

GENERAL NOTES

- 1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE... 2. THE CONTRACTOR IS TO NOTIFY THE FOLLOWING UTILITIES OF ANY WORK AT LEAST FIVE DAYS BEFORE STARTING WORK ON THESE DRAWINGS...

OPEN SPACE TABULATION:

IN ACCORDANCE WITH SECTION 16.121(A)(2) OF THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS THE OPEN SPACE REQUIREMENTS FOR THIS R-12 PROJECT IS 40% OF GROSS AREA (7,200 SF MIN LOT) (12.35 AC. GROSS AREA X 40% = 4.94 AC.)

NOTES:

1. ALL WATER CONNECTIONS SHALL BE 1'-1/2" WITH 1" OUTSIDE METER SETTINGS, UNLESS OTHERWISE NOTED. REFER TO HOWARD COUNTY DETAILS W-3.28 OUTSIDE METER SETTINGS.

FINAL ROAD CONSTRUCTION PLAN GREENWOOD VILLAGE - PHASE 1 LOTS 1-4, NON BUILDABLE BULK PARCELS A-C AND OPEN SPACE LOTS 5-11 A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4 LOTS 2-4 (P.B. 3/51), 5R (L.16288 F.488), 8R (L.16288 F.502) AND 9 (P.B. 3/51) HOWARD COUNTY, MARYLAND

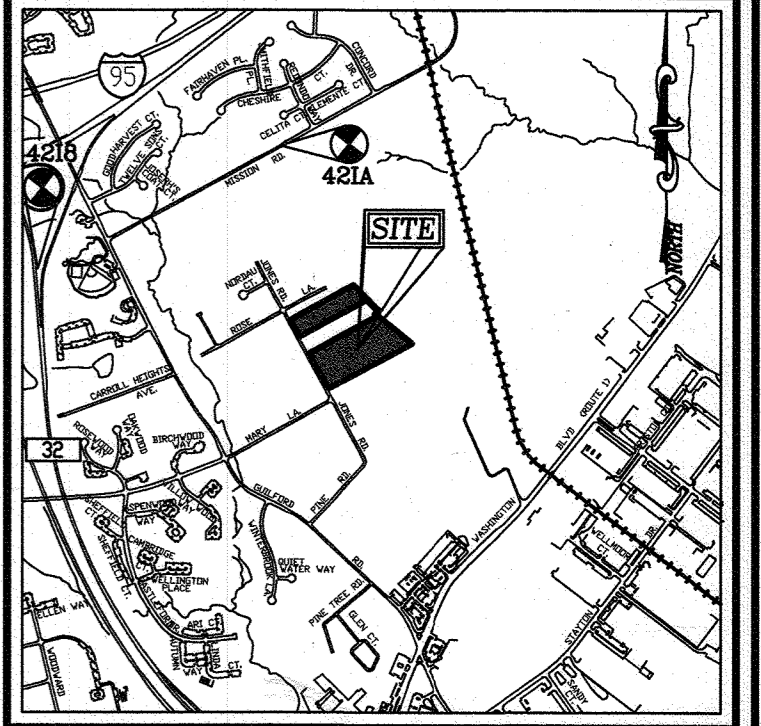
COORDINATE TABLE with columns NO., NORTH, EAST. Values range from 540865.3236 to 541789.7212.

BENCHMARKS

HOWARD COUNTY BENCHMARK 421A N 543,390.41 E 1,364,912.66 ELEV. 312.01 3/4" REBAR - NORTH EAST SIDE OF MISSION ROAD, 74.3' NORTH OF B&E #297906

GREENWOOD VILLAGE APFO PHASING

Table with columns PHASE NUMBER, ALLOCATION YEAR, TOTAL NO. OF ALLOCATIONS, TOTAL NO. OF CREDITS, TOTALS. Shows phasing for 2020 and 2021.



VICINITY MAP SCALE: 1"=2000' ADC MAP COORDINATES: PAGE: 41 BLOCK: A2

SHEET INDEX

Table with columns DESCRIPTION and SHEET NO. Lists various sheets from COVER SHEET to MAINTENANCE OF TRAFFIC PLAN.

SITE DATA

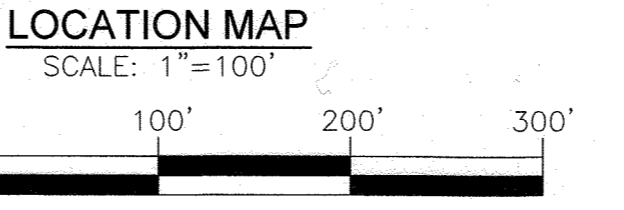
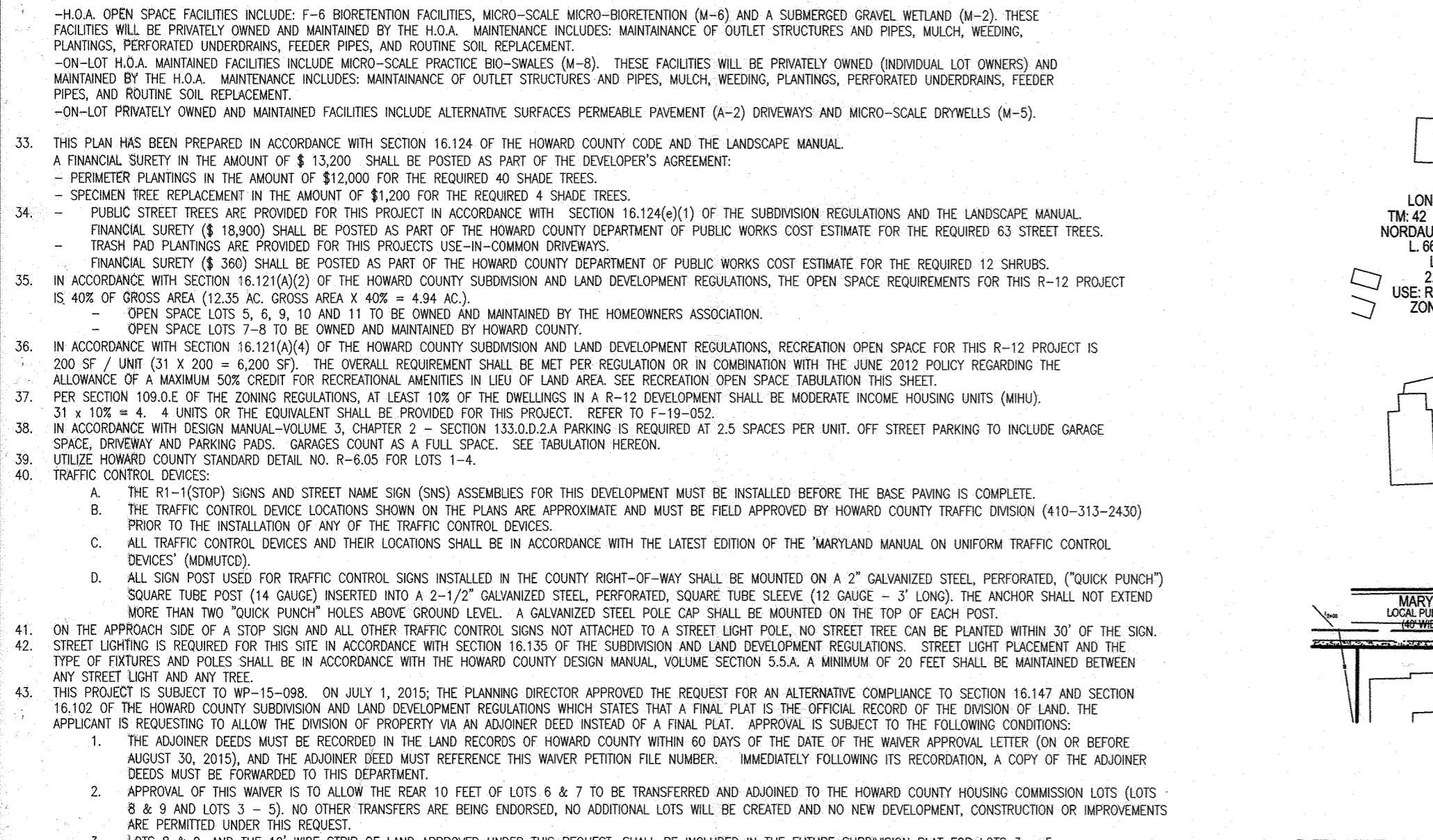
SUBDIVISION NAME: NORDAU SUBDIVISION SECTION E-4, LOTS 2-4, 5R, 8R AND 9 DEED REFERENCE: PARCEL 138-140 (P.B. 3 F. 51) PARCEL 136 (PLAT 21417)

RECREATION OPEN SPACE TABULATION:

TOTAL RECREATION OPEN SPACE REQUIRED: R-12 - SINGLE FAMILY HOMES SFD = 200 SF PER UNIT X 31 UNITS = 6,200 SF

OWNER/DEVELOPER

HOWARD COUNTY HOUSING COMMISSION 9770 PATUXENT WOODS DRIVE SUITE 100 COLUMBIA, MD 21046



GENERAL NOTES

- 47. THE PROJECT COMPLIES WITH SECTION 16.127 OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS, RESIDENTIAL INFILL DEVELOPMENT... 48. IF ANY WELL OR SEPTIC SYSTEMS ARE FOUND DURING ANY STAGE OF THE PROCESS THE HEALTH DEPARTMENT MUST BE NOTIFIED...

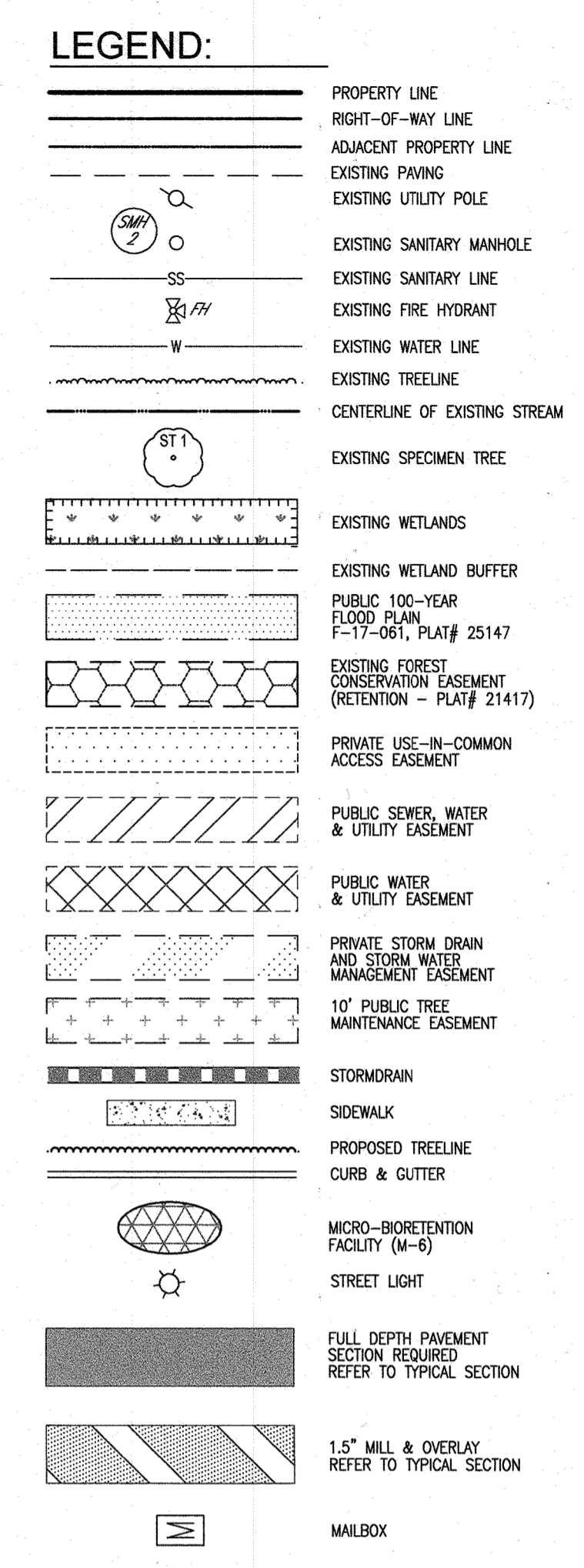
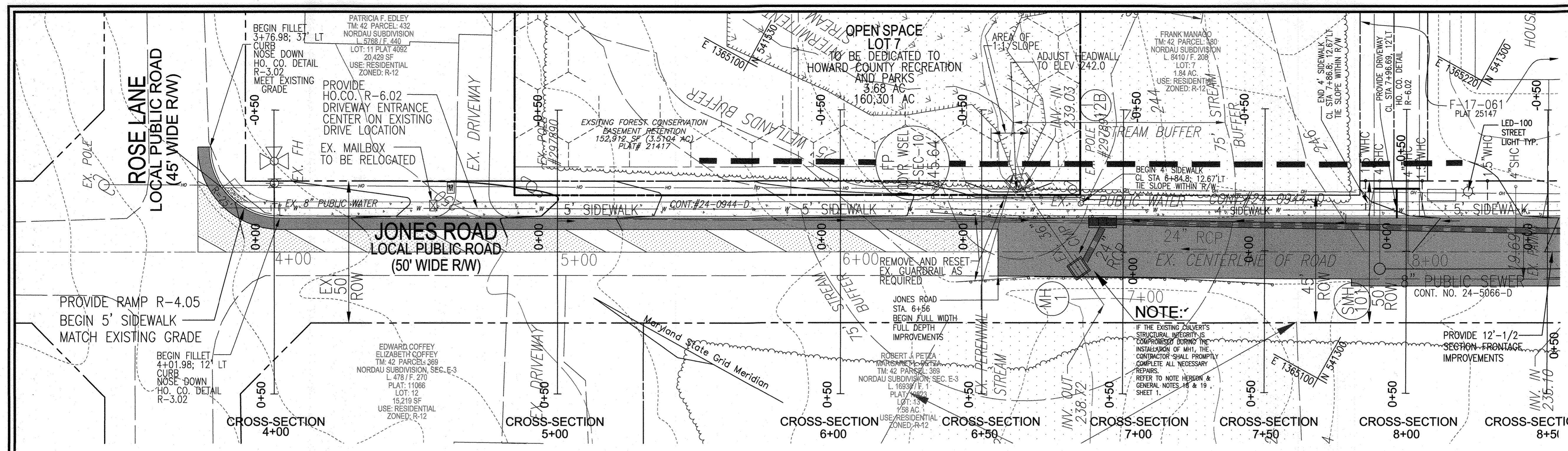
PARKING TABULATION:

TOTAL NUMBER OF DWELLING UNITS PROPOSED: 31 SINGLE FAMILY DETACHED (SFD) = 31 LOTS PHASE 1: OFF-STREET PARKING SPACES REQUIRED: 2 SPACES PER UNIT

Stormwater Management Information table with columns Lot/Parcel Number, Facility Name & Number, Practice Type (Management), Public/Private, HMA/Maintains, Misc.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS and HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING with signatures and dates.

FINAL ROAD CONSTRUCTION PLAN COVER SHEET GREENWOOD VILLAGE - PHASE 1 LOTS 1-4, NON BUILDABLE BULK PARCELS A-C AND OPEN SPACE LOTS 5-11. Includes VOGEL ENGINEERING and TIMMONS GROUP logos and contact information.



FOR CONTINUATION SEE SHEET 3

**JONES ROAD - ROAD IMPROVEMENTS**  
SCALE: 1"=20'

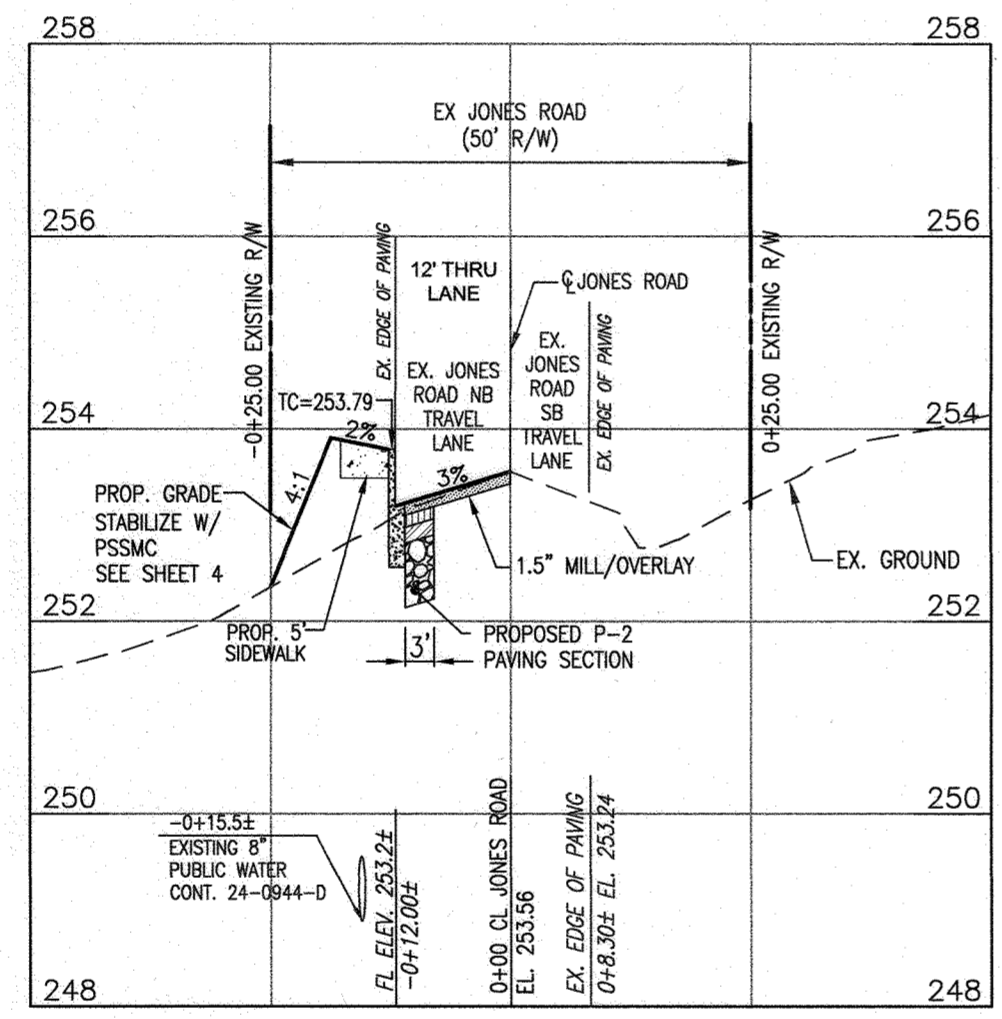
**PAVEMENT CONSTRUCTION LOCATION**

TYPE OF CONSTRUCTION	START STATION	FINISH STATION
FULL DEPTH PAVEMENT	3+73	8+63
MILL & OVERLAY	3+73	6+50

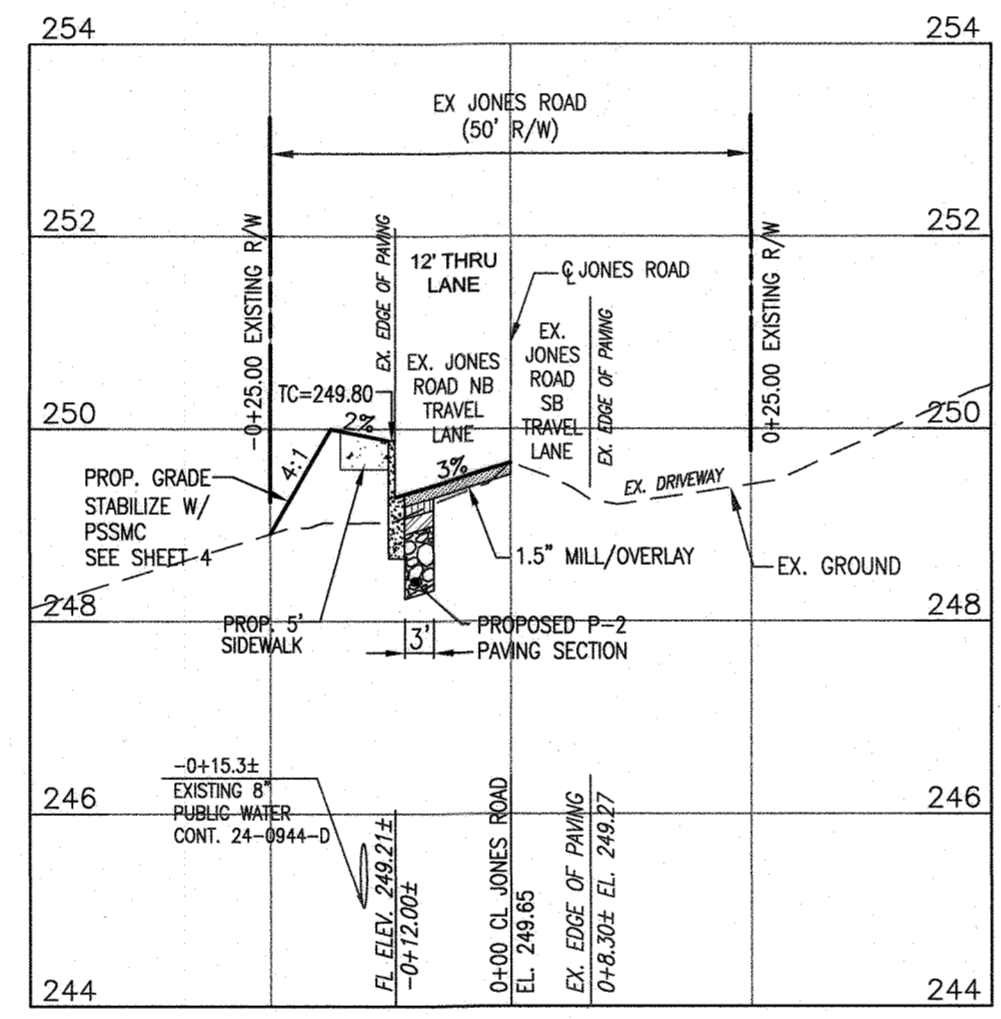
REFER TO PLAN LEGEND AND PLAN VIEW HATCH

**STREET LIGHT LOCATIONS**

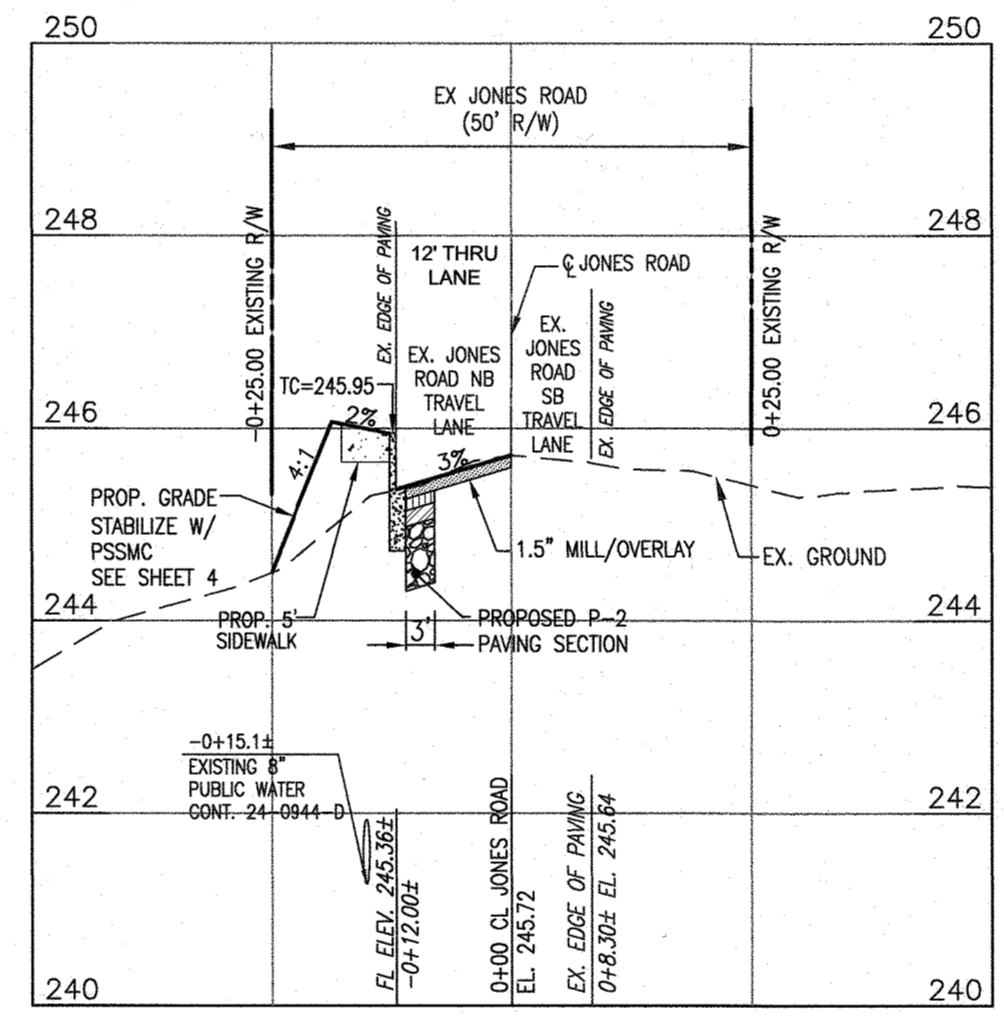
ROAD NAME	STATION	OFFSET	FIXTURE/POLE TYPE
JONES DRIVE	8+21.98	21.28' LEFT	LED-100 PREMIER COLONIAL POST-TOP FIXTURE MOUNTED ON A 14" BLACK FIBERGLASS POLE



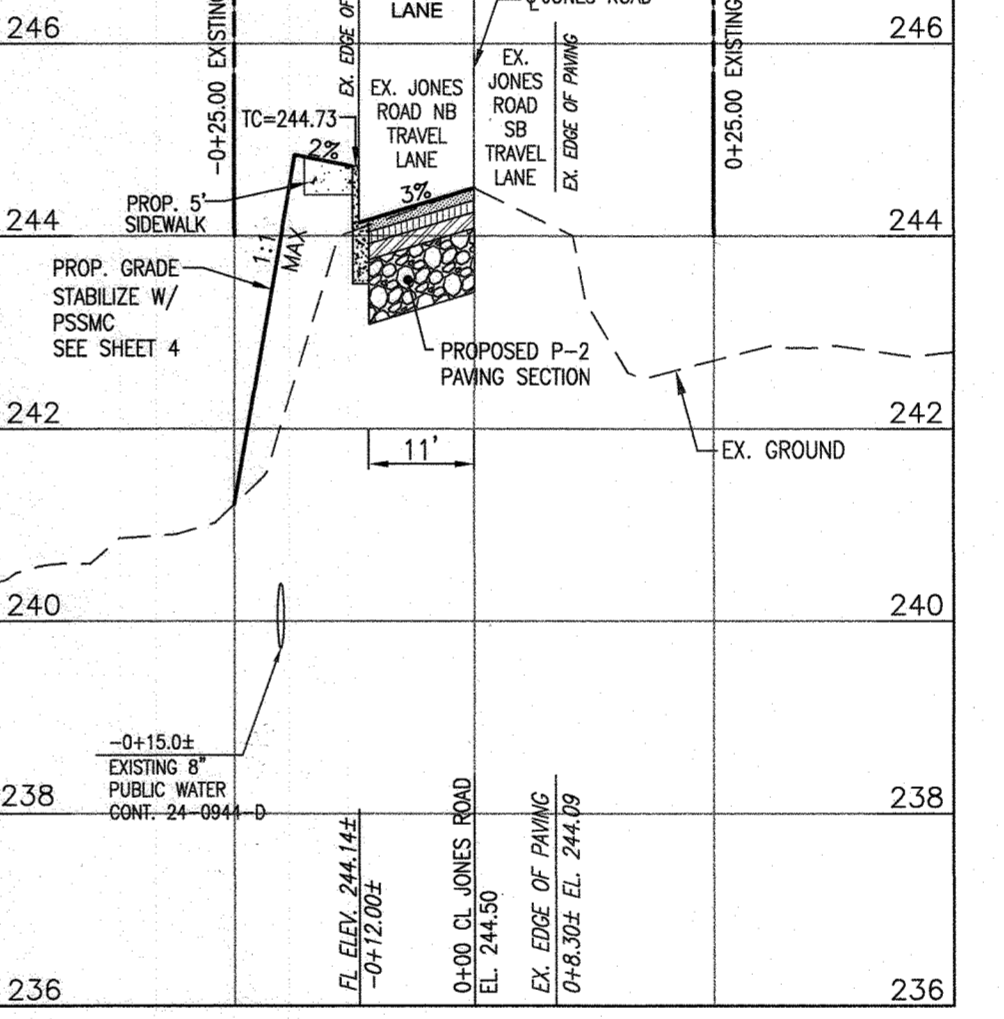
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SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2'



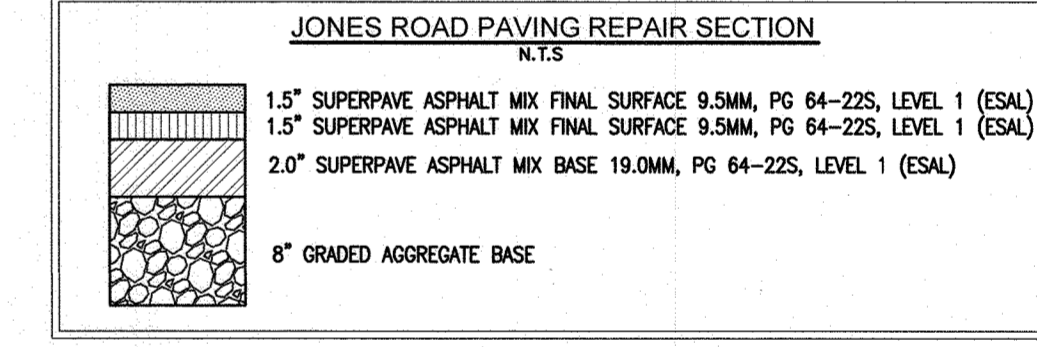
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SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2'



