIORETENTION

a. The Owner shall maintain the plant material, mulch layer and soil layer annually. Maintenance of mulch and soil is limited to correcting areas of erosion or wash out. Any mulch replacement shall be done in the spring. Plant material shall be checked for disease and insect infestation and maintenance will address dead material and pruning. Acceptable replacement plant material is limited to the following: 2000 Maryland Stormwater Design Manual Volume II, Table A.4.1 and 2.

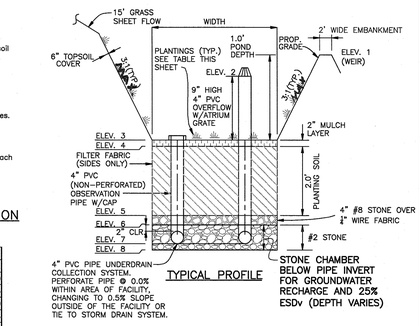
b. The Owner shall perform a plant in the spring and in the fall of each year. During the inspection, the Owner shall remove dead and diseased vegetation considered beyond treatment, replace dead plant material with acceptable replacement plant material, treat diseased trees and shrubs, and replace all deficient stakes and wires.

c. The Owner shall inspect the mulch each spring. The mulch shall be replaced every two to three years. The previous mulch layer shall be removed before the new layer is applied.

d. The Owner shall correct soil erosion on an as needed basis, with a minimum of once per month and after each heavy storm.

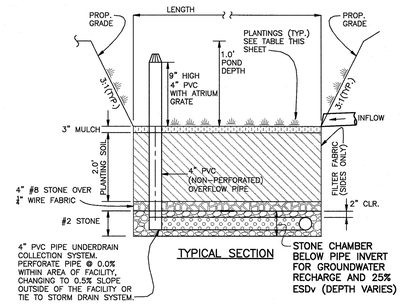
MICRO-BIORETENTION DESIGN TABLE

MB-1	(M-6)
	4 " PVC
Elevation 1	160.00
Elevation 2	159.75
Elevation 3	159.00
Elevation 4	158.83
Elevation 5	156.83
Elevation 6	156.50
Elevation 7	155.92
Elevation 8	155.40
Surface (sf)	889.8



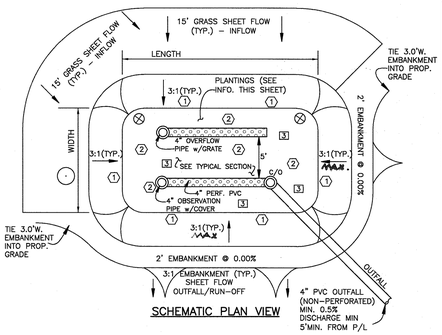
TYPICAL PROFILE

STONE CHAMBER BELOW PIPE INVERT FOR GROUNDWATER RECHARGE AND 25% ESDv (DEPTH VARIES)



TYPICAL SECTION

STONE CHAMBER BELOW PIPE INVERT FOR GROUNDWATER RECHARGE AND 25% ESDv (DEPTH VARIES)



SCHEMATIC PLAN VIEW

UNDERDRAIN, OVERFLOW AND OUTFALL NOTES

1. THE LAST CLEAN-OUT LOCATION WITHIN EACH MICRO-BIORETENTION FACILITY SHALL BE FITTED WITH A NON-CLOGGING SURFACE DRAIN (EXAMPLE: 4" ABS ROOF DRAIN W/CAST ALUMINUM DOME) AT THE POND SURFACE ELEVATION INDICATED IN THE CORRESPONDING TABLE ELEV. 2.
2. THE PVC WITHIN THE FACILITY SHALL BE PERFORATED.
3. THE UNDER-DRAIN AND PIPE TO OUTFALL SHALL BE INSTALLED TO A MINIMUM DEPTH OF 2' BELOW FINISHED GRADE AND SHALL MAINTAIN A MINIMUM 1% SLOPE AND MAINTAIN A MINIMUM OF 1' OF SEPARATION AT ALL CROSSINGS.

TYPICAL MICRO-BIORETENTION DETAILS

NOT TO SCALE

MICRO-BIORETENTION (M-6) PLANTING DATA

1. PLANTINGS WITHIN THE PONDING AREA OF THE LS INFILTRATION ARE TO BE OF A MEDIUM TO HIGH WATER TOLERANCE
   SUGGESTED SPECIES:
   CREEPING BUGLEWEED (AJUGA REPTANS)
   COMMON PERIWINKLE (VINCA MINOR)
   LILY-TURF (LIRIOPE, SP.)
2. PLANTINGS ALONG THE PERIMETER (BERM) AREA OF THE LS INFILTRATION ARE TO BE OF A LOW TO MEDIUM WATER TOLERANCE
   SUGGESTED SPECIES:(PERENNIALS/ANNUALS)
   IRIS (IRIS VERSICOLOR)
   DAYLILY (HEMEROCALLIS SP.)
   WHITE GLORY (ASTIBLE SP.)

MICRO-BIORETENTION (M-6) LANDSCAPE DATA

HYDROLOGIC ZONE 3 – REGULARLY INUNDATED SHORELINE FRINGE (HIGH MARSH)
HYDROLOGIC CONDITION – 0" TO 1'-0" DEEP
HARDINESS – TEMPERATE ZONE 6b (-5° TO 0°)
SEE SHEET – FOR SEQUENCE OF CONSTRUCTION

NOTE: REFER TO MDE 2000 MD STORMWATER DESIGN MANUAL VOLUMES 1 & 2 FOR LANDSCAPE CONTRACTOR RESPONSIBILITIES, PRACTICES AND MAINTENANCE DUTIES

(M-6) Micro Bio-Retention Landscaping Chart

PLANT NAME	COMMON NAME	TYPE	SIZE	MB #1 889.8 QUANTITY	TOTAL 889.8 QUANTITY
Ilex verticillata	Common Winterberry	shrub	2.5'-3' ht	9	9
Lobelia cardinalis	Cardinal flower	perennial herbaceous plant	quart bulb	59	59
Lobelia siphilitica	Great Blue Lobelia	perennial herbaceous plant	quart bulb	59	59
Carex stricta	Uptight Sedge	grass	quart bulb	59	59
Iris versicolor	Blue Water Iris	perennial herbaceous plant	quart bulb	59	59
Liatris spicata	Prairie Gay Feather	perennial herbaceous plant	quart bulb	59	59

CONFORMS TO HOCO STD D-9.01

ROOF DRAIN DRYWELL(M-5)

NOT TO SCALE

DRYWELL DIMENSION CHART

Dry Well	Length (ft)	Width (ft)	Depth of Media (Ft)	Bottom of Stone Elevation	Bottom of Sand Elevation
LOT 458	10.0	5.0	5.0	179.0	178.0
LOT 459	10.0	5.0	5.0	178.1	177.1
LOT 460	10.0	5.0	5.0	173.0	172.8
LOT 461	10.0	5.0	5.0	172.1	171.1
LOT 462	10.0	5.0	5.0	168.5	167.5
LOT 463	10.0	5.0	5.0	161.4	160.4

DRAINAGE AREAS TO THE DRYWELLS ARE ROOFTOPS OF EACH UNIT (652 SF)

PLAN VIEW

SCALE: 1"=20'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 1/3/20

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 1.3.20

DIRECTOR — DATE 1-3-20

NO.	DATE	REVISION
2	9.11.20	ADD TIMBER WALL TO LOT 463
1	5.6.20	REVISE GRADES REAR OF LOTS 463 TO 458

BENCHMARK ENGINEERING, INC.
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
WWW.BEI-CIVILENGINEERING.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. 22390, Expiration Date: 6/30/21.

STATE OF MARYLAND — CHRISTOPHER CLARK MALONEY — No. 22390 — PROFESSIONAL ENGINEER

1-03-20

OWNER:
7075 CEDAR, LLC
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

DEVELOPER:
H&H ROCK COMPANIES
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

LENNOX PARK
CROSBY PROPERTY
LOTS 458-465

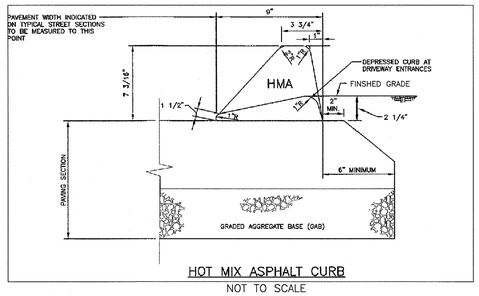
TAX MAP: 43 – GRID: 06 – PARCEL: p/o319
ZONED: R-12 (RESIDENTIAL)
ELECTION DISTRICT NO. 1 – HOWARD COUNTY, MARYLAND

ALTERNATIVE COMPLIANCE EXHIBIT & SIMPLIFIED ECP

DATE: JANUARY 03, 2020 — BEI PROJECT NO. 2741
DESIGN: MCR — DRAFT: MCR — SCALE: AS SHOWN — SHEET 2 OF 3

J:\2741 Lennox Park\dwg\CONCEPT-V5.dwg, ESD, 1/3/2020 2:57:32 PM

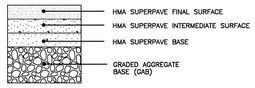
WP-20-059



HOT MIX ASPHALT CURB

NOT TO SCALE

THIS DETAIL CONFORMS TO HO.CO. DMV IV R-3.03

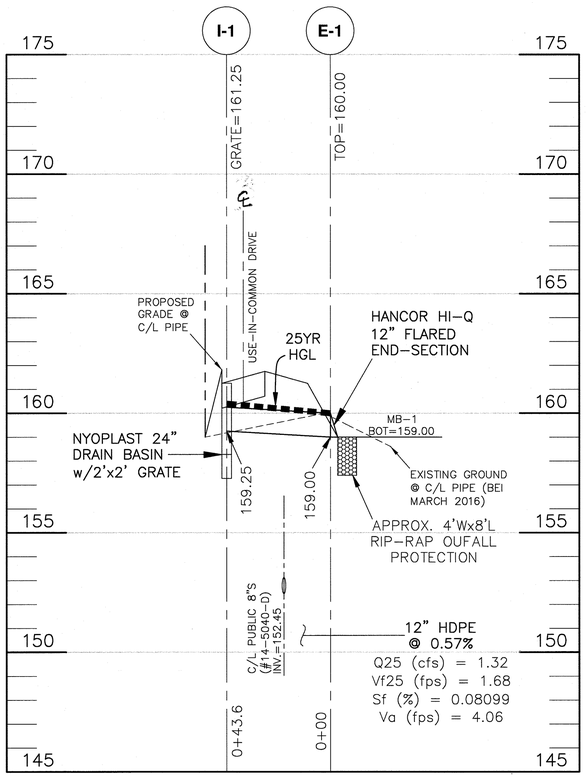


SCHEMATIC PAVING DETAIL

NOT TO SCALE

SECTION NUMBER	ROAD AND STREET CLASSIFICATION	CALIFORNIA BEARING RATIO (CBR)	3 to <5	5 to <7	≥7	3 to <5	5 to <7	≥7
		PAVEMENT MATERIAL (INCHES)	MIN. HMA WITH GAB			HMA WITH CONSTANT GAB		
P-2	PARKING DRIVE AISLES: RESIDENTIAL AND NON-RESIDENTIAL WITH NO MORE THAN 10 HEAVY TRUCKS PER DAY LOCAL ROADS: ACCESS PLACE; ACCESS STREET CUL-DE-SAC: RESIDENTIAL	HMA SUPERPAVE FINAL SURFACE 9.5 MM PG 64-22, LEVEL 1 (LOW ESAL)	1.5	1.5	1.5	1.5	1.5	1.5
		HMA SUPERPAVE INTERMEDIATE SURFACE, 9.5 MM PG 64-22, LEVEL 1 (LOW ESAL)	1.0	1.0	1.0	1.0	1.0	1.0
		HMA SUPERPAVE BASE 9.0 MM PG 64-22, LEVEL 1 (LOW ESAL)	2.0	2.0	2.0	3.5	2.0	2.0
		GRADED AGGREGATE BASE (GAB)	8.0	4.0	3.0	4.0	4.0	4.0

PAVING SPECIFICATIONS (HO.CO. STD R-2.01)



SD PROFILE

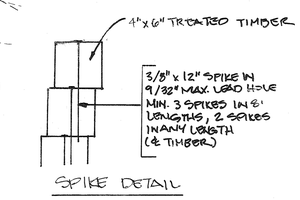
HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 3'

PLAN VIEW

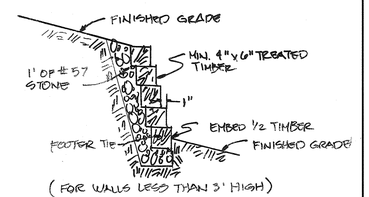
SCALE: 1"=20'

LEGEND

SOILS CLASSIFICATION	AbC1
SOILS DELINEATION	
EXISTING CONTOURS	999
PROPOSED CONTOURS	999
EXISTING WOODS LINE	
PROPOSED WOODS LINE	
EXISTING STRUCTURE	
PROPOSED STRUCTURE	
SD DRAINAGE AREA	
PUBLIC WATER, SEWER, & UTILITY AND PRIVATE USE-IN-COMMON ACCESS EASEMENT	
PUBLIC SEWER & UTILITY EASEMENT	
PRIVATE DRAINAGE & UTILITY EASEMENT	



SPIKE DETAIL



(FOR WALLS LESS THAN 3' HIGH)

TIMBER RETAINING WALL DETAIL

NOT TO SCALE

PIPE SCHEDULE			
SIZE	TYPE	LENGTH (L.F.)	MAINTENANCE
12"	HDPE	43.6	PRIVATE
4" (MB-1)	PVC	26.3	PRIVATE

All pipes shall have smooth interior. No interior corrugations.

STRUCTURE SCHEDULE								
STRUCTURE	TYPE	LOCATION	INVERT IN		INVERT OUT	TOP ELEV.	THROAT ELEV.	STD. DETAIL	MAINTENANCE
INLETS									
I-1	NDS 24"x24"	N 549,728.7314 E 1,382,669.8137	-	-	159.25	-	161.25	Manufacturer Specs.	PRIVATE
MANHOLES									
-	-	-	-	-	-	-	-		PRIVATE
HEADWALLS/END SECTIONS									
ES-1	HDPE End Section	N 549,702.1827 E 1,382,704.3474	-	-	159.00	160.00	-	Manufacturer Specs.	PRIVATE

STRUCTURE LOCATION FOR MANHOLES IS AT THE CENTER OF THE MANHOLE RIM.
STRUCTURE LOCATION FOR END SECTIONS IS AT THE MIDPOINT OF THE END OF THE STRUCTURE
PRECAST STRUCTURES MEETING HS-20 LOADING MAY BE USED.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 1/3/20

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 1.3.20

DIRECTOR — DATE 1-3-20

NO.	DATE	REVISION
2	9.11.20	ADD TIMBER WALL LOT 463
1	5.6.20	REVISE GRADES REAR OF LOTS 458 TO 463 & ADD TIMBER WALL

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
WWW.BEI-CIVILENGINEERING.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. 22390, Expiration Date: 6/30/21.

1-03-20

OWNER:
7075 CEDAR, LLC
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

DEVELOPER:
H&H ROCK COMPANIES
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