**JONES ROAD STA. 6+00**  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2'



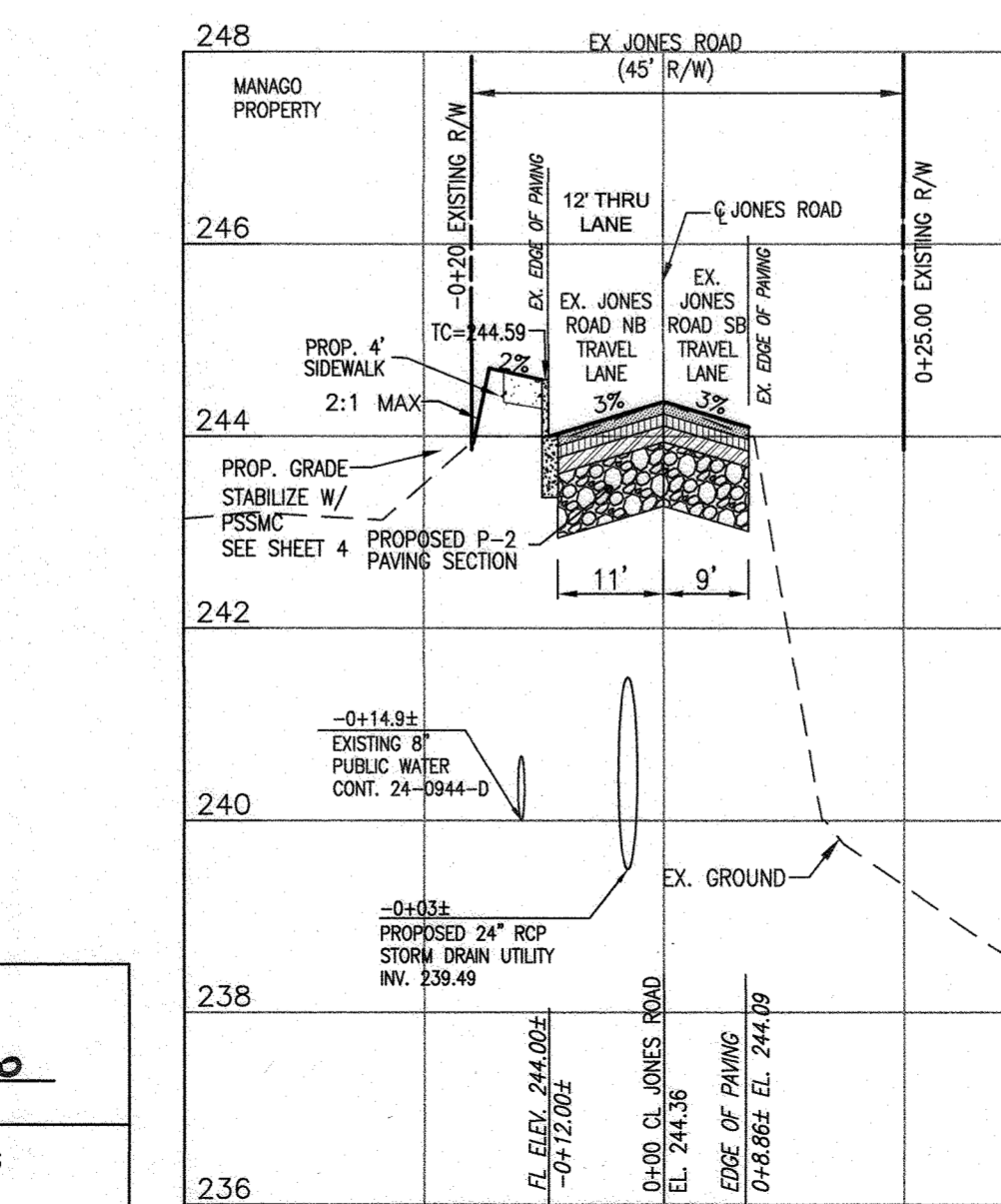
**JONES ROAD STA. 6+50**  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2'



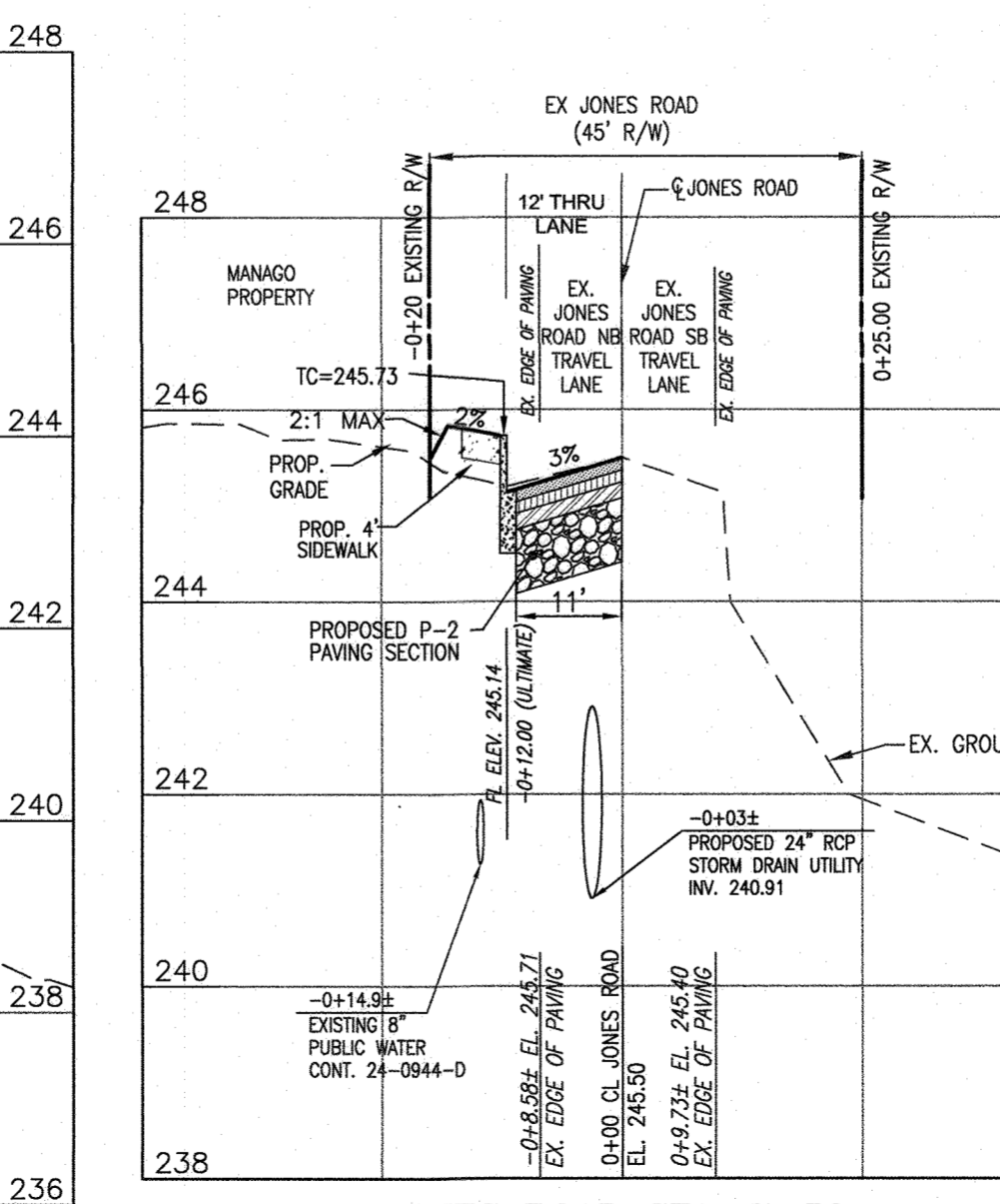
**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISION  
9770 PATUXENT WOODS DR., SUITE 100  
COLUMBIA, MD 21046  
ATTN: PETER ENGEL  
(410) 313-6316

**NOTES:**

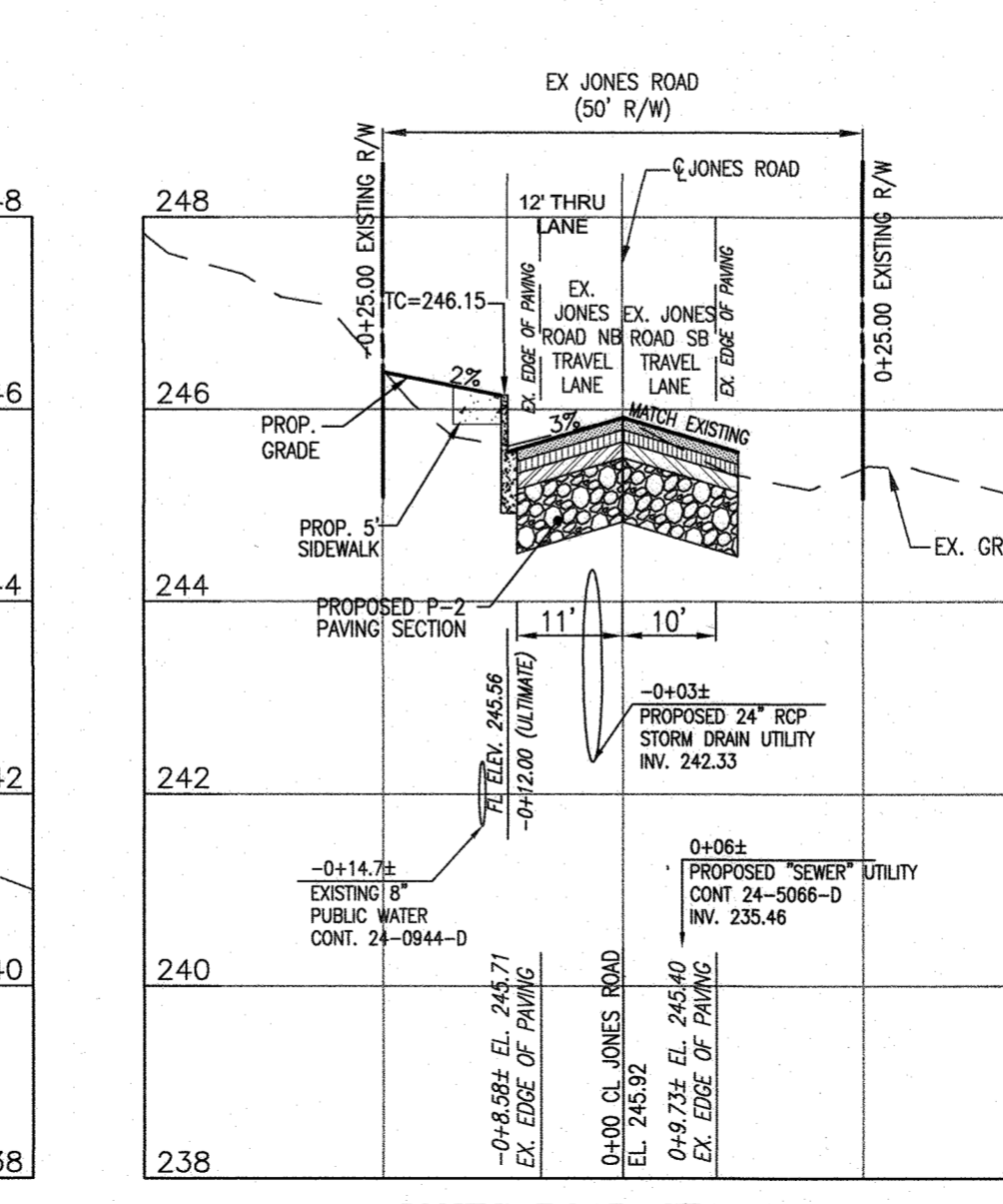
- ANY DAMAGE INCURRED TO THE EXISTING UTILITIES, DUE TO CONTRACTOR'S OPERATIONS, SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S/DEVELOPER'S EXPENSE.
- ANY DAMAGE TO PUBLIC RIGHT-OF-WAY, PAVING, OR EXISTING UTILITIES WILL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.



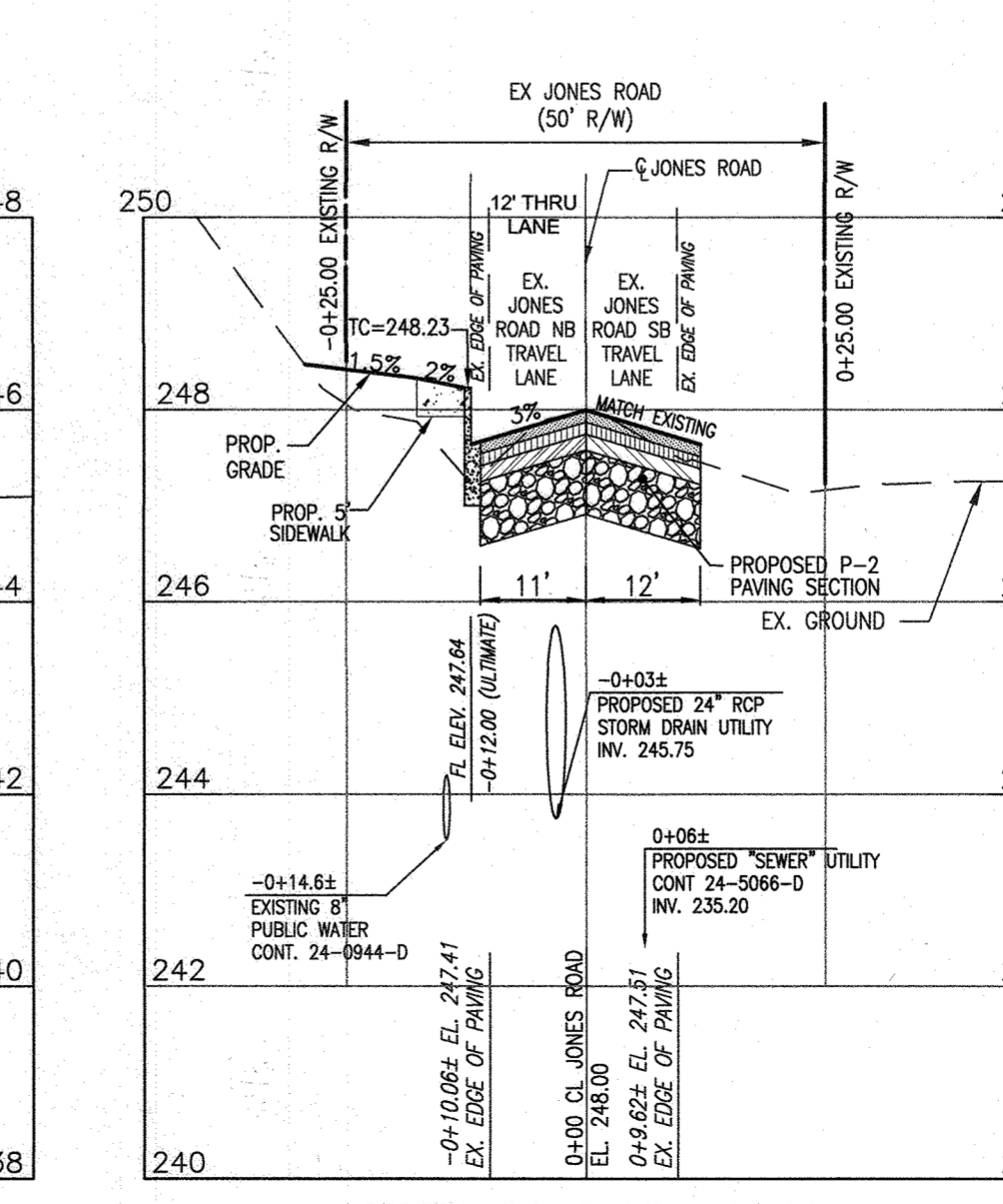
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SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2'



**JONES ROAD STA. 7+50**  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2'



**JONES ROAD STA. 8+00**  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2'



**JONES ROAD STA. 8+50**  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2'

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*Shah Khan* 11/28/20  
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Anna Mow* 12/2/20  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
JONES ROAD - ROAD IMPROVEMENTS  
AND CROSS SECTIONS  
**GREENWOOD VILLAGE - PHASE 1**  
LOTS 1-4, NON BUILDABLE BULK PARCELS A-C  
AND OPEN SPACE LOTS 5-11  
A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4  
LOTS 2-4 (P.B. 3/51), 5R (L16288 F.488), 8R (L16288 F.502) AND 9 (P.B. 3/51)  
TAX MAP: 42 GRID: 24 6TH ELECTION DISTRICT ZONED: R-12 PARCEL: 136 & 138-140 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
+  
**TIMMONS GROUP**  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com

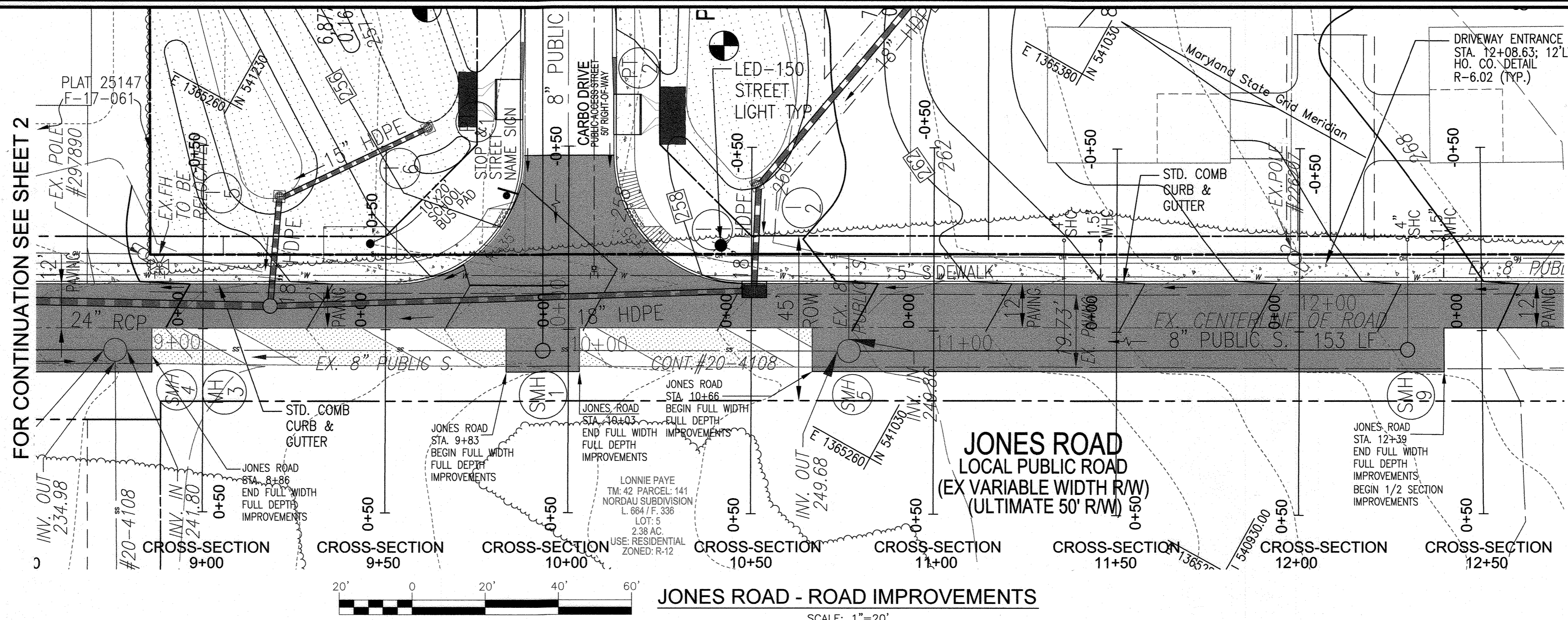
PROFESSIONAL CERTIFICATE  
DESIGN BY: RHY  
DRAWN BY: VETG  
CHECKED BY: RHY  
DATE: MARCH 2020  
SCALE: AS SHOWN  
W.O. NO.: 12-05

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. 16193 EXPIRATION DATE: 08-27-2020

ROBERT H. VOGEL, PE No.16193

2 SHEET OF 23

- NOTES:
1. ANY DAMAGE INCURRED TO THE EXISTING UTILITIES, DUE TO CONTRACTOR'S OPERATIONS, SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S/DEVELOPER'S EXPENSE.
  2. ANY DAMAGE TO PUBLIC RIGHT-OF-WAY, PAVING, OR EXISTING UTILITIES WILL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.



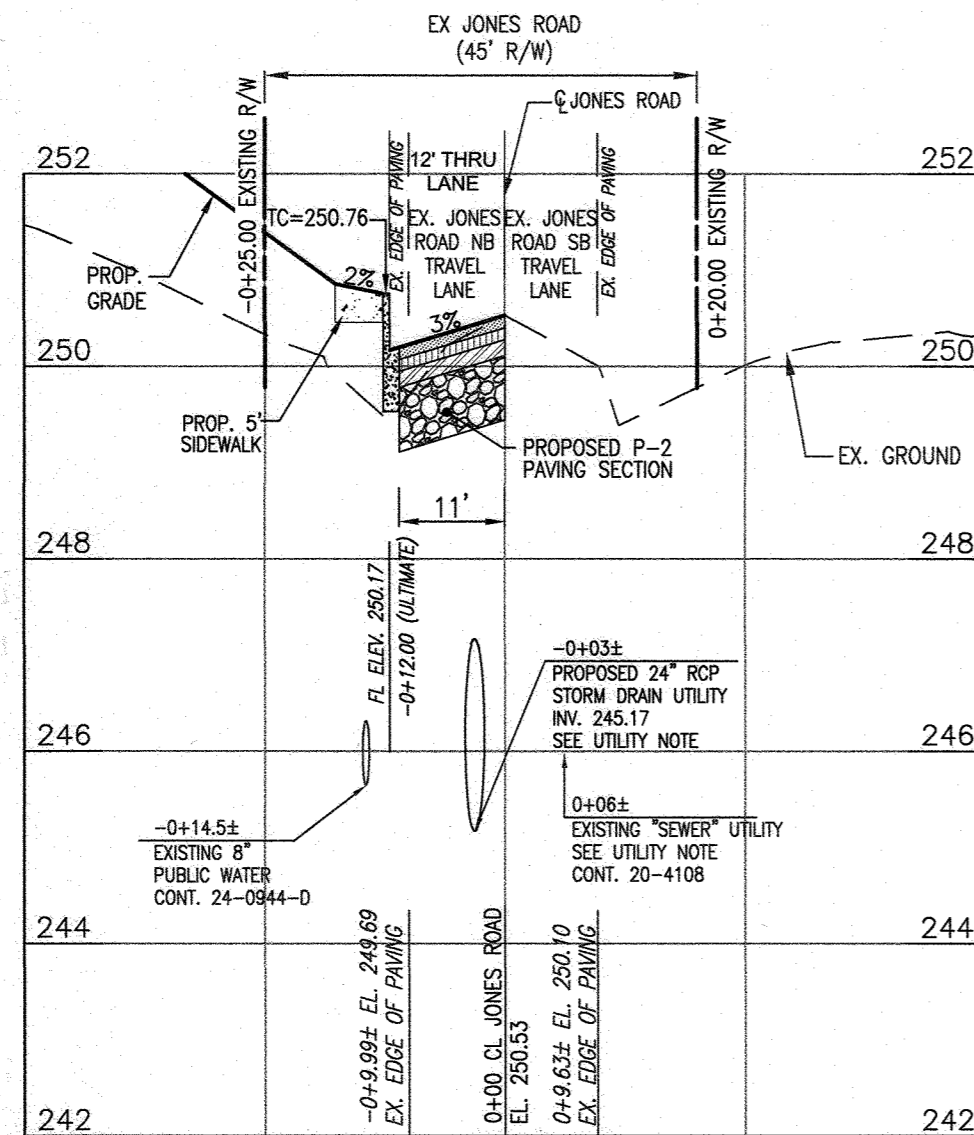
JONES ROAD - ROAD IMPROVEMENTS

SCALE: 1"=20'

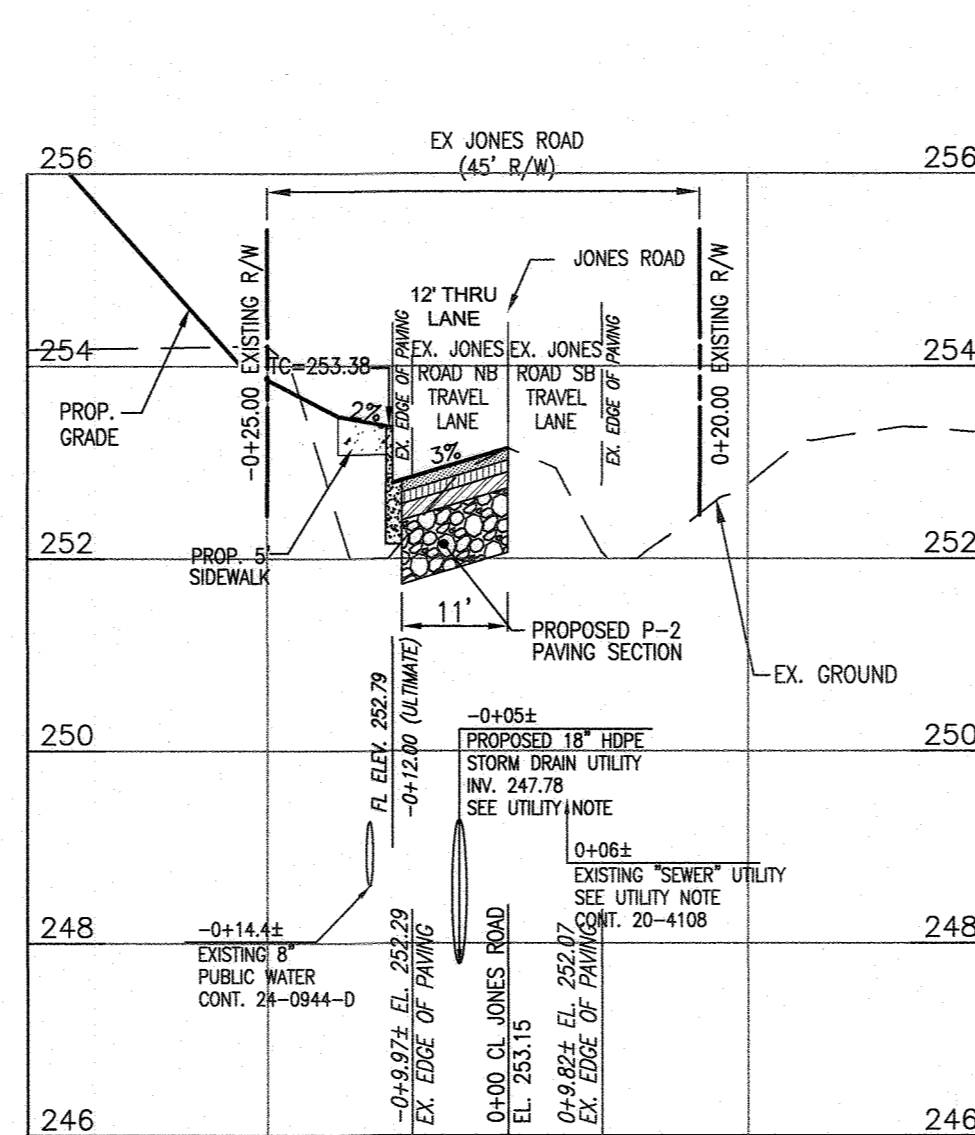
PAVEMENT CONSTRUCTION LOCATION		
TYPE OF CONSTRUCTION	START STATION	FINISH STATION
FULL DEPTH PAVEMENT	8+63	12+80