LENNOX PARK
CROSBY PROPERTY
LOTS 458-465

TAX MAP: 43 - GRID: 06 - PARCEL: p/o319
ZONED: R-12 (RESIDENTIAL)
ELECTION DISTRICT NO. 1 - HOWARD COUNTY, MARYLAND

ALTERNATIVE COMPLIANCE EXHIBIT STORM DRAINAGE MAP AND PROFILES, NOTES & DETAILS

DATE: JANUARY 03, 2020 — BEI PROJECT NO. 2741
DESIGN: MCR — DRAFT: MCR
SCALE: AS SHOWN — SHEET 3 OF 3

J:\2741 Lennox Park\dwg\CONCEPT-V5.dwg, SD&DETAILS, 1/3/2020 2:58:15 PM

WP-20-059

GENERAL NOTES

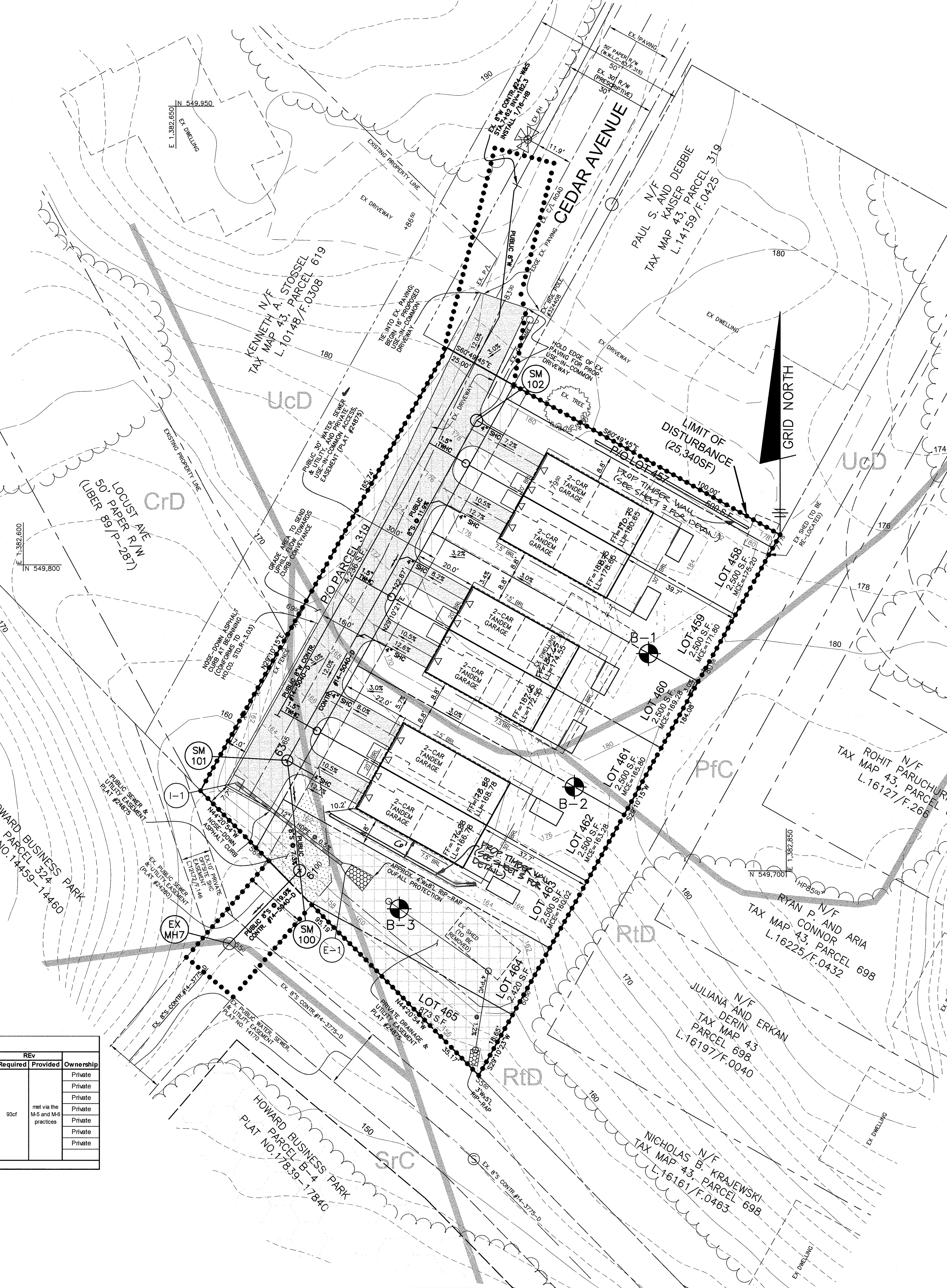
1. THE TOPOGRAPHY SHOWN HEREON IS BASED ON A FIELD RUN SURVEY DATED FEBRUARY, 2016 BY BENCHMARK ENGINEERING, INC. THE BOUNDARY SHOWN HEREON IS BASED ON BOUNDARY SURVEY PREPARED BY BENCHMARK ENGINEERING INC., DATED MARCH, 2016.
2. THE PROPERTY IS KNOWN AS TAX MAP 43, GRID 06, PARCEL 319. THIS INCLUDES LOTS 458–465, P/O LOT 457, AND A PORTION OF CEDAR AVENUE. THE TOTAL PROPERTY AREA IS APPROXIMATELY 0.53 ACRES.
3. THE PROPERTY IS ZONED R–12 PER THE 10.06.13 COMPREHENSIVE ZONING PLAN.
4. THE EXISTING HOUSE LOCATED ON THE PROPERTY IS TO BE REMOVED; THE EXISTING DRIVEWAY WILL BE IMPROVED TO A 16' WIDE USE–IN–COMMON DRIVE TO PROVIDE ACCESS FOR THE DEVELOPMENT. THE APPROXIMATE LIMIT OF DISTURBANCE = 25,420 SF
5. STORMWATER MANAGEMENT FOR THIS SITE WILL BE PROVIDED BY DRYWELLS FOR THE ROOFTOPS AND MICRO–BIORETENTION FOR THE DRIVEWAYS AND USE–IN–COMMON DRIVE.
6. THESE LOTS ARE EXISTING LOTS KNOWN AS LENNOX PARK RECORDED AS PLATBOOK 83 PAGE 315 DATED FEBRUARY 4, 1907.
7. A TRAFFIC STUDY IS NOT REQUIRED FOR THIS DEVELOPMENT SINCE THE LOTS ARE EXISTING AND NO NEW LOTS ARE TO BE CREATED.
8. TO THE BEST OF OUR KNOWLEDGE AND AVAILABLE DATA, THERE ARE NO FLOODPLAINS, STREAMS, OR STEEP SLOPES LOCATED ON THIS SITE.
9. THERE ARE NO WETLANDS ON–SITE PER AN ENVIRONMENTAL FIELD INVESTIGATION PERFORMED BY HILLIS–CARNES ENGINEERING ASSOCIATES, INC. ON JANUARY, 2017.
10. THERE ARE NO SPECIMEN TREES OR FORESTED AREAS ON–SITE PER A SIMPLIFIED FOREST STAND DELINEATION PERFORMED BY BENCHMARK ENGINEERING, INC ON FEBRUARY, 2017.
11. A GEOTECHNICAL INVESTIGATION WAS PERFORMED HILLIS–CARNES ENGINEERING ASSOCIATES, INC. WHICH DETERMINED THAT THE ONSITE SOILS ARE ACCEPTABLE FOR THE PROPOSED ESD PRACTICES.
12. A NOISE STUDY IN NOT REQUIRED FOR THIS PROPERTY SINCE IT IS NOT IN THE AIRPORT NOISE ZONE AND IS MORE THAN 500' FROM A RAIL LINE.
13. LOTS 458 THRU 463 WILL BE DEVELOPED WITH SINGLE–FAMILY SEMI–DETACHED UNITS; LOTS 464 TO 465 WILL BE UTILIZED FOR ESD–SWM; AND THE REMAINING PORTION OF PARCEL WILL BE UTILIZED FOR A USE–IN–COMMON DRIVEWAY AND UTILITIES.
14. THIS PLAN IS SUBJECT TO AN ALTERNATIVE COMPLIANCE WP–17–085 APPROVED NOVEMBER 14, 2017 TO SECTION 16.155(a)(2) RESIDENTIAL: NEW RESIDENTIAL DEVELOPMENT REQUIRING APPROVAL OF A SITE DEVELOPMENT PLAN FOR SIX SEMI–DETACHED DUPLEX UNITS APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:

    1. THE DED COMMENTS DATED NOVEMBER 13, 2017.

    2. THE ALTERNATIVE COMPLIANCE EXHIBIT SHALL SERVE AS A SUBSTITUTE FOR A SITE DEVELOPMENT PLAN FOR DEVELOPMENT. ALL IMPROVEMENTS SHOWN ON THE EXHIBIT MUST BE CONSTRUCTED PER THE PLAN EXHIBITS SUBMITTED DATED OCTOBER 7, 2017. THE REVISED ALTERNATIVE COMPLIANCE PLAN EXHIBIT SHALL BE SUBMITTED AS AN ORIGINAL MYLAR AND RECEIVE SIGNATURE APPROVAL FROM THE DEPARTMENT OF PLANNING & ZONING, PRIOR TO APPLYING FOR PERMITS. THE ORIGINAL MYLAR PLAN EXHIBIT SHALL BE SUBMITTED WITHIN 45 DAYS OF THIS LETTER (ON OR BEFORE DECEMBER 29, 2017)

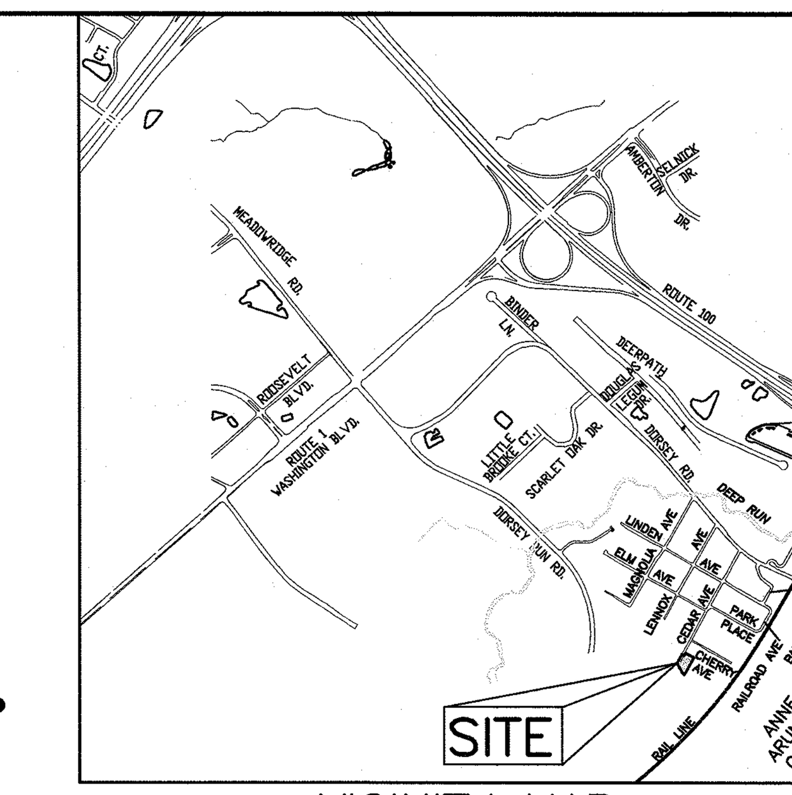
    3. COMPLIANCE WITH ALL APPLICABLE COUNTY & STATE REGULATIONS, AND OBTAIN ALL NECESSARY PERMITS FROM THE DEPARTMENT OF INSPECTIONS, LICENSES & PERMITS, PRIOR TO INITIATING DEVELOPMENT ON–SITE

    – NOTE: WP–17–085 HAS SINCE EXPIRED AND A NEW ALTERNATIVE COMPLIANCE IS BEING REQUESTED VIA THIS PLAN EXHIBIT AND APPLICATION.



LEGEND

SOILS CLASSIFICATION	AbC1
SOILS DELINEATION	
EXISTING CONTOURS	999
PROPOSED CONTOURS	999
EXISTING WOODS LINE	
PROPOSED WOODS LINE	
EXISTING STRUCTURE	
PROPOSED STRUCTURE	
LIMIT OF DISTURBANCE	
PUBLIC WATER, SEWER, & UTILITY AND PRIVATE USE–IN–COMMON ACCESS EASEMENT	
PUBLIC SEWER & UTILITY EASEMENT	
PRIVATE DRAINAGE & UTILITY EASEMENT	



VICINITY MAP
SCALE: 1" = 2000'
ADC MAP NO. 35 GRID B6

NARRATIVE

The Lennox Park, Crosby Property Lots 458-465, Elkridge, Maryland comprises approximately 0.53 acres. The property is zoned R-12 and is located on the southeast side of Cedar Avenue at its terminus point adjoining the Howard Business Park. Access will be provided by a Use-In-Common Drive constructed from the existing edge of paving of Cedar Avenue. The proposed development shall consist of 3 Semi-Detached Dwellings containing 6 units total. The project is located within an existing neighborhood known as Lennox Park. The site drains from the northeast to the southwest and is conveyed off site through an off swale on the adjoining property. The project lies within the Patapsco River watershed (02-13-09) and the use is I-P.

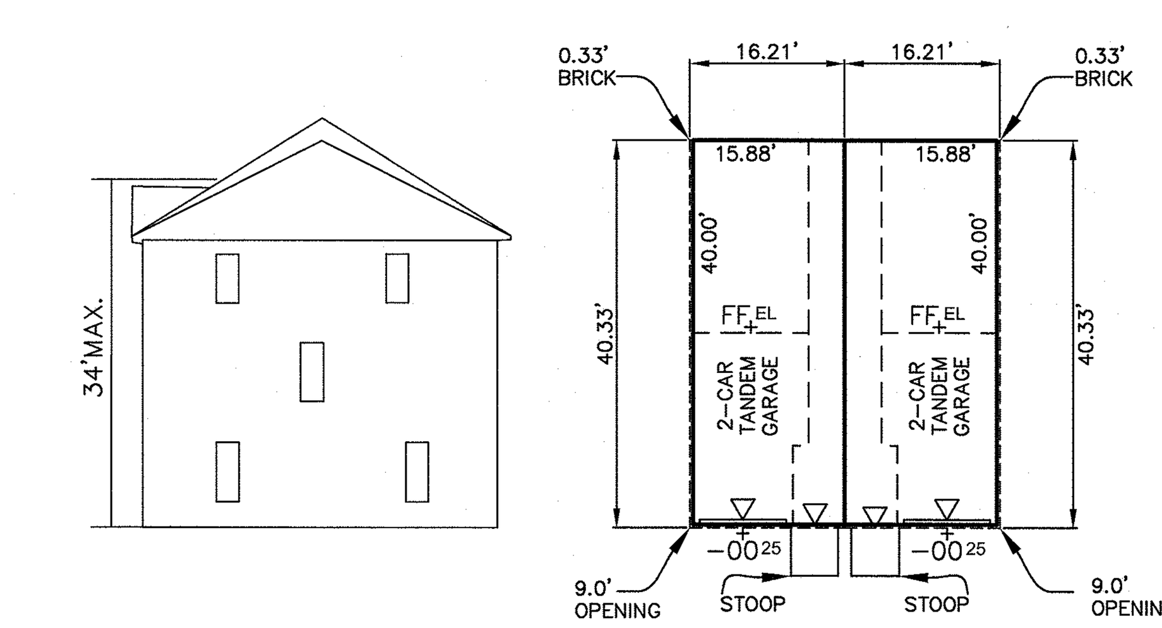
The NRCS soils in the location of this development are mostly Hydrologic Group 'C' & 'D'. Other Lots within close proximity of this site have indicated 'B' type soils. A Geotechnical Investigation was performed by Hillis-Carnes Engineering Associates, Inc. in July 2017 which determined that the on-site soils are acceptable for the proposed ESD practices.

To the best of our knowledge and available data, there are no Floodplains, Streams, or Steep Slopes located on this site. There are no Wetlands on-site per an Environmental Field Investigation performed by Hillis-Carnes Engineering Associates, Inc. on January, 2017.There are no Specimen Trees or Forested areas on-site per a Simplified Forest Stand Delineation performed by Benchmark Engineering, Inc., on February, 2017.

This site was analyzed as woods in good condition and a target RCN was determined. A target rainfall depth treatment (Pe) was determined based on the measured impervious areas and HSG soil types (mostly 'C' & 'D'). The target Pe for this site is 1.8 inches based on the overall proposed drainage area. Full treatment of the target 1.8"Pe will be provided using Environmental Site Design practices as outlined in Chapter 5 of the 2000 Maryland Stormwater Design Manual, as amended by Maryland's Stormwater Management Act of 2007. The selected methods include Drywells (M-5) for the entire rooftop for each unit and a Mico-Bioretention (M-6) for the driveways. The facilities will be privately owned and maintained.

To protect natural resources, it is important to minimize and adequately treat the stormwater runoff. The final design will incorporate adequate treatment and storage in order to create the least possible stormwater runoff in general compliance with this concept plan. The runoff will be treated on-site using approved methods. Outfalls generally correspond with the natural drainage patterns for the site.

The proposed development and ESD implementation should have no affect on adjacent properties as treatment of the target Pe in the development runoff conditions meet the existing runoff. The proposed development is not expected to have adverse effects on downstream properties, utilities, public facilities or natural systems since natural drainage pathways are maintained. Preliminary ESD practices have been designed to address 1.8 inches of runoff, the target Pe, for all area which could be conveyed to a facility. We believe this plan provides environmental site design to the maximum extent possible.