REFER TO PLAN LEGEND AND PLAN VIEW HATCH

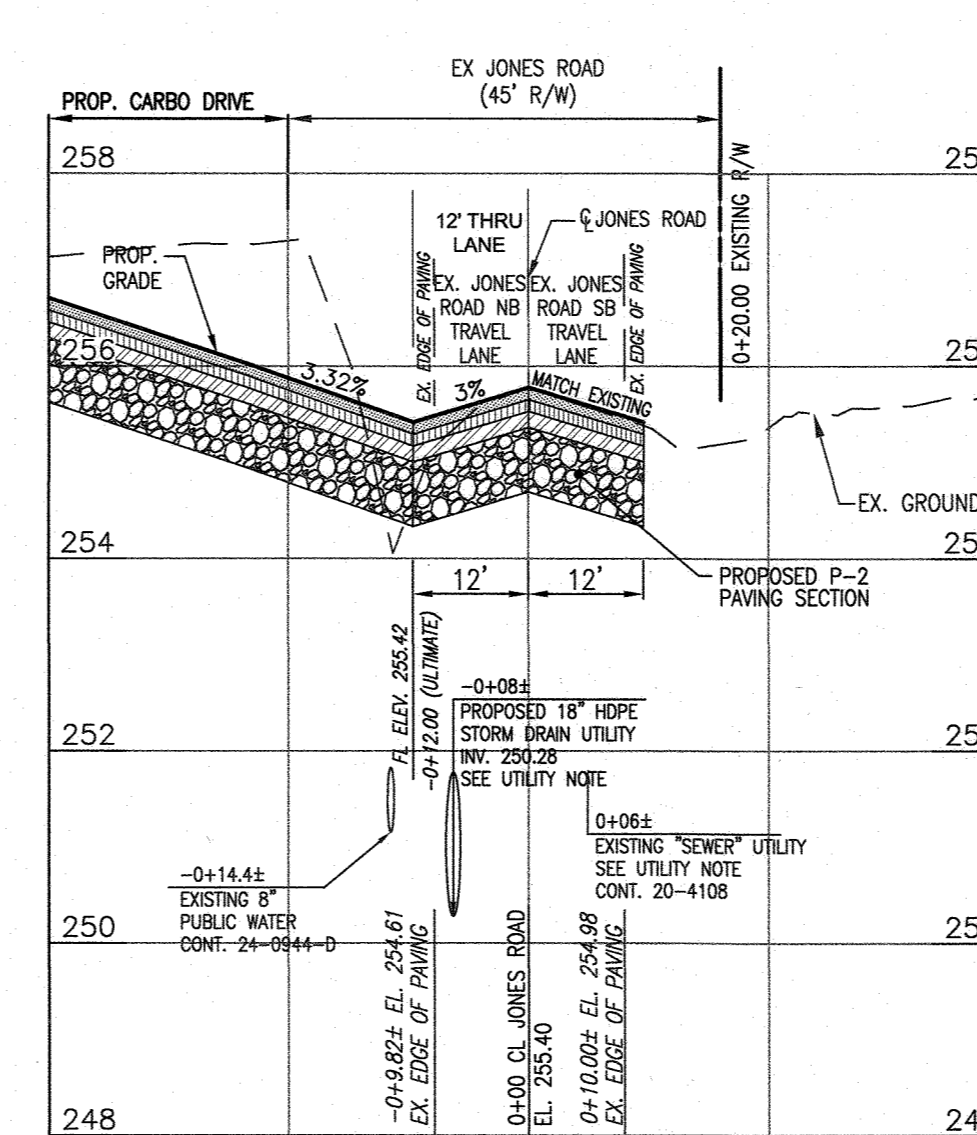
NOTE:  
STATIONS 9+00 TO 12+50 REFER TO GRADING PLAN SHEET 8



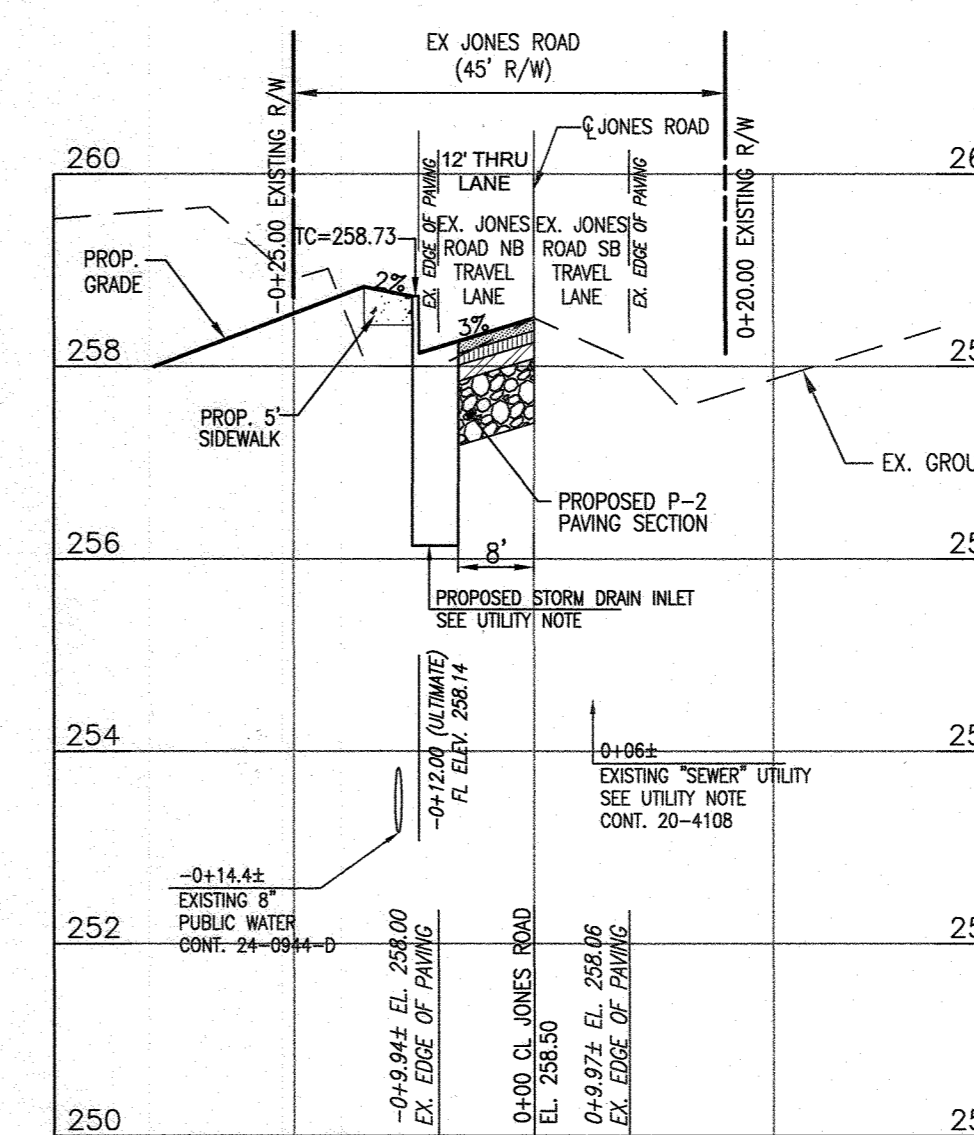
JONES ROAD STA. 9+00  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2"



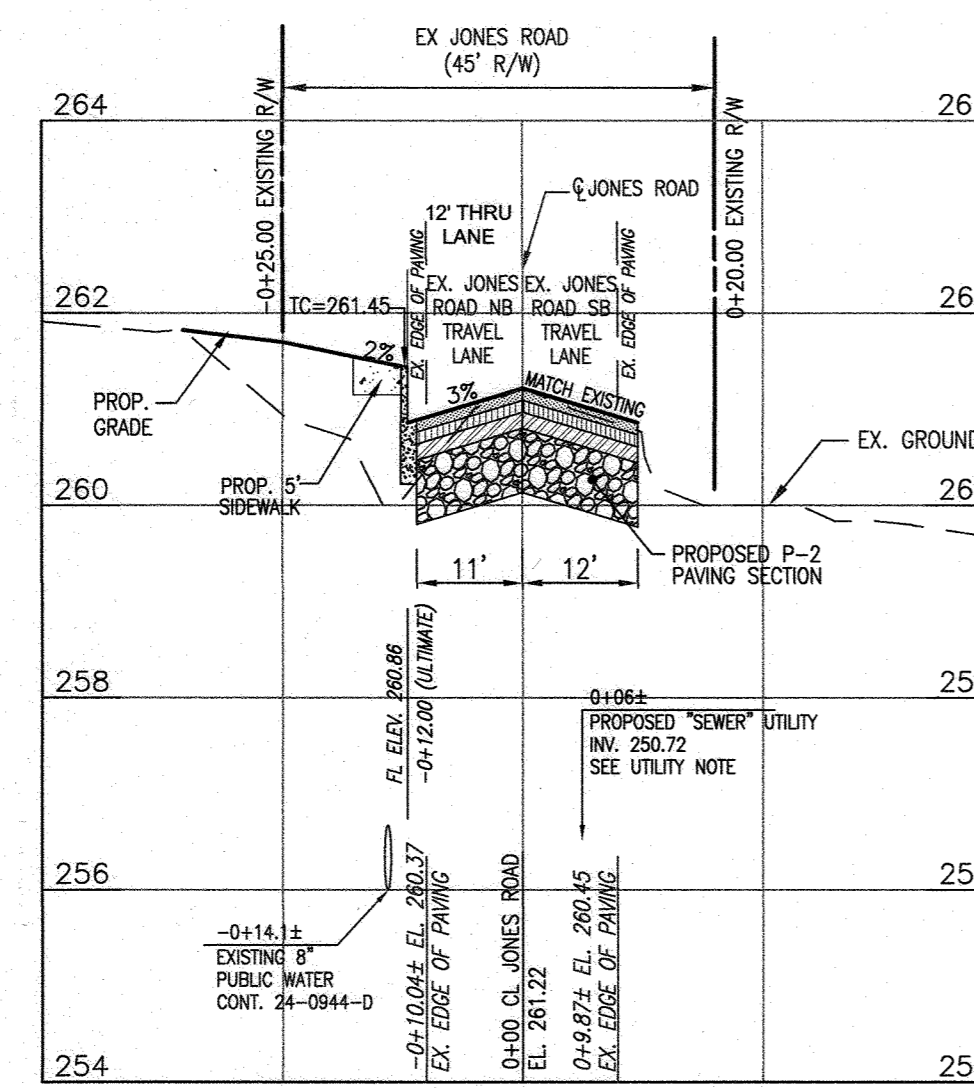
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VERTICAL - 1"=2"



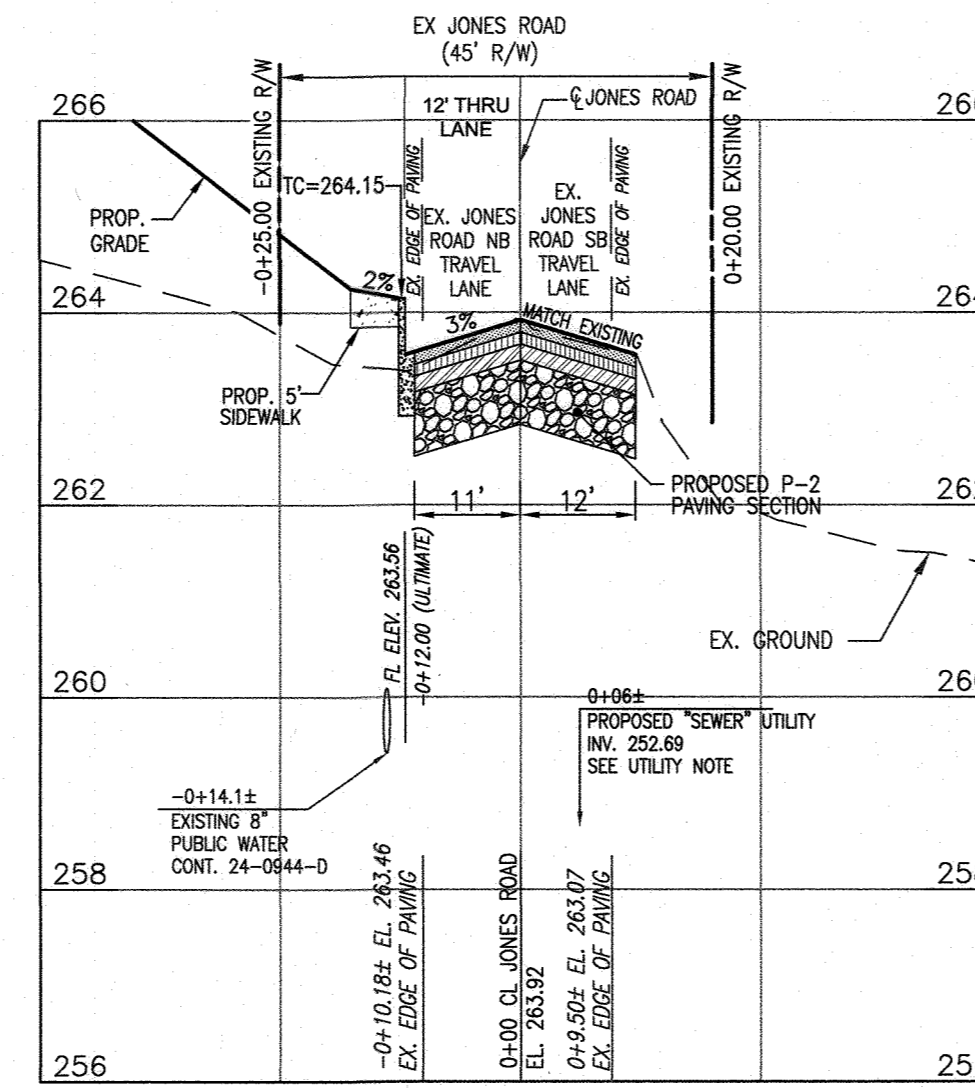
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SCALE: HORIZONTAL - 1"=20'  
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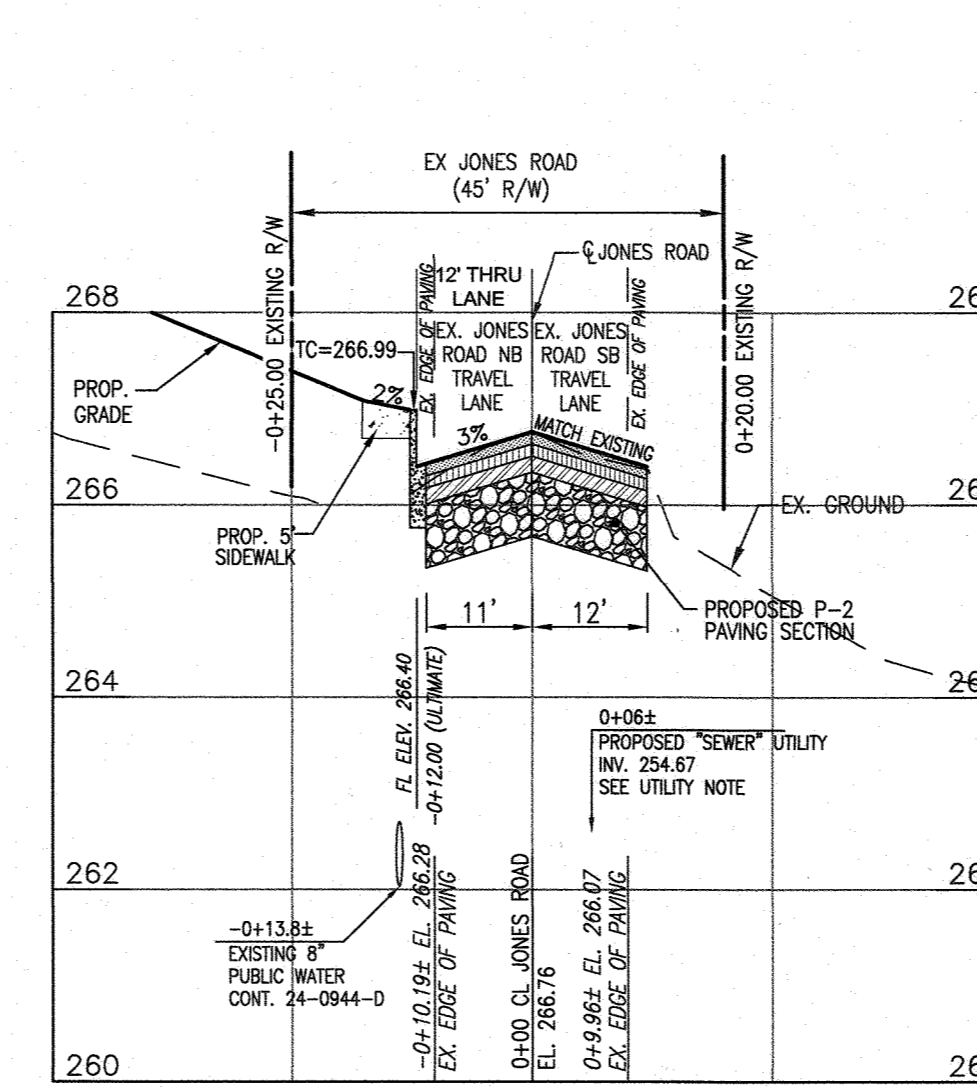
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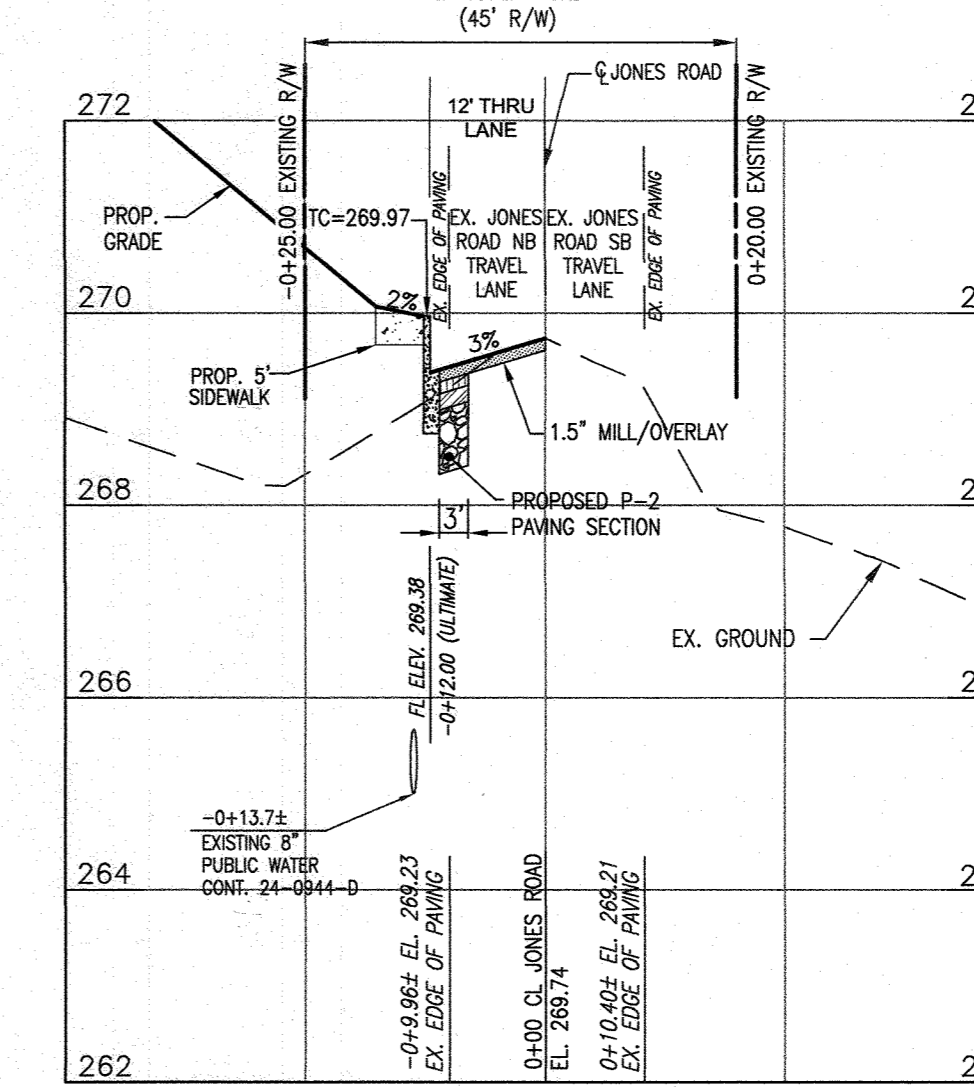
JONES ROAD STA. 11+00  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2"



JONES ROAD STA. 11+50  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2"



JONES ROAD STA. 12+00  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2"

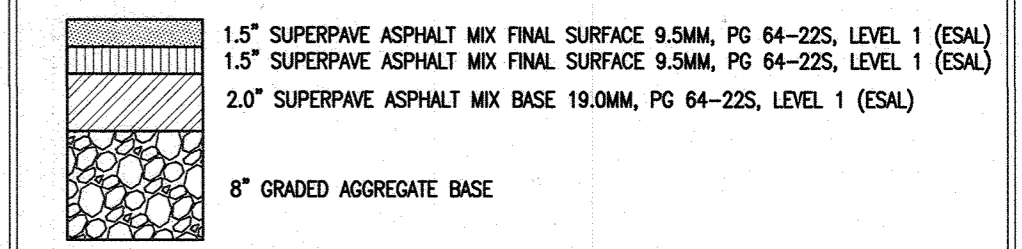


JONES ROAD STA. 12+50  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2"

LEGEND:

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING PAVING
- EXISTING UTILITY POLE
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING TREE LINE
- CENTERLINE OF EXISTING STREAM
- EXISTING SPECIMEN TREE
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- PRIVATE USE-IN-COMMON ACCESS EASEMENT
- PUBLIC SEWER WATER & UTILITY EASEMENT
- PUBLIC WATER & UTILITY EASEMENT
- PRIVATE STORM DRAIN AND STORM WATER MANAGEMENT EASEMENT
- 10' PUBLIC TREE MAINTENANCE EASEMENT
- STORMDRAIN
- SIDEWALK
- PROPOSED TREE LINE CURB & GUTTER
- MICRO-BIORETENTION FACILITY (M-6)
- STREET LIGHT
- FULL DEPTH PAVEMENT SECTION REQUIRED REFER TO TYPICAL SECTION
- GRADING, REQ'D. 2" MILL, VARIABLE DEPTH WEDGE LEVEL AND RESURFACING REFER TO TYPICAL SECTION

JONES ROAD PAVING REPAIR SECTION



OWNER/DEVELOPER

HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DR., SUITE 100  
COLUMBIA, MD 21046  
ATTN: PETER ENGEL  
(410) 313-6316

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*[Signature]* 11/23/20  
CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*[Signature]* 12-2-20  
CHIEF, DEVELOPMENT ENGINEERING DIVISION

*[Signature]* 12/10/20  
CHIEF, DIVISION OF LAND DEVELOPMENT

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
JONES ROAD - ROAD IMPROVEMENTS  
AND CROSS SECTIONS

**GREENWOOD VILLAGE - PHASE 1**  
LOTS 1-4, NON BUILDABLE BULK PARCELS A-C  
AND OPEN SPACE LOTS 5-11

A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4  
LOTS 2-4 (P.B. 3/51), SR (L.16288 F.498), BR (L.16288 F.502) AND 9 (P.B. 3/51)

TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140  
6TH ELECTION DISTRICT ZONED: R-12 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
TIMMONS GROUP  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com

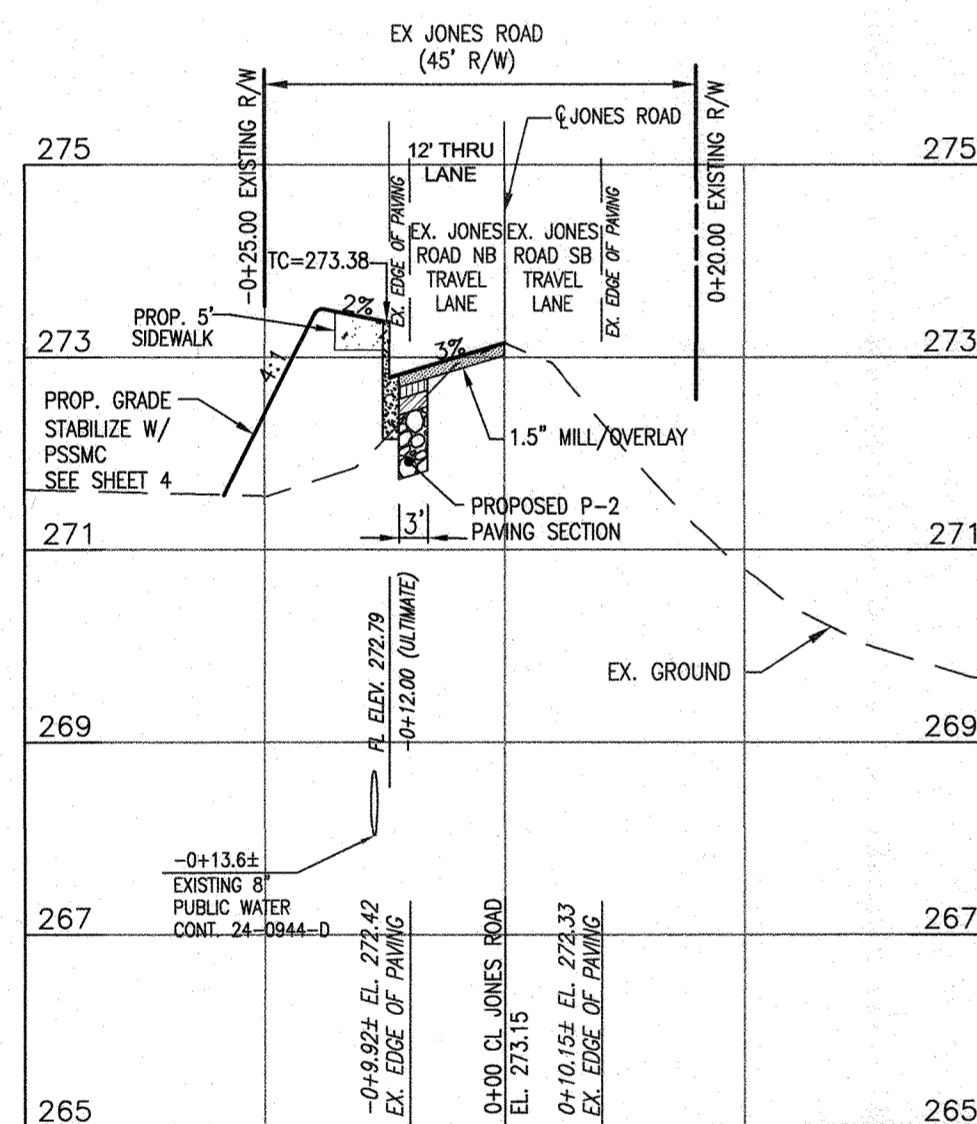
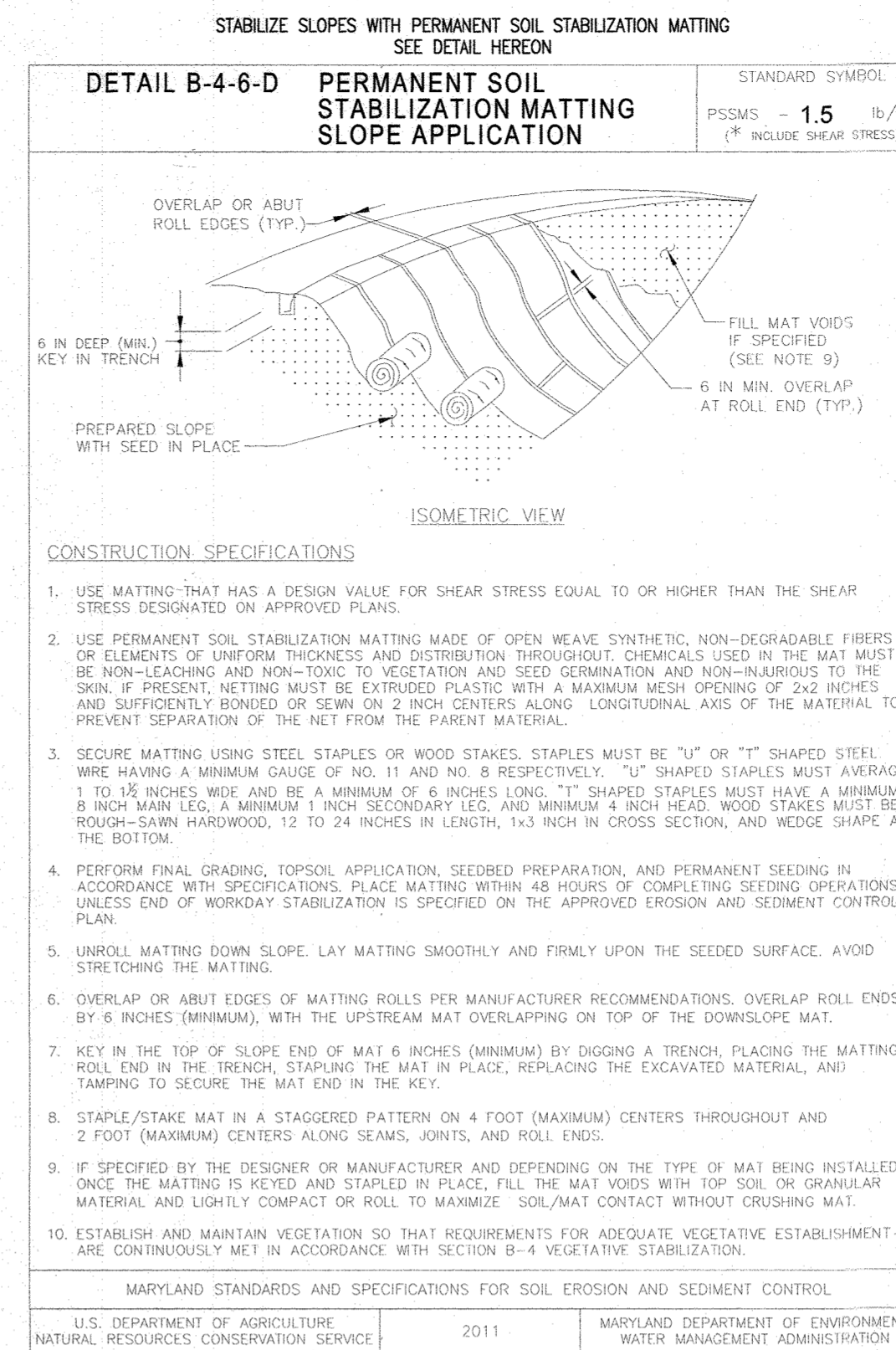
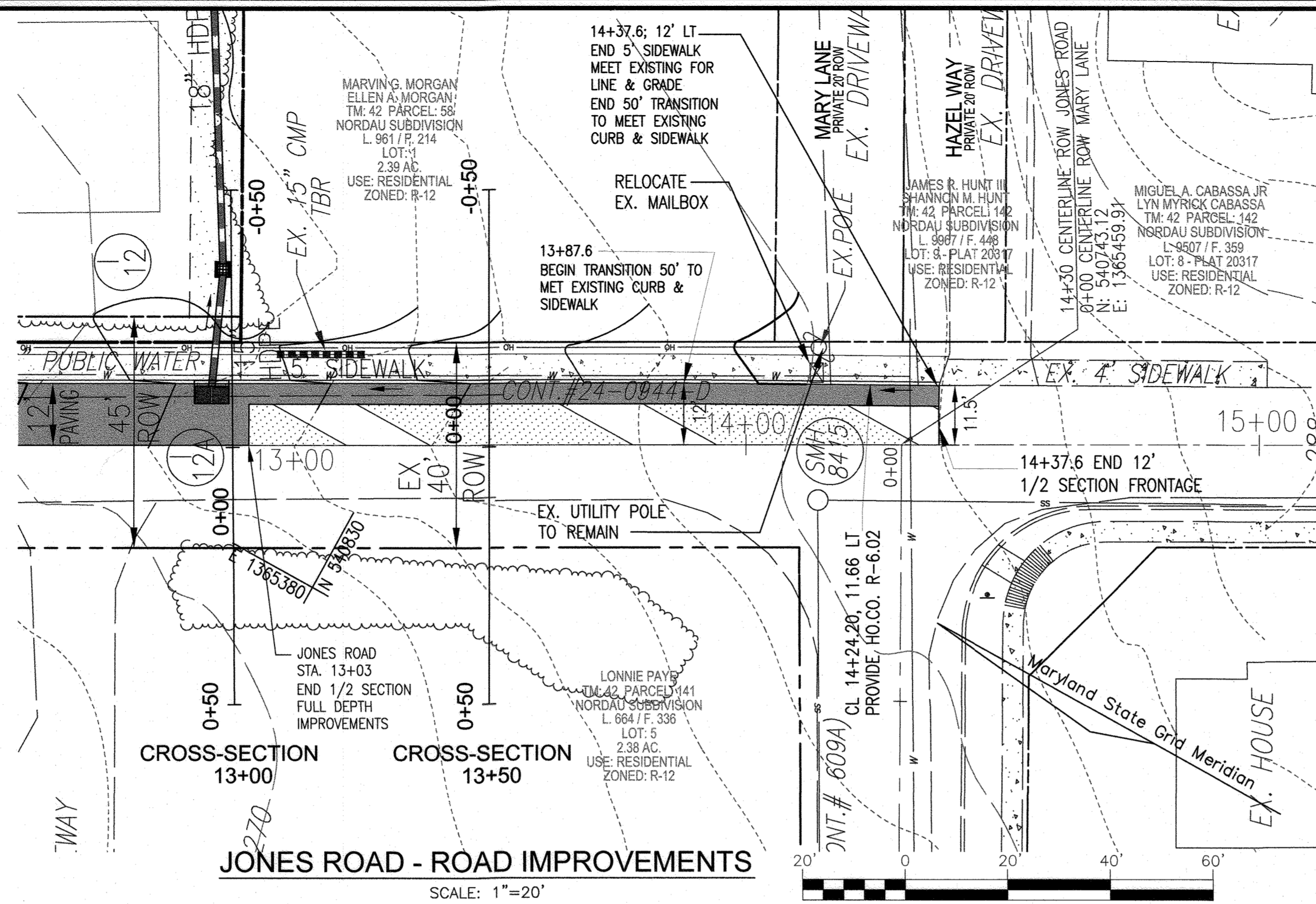
DESIGN BY: RHV  
DRAWN BY: VETG  
CHECKED BY: RHV  
DATE: MARCH 2020  
SCALE: AS SHOWN  
W.O. NO.: 12-05