CLARENDON
(MODIFIED DOUBLE END UNIT)

TYPICAL HOUSE FOOTPRINT
SCALE: 1" = 20'

ESD STORMWATER MANAGEMENT SUMMARY TABLE

Practice	DA (sf)	Imp Area (sf)	% Imp	Rv	Pe required	Af (sf) Required	Af (sf) Provided	Af (sf) 2% DA?	ESDv (cf) Required	ESDv (cf) Provided	Pe Provided	REv Required	REv Provided	Ownership
(M-5) Drywell LOT 458	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5) Drywell LOT 459	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5) Drywell LOT 460	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5) Drywell LOT 461	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9	93cf	met via the M-5 and M-6 practices	Private
(M-5) Drywell LOT 462	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-5) Drywell LOT 463	652	652	100%	0.95	1.8	50	50	PASS	93	100	1.9			Private
(M-6) Micro-Bioretention MB-1	18,384	4,490	24%	0.27	1.8	368	446	PASS	744	854	2.1			Private
Totals per individual Drainage Area	22,296	8,402	40%	0.41					1301	1454				
Totals per Overall Site	26,125	8,414	35%	0.37	1.8				1332	1454				

Notes:
1. The Pe required column is based on total site Pe calculation. The Rv is based on individual drainage area percent impervious (per DED)
2. The ESDv Required for the (M-6) pratices is based on 75% of ESDv.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

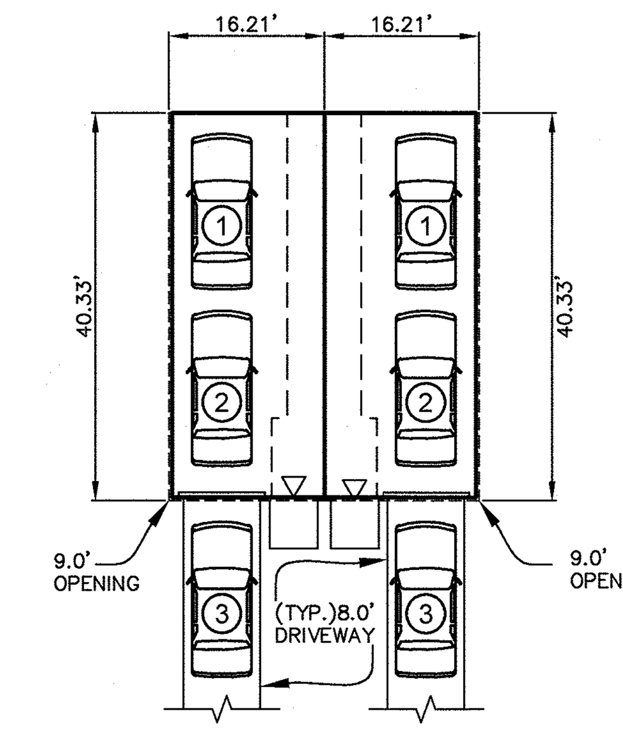
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 1/3/20
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 1.3.20
DIRECTOR	DATE 1-3-20

SOILS CHART - SOIL SURVEY HOWARD COUNTY, MARYLAND

SYMBOL	HYDRIC	HYDROLOGIC GROUP	ALTERNATE GROUP	NAME	k-VALUE
CrD		C		CROOM AND EVESBORO SOILS, 10 TO 15 PERCENT SLOPES	0.28/0.15
PfC		A	A	PATAPSCO-FORT MOTT COMPLEX, 5 TO 10 PERCENT SLOPES	0.10/0.17
RtD		C	C/B	RUSSETT-ALLOWAY-HAMBROOK COMPLEX, 10 TO 15 PERCENT SLOPES	0.24/0.43
SrC		B	C	SASSAFRAS AND CROOM SOIL, 5 TO 10 PERCENT SLOPES	0.37/0.28
UcD		D	B/C	URBAN LAND- CHILLUM-BELTSVILLE COMPLEX, 5 TO 15 PERCENT SLOPES	0.37

0 20' 40'

PLAN VIEW
SCALE: 1"=20'



TYPICAL UNIT PARKING
SCALE: 1" = 20'

NO.	DATE	REVISION
2	9.11.20	ADD TIMBER WALL TO LOT 463
1	5.6.20	REVISE GRADES REAR OF LOTS 458 TO 463

BENCHMARK ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410–465–6105 (F) 410–465–6644
WWW.BEI–CIVILENGINEERING.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. 22390, Expiration Date: 6/30/21.
1-03-20

OWNER:
7075 CEDAR, LLC
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

DEVELOPER:
H&H ROCK COMPANIES
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

LENNOX PARK CROSBY PROPERTY LOTS 458-465

TAX MAP: 43 – GRID: 06 – PARCEL: p/o319
ZONED: R–12 (RESIDENTIAL)
ELECTION DISTRICT NO. 1 – HOWARD COUNTY, MARYLAND

ALTERNATIVE COMPLIANCE EXHIBIT & SIMPLIFIED ECP

DESIGN: MCR	DRAFT: MCR	DATE: JANUARY 03, 2020	BEI PROJECT NO. 2741
		SCALE: AS SHOWN	SHEET 1 OF 3

J:\2741 Lennox Park\dwg\CONCEPT-V5.dwg, ECP, 1/3/2020 2:54:39 PM

WP-20-059

CONSTRUCTION SPECIFICATIONS

B.4.C Specifications for Micro-Bioretention, Rain Gardens, Landscape Infiltration & Infiltration Berms

1. Material Specifications:

The allowable materials to be used in these practices are detailed in Table B.4.1.

2. Filtering Media or Planting Soil:

The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the micro-bioretention practice that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The planting soil shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds as specified under COMAR 15.08.01.05.

The planting soil shall be tested and shall meet the following criteria:

- Soil Component - Loamy Sand or Sandy Loam (USDA Soil Textural Classification)
- Organic Content - Minimum 10% by dry weight (ASTM D 2974). In general, this can be met with a mixture of loamy and(60%-65%) and compost (35% to 40%) or sandy loam (30%), coarse sand (30%), and compost (40%).
- Clay Content - Media shall have a clay content of less than 5%.
- pH Range - Should be between 5.5 - 7.0. Amendments (e.g., lime, iron sulfate plus sulfur) may be mixed into the soil to increase or decrease pH.

There shall be at least one soil test per project. Each test shall consist of both the standard soil test for pH, and additional tests of organic matter, and soluble salts. A textural analysis is required from the site stockpiled topsoil. If topsoil is imported, then a texture analysis shall be performed for each location where the topsoil was excavated.

3. Compaction:

It is very important to minimize compaction of both the base of bioretention practices and the required backfill. When possible, use excavation hoes to remove original soil. If practices are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high-pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure.

Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to refracture the soil profile through the 12 inch compaction zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfilling the optional sand layer. Pump any ponded water before preparing (rototilling) base.

When backfilling the topsoil over the sand layer, first place 3 to 4 inches of topsoil over the sand, then rototill the sand/topsoil to create a gradation zone. Backfill the remainder of the topsoil to final grade.

When backfilling the bioretention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bioretention basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

4. Plant Material:

Recommended plant material for micro-bioretention practices can be found in Appendix A, Section A.2.3.

5. Plant Installation:

Compost is a better organic material source, is less likely to float, and should be placed in the invert and other low areas. Mulch should be placed in surrounding to a uniform thickness of 2" to 3". Shredded or chipped hardwood mulch is the only accepted mulch. Pine mulch and wood chips will float and move to the perimeter of the bioretention area during a storm event and are not acceptable. Shredded mulch must be well aged (6 to 12 months) for acceptance.

Rootstock of the plant material shall be kept moist during transport and on-site storage. The plant root ball should be planted so 1/8th of the ball is above final grade surface. The diameter of the planting pit shall be at least six inches larger than the diameter of the planting ball. Set and maintain the plant straight during the entire planting process. Thoroughly water ground bed cover after installation.

Trees shall be braced using 2" by 2" stakes only as necessary and for the first growing season only. Stakes are to be equally spaced on the outside of the tree ball.

Grasses and legume seed should be drilled into the soil to a depth of at least one inch. Grass and legume plugs shall be planted following the non-grass ground cover planting specifications.

The topsoil specifications provide enough organic material to adequately supply nutrients from natural cycling. The primary function of the bioretention structure is to improve water quality. Adding fertilizers defeats, or at a minimum, impedes this goal. Only add fertilizer if wood chips or mulch are used to amend the soil. Rototill urea fertilizer at a rate of 2 pounds per 1000 square feet.

6. Underdrains:

Underdrains should meet the following criteria:

- Pipe- Should be 4" to 6" diameter, slotted or perforated rigid plastic pipe (ASTMF 758, Type PS 28, or AASHTO-M-278) in a gravel layer. The preferred material is slotted, 4" rigid pipe (e.g., PVC or HDPE).
- Perforations - If perforated pipe is used, perforations should be ⅜" diameter located 6" on center with a minimum of four holes per row. Pipe shall be wrapped with a ¼" (No. 4 or 4x4) galvanized hardware cloth.
- Gravel - The gravel layer (No. 57 stone preferred) shall be at least 3" thick above and below the underdrain
- The main collector pipe shall be at a minimum 0.5% slope.
- A rigid, non-perforated observation well must be provided (one per every 1,0000 square feet) to provide a clean-out port and monitor performance of the filter.
- A 4" layer of pea gravel (⅛" to ¾" stone) shall be located between the filter media and underdrain to prevent migration of fines into the underdrain. This layer may be considered part of the filter bed when bed thickness exceeds 24".

The main collector pipe for underdrain systems shall be constructed at a minimum slope of 0.5%. Observation wells and/or clean-out pipes must be provided (one minimum per every 1000 square feet of surface area).

7. Miscellaneous:

These practices may not be constructed until all contributing drainage area has been stabilized

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED STORMWATER, DRY WELLS (M-5)

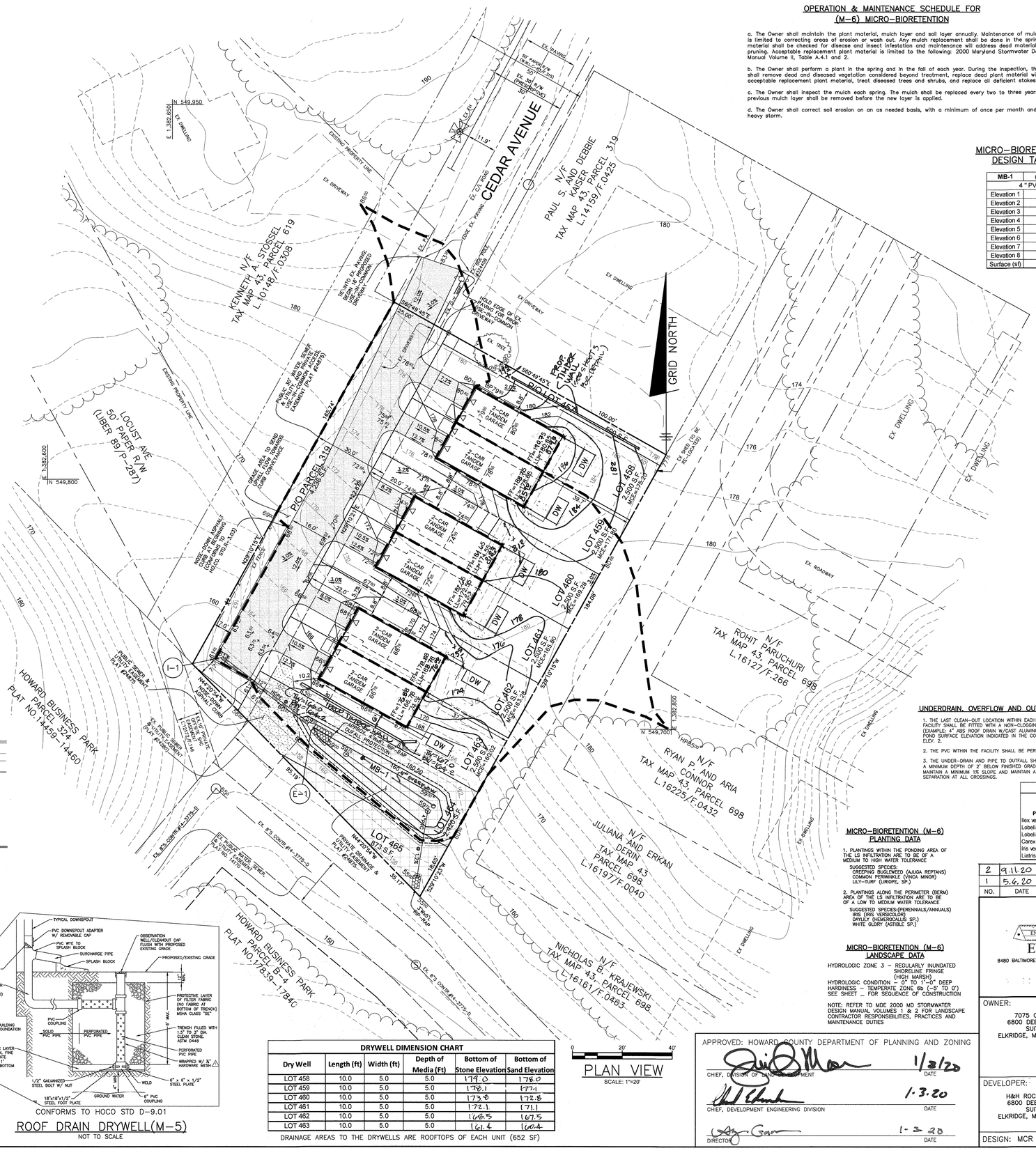
1. THE MONITORING WELLS AND STRUCTURES SHALL BE INSPECTED ON A QUARTERLY BASIS AND AFTER EVERY LARGE STORM EVENT.
2. WATER LEVELS AND SEDIMENT BUILD UP IN THE MONITORING WELLS SHALL BE RECORDED OVER A PERIOD OF SEVERAL DAYS TO INSURE TRENCH DRAINAGE.
3. A LOG BOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
4. WHEN THE FACILITY BECOMES CLOGGED SO THAT IT DOES NOT DRAIN DOWN WITHIN THE 72 HOUR TIME PERIOD, CORRECTIVE ACTION SHALL BE TAKEN.
5. THE MAINTENANCE LOG BOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
6. ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION FACILITY HAVE BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.

TABLE B.3.2 MATERIALS AND SPECIFICATIONS FOR SWM FACILITIES (DRYWELLS)

MATERIAL	SPECIFICATION	SIZE	NOTES:
PLANTINGS (IF REQUIRED)	SEE APPENDIX A; TABLE A.4	N/A	PLANTINGS ARE SITE SPECIFIC
PLANTING SOIL (2.5' TO 4.0' DEEP)	SAND: 35-60% SILT: 30-35% CLAY: 10-25%	N/A	USDA SOIL TYPES: LOAMY SAND, SANDY LOAM OR LOAM
MULCH	SHREDDED HARDWOOD	N/A	2" TO 3" DEPTH, AGED 6 MONTHS, MINIMUM
GEOTEXTILE (CLASS "C")	APPARENT OPENING SIZE: (ASTM D-4751) GRAB TENSILE STRENGTH: (ASTM D-4632) PUNCTURE RESISTANCE: (ASTM D-4833)	N/A	FOR USE AS NECESSARY BENEATH UNDERDRAINS ONLY
UNDERDRAIN GRAVEL	AASHTO M-43	0.375" TO 0.750"	
UNDERDRAIN PIPING	F758, TYPE PS28 OR AASHTO M-278	4" TO 6" RIGID SCH.40 PVC OR SDR35	3/8" PERF. @ 6" O/C, 4 HOLES PER ROW, MINIMUM OF 3" OF GRAVEL OVER PIPES, NOT NECESSARY UNDERNEATH PIPES
POURED-IN-PLACE CONC. (IF REQUIRED)	MSHA MIX NO.3; f'c=3500psi @ 28 DAYS, NORMAL WEIGHT, AIR ENTRAINED; REINFORCING TO MEET ASTM 615-60	N/A	ON-SITE TESTING OF POURED-IN-PLACE CONC. REQUIRED; 28 DAY STRENGTH TEST AND SLUMP TEST; ALL CONC. DESIGN (CAST-IN-PLACE or PRE-CAST) NOT USING PREVIOUSLY APPROVED STATE OR LOCAL STANDARDS REQUIRES DESIGN DRAWINGS SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND. - DESIGN TO INCLUDE MEETING ACI CODE 350.R/89: VERTICAL LOADING (H-10 or H-20) ALLOWABLE HORIZONTAL LOADING (BASED ON SOIL PRESSURES); AND ANALYSIS OF POTENTIAL CRACKING
CHEESY DAM (TREATED WOOD)	AWPA STANDARD C6	6"X6" OR 8"X8"	DO NOT COAT WITH CREOSOTE. EMBED AT LEAST 3' INTO SIDE SLOPES

LEGEND

SOILS CLASSIFICATION — AbC1
SOILS DELINEATION
EXISTING CONTOURS — 999
PROPOSED CONTOURS — 999
EXISTING WOODS LINE
PROPOSED WOODS LINE
EXISTING STRUCTURE
PROPOSED STRUCTURE
ESD DRAINAGE AREA
PUBLIC WATER, SEWER, & UTILITY AND PRIVATE USE-IN-COMMON ACCESS EASEMENT
PUBLIC SEWER & UTILITY EASEMENT
PRIVATE DRAINAGE & UTILITY EASEMENT



OPERATION & MAINTENANCE SCHEDULE FOR (M-6) MICRO-BIORETENTION

a. The Owner shall maintain the plant material, mulch layer and soil layer annually. Maintenance of mulch and soil is limited to correcting areas of erosion or wash out. Any mulch replacement shall be done in the spring. Plant material shall be checked for disease and insect infestation and maintenance will address dead material and pruning. Acceptable replacement plant material is limited to the following: 2000 Maryland Stormwater Design Manual Volume II, Table A.4.1 and 2.