PROFESSIONAL CERTIFICATE  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DAILY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193 EXPIRES DATE 09-27-2025

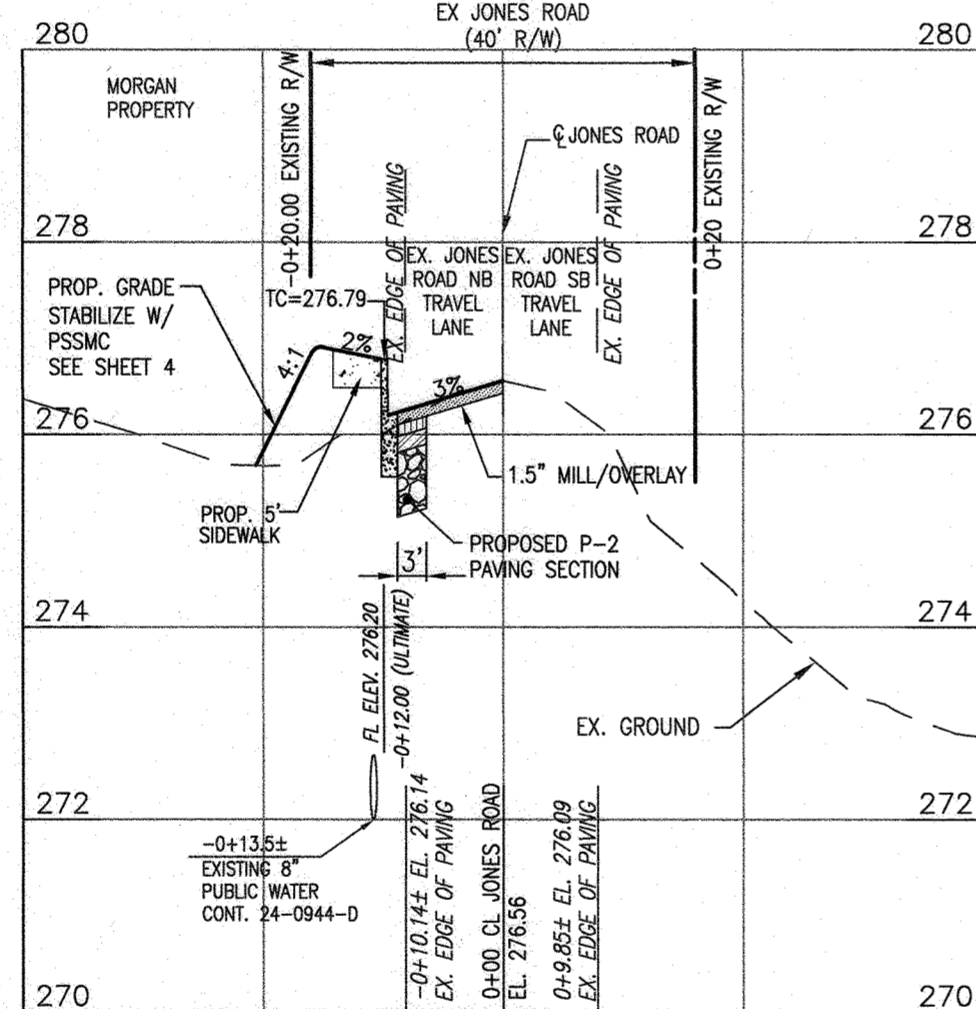
3 SHEET OF 23

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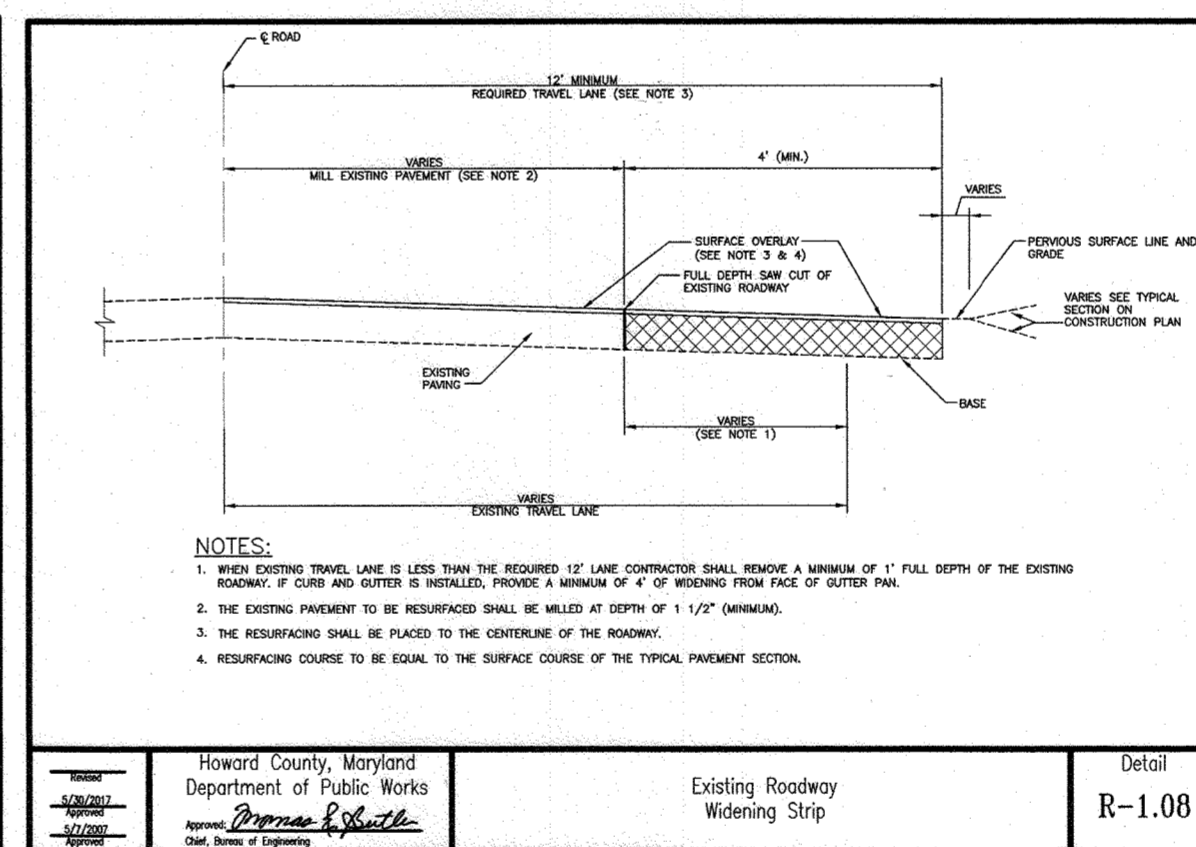
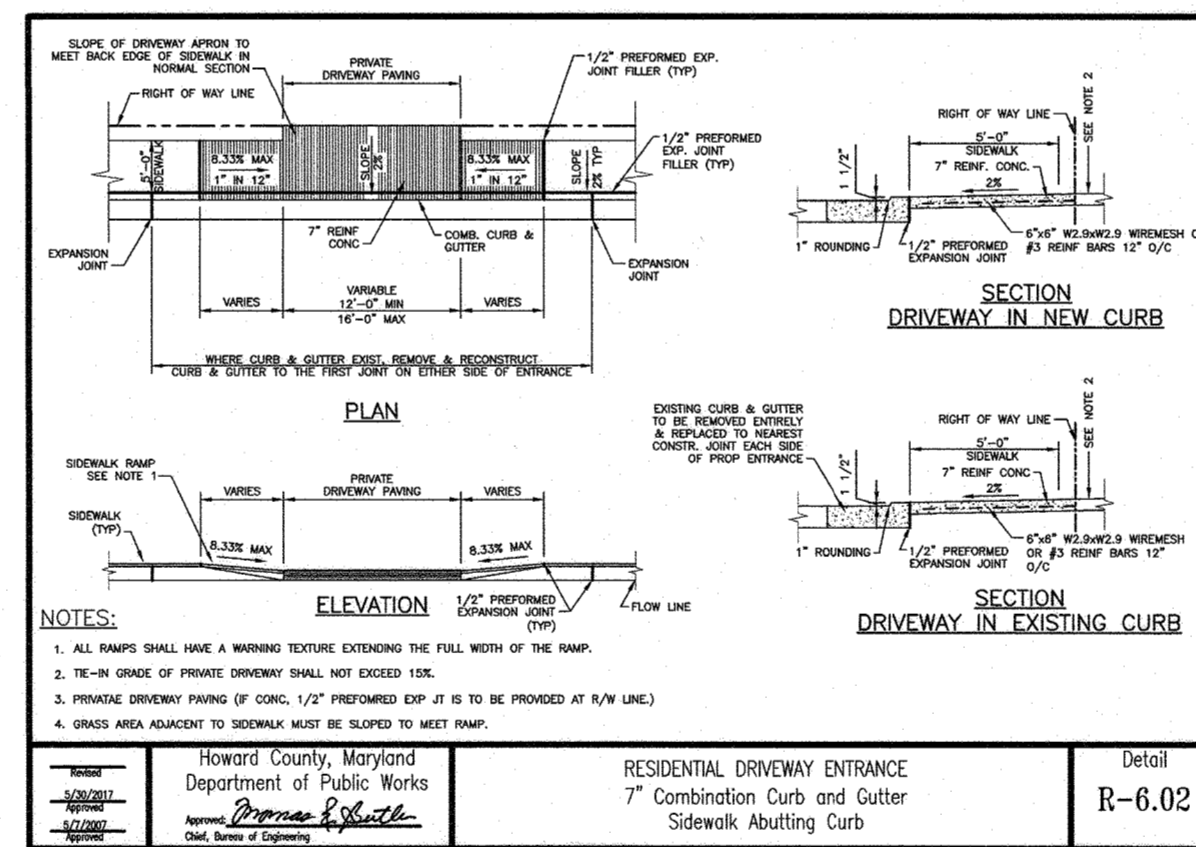
FOR CONTINUATION SEE SHEET 3



JONES ROAD STA. 13+00  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2'

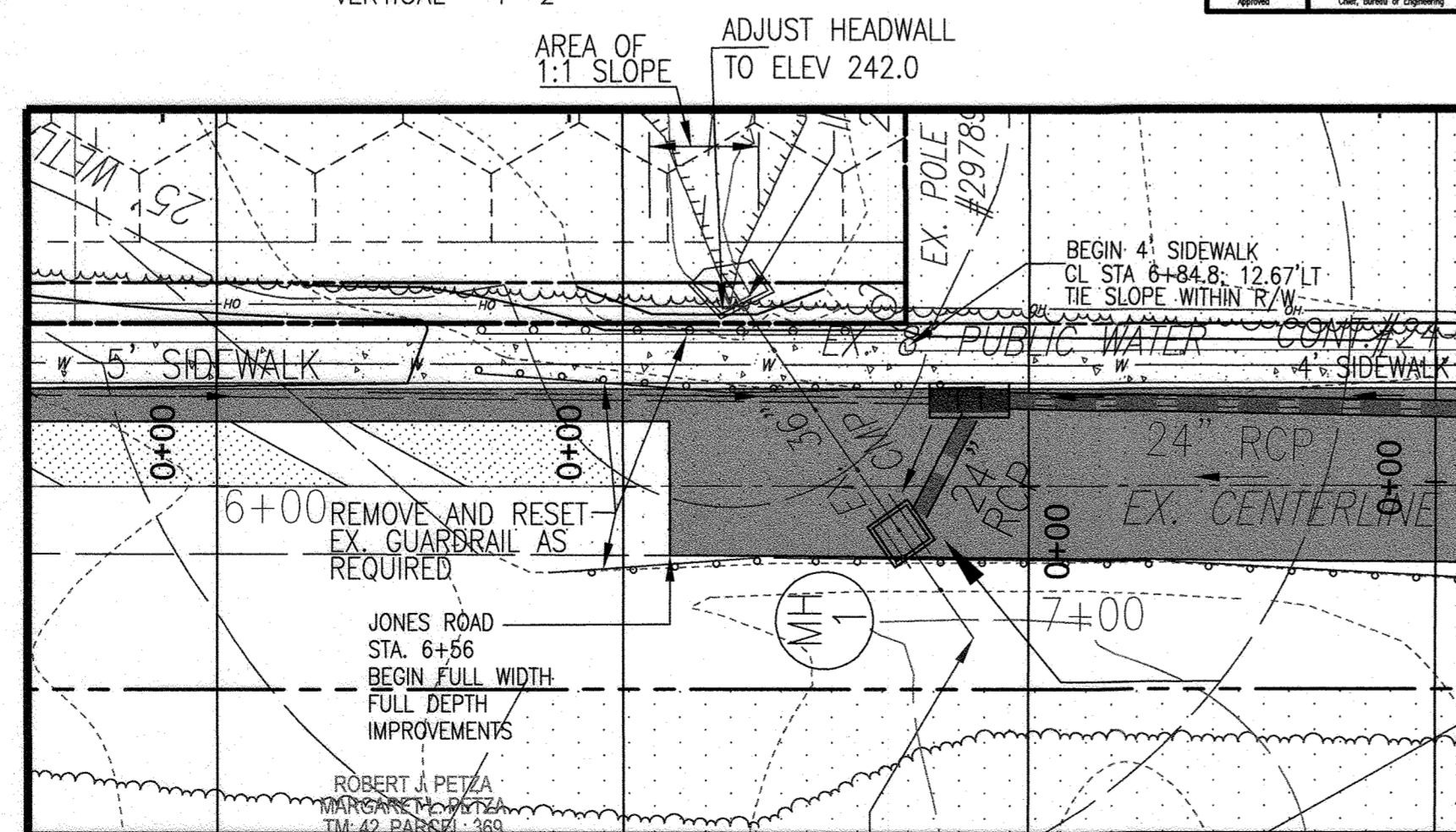


JONES ROAD STA. 13+50  
SCALE: HORIZONTAL - 1"=20'  
VERTICAL - 1"=2'



PAVEMENT CONSTRUCTION LOCATION		
TYPE OF CONSTRUCTION	START STATION	FINISH STATION
FULL DEPTH PAVEMENT	12+80	14+38
MILL & OVERLAY	13+03	14+38

REFER TO PLAN LEGEND AND PLAN VIEW HATCH



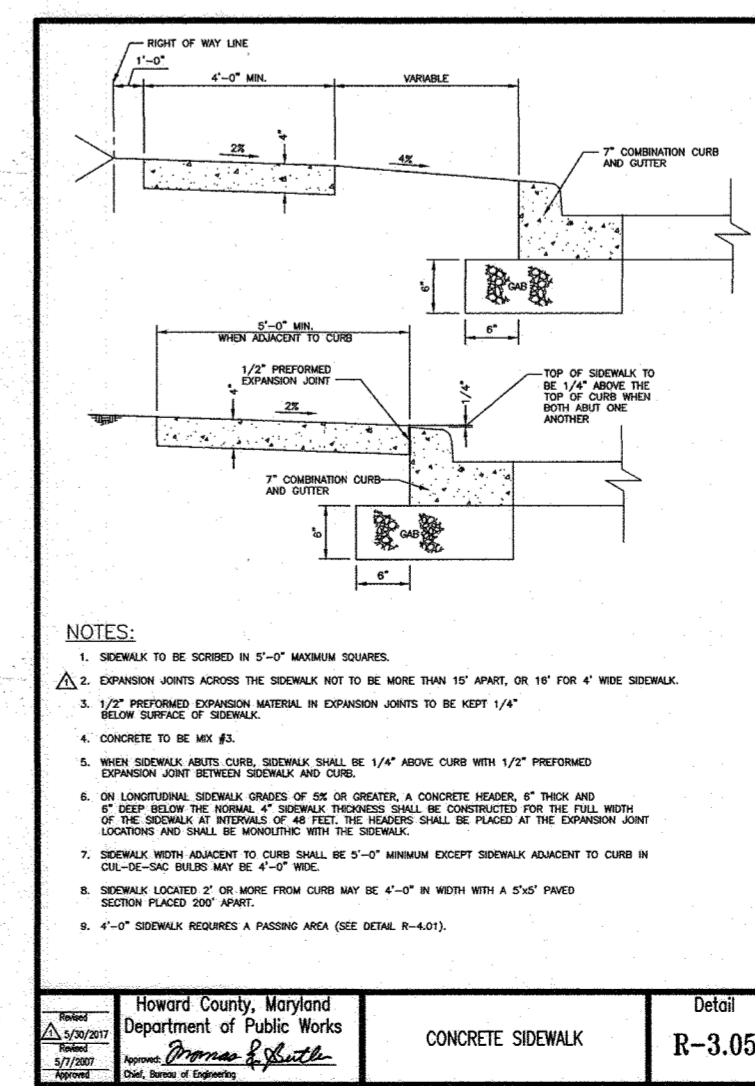
JONES ROAD EX. CULVERT PAVEMENT REPAIR  
SCALE: 1"=50'

**NOTE:**  
IF THE EXISTING CULVERT'S STRUCTURAL INTEGRITY IS COMPROMISED DURING THE INSTALLATION OF MPH, THE CONTRACTOR/DEVELOPER SHALL PROMPTLY COMPLETE ALL NECESSARY REPAIRS.  
REFER TO GENERAL NOTES 18 & 19, SHEET 1.

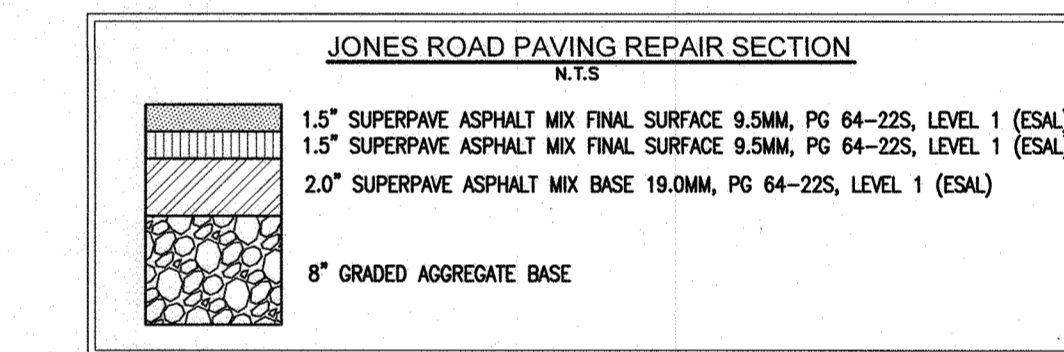
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*[Signature]* 11/23/20  
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*[Signature]* 12-2-20  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 12/10/20  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE



CONCRETE SIDEWALK  
R-3.05



**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DR., SUITE 100  
COLUMBIA, MD 21046  
ATTN: PETER ENGEL  
(410) 313-6316

NO.	REVISION	DATE

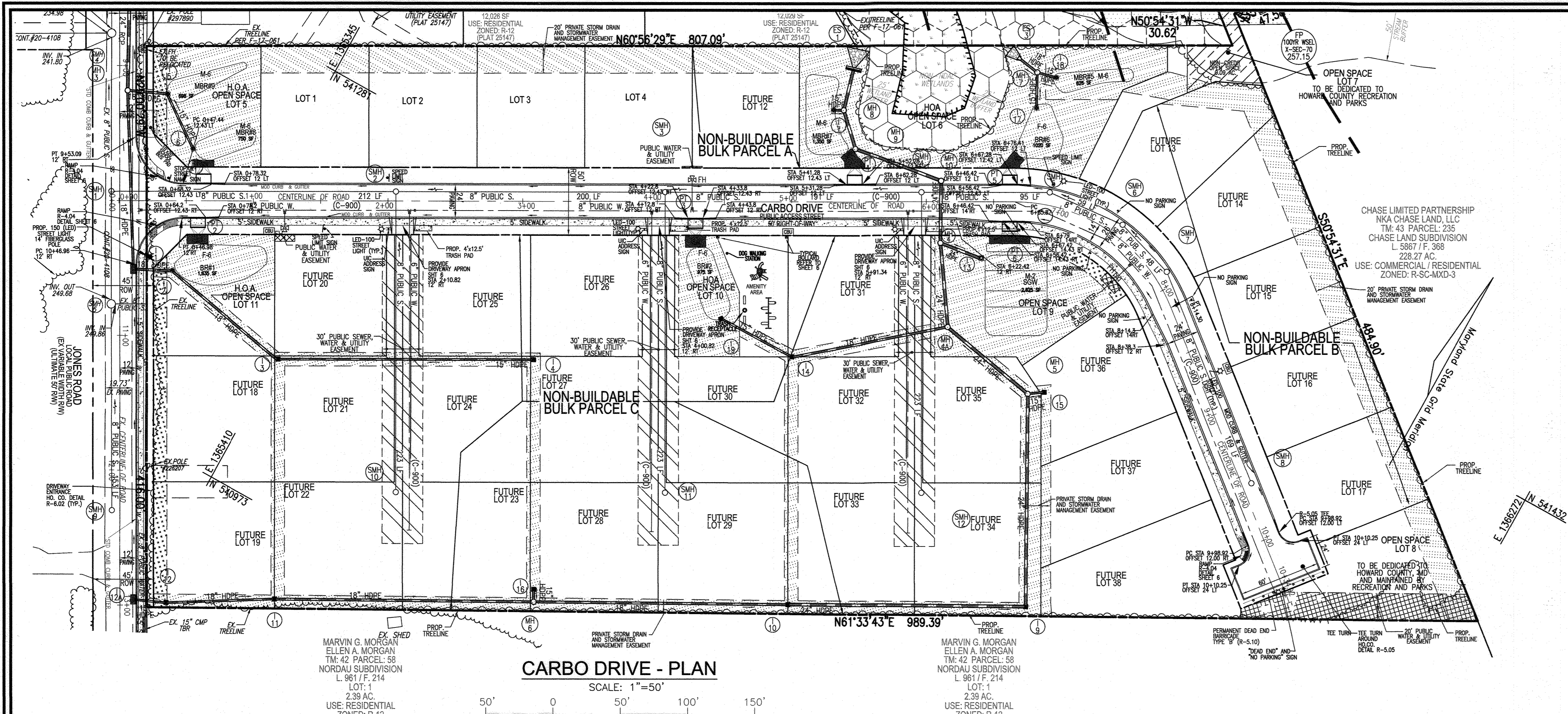
FINAL ROAD CONSTRUCTION PLAN  
JONES ROAD - ROAD IMPROVEMENTS,  
CROSS SECTIONS AND TRAFFIC CONTROL  
**GREENWOOD VILLAGE - PHASE 1**  
LOTS 1-4, NON-BUILDABLE BULK PARCELS A-C  
AND OPEN SPACE LOTS 5-11  
A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4  
LOTS 2-4 (P.B. 3/51), 5R (L16288 F.488), 6R (L16288 F.502) AND 9 (P.B. 3/51)  
TAX MAP: 42 GRID: 24 PARCELS: 136 & 138-140  
8TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
TIMMONS GROUP  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com

PROFESSIONAL CERTIFICATE  
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. 16193 EXPIRATION DATE 08-27-2020

DESIGN BY: RHV  
DRAWN BY: VETG  
CHECKED BY: RHV  
DATE: MARCH 2020  
SCALE: AS SHOWN  
W.O. NO.: 12-05

4 SHEET OF 23



**ROAD WIDTH TRANSITION NOTE**  
 PAVEMENT WIDTH EXPANSION SHALL OCCUR BETWEEN CL RD STATIONS 6+22.42 - 8+38.3  
 -CL STA 6+22.42; 12'RT; BEGIN 12:1 TRANSITION FROM 24' TO 26'  
 EXPANDED ROAD WIDTH WILL OCCUR ON THE RIGHT/INSIDE OF CURVE  
 -CL STA 6+48.42; 14'RT END 12:1 TRANSITION TO 26'; BEGIN STANDARD R-3.02 TRANSITION TO PT6  
 -CL STA 6+56.42; 14.43'RT END R-3.02 TRANSITION AT PT6  
 -CL STA 6+67.42; 14.43'RT BEGIN R-3.02 TRANSITION TO 26'  
 -CL STA 6+78; 14'RT END TRANSITION TO 26'  
 -CL STA 8+14.3; 14'RT BEGIN 12:1 TRANSITION FROM 26' TO 24'  
 -CL STA 8+38.3; 12'RT END TRANSITION TO 24'

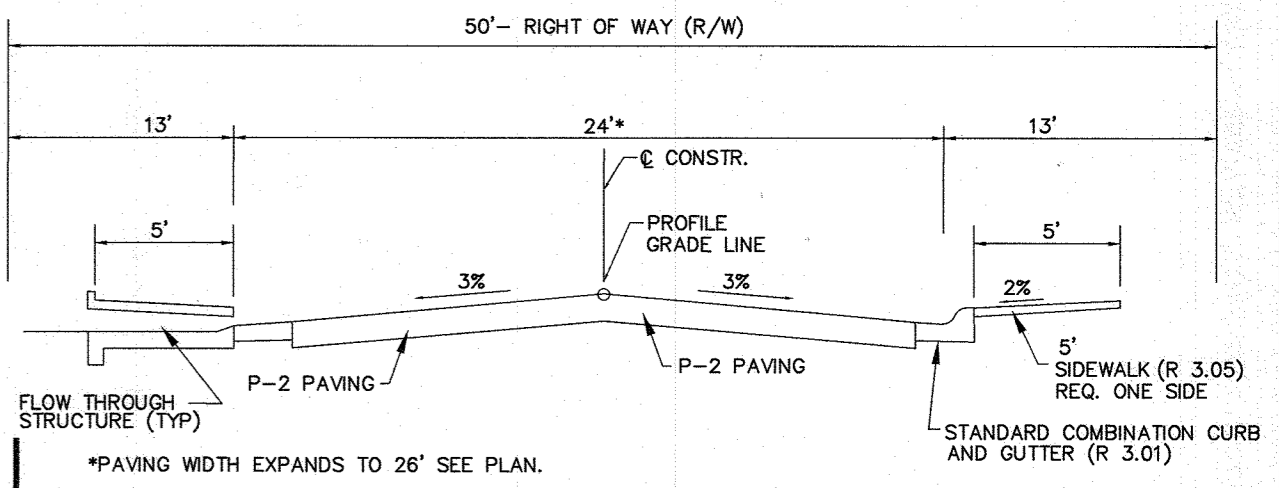
STREET LIGHT LOCATIONS			
ROAD NAME	STATION	OFFSET	FIXTURE/POLE TYPE
JONES ROAD	10+41.58	23.21' LEFT	LED-150 PREMIER COLUMN POST-TOP FIXTURE MOUNTED ON 14' BLACK FIBERGLASS POLE
CARBO DRIVE	1+95.09	21' RIGHT	LED-100 PREMIER COLUMN POST-TOP FIXTURE MOUNTED ON 14' BLACK FIBERGLASS POLE
CARBO DRIVE	3+85.59	20.3' RIGHT	LED-100 PREMIER COLUMN POST-TOP FIXTURE MOUNTED ON 14' BLACK FIBERGLASS POLE
CARBO DRIVE	5+76.67	20.6' RIGHT	LED-100 PREMIER COLUMN POST-TOP FIXTURE MOUNTED ON 14' BLACK FIBERGLASS POLE
CARBO DRIVE	6+97.32	19.98' LEFT	LED-100 PREMIER COLUMN POST-TOP FIXTURE MOUNTED ON 14' BLACK FIBERGLASS POLE
CARBO DRIVE	8+71.59	16.6' LEFT	LED-100 PREMIER COLUMN POST-TOP FIXTURE MOUNTED ON 14' BLACK FIBERGLASS POLE
CARBO DRIVE	10+40.54	4.57' RIGHT	LED-100 PREMIER COLUMN POST-TOP FIXTURE MOUNTED ON 14' BLACK FIBERGLASS POLE
JONES ROAD	8+21.98	21.28' LEFT	LED-100 PREMIER COLUMN POST-TOP FIXTURE MOUNTED ON 14' BLACK FIBERGLASS POLE

- NOTES**
- REFER TO SHEETS 13 AND 14 FOR STORMDRAIN PROFILES.
  - REFER TO SHEET 13 FOR STORMDRAIN STRUCTURE SCHEDULE.
  - FOR STREET TREE LOCATIONS, REFER TO SHEET 15.
  - ALL STREET TREES AND/OR SIGN SHALL BE LOCATED 5' MIN. FROM PROPOSED DRAINAGE, UTILITY STRUCTURE.
  - THERE SHOULD BE A MINIMUM OF 20' BETWEEN STREET LIGHTS AND STREET TREES.
  - IN THE DIRECTION FACING A TRAFFIC CONTROL SIGN:
    - THERE SHALL BE A MINIMUM OF 40' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL STOP SIGNS.
    - THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN.
  - REFER TO SHEET 6 FOR SIDEWALK, CURB TRANSITION, PAVING SECTION, TYPICAL SECTION AND CURB DETAILS.
  - ALL SIGN LOCATIONS ARE APPROXIMATE; HOWARD COUNTY TRAFFIC SHALL FIELD APPROVE OR MARK ALL SIGN LOCATIONS PRIOR TO ANY SIGNS BEING INSTALLED. CALL 410-313-5752.
  - REFER TO SHEET 6 FOR PROPOSED CENTRAL MAIL DELIVERY BOX (CBU) LOCATIONS. FINAL LOCATIONS SHALL BE DIRECTED BY THE U.S. POSTAL SERVICE.
  - HANDICAP RAMPS PER STANDARD R-4.01.

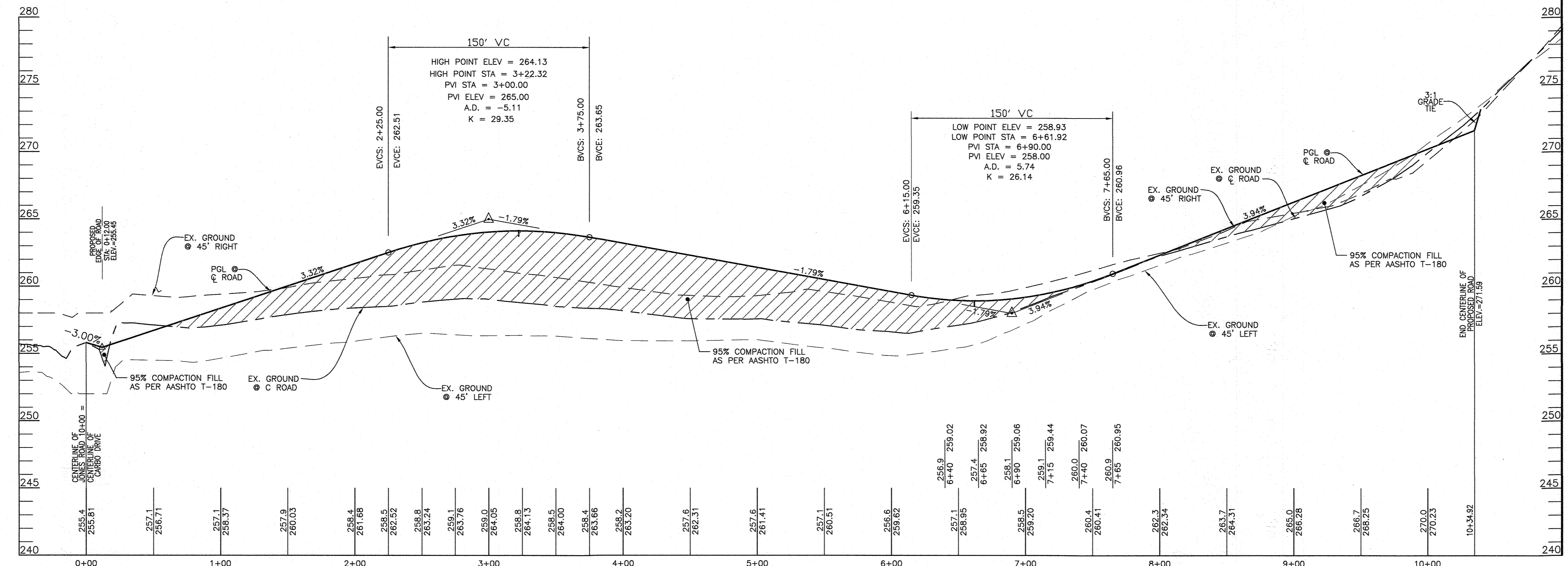
**CURVE TABLE**

CURVE	ARC	RADIUS	TANGENT	DELTA	CHORD
6+65.87 - 8+14.30	148.44'	125.00' (1)	84.37'	68°02'16"	N84°55'39"W 139.87'
10+73.60 - 14+63.26	399.66'	350.00'	217.81'	63°47'17"	S82°48'09"E 369.85'

(1) REFER TO GENERAL NOTE 50, SHEET 1.



**CARBO DRIVE - PLAN**  
 SCALE: 1"=50'  
 0 50' 100' 150'



**CARBO DRIVE - PROFILE**  
 PUBLIC ACCESS STREET  
 50' R/W - 24' PAVEMENT  
 DESIGN SPEED: 30 MPH  
 SCALE: 1"=50' HORIZ.  
 1"=5' VERT.

**TRAFFIC CONTROL SIGNAGE SCHEDULE**

ROAD NAME	STATION	OFFSET	TYPE
CARBO DRIVE	0+36.64	16.9 LT	R1-1 STOP SIGN
CARBO DRIVE	0+36.64	16.9 LT	STREET NAME SIGN
CARBO DRIVE	1+52.96	20.7 RT	R2-1 SPEED LIMIT SIGN
CARBO DRIVE	1+99.46	17.28 LT	R2-1 SPEED LIMIT SIGN
CARBO DRIVE	2+00.32	20.7 RT	UC ADDRESS SIGN
CARBO DRIVE	3+90.32	20.7 RT	UC ADDRESS SIGN
CARBO DRIVE	5+80.84	20.7 RT	UC ADDRESS SIGN
CARBO DRIVE	6+90.96	16.1 LT	R2-1 SPEED LIMIT SIGN
CARBO DRIVE	10+40.01	0.0	ROAD END SIGN
CARBO DRIVE	10+40.01	0.0	R7-1 "NO PARKING" SIGN
CARBO DRIVE	6+65.87	21.5' RT	R7-1 "NO PARKING" SIGN W/ RIGHT ARROW 'D'
CARBO DRIVE	8+14.30	21.5' RT	R7-1 "NO PARKING" SIGN W/ LEFT ARROW 'B'
CARBO DRIVE	7+37.29	21.5' RT	R7-1 "NO PARKING" SIGN W/ DOUBLE ARROW 'C'
CARBO DRIVE	6+70	16.1' LT	R7-1 "NO PARKING" SIGN W/ RIGHT ARROW 'B'
CARBO DRIVE	8+14.30	16.1' LT	R7-1 "NO PARKING" SIGN W/ LEFT ARROW 'D'
CARBO DRIVE	7+37.29	16.1' LT	R7-1 "NO PARKING" SIGN W/ DOUBLE ARROW 'C'

**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DR., SUITE 100  
 COLUMBIA, MD 21046  
 ATTN: PETER ENGEL  
 (410) 313-6316

- LEGEND:**
- PROPERTY LINE
  - RIGHT-OF-WAY LINE
  - ADJACENT PROPERTY LINE
  - EXISTING PAVING
  - EXISTING UTILITY POLE
  - EXISTING SANITARY MANHOLE
  - EXISTING SANITARY LINE
  - EXISTING FIRE HYDRANT
  - EXISTING WATER LINE
  - EXISTING TREELINE
  - EXISTING WETLANDS
  - EXISTING WETLAND BUFFER
  - PUBLIC 100-YEAR FLOOD PLAIN (PLAT 25147)
  - EXISTING FOREST CONSERVATION EASEMENT (RETENTION - PLAT 25147)
  - PROP. FOREST CONSERVATION EASEMENT
  - PUBLIC SEWER, WATER & UTILITY EASEMENT
  - PUBLIC WATER & UTILITY EASEMENT
  - PUBLIC DRAINAGE & UTILITY EASEMENT
  - PRIVATE STORM DRAIN AND STORM WATER MANAGEMENT EASEMENT
  - 10' PUBLIC TREE MAINTENANCE EASEMENT
  - STORMDRAIN
  - STORM DRAIN INLET
  - SIDEWALK
  - TREELINE
  - CURB & GUTTER
  - STREET LIGHT

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*[Signature]* for *[Signature]* 4/28/20  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*[Signature]* 4.2.20  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 4/21/20  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

NO. REVISION DATE

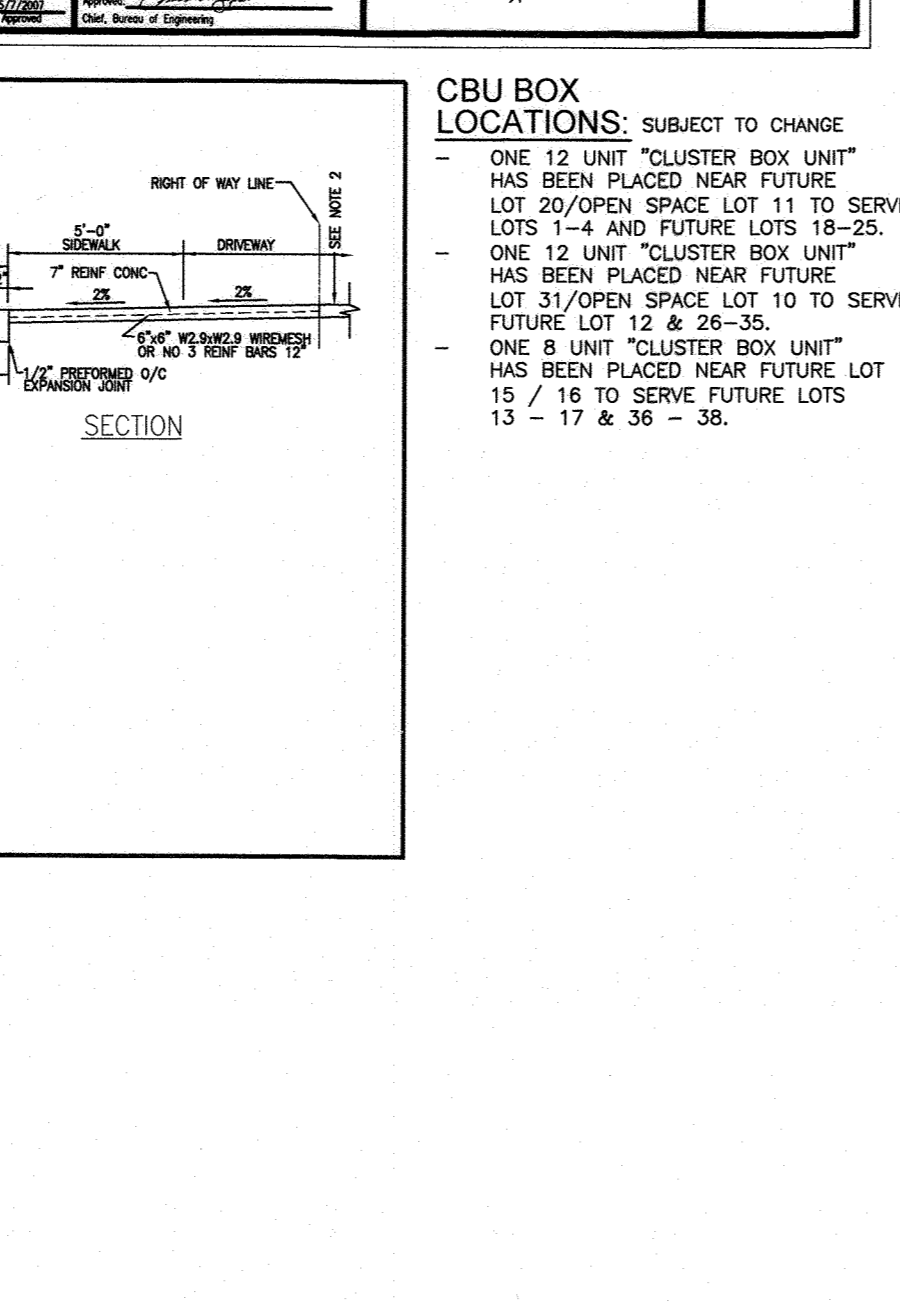
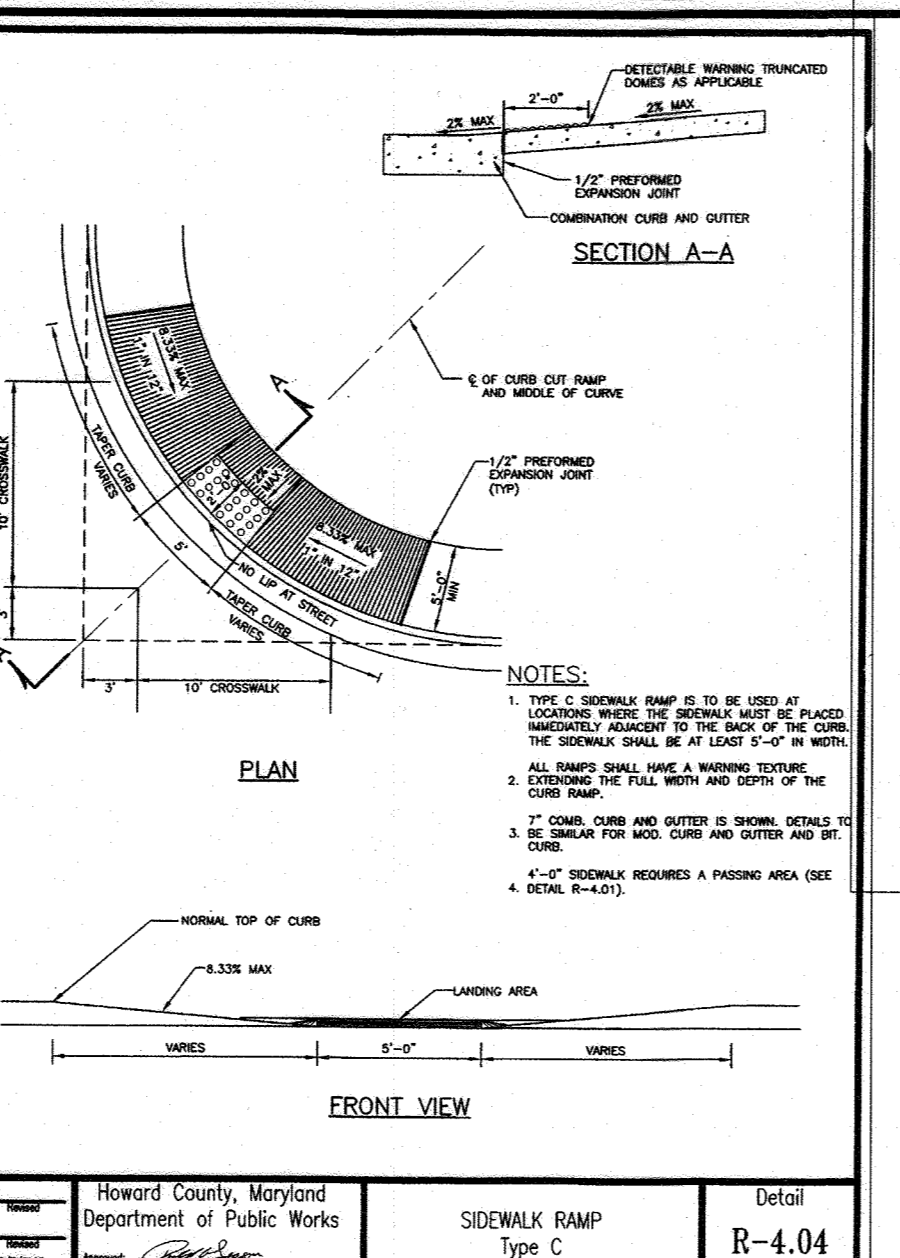
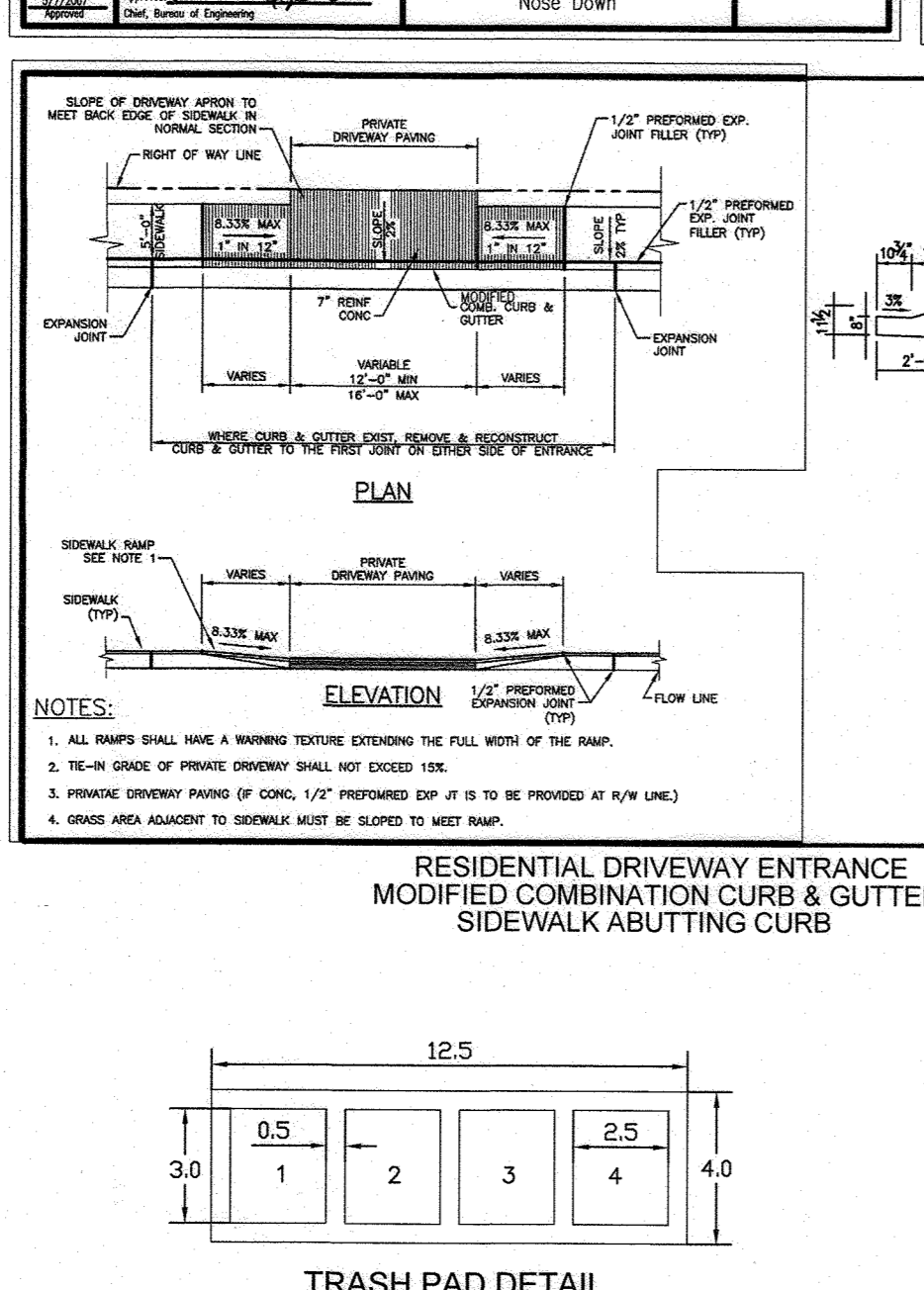
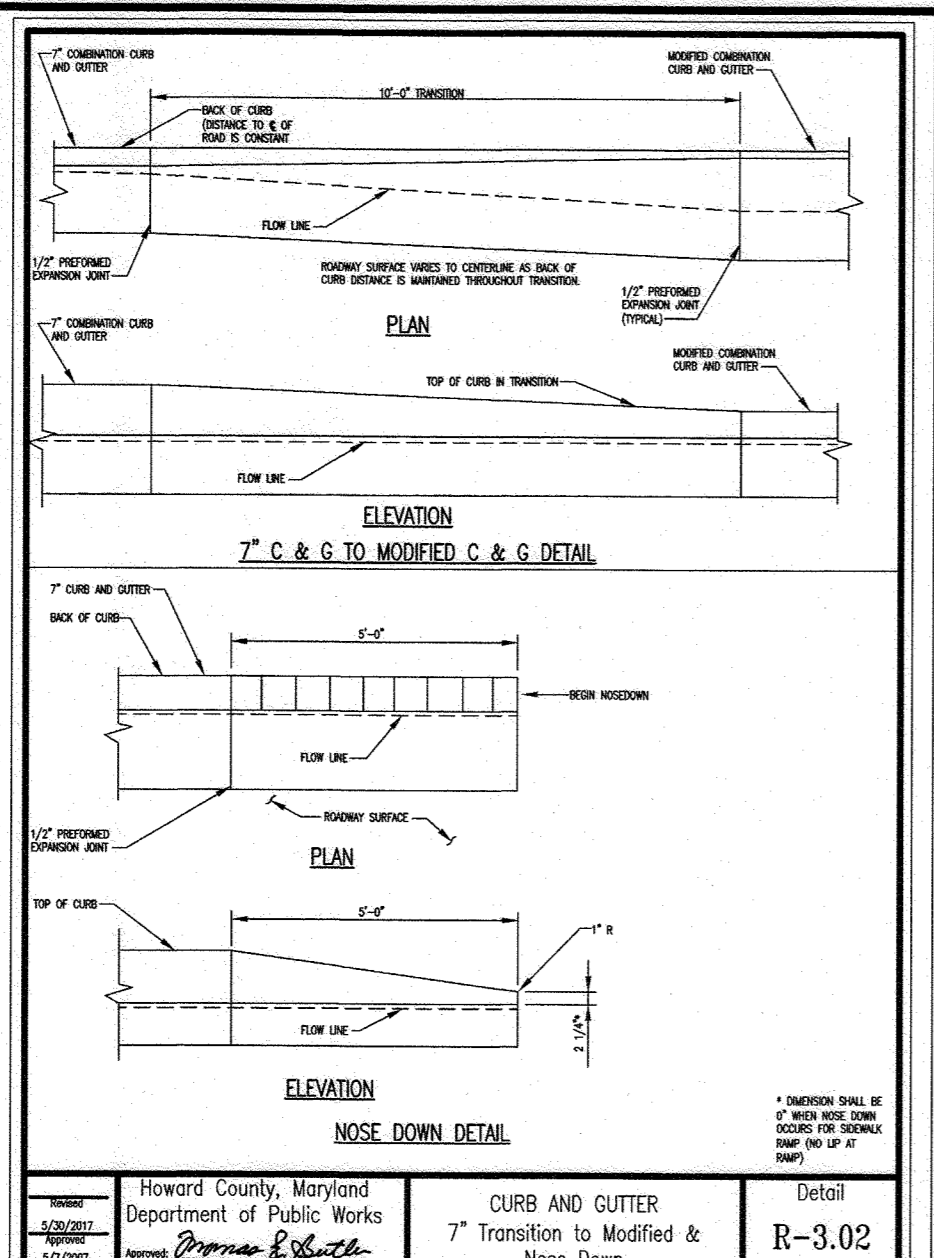
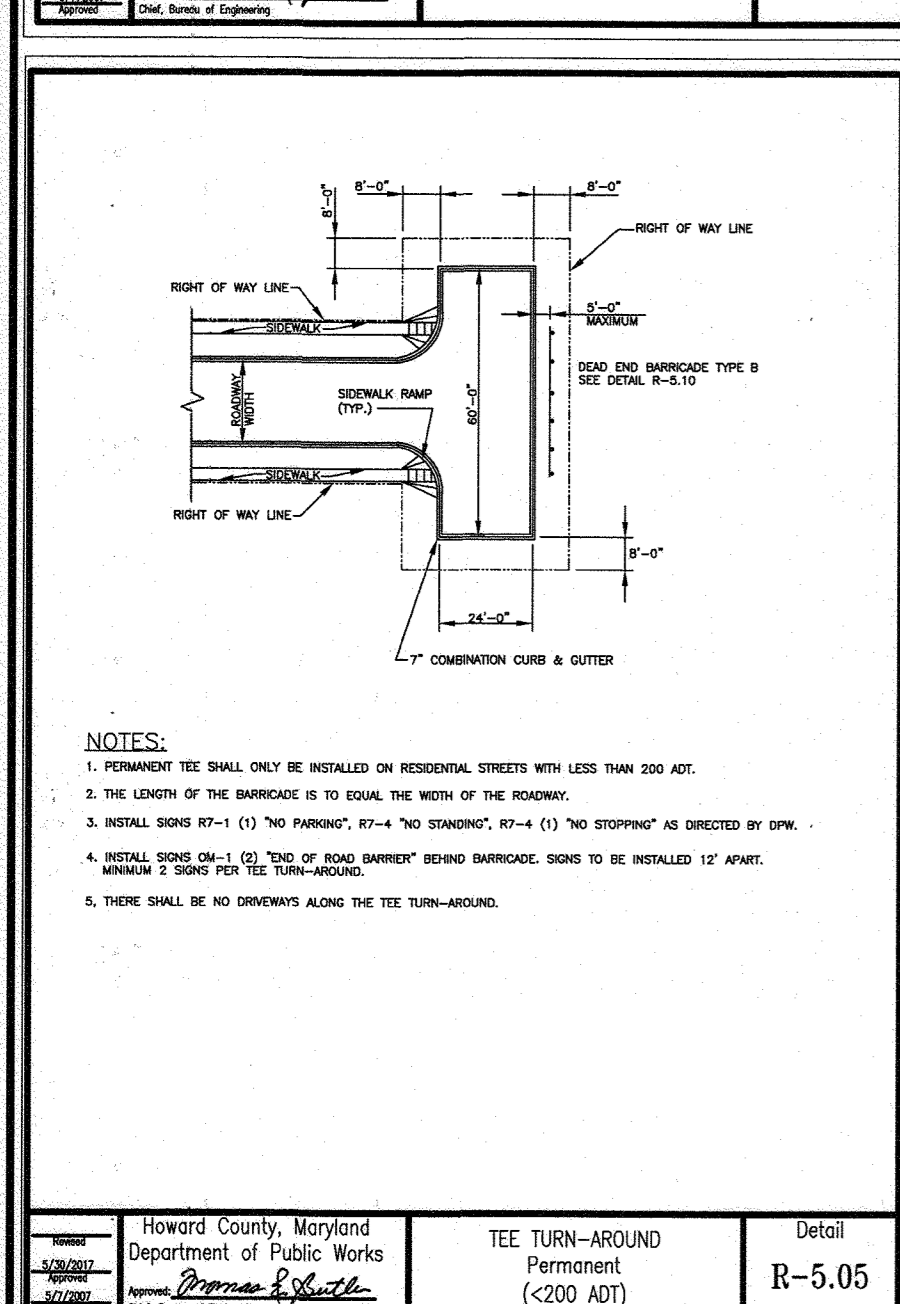
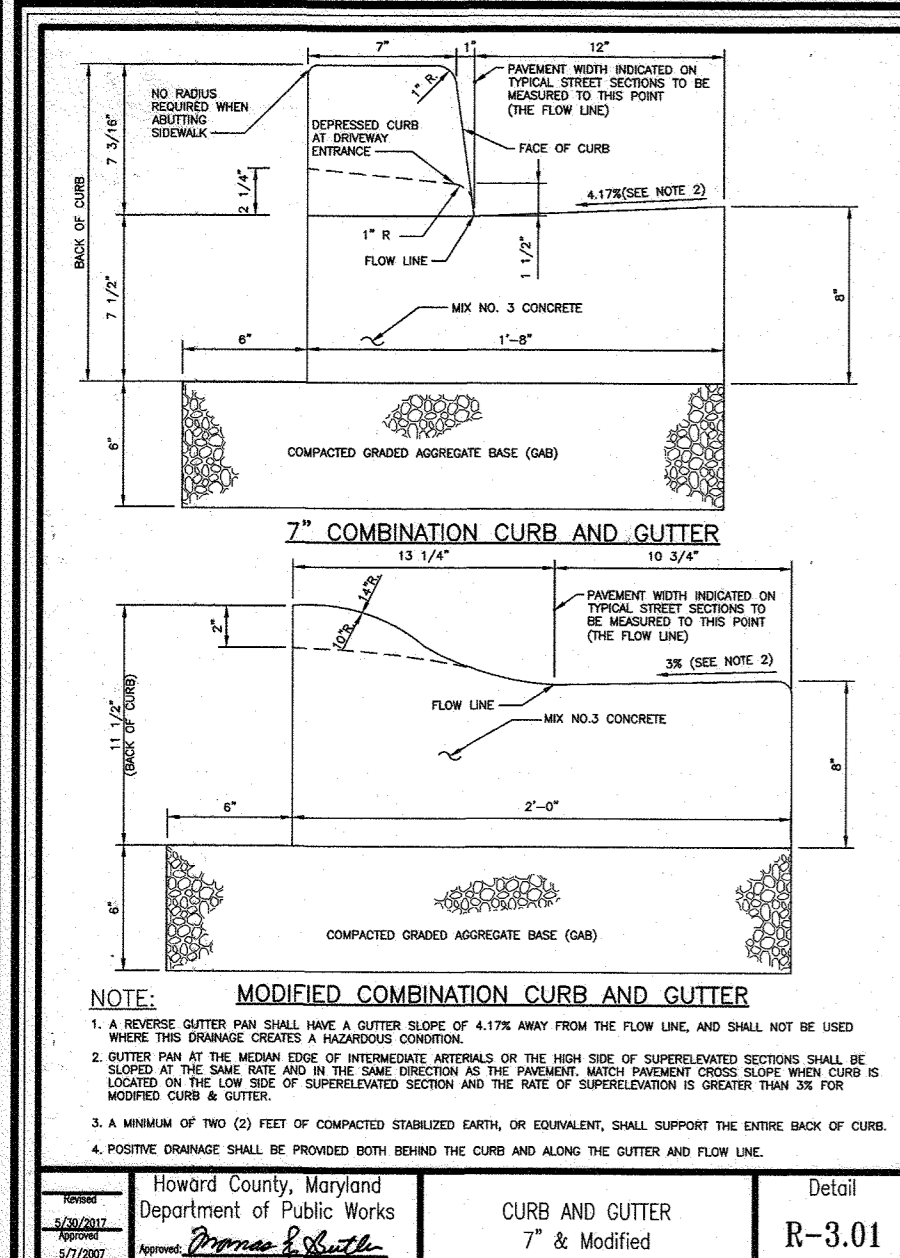
**FINAL ROAD CONSTRUCTION PLAN**  
 CARBO DRIVE  
 PLAN AND PROFILE  
**GREENWOOD VILLAGE - PHASE 1**  
 LOTS 1-4, NON-BUILDABLE BULK PARCELS A-C  
 AND OPEN SPACE LOTS 5-11  
 A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4  
 LOTS 2-4 (P.B. 3/51), 5R (L-16286 F-488), 8R (L-16286 F-502) AND 9 (P.B. 3/51)  
 TAX MAP: 42 GRD. 24 PARCELS: 135 & 138-140  
 6TH ELECTION DISTRICT ZONED: R-12 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
**TIMMONS GROUP**  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7666 F: 410.461.8961 www.timmons.com