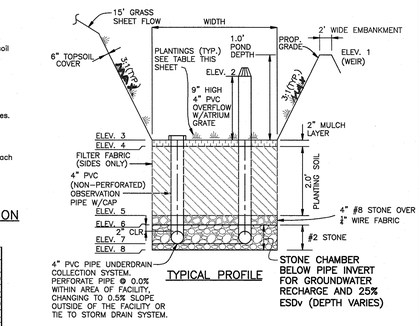
b. The Owner shall perform a plant in the spring and in the fall of each year. During the inspection, the Owner shall remove dead and diseased vegetation considered beyond treatment, replace dead plant material with acceptable replacement plant material, treat diseased trees and shrubs, and replace all deficient stakes and wires.

c. The Owner shall inspect the mulch each spring. The mulch shall be replaced every two to three years. The previous mulch layer shall be removed before the new layer is applied.

d. The Owner shall correct soil erosion on an as needed basis, with a minimum of once per month and after each heavy storm.

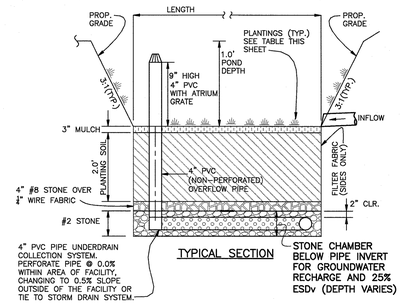
MICRO-BIORETENTION DESIGN TABLE

MB-1	(M-6)
	4 " PVC
Elevation 1	160.00
Elevation 2	159.75
Elevation 3	159.00
Elevation 4	158.83
Elevation 5	156.83
Elevation 6	156.50
Elevation 7	155.92
Elevation 8	155.40
Surface (sf)	889.8



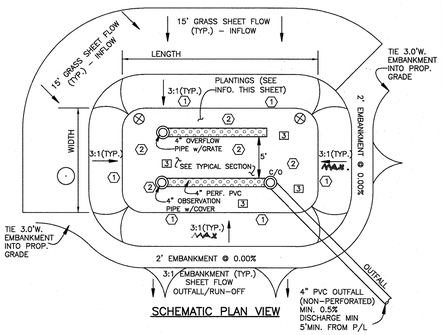
TYPICAL PROFILE

STONE CHAMBER BELOW PIPE INVERT FOR GROUNDWATER RECHARGE AND 25% ESDv (DEPTH VARIES)



TYPICAL SECTION

STONE CHAMBER BELOW PIPE INVERT FOR GROUNDWATER RECHARGE AND 25% ESDv (DEPTH VARIES)



SCHEMATIC PLAN VIEW

UNDERDRAIN, OVERFLOW AND OUTFALL NOTES

1. THE LAST CLEAN-OUT LOCATION WITHIN EACH MICRO-BIORETENTION FACILITY SHALL BE FITTED WITH A NON-CLOGGING SURFACE DRAIN (EXAMPLE: 4" ABS ROOF DRAIN W/CAST ALUMINUM DOME) AT THE POND SURFACE ELEVATION INDICATED IN THE CORRESPONDING TABLE ELEV. 2.
2. THE PVC WITHIN THE FACILITY SHALL BE PERFORATED.
3. THE UNDER-DRAIN AND PIPE TO OUTFALL SHALL BE INSTALLED TO A MINIMUM DEPTH OF 2' BELOW FINISHED GRADE AND SHALL MAINTAIN A MINIMUM 1% SLOPE AND MAINTAIN A MINIMUM OF 1' OF SEPARATION AT ALL CROSSINGS.

TYPICAL MICRO-BIORETENTION DETAILS

NOT TO SCALE

MICRO-BIORETENTION (M-6) PLANTING DATA

1. PLANTINGS WITHIN THE PONDING AREA OF THE LS INFILTRATION ARE TO BE OF A MEDIUM TO HIGH WATER TOLERANCE
   SUGGESTED SPECIES:
   CREEPING BUGLEWEED (AJUGA REPTANS)
   COMMON PERIWINKLE (VINCA MINOR)
   LILY-TURF (LIRIOPE, SP.)
2. PLANTINGS ALONG THE PERIMETER (BERM) AREA OF THE LS INFILTRATION ARE TO BE OF A LOW TO MEDIUM WATER TOLERANCE
   SUGGESTED SPECIES:(PERENNIALS/ANNUALS)
   IRIS (IRIS VERSICOLOR)
   DAYLILY (HEMEROCALLIS SP.)
   WHITE GLORY (ASTIBLE SP.)

MICRO-BIORETENTION (M-6) LANDSCAPE DATA

HYDROLOGIC ZONE 3 – REGULARLY INUNDATED SHORELINE FRINGE (HIGH MARSH)
HYDROLOGIC CONDITION – 0" TO 1'-0" DEEP
HARDINESS – TEMPERATE ZONE 6b (-5° TO 0°)
SEE SHEET – FOR SEQUENCE OF CONSTRUCTION

NOTE: REFER TO MDE 2000 MD STORMWATER DESIGN MANUAL VOLUMES 1 & 2 FOR LANDSCAPE CONTRACTOR RESPONSIBILITIES, PRACTICES AND MAINTENANCE DUTIES

(M-6) Micro Bio-Retention Landscaping Chart

PLANT NAME	COMMON NAME	TYPE	SIZE	MB #1 889.8 QUANTITY	TOTAL 889.8 QUANTITY
Ilex verticillata	Common Winterberry	shrub	2.5'-3' ht	9	9
Lobelia cardinalis	Cardinal flower	perennial herbaceous plant	quart bulb	59	59
Lobelia siphilitica	Great Blue Lobelia	perennial herbaceous plant	quart bulb	59	59
Carex stricta	Uptight Sedge	grass	quart bulb	59	59
Iris versicolor	Blue Water Iris	perennial herbaceous plant	quart bulb	59	59
Liatris spicata	Prairie Gay Feather	perennial herbaceous plant	quart bulb	59	59

CONFORMS TO HOCO STD D-9.01

ROOF DRAIN DRYWELL(M-5)

NOT TO SCALE

DRYWELL DIMENSION CHART

Dry Well	Length (ft)	Width (ft)	Depth of Media (Ft)	Bottom of Stone Elevation	Bottom of Sand Elevation
LOT 458	10.0	5.0	5.0	179.0	178.0
LOT 459	10.0	5.0	5.0	178.1	177.1
LOT 460	10.0	5.0	5.0	173.0	172.8
LOT 461	10.0	5.0	5.0	172.1	171.1
LOT 462	10.0	5.0	5.0	168.5	167.5
LOT 463	10.0	5.0	5.0	161.4	160.4

DRAINAGE AREAS TO THE DRYWELLS ARE ROOFTOPS OF EACH UNIT (652 SF)

PLAN VIEW

SCALE: 1"=20'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 1/3/20

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 1.3.20

DIRECTOR — DATE 1-3-20

NO.	DATE	REVISION
2	9.11.20	ADD TIMBER WALL TO LOT 463
1	5.6.20	REVISE GRADES REAR OF LOTS 463 TO 458

BENCHMARK ENGINEERING, INC.
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
WWW.BEI-CIVILENGINEERING.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. 22390, Expiration Date: 6/30/21.