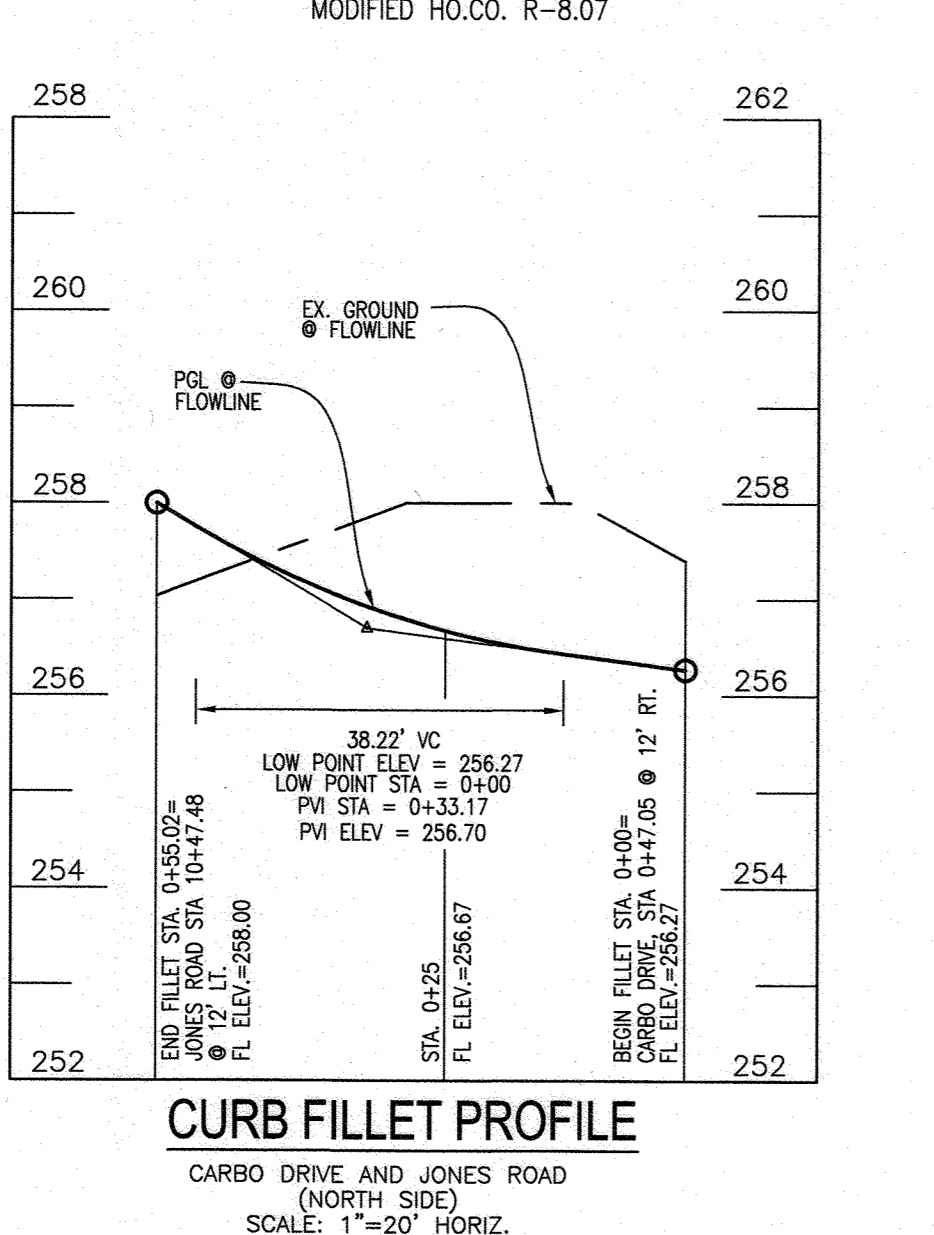
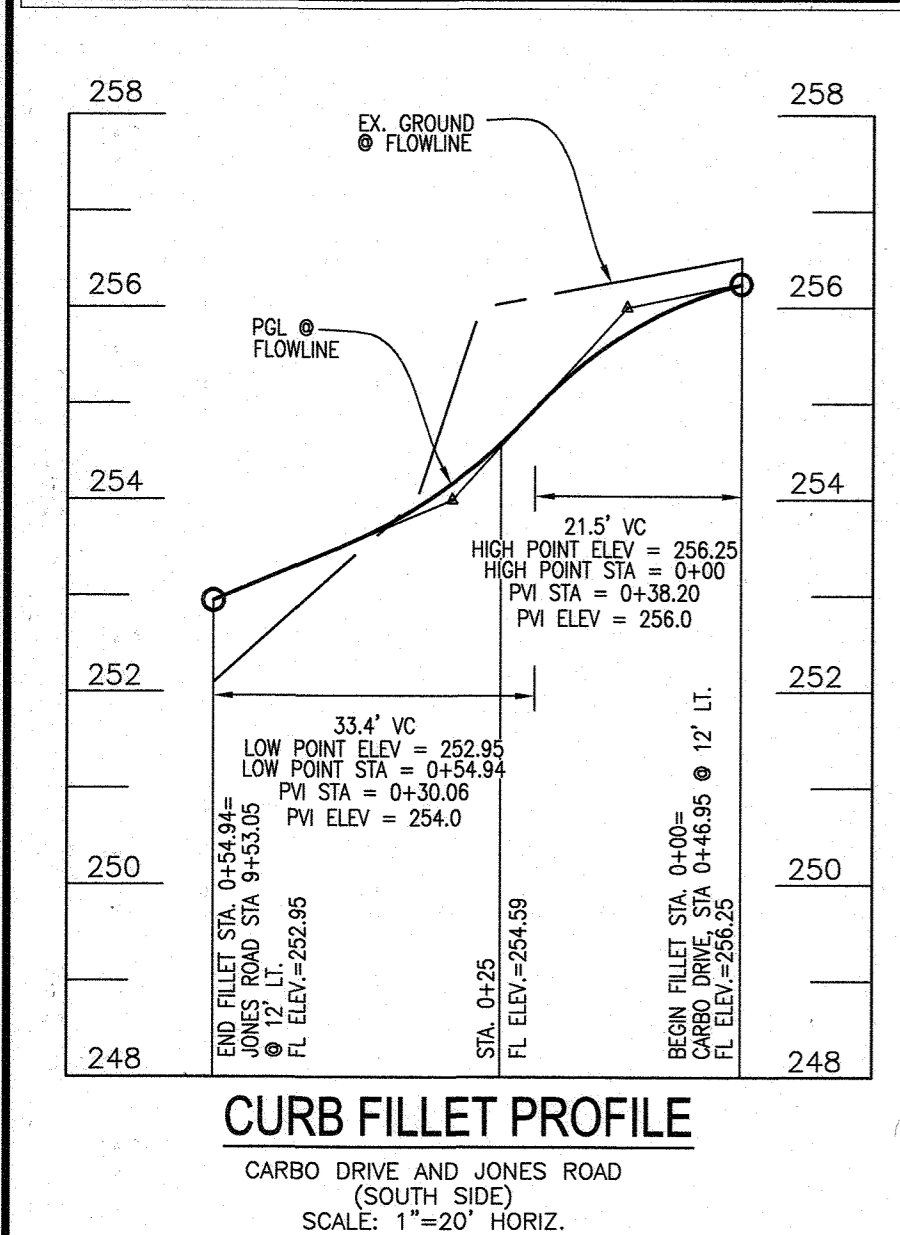
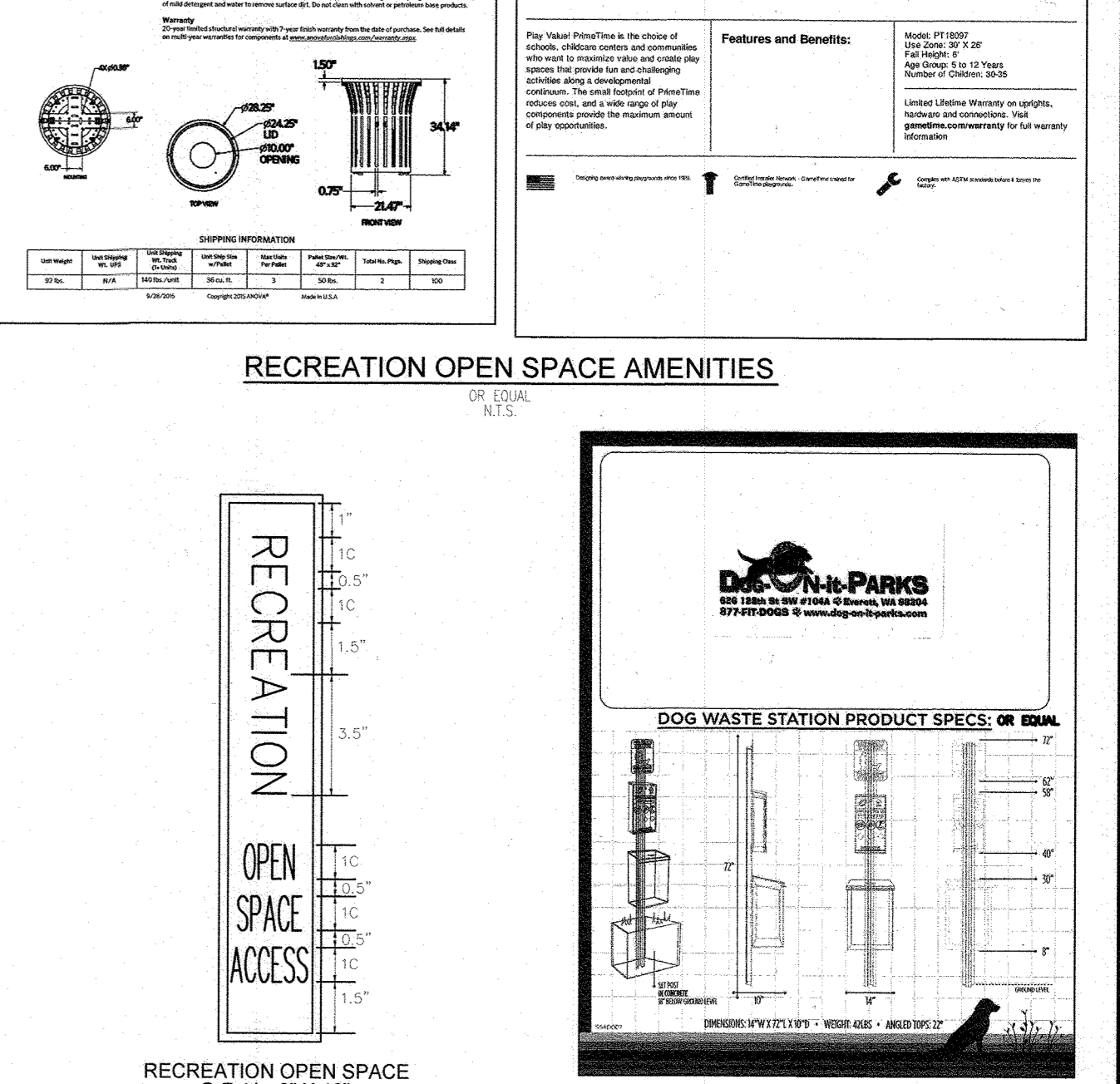
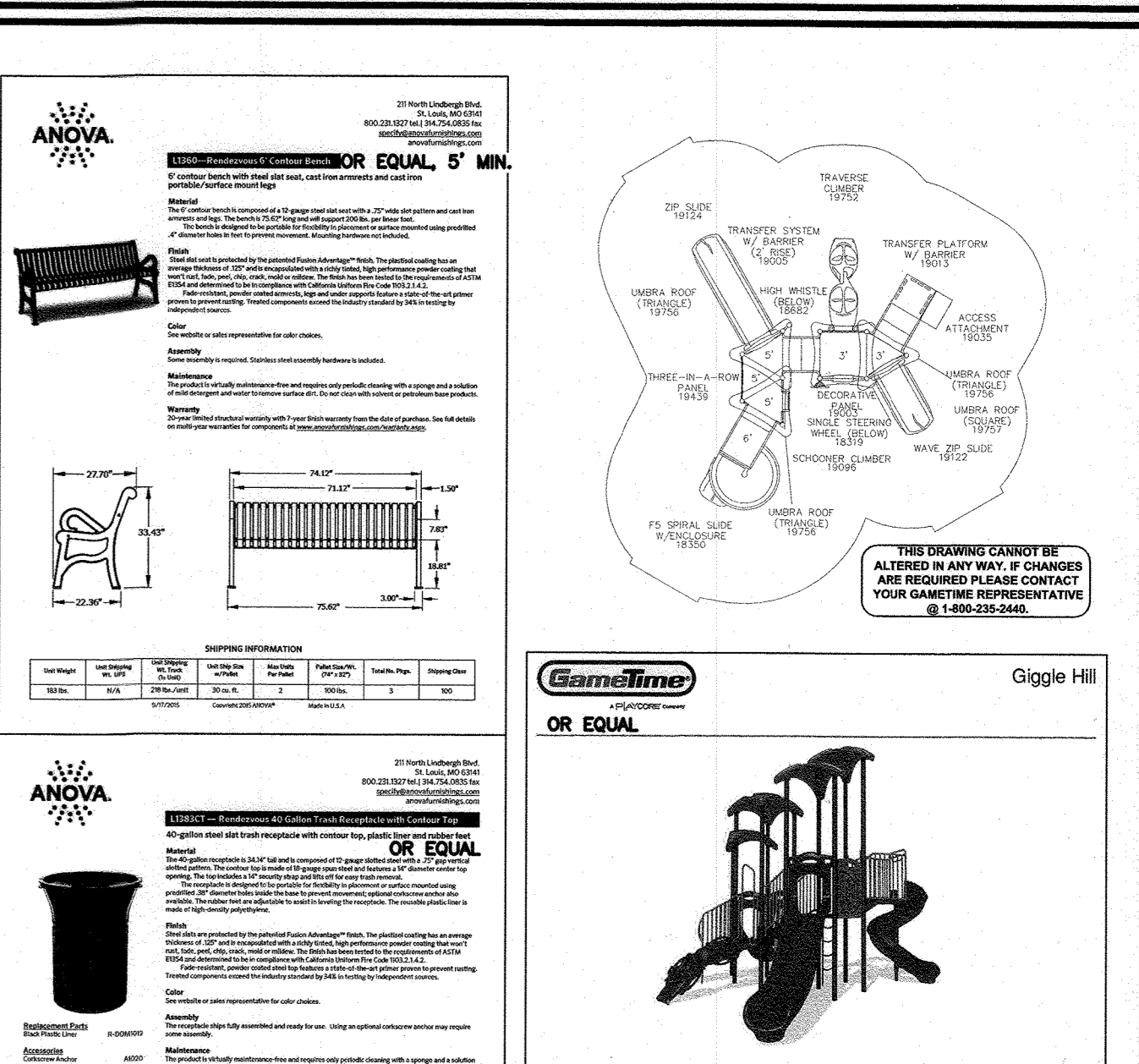
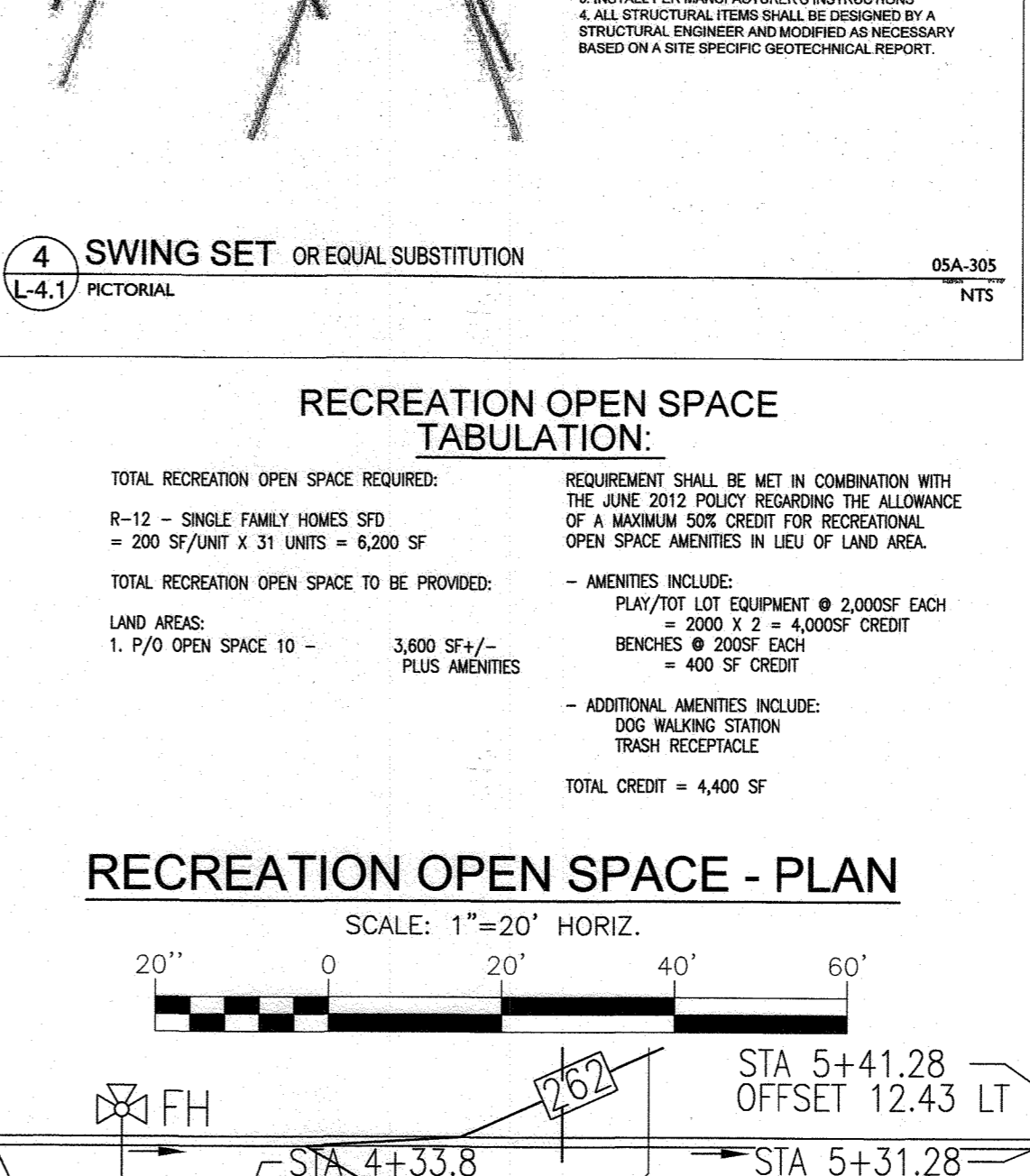
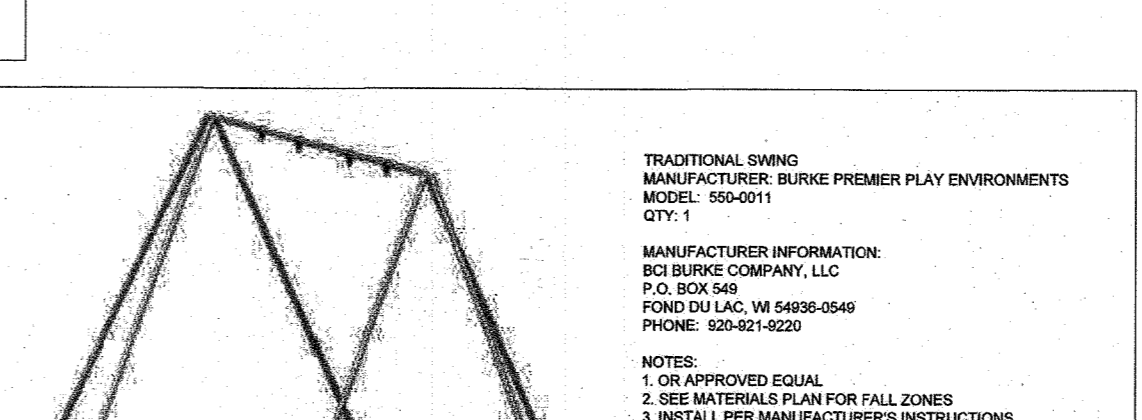
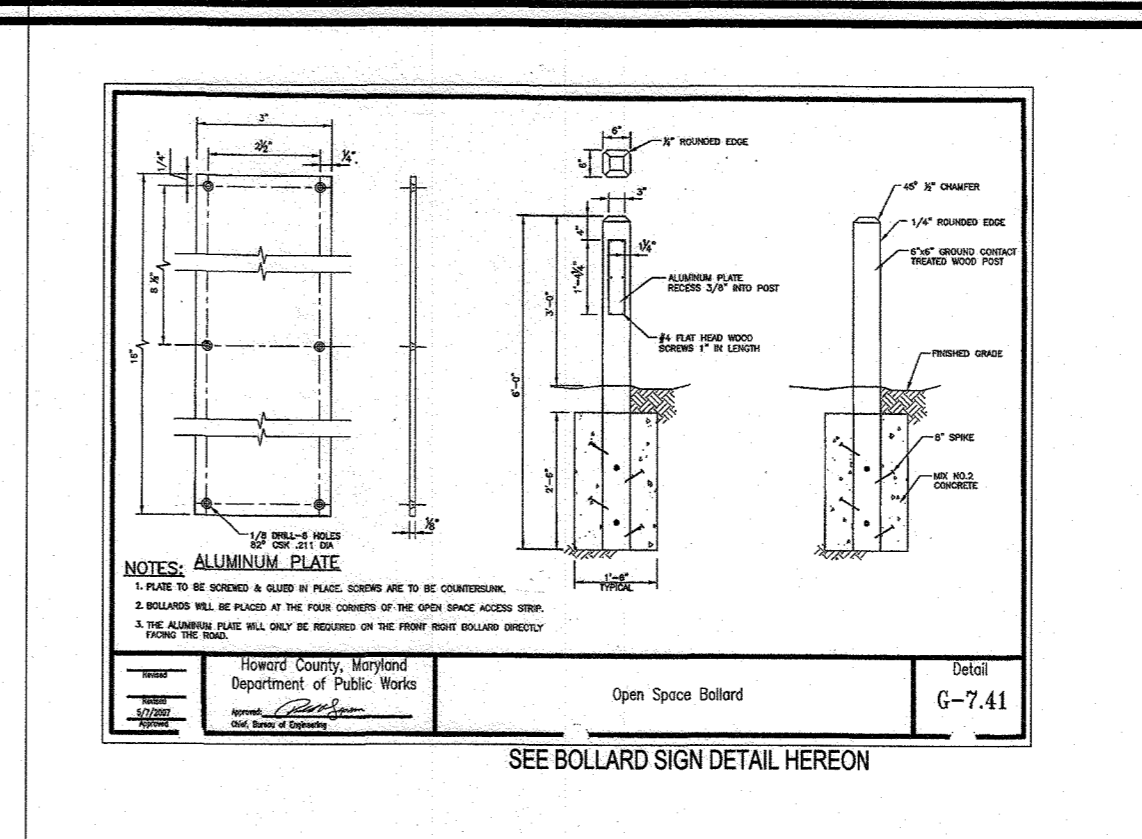
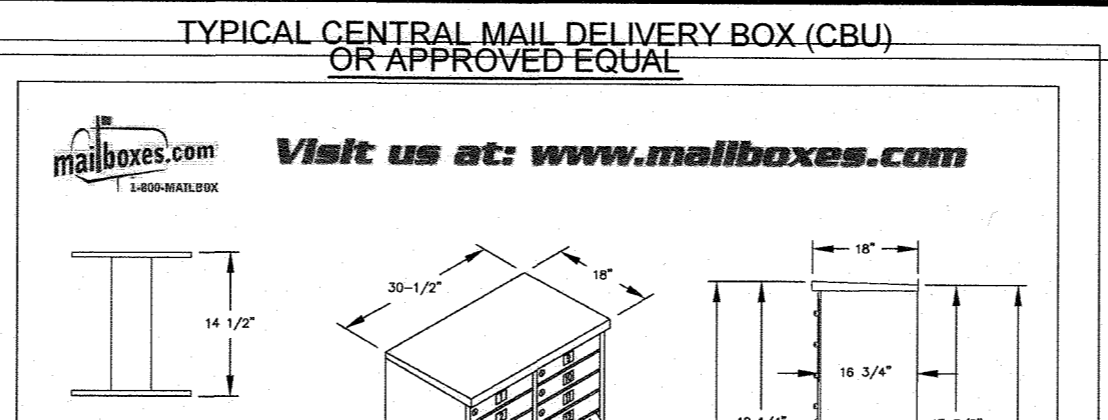
PROFESSIONAL CERTIFICATE  
 DESIGN BY: RHY  
 DRAWN BY: VETG  
 CHECKED BY: RHY  
 DATE: MARCH 2020  
 SCALE: AS SHOWN  
 W.O. NO.: 12-05

1. 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. 16193 EXPIRATION DATE: 08-27-2020

5 SHEET OF 23  
 ROBERT H. VOGEL, PE No. 16193



SECTION NUMBER	ROAD AND STREET CLASSIFICATION	CALIFORNIA BEARING RATIO (CBR)	3 TO <4>	4 TO <5>	5 TO <6>	6 TO <7>	7 TO <8>	8 TO <9>	9 TO <10>	10 TO <15>	15 TO <20>
P-1	PAVEMENT MATERIAL (INCHES)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
P-2	PAVEMENT MATERIAL (INCHES)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
P-3	PAVEMENT MATERIAL (INCHES)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
P-4	PAVEMENT MATERIAL (INCHES)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

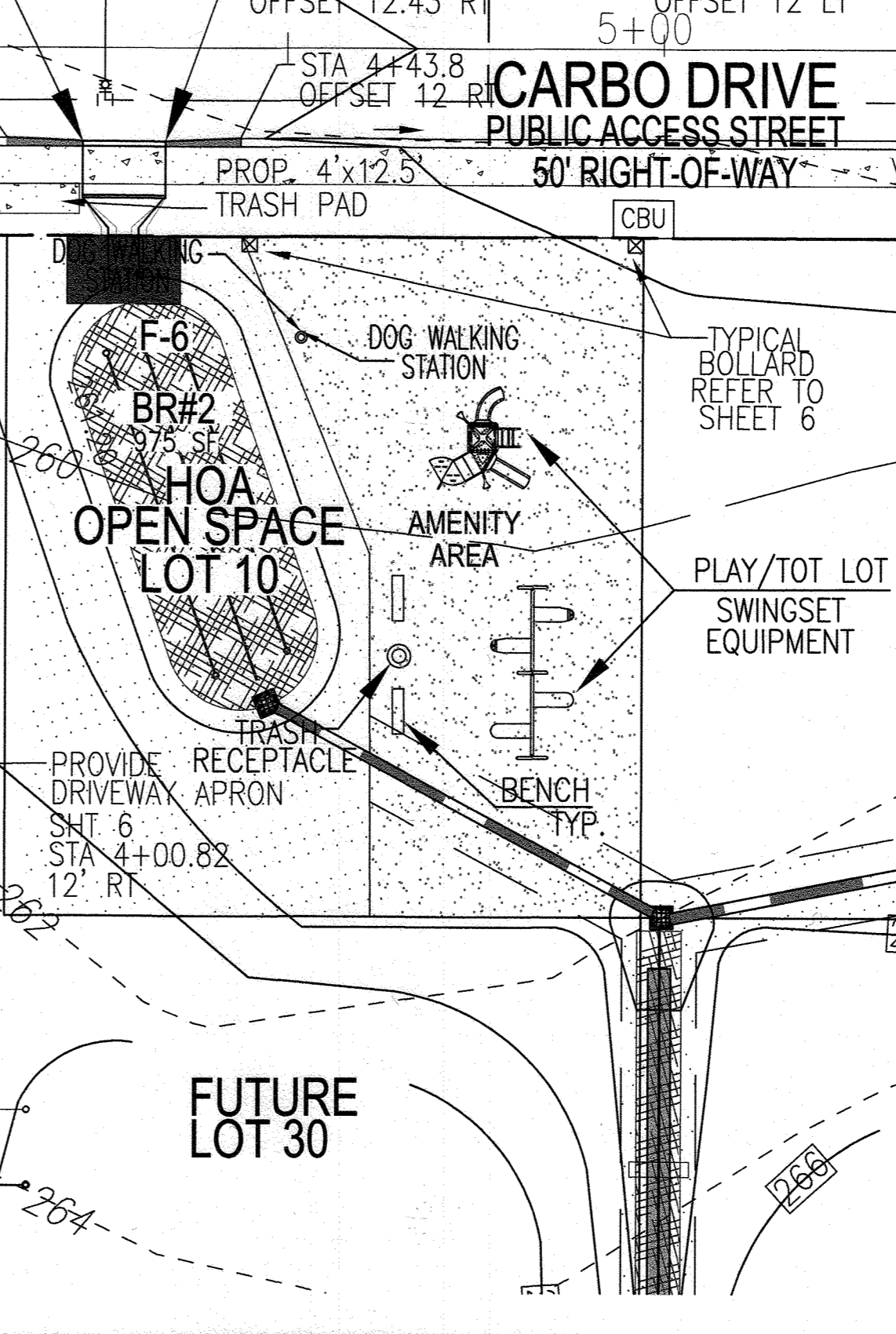


APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 11/23/20

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 12-2-20

CBU BOX LOCATIONS: SUBJECT TO CHANGE  
 - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR FUTURE LOT 20/OPEN SPACE LOT 11 TO SERVE LOTS 1-4 AND FUTURE LOTS 18-25.  
 - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR FUTURE LOT 31/OPEN SPACE LOT 10 TO SERVE FUTURE LOT 12 & 26-35.  
 - ONE 8 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR FUTURE LOTS 13 - 17 & 36 - 38.

SALSBUURY INDUSTRIES MANUFACTURES CBU'S THAT ARE OFFICIALLY LICENSED BY THE U.S.P.S. SALSBUURY 3300 SERIES CLUSTER BOX UNITS ARE MANUFACTURED TO U.S.P.S. "1" SPECIFICATIONS. THEY ARE AN OFFICIALLY LICENSED PRODUCT OF THE U.S. POSTAL SERVICE FOR CENTRALIZED MAIL DELIVERY. LICENSE NUMBER 1CDSEP-08-B-0026



OWNER/DEVELOPER  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DR., SUITE 100  
 COLUMBIA, MD 21046  
 ATTN: PETER ENGEL  
 (410) 313-6316

FINAL ROAD CONSTRUCTION PLAN  
 CARBO DRIVE  
 ROAD DETAILS AND RECREATION OPEN SPACE DETAILS  
**GREENWOOD VILLAGE - PHASE 1**  
 LOTS 1-4, NON BUILDABLE BULK PARCELS A-C  
 AND OPEN SPACE LOTS 5-11  
 A RE-SUBDIVISION OF THE "NORDBAU SUBDIVISION" - SECTION E-4  
 LOTS 2-4 (P.B. 3/51), 5R (L-16288 F.488), 8R (L-16288 F.502) AND 9 (P.B. 3/51)

TAX MAP: 42 GRID: 24  
 6TH ELECTION DISTRICT

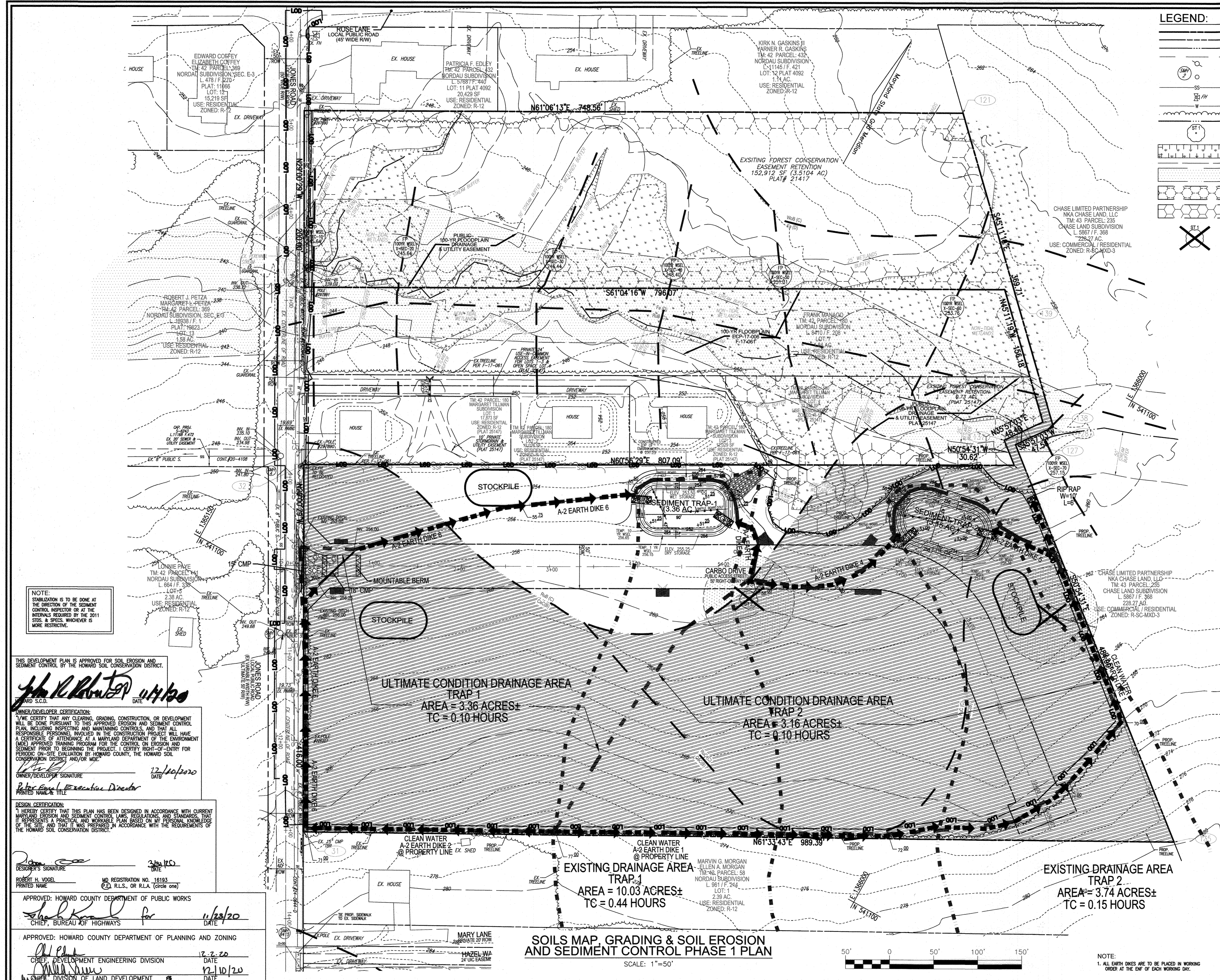
ZONED: R-12  
 PARCEL: 136 & 138-140  
 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
 TIMMONS GROUP  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7666 F: 410.461.8961 www.timmons.com

PROFESSIONAL CERTIFICATE  
 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. 19183 EXPIRATION DATE: 06-27-2020

DESIGN BY: RHV  
 DRAWN BY: VETG  
 CHECKED BY: RHV  
 DATE: MARCH 2020  
 SCALE: AS SHOWN  
 W.O. NO.: 12-05

6 SHEET OF 23



**LEGEND:**

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING PAVING
- EXISTING UTILITY POLE
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING TREELINE
- CENTERLINE OF EXISTING STREAM
- EXISTING SPECIMEN TREE
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- PUBLIC 100-YEAR FLOOD PLAN PLAT # 21417
- EXISTING FOREST CONSERVATION EASEMENT (RETENTION)
- FOREST CONSERVATION EASEMENT (RETENTION)
- EXISTING SPECIMEN TREE TO BE REMOVED
- Rub (C) Cc(C)
- SOILS BOUNDARY
- TREELINE
- CURB & GUTTER
- SUPER SILT FENCE
- SILT FENCE
- L100
- LIMIT OF DISTURBANCE
- EARTH DIKE
- CLEANWATER DIVERSION DIKE
- STABILIZED CONSTRUCTION ENTRANCE
- EXISTING DRAINAGE DIVIDE
- PROPOSED DRAINAGE DIVIDE
- BAFFLE
- GABION PROTECTION
- REMOVABLE PUMP STATION
- NRCS/MDE/HSCD HIGHLY ERODIBLE SOILS

**NOTE:**  
 - SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.  
 - SILT FENCE RUNNING DOWNHILL SHALL BE CURLED UPHILL. NO MORE THAN 35 FEET APART.  
 - DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.

**NOTE:**  
 SEDIMENT CONTROLS INTERRUPTED BY INSTALLATION OF UTILITY LINES ARE TO BE REPAIRED IMMEDIATELY.

**NOTE:**  
 LOCATE STOCKPILE AS SHOWN HEREON OR AS DIRECTED BY THE SEDIMENT CONTROL INSPECTOR. STOCKPILES EXCEEDING 15 FEET IN HEIGHT SHALL BE BENCHED. SEE STABILIZATION SPEC'S SHEET 9

**NOTE:**  
 FOR SOILS ON-SITE THAT WOULD BE CONSIDERED HIGHLY ERODIBLE BY THE HOWARD SOIL CONSERVATION DISTRICT, MORE STABILIZATION METHODS AND STABILIZATION METHODS MAY BE EXPECTED AT SITE DEVELOPMENT STAGE.

**SOILS LEGEND**  
 HOWARD COUNTY SOILS MAP #24

SYMBOL	NAME / DESCRIPTION	HYDROLOGIC GROUP	K FACTOR	15% SLOPE EROSION
CcC	CHILLUM LOAM, 5 TO 10 PERCENT SLOPES	NO	0.43	YES
RuB	RUSSETT AND BELTSVILLE SOILS, 2 TO 5 PERCENT SLOPES	NO	0.43	NO
RuC	RUSSETT AND BELTSVILLE SOILS, 5 TO 10 PERCENT SLOPES	NO	0.43	YES
Fg	FALLSINGTON SANDY LOAM, 0 TO 2 PERCENT SLOPES	YES	0.24	NO
Wob	WOODSTOWN SANDY LOAM, 2 TO 5 PERCENT SLOPES	YES	0.32	NO
Cd	CROOM AND EYEBORO SOILS, 10 TO 15 PERCENT SLOPES	NO	0.37	YES
Ebc	EYEBORO LOAMY SAND, 2 TO 10 PERCENT SLOPES	NO	0.15	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
 K-FACTOR =  $k_e @ 0.4" DEPTH$   
 NOTE:  
 HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DR., SUITE 100  
 COLUMBIA, MD 21046  
 ATTN: PETER ENGEL  
 (410) 313-6316

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**SOILS MAP, GRADING & SOIL EROSION AND SEDIMENT CONTROL PHASE 1 PLAN**  
**GREENWOOD VILLAGE - PHASE 1**  
 LOTS 1-4, NON-BUILDABLE BULK PARCELS A-C AND OPEN SPACE LOTS 5-11  
 A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4 LOTS 2-4 (P.B. 3/51), 5R (L16288 F.488), 8R (L16288 F.502) AND 9 (P.B. 3/51)  
 TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140  
 6TH ELECTION DISTRICT ZONED: R-12 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
 TIMMONS GROUP  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7666 F: 410.461.8961 www.timmons.com

**PROFESSIONAL CERTIFICATE**  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DAILY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 09-27-2020

DESIGN BY: RHV  
 DRAWN BY: VETG  
 CHECKED BY: RHV  
 DATE: MARCH 2020  
 SCALE: AS SHOWN  
 W.O. NO.: 12-05

7 SHEET OF 23

**NOTE:**  
 STABILIZATION IS TO BE DONE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE INTERVALS REQUIRED BY THE 2011 STD. & SPEC. WORKBOOK IS MORE RESTRICTIVE.

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.  
 John R. Roberts, S.C.D. DATE: 04/13/20

**OWNER/DEVELOPER CERTIFICATION:**  
 I/WE CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE.

Robert Engel, Executive Director DATE: 12/20/20

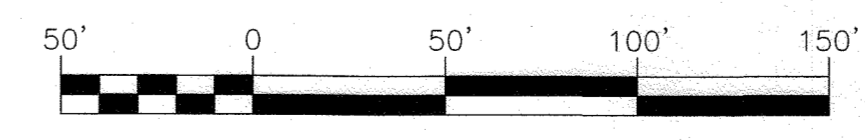
**DESIGN CERTIFICATION:**  
 I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARDS, THAT IT REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

Robert H. Vogel DATE: 12/20/20

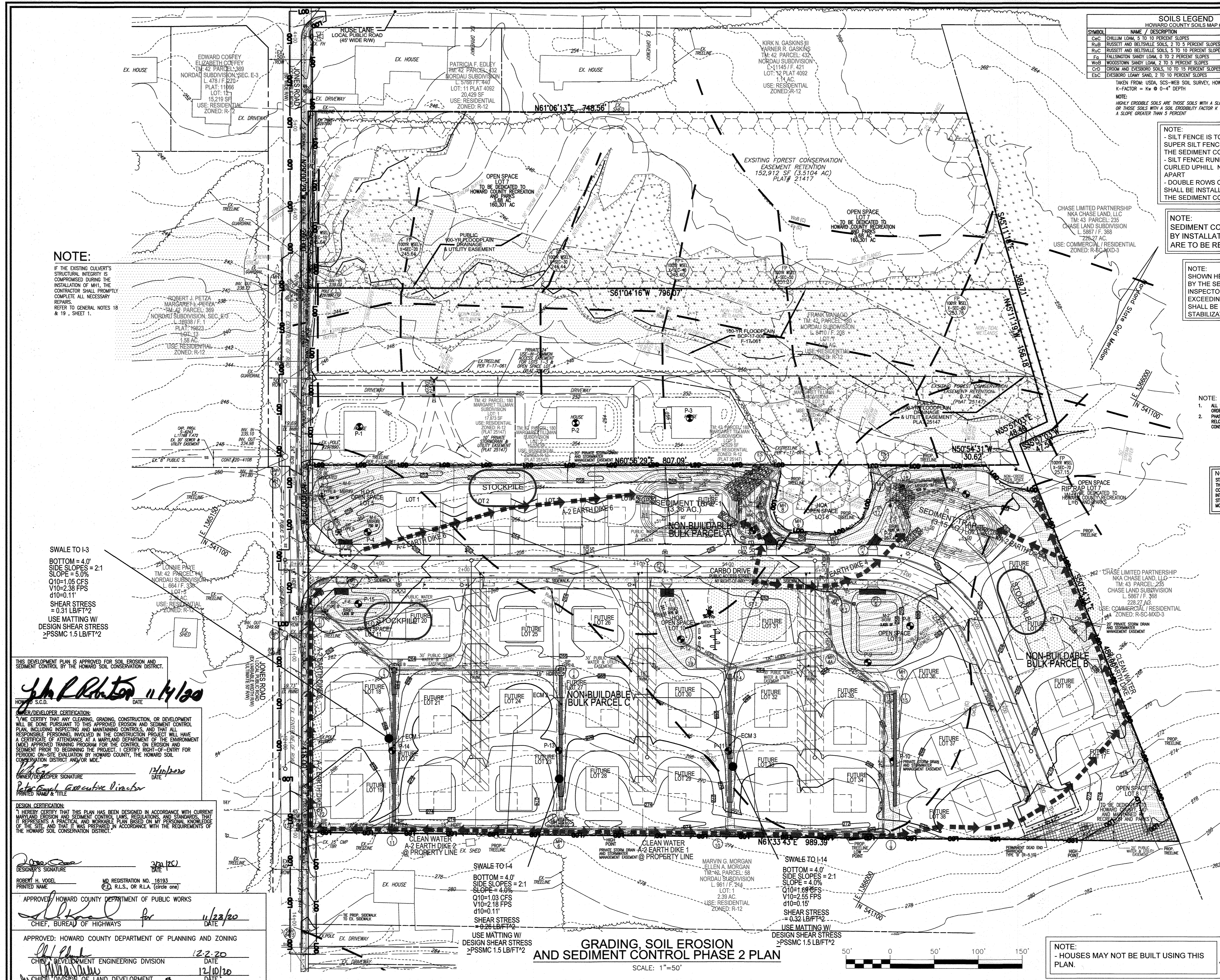
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 Chief, Bureau of Highways DATE: 11/23/20

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 Chief, Development Engineering Division DATE: 12-2-20  
 Chief, Division of Land Development DATE: 12/10/20

**SOILS MAP, GRADING & SOIL EROSION AND SEDIMENT CONTROL PHASE 1 PLAN**  
 SCALE: 1" = 50'



**NOTE:**  
 1. ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORKING DAY.



**SOILS LEGEND**  
HOWARD COUNTY SOILS MAP #24

SYMBOL	NAME / DESCRIPTION	HYDRO GROUP	K FACTOR	<1% SLOPE	>1% SLOPE
CnC	CHILLUM LOAM, 5 TO 10 PERCENT SLOPES	NO	B	0.43	NO
RuB	RUSSETT AND BELTSVILLE SOILS, 2 TO 5 PERCENT SLOPES	NO	C	0.43	NO
Fs	FALLSINGTON SANDY LOAM, 0 TO 2 PERCENT SLOPES	YES	D	0.24	NO
Wob	WOODSTOWN SANDY LOAM, 2 TO 5 PERCENT SLOPES	YES	C	0.32	NO
CvD	CROOM AND EVERSOR SOILS, 10 TO 15 PERCENT SLOPES	NO	C	0.37	YES
EeC	EVERSOR LOAMY SAND, 2 TO 10 PERCENT SLOPES	NO	A	0.15	NO

TAKEN FROM: USDA, SCS-WEBS SOIL SURVEY, HOWARD COUNTY  
K-FACTOR =  $K_e \times Q \times D^2$  DEPTH  
NOTE: HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

**LEGEND:**

---	PROPERTY LINE
---	RIGHT-OF-WAY LINE
---	ADJACENT PROPERTY LINE
---	EXISTING PAVING
---	EXISTING UTILITY POLE
---	EXISTING SANITARY MANHOLE
---	EXISTING SANITARY LINE
---	EXISTING FIRE HYDRANT
---	EXISTING WATER LINE
---	EXISTING TREE LINE
---	CENTERLINE OF EXISTING STREAM
---	EXISTING SPECIMEN TREE
---	EXISTING WETLANDS
---	EXISTING WETLAND BUFFER
---	PUBLIC 100-YEAR FLOOD PLAIN PLAT# 25147
---	EXISTING FOREST CONSERVATION EASEMENT (RETENTION - PLAT# 21417, 25147)
---	FOREST CONSERVATION EASEMENT (RETENTION)
---	PUBLIC SEWER, WATER & UTILITY EASEMENT
---	PUBLIC WATER & UTILITY EASEMENT
---	PRIVATE STORM DRAIN AND STORM WATER MANAGEMENT EASEMENT
---	PUBLIC DRAINAGE & UTILITY EASEMENT
---	10' PUBLIC TREE MAINTENANCE EASEMENT
---	SOILS BOUNDARY
---	STORMDRAIN
---	SIDWALK
---	TREELINE
---	CURB & GUTTER
---	SUPER SILT FENCE
---	SSF
---	LIMIT OF DISTURBANCE
---	CURB INLET PROTECTION
---	STANDARD INLET PROTECTION
---	PHASE 1 EARTH DIKE / CLEANWATER DIVERSION DIKE
---	TEMPORARY ASPHALT BERM
---	STABILIZED CONSTRUCTION ENTRANCE
---	ESS STORMWATER MANAGEMENT TEST PIT

**NOTE:**  
- SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.  
- SILT FENCE RUNNING DOWNHILL SHALL BE CURLED UPHILL NO MORE THAN 35 FEET APART  
- DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.

**NOTE:**  
SEDIMENT CONTROLS INTERRUPTED BY INSTALLATION OF UTILITY LINES ARE TO BE REPAIRED IMMEDIATELY.

**NOTE:**  
LOCATE STOCKPILE AS SHOWN HEREON OR AS DIRECTED BY THE SEDIMENT CONTROL INSPECTOR. STOCKPILES EXCEEDING 15 FEET IN HEIGHT SHALL BE BENCHED, SEE STABILIZATION SPEC. SHEET 9

**NOTE:**  
1. ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORKING DAY.  
2. PHASE 1 CONTROLS (GREENSCALE) SHALL BE RELOCATED AS FOR THEIR CONTINUED USE AS CONSTRUCTION CONTINUES

**NOTE:**  
STABILIZATION IS TO BE DONE IN THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE INTERVALS REQUIRED BY THE 2011 STOS & SPECS, WHICHEVER IS MORE RESTRICTIVE.

**NOTE:**  
FOR SOILS ON SITE THAT WOULD BE CONSIDERED HIGHLY ERODIBLE BY THE HOWARD SOIL CONSERVATION DISTRICT, MORE STRINGENT SEEDING AND STABILIZATION METHODS MAY BE EXPECTED AT SITE DEVELOPMENT STAGE

**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DR., SUITE 100  
COLUMBIA, MD 21046  
ATTN: PETER ENGEL  
(410) 313-6316

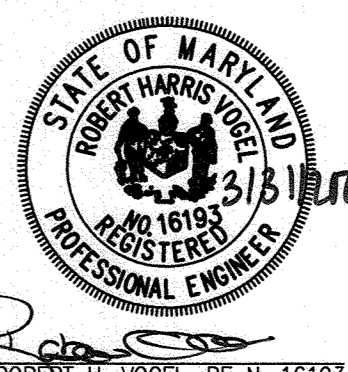
NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
GRADING & SOIL EROSION  
AND SEDIMENT CONTROL PHASE 2 PLAN  
**GREENWOOD VILLAGE - PHASE 1**  
LOTS 1-4, NON-BUILDABLE BULK PARCELS A-C  
AND OPEN SPACE LOTS 5-11  
A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4  
LOTS 2-4 (P.B. 3/51), 5R (L16288 F.488), 8R (L16288 F.502) AND 9 (P.B. 3/51)

TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140  
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND  
ZONED: R-12

**VOGEL ENGINEERING**

**TIMMONS GROUP**  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com



**PROFESSIONAL CERTIFICATE**  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE 09-27-2020

DESIGN BY: RHV  
CHECKED BY: VETG  
DRAWN BY: RHV  
DATE: MARCH 2020  
SCALE: AS SHOWN  
W.O. NO.: 12-05

8 SHEET OF 23

**NOTE:**  
IF THE EXISTING CULVERT'S STRUCTURAL INTEGRITY IS COMPROMISED DURING THE INSTALLATION OF MH1, THE CONTRACTOR SHALL PROMPTLY COMPLETE ALL NECESSARY REPAIRS. REFER TO GENERAL NOTES 18 & 19, SHEET 1.

SWALE TO I-3  
BOTTOM = 4.0'  
SIDE SLOPES = 2:1  
SLOPE = 3.0%  
Q10=1.05 CFS  
V10=2.38 FPS  
d10=0.11'  
SHEAR STRESS = 0.31 LB/FT<sup>2</sup>  
USE MATTING W/  
DESIGN SHEAR STRESS >PSSMC 1.5 LB/FT<sup>2</sup>

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.  
*John P. Rhoton* 11/14/20  
HOWARD S.C.D. DATE

**OWNER/DEVELOPER CERTIFICATION:**  
I, THE OWNER/DEVELOPER, CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE.

*Peter Engel*  
OWNER/DEVELOPER SIGNATURE  
PRINTED NAME & TITLE

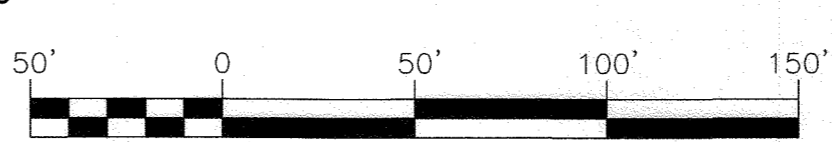
**DESIGN CERTIFICATION:**  
I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARDS, THAT IT REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

*Robert H. Vogel*  
DESIGNER'S SIGNATURE  
DATE: 12/10/20  
ROBERT H. VOGEL  
PRINTED NAME  
MD REGISTRATION NO. 16193  
(P.B. R.L.S., OR R.L.A. (Circle one))

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*Alfred*  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 11/23/20

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Robert H. Vogel*  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 12-2-20  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 12/10/20

**GRADING, SOIL EROSION AND SEDIMENT CONTROL PHASE 2 PLAN**  
SCALE: 1"=50'



**NOTE:**  
- HOUSES MAY NOT BE BUILT USING THIS PLAN.







- NOTES:**
1. WORST CASE 5 MIN. TO ASSUMED THROUGHOUT DESIGN.
  2. PERCENT IMPERVIOUS SHOWN, IGNORES STORMWATER MANAGEMENT "CREDITS", I.E. ROOFTOP DISCONNECTS.
  3. DESIGN ASSUMES COMPLETE FAILURE OF PROPOSED MICRO-SCALE PRACTICES.