STATE OF MARYLAND — CHRISTOPHER CLARK MALONEY — No. 22390 — PROFESSIONAL ENGINEER

1-03-20

OWNER:
7075 CEDAR, LLC
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

DEVELOPER:
H&H ROCK COMPANIES
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

LENNOX PARK
CROSBY PROPERTY
LOTS 458-465

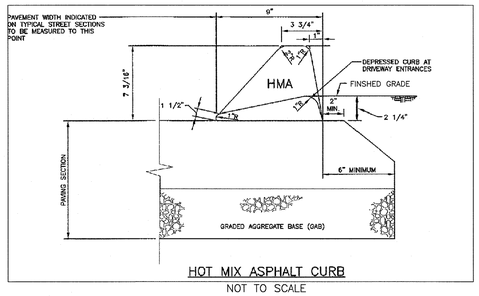
TAX MAP: 43 – GRID: 06 – PARCEL: p/o319
ZONED: R-12 (RESIDENTIAL)
ELECTION DISTRICT NO. 1 – HOWARD COUNTY, MARYLAND

ALTERNATIVE COMPLIANCE EXHIBIT & SIMPLIFIED ECP

DATE: JANUARY 03, 2020 — BEI PROJECT NO. 2741
DESIGN: MCR — DRAFT: MCR — SCALE: AS SHOWN — SHEET 2 OF 3

J:\2741 Lennox Park\dwg\CONCEPT-V5.dwg, ESD, 1/3/2020 2:57:32 PM

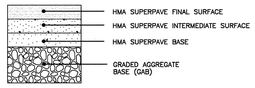
WP-20-059



HOT MIX ASPHALT CURB

NOT TO SCALE

THIS DETAIL CONFORMS TO HO.CO. DMV IV R-3.03

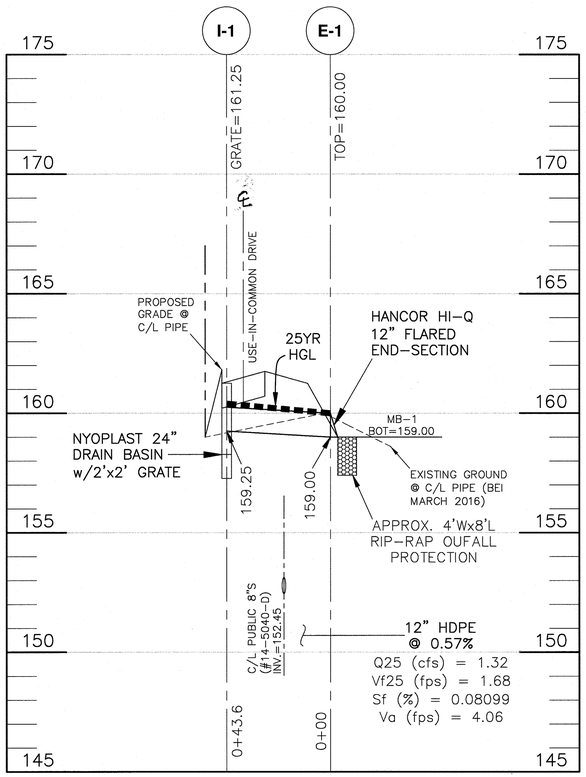


SCHEMATIC PAVING DETAIL

NOT TO SCALE

SECTION NUMBER	ROAD AND STREET CLASSIFICATION	CALIFORNIA BEARING RATIO (CBR)	3 to <5	5 to <7	≥7	3 to <5	5 to <7	≥7
		PAVEMENT MATERIAL (INCHES)	MIN. HMA WITH GAB			HMA WITH CONSTANT GAB		
P-2	PARKING DRIVE AISLES: RESIDENTIAL AND NON-RESIDENTIAL WITH NO MORE THAN 10 HEAVY TRUCKS PER DAY LOCAL ROADS: ACCESS PLACE; ACCESS STREET CUL-DE-SAC: RESIDENTIAL	HMA SUPERPAVE FINAL SURFACE 9.5 MM PG 64-22, LEVEL 1 (LOW ESAL)	1.5	1.5	1.5	1.5	1.5	1.5
		HMA SUPERPAVE INTERMEDIATE SURFACE, 9.5 MM PG 64-22, LEVEL 1 (LOW ESAL)	1.0	1.0	1.0	1.0	1.0	1.0
		HMA SUPERPAVE BASE 9.0 MM PG 64-22, LEVEL 1 (LOW ESAL)	2.0	2.0	2.0	3.5	2.0	2.0
		GRADED AGGREGATE BASE (GAB)	8.0	4.0	3.0	4.0	4.0	4.0

PAVING SPECIFICATIONS (HO.CO. STD R-2.01)



SD PROFILE

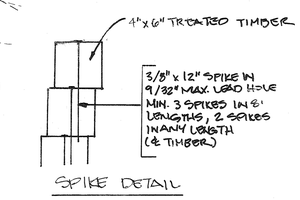
HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 3'

PLAN VIEW

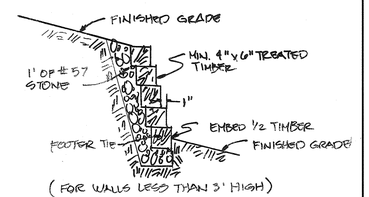
SCALE: 1"=20'

LEGEND

SOILS CLASSIFICATION	AbC1
SOILS DELINEATION	
EXISTING CONTOURS	999
PROPOSED CONTOURS	999
EXISTING WOODS LINE	
PROPOSED WOODS LINE	
EXISTING STRUCTURE	
PROPOSED STRUCTURE	
SD DRAINAGE AREA	
PUBLIC WATER, SEWER, & UTILITY AND PRIVATE USE-IN-COMMON ACCESS EASEMENT	
PUBLIC SEWER & UTILITY EASEMENT	
PRIVATE DRAINAGE & UTILITY EASEMENT	



SPIKE DETAIL



(FOR WALLS LESS THAN 3' HIGH)

TIMBER RETAINING WALL DETAIL

NOT TO SCALE

PIPE SCHEDULE			
SIZE	TYPE	LENGTH (L.F.)	MAINTENANCE
12"	HDPE	43.6	PRIVATE
4" (MB-1)	PVC	26.3	PRIVATE

All pipes shall have smooth interior. No interior corrugations.

STRUCTURE SCHEDULE								
STRUCTURE	TYPE	LOCATION	INVERT IN		INVERT OUT	TOP ELEV.	THROAT ELEV.	STD. DETAIL	MAINTENANCE
INLETS									
I-1	NDS 24"x24"	N 549,728.7314 E 1,382,669.8137	-	-	159.25	-	161.25	Manufacturer Specs.	PRIVATE
MANHOLES									
-	-	-	-	-	-	-	-		PRIVATE
HEADWALLS/END SECTIONS									
ES-1	HDPE End Section	N 549,702.1827 E 1,382,704.3474	-	-	159.00	160.00	-	Manufacturer Specs.	PRIVATE

STRUCTURE LOCATION FOR MANHOLES IS AT THE CENTER OF THE MANHOLE RIM.
STRUCTURE LOCATION FOR END SECTIONS IS AT THE MIDPOINT OF THE END OF THE STRUCTURE
PRECAST STRUCTURES MEETING HS-20 LOADING MAY BE USED.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 1/3/20

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 1.3.20

DIRECTOR — DATE 1-3-20

NO.	DATE	REVISION
2	9.11.20	ADD TIMBER WALL LOT 463
1	5.6.20	REVISE GRADES REAR OF LOTS 458 TO 463 & ADD TIMBER WALL

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 315 ▲ ELLICOTT CITY, MARYLAND 21043
(P) 410-465-6105 (F) 410-465-6644
WWW.BEI-CIVILENGINEERING.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. 22390, Expiration Date: 6/30/21.

1-03-20

OWNER:
7075 CEDAR, LLC
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

DEVELOPER:
H&H ROCK COMPANIES
6800 DEERPATH ROAD
SUITE 100
ELKRIDGE, MARYLAND 21075

LENNOX PARK
CROSBY PROPERTY
LOTS 458-465

TAX MAP: 43 - GRID: 06 - PARCEL: p/o319
ZONED: R-12 (RESIDENTIAL)
ELECTION DISTRICT NO. 1 - HOWARD COUNTY, MARYLAND

ALTERNATIVE COMPLIANCE EXHIBIT STORM DRAINAGE MAP AND PROFILES, NOTES & DETAILS

DATE: JANUARY 03, 2020 — BEI PROJECT NO. 2741
DESIGN: MCR — DRAFT: MCR
SCALE: AS SHOWN — SHEET 3 OF 3

J:\2741 Lennox Park\dwg\CONCEPT-V5.dwg, SD&DETAILS, 1/3/2020 2:58:15 PM

WP-20-059