**LEGEND:**

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING PAVING
- EXISTING UTILITY POLE
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING TREE LINE
- CENTERLINE OF EXISTING STREAM
- EXISTING SPECIMEN TREE
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- PUBLIC 100-YEAR FLOOD PLAIN PLAT# 25417
- EXISTING FOREST CONSERVATION EASEMENT (RETENTION PLATS 21417, 25147)
- FOREST CONSERVATION EASEMENT
- PRIVATE USE-IN-COMMON ACCESS EASEMENT F-19-022
- PUBLIC SEWER WATER & UTILITY EASEMENT
- PUBLIC WATER & UTILITY EASEMENT
- PRIVATE STORM DRAIN AND STORM WATER MANAGEMENT EASEMENT
- PUBLIC DRAINAGE & UTILITY EASEMENT
- 10' PUBLIC TREE MAINTENANCE EASEMENT
- STORMDRAIN
- STORM DRAIN INLET
- SIDEWALK
- TREELINE
- CURB & GUTTER
- MICRO-BIORETENTION FACILITY (M-B)
- RUB (C)
- SOILS BOUNDARY
- DRAINAGE AREA DIVIDE
- STREET LIGHT
- DRAINAGE AREA #
- INLET
- ZONING
- C FACTOR
- % IMPERVIOUS

**SOILS LEGEND**  
HOWARD COUNTY SOILS MAP #24

SYMBOL	NAME / DESCRIPTION	HYDROLOGIC GROUP	PERCENT IMPERVIOUS	EROSION FACTOR	100-YR FLOODPLAIN
CcC	CHILLUM LOAM, 5 TO 10 PERCENT SLOPES	NO	B	0.43	YES
RUB	RUSSETT AND BELTSVILLE SOILS, 2 TO 5 PERCENT SLOPES	NO	C	0.43	NO
RUC	RUSSETT AND BELTSVILLE SOILS, 5 TO 10 PERCENT SLOPES	NO	C	0.43	YES
Fa	FALLSINGTON SANDY LOAM, 0 TO 2 PERCENT SLOPES	YES	D	0.24	NO
WbB	WOODSTOWN SANDY LOAM, 2 TO 5 PERCENT SLOPES	YES	C	0.32	NO
C-D	CRUM AND EYEBROOK SOILS, 10 TO 15 PERCENT SLOPES	NO	C	0.37	YES
Ebc	EVESBORO LOAMY SAND, 2 TO 10 PERCENT SLOPES	NO	A	0.15	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
K-FACTOR =  $K_w @ 0-4" \text{ DEPTH}$

NOTE:  
HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL EROSION FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DR., SUITE 100  
COLUMBIA, MD 21046  
ATTN: PETER ENGEL  
(410) 313-6316

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
STORM DRAIN DRAINAGE AREA MAP  
**GREENWOOD VILLAGE - PHASE 1**  
LOTS 1-4, NON-BUILDABLE BULK PARCELS A-C  
AND OPEN SPACE LOTS 5-11  
A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION F-4  
LOTS 2-4 (P.B. 3/51), 5R (L.16288 F.488), 8R (L.16288 F.502) AND 9 (P.B. 3/51)  
TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140  
6TH ELECTION DISTRICT ZONED: R-12 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
**TIMMONS GROUP**  
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P: 410.461.7656 F: 410.461.9951 www.timmons.com

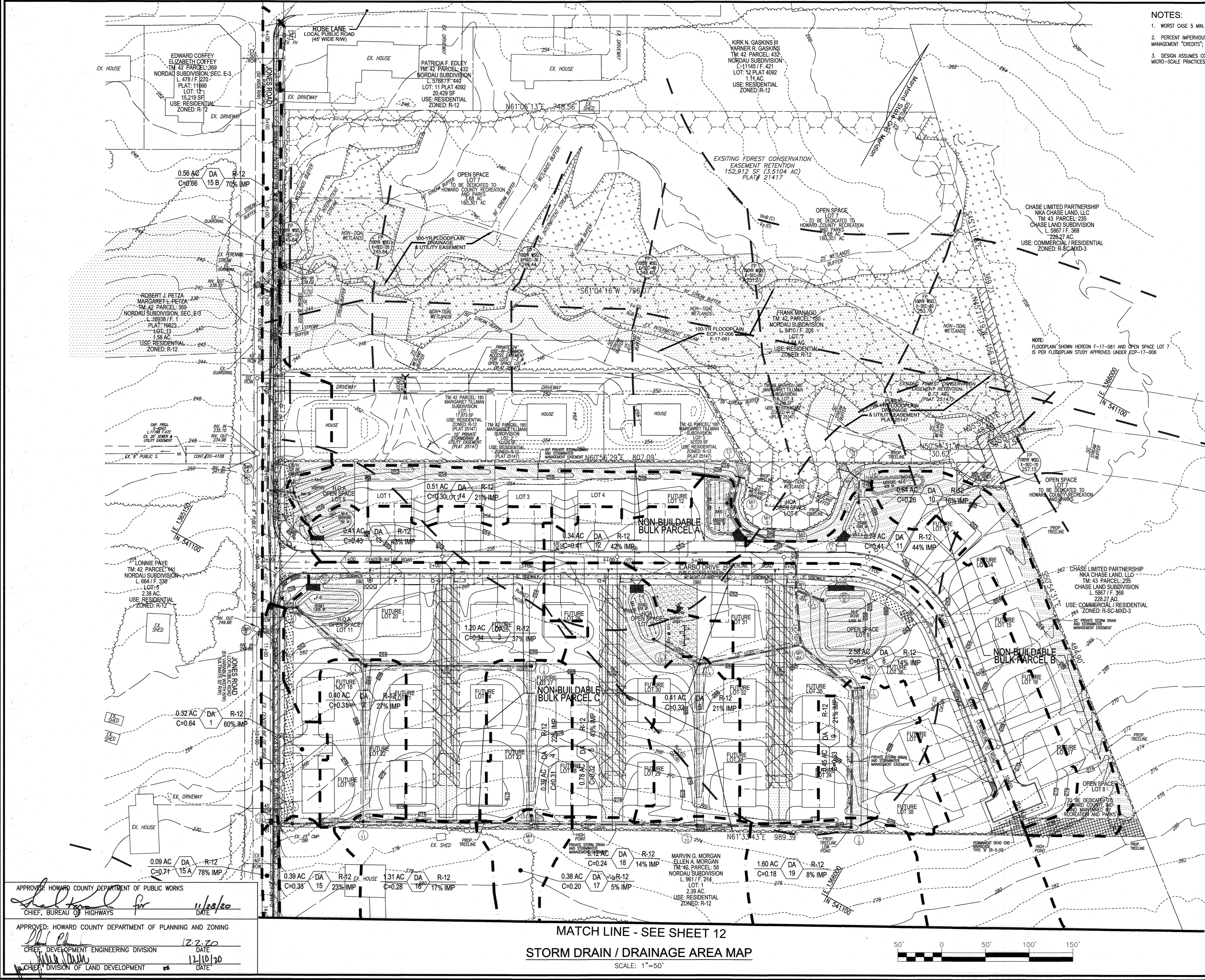
PROFESSIONAL CERTIFICATE

STATE OF MARYLAND  
ROBERT H. VOGEL  
REGISTERED PROFESSIONAL ENGINEER  
NO. 16193  
EXPIRES 12/31/2020

DESIGN BY: RHY  
DRAWN BY: VETG  
CHECKED BY: RHY  
DATE: MARCH 2020  
SCALE: AS SHOWN  
W.O. NO.: 12-05

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. 16193, EXPIRATION DATE: 08-27-2020

11 SHEET OF 23

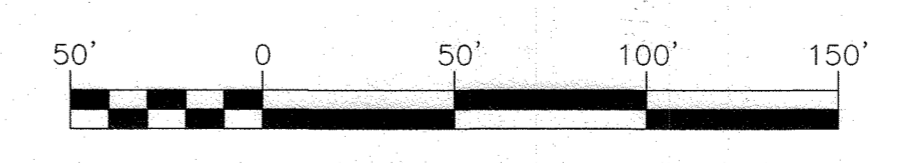


APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*[Signature]* for 11/28/20  
CHIEF, BUREAU OF HIGHWAYS DATE

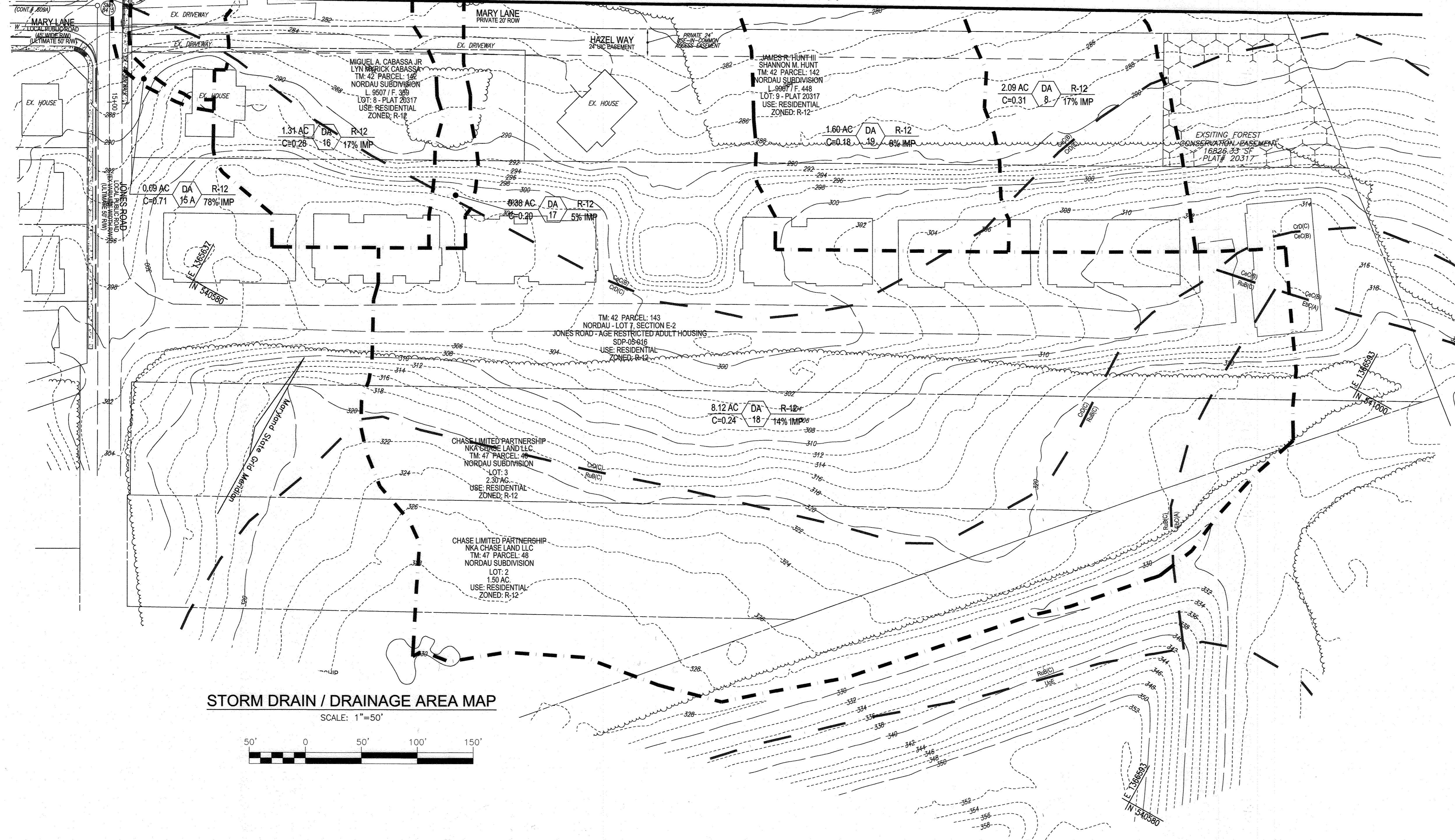
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*[Signature]* 12.2.20  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 12/10/20  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

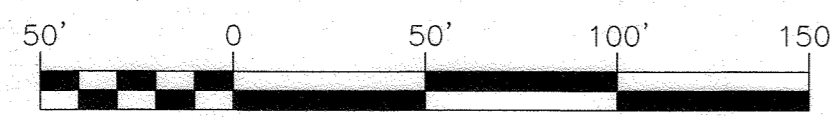
MATCH LINE - SEE SHEET 12  
**STORM DRAIN / DRAINAGE AREA MAP**  
SCALE: 1"=50'



MATCH LINE - SEE SHEET 11



STORM DRAIN / DRAINAGE AREA MAP  
SCALE: 1"=50'



**LEGEND:**

	PROPERTY LINE
	RIGHT-OF-WAY LINE
	ADJACENT PROPERTY LINE
	EXISTING PAVING
	EXISTING UTILITY POLE
	EXISTING SANITARY MANHOLE
	EXISTING FIRE HYDRANT
	EXISTING WATER LINE
	EXISTING TREE LINE
	CENTERLINE OF EXISTING STREAM
	SIDEWALK
	TREELINE
	CURB & GUTTER
	MICRO-BIOTENTION FACILITY (M-6)
	DRAINAGE AREA 'C' FACTOR
	INLET #
	ZONING % IMPERVIOUS
	SOILS BOUNDARY
	DRAINAGE AREA DIVIDE
	STREET LIGHT

**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DR., SUITE 100  
 COLUMBIA, MD 21046  
 ATTN: PETER ENGEL  
 (410) 313-6316

**SOILS LEGEND**  
 HOWARD COUNTY SOILS MAP #24

SYMBOL	NAME / DESCRIPTION	HYDROIC GROUP	K FACTOR	<1% SLOPE
CcC	CHILLUM LOAM, 5 TO 10 PERCENT SLOPES	NO	B 0.43	YES
RuB	RUSSETT AND BELTSVILLE SOILS, 2 TO 5 PERCENT SLOPES	NO	C 0.43	NO
RvC	RUSSETT AND BELTSVILLE SOILS, 5 TO 10 PERCENT SLOPES	NO	C 0.43	YES
Fg	FALLSINGTON SANDY LOAM, 0 TO 2 PERCENT SLOPES	YES	D 0.24	NO
WOB	WOODSTOWN SANDY LOAM, 2 TO 5 PERCENT SLOPES	YES	C 0.32	NO
CcO	CHROM AND EYEBROOD SOILS, 10 TO 15 PERCENT SLOPES	NO	C 0.37	YES
Ebc	EYEBROOD LOAMY SAND, 2 TO 10 PERCENT SLOPES	NO	A 0.15	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
 K-FACTOR =  $K_w \cdot 0.4 \cdot \text{DEPTH}$   
 NOTE:  
 HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT  
 OR THOSE SOILS WITH A SOIL EROSION FACTOR K GREATER THAN 0.35 AND WITH  
 A SLOPE GREATER THAN 5 PERCENT

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 11/23/20

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 12.2.20

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 12/10/20

NO.	REVISION	DATE

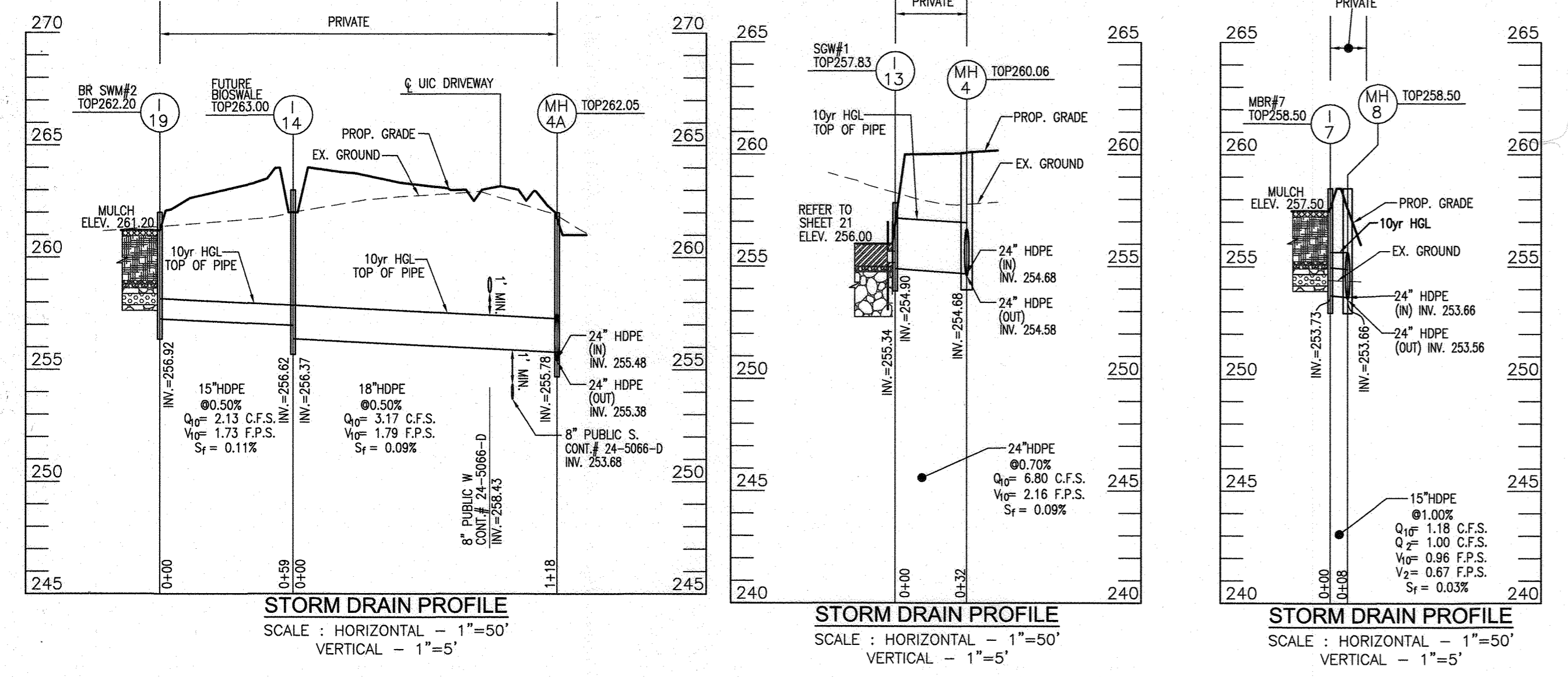
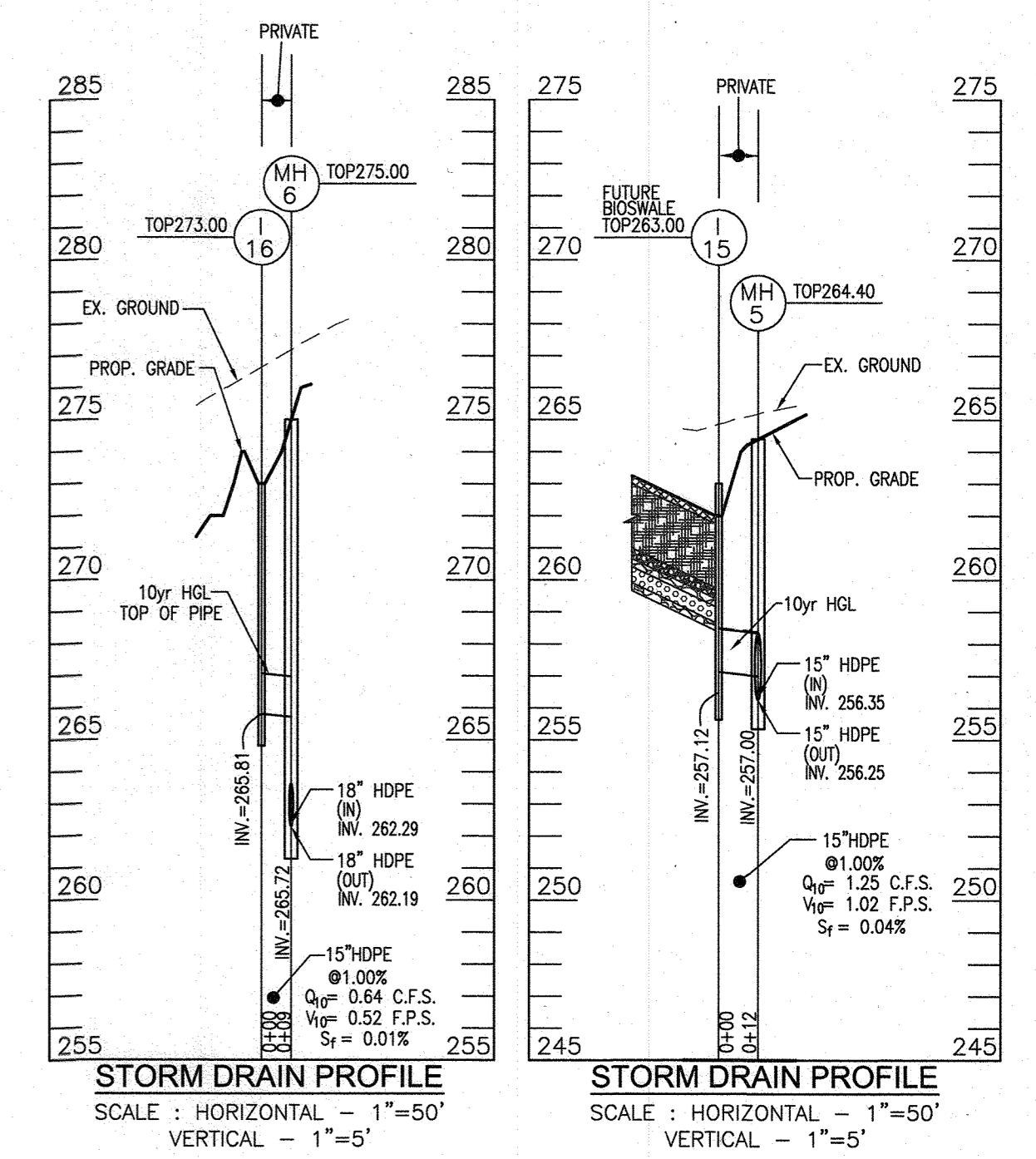
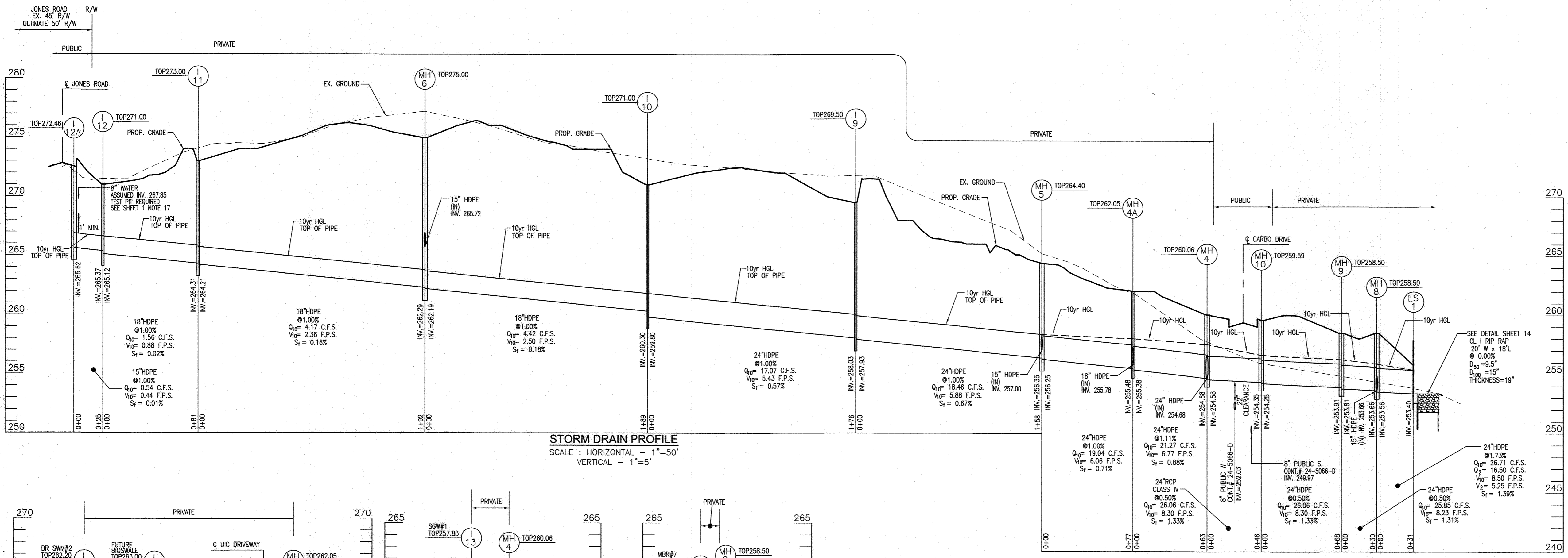
FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN DRAINAGE AREA MAP  
**GREENWOOD VILLAGE - PHASE 1**  
 LOTS 1-4, NON BUILDABLE BULKY PARCELS A-C  
 AND OPEN SPACE LOTS 5-11  
 A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4  
 LOTS 2-4 (P.B. 3/51), 5R (L16288 F.488), 8R (L16288 F.502) AND 9 (P.B. 3/51)  
 TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140  
 6TH ELECTION DISTRICT ZONED: R-12 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
  
**TIMMONS GROUP**  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7656 F: 410.461.8961 www.timmons.com

PROFESSIONAL CERTIFICATE  
  
 DESIGN BY: RHY  
 DRAWN BY: VETG.  
 CHECKED BY: RHY  
 DATE: MARCH 2020  
 SCALE: AS SHOWN  
 W.O. NO.: 12-05

I HEREBY CERTIFY THAT THESE DOCUMENTS  
 WERE PREPARED OR APPROVED BY ME, AND  
 THAT I AM A FULLY LICENSED PROFESSIONAL  
 ENGINEER UNDER THE LAWS OF THE STATE  
 OF MARYLAND, LICENSE NO. 16193  
 EXPIRATION DATE: 09-27-2020

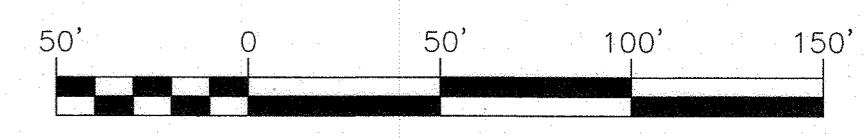
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  3. DESIGN ASSUMES COMPLETE FAILURE OF PROPOSED MICRO-SCALE PRACTICES



STR #	TYPE	INV. IN	INV. OUT	TOP ELEV	DETAIL	LOCATION	PUBLIC/PRIVATE	REMARKS
I-1	DOUBLE WR INLET	252.09	251.99	258.00	D-4.31	N 541080.52 E 1365285.88	PUBLIC STRUCTURE	
I-2	YARD INLET	252.48	252.38	258.00	D-4.11	N 541093.19 E 1365310.30	PRIVATE STRUCTURE	
I-3	YARD INLET	255.63	255.38	264.00	D-4.12	N 541073.59 E 1365411.12	PRIVATE STRUCTURE	
I-4	YARD INLET	---	262.08	267.00	D-4.12	N 541185.40 E 1365577.13	PRIVATE STRUCTURE	
I-5	YARD INLET	248.25	244.00	252.00	D-4.11	N 541205.94 E 1365244.19	PRIVATE STRUCTURE	
I-6	YARD INLET	---	249.67	258.00	D-4.11	N 541179.37 E 1365280.30	PRIVATE STRUCTURE	
I-7	YARD INLET	---	253.73	258.00	D-4.11	N 541435.76 E 1365682.42	PRIVATE STRUCTURE	
I-9	YARD INLET	258.03	257.93	269.50	D-4.12	N 541182.49 E 1365985.83	PRIVATE STRUCTURE	
I-10	YARD INLET	260.30	259.80	271.00	D-4.12	N 541098.38 E 1365830.54	PRIVATE STRUCTURE	
I-11	YARD INLET	264.31	264.21	273.00	D-4.12	N 540916.69 E 1365495.04	PRIVATE STRUCTURE	
I-12	YARD INLET	265.37	265.12	271.00	D-4.12	N 540875.23 E 1365425.62	PRIVATE STRUCTURE	
I-12A	DOUBLE WR INLET	---	265.62	272.46	D-4.31	N 540896.17 E 1365404.66	PUBLIC STRUCTURE	
I-12B	TRIPLE WR INLET	240.12	240.02	244.04	MD 374.08	N 541393.52 E 1365111.24	PUBLIC STRUCTURE	
I-13	YARD INLET	---	254.90	257.83	D-4.10	N 541392.64 E 1365831.74	PRIVATE STRUCTURE	
I-14	YARD INLET	256.62	256.37	263.00	D-4.12	N 541280.55 E 1365743.99	PRIVATE STRUCTURE	
I-15	YARD INLET	---	257.12	263.00	D-4.12	N 541328.33 E 1365920.77	PRIVATE STRUCTURE	
I-16	YARD INLET	---	265.81	273.00	D-4.12	N 541016.47 E 1365659.76	PRIVATE STRUCTURE	
I-17	YARD INLET	---	254.18	258.40	D-4.11	N 541509.96 E 1365813.78	PRIVATE STRUCTURE	
I-18	YARD INLET	---	254.12	258.50	D-4.11	N 541536.95 E 1365815.88	PRIVATE STRUCTURE	
I-19	YARD INLET	---	256.92	262.20	D-4.11	N 541259.82 E 1365884.46	PRIVATE STRUCTURE	

SIZE	RESPONSIBILITY	CLASS	TOTAL LENGTH
16"	PUBLIC	HDPE	16
18"	PUBLIC	HDPE	167
24"	PUBLIC	HDPE	10
24"	PUBLIC	RCP V	41
24"	PUBLIC	RCP V	245

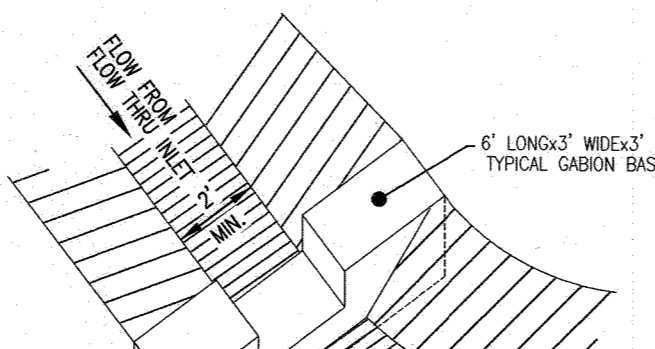
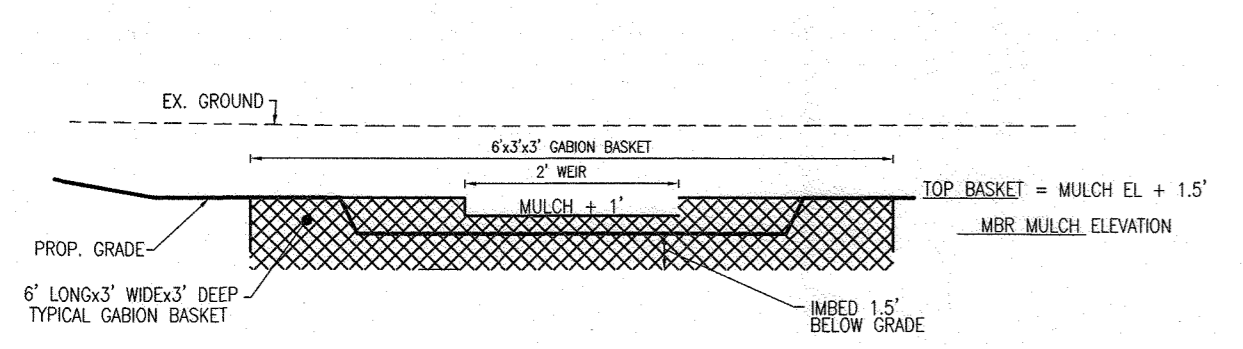
SIZE	RESPONSIBILITY	CLASS	TOTAL LENGTH
15"	PRIVATE	HDPE	425
18"	PRIVATE	HDPE	672
24"	PRIVATE	HDPE	507
24"	PRIVATE	RCP V	6



OWNER/DEVELOPER  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATULMENT WOODS DR., SUITE 100  
 COLUMBIA, MD 21046  
 ATTN: PETER ENGEL  
 (410) 313-6316

STR #	TYPE	INV. IN	INV. OUT	TOP OR UPPER/LOWER	DETAIL	LOCATION	PUBLIC/PRIVATE	REMARKS
ES-01	TYPE 'C'	253.40	255.40	255.40	D-5.21	N 541469.56 E 1365680.75	(2), PRIVATE STRUCTURE	SEE DETAIL SHEET 14
ES-03	18" HDPE	253.75	255.25	255.25	HDPE	N 541535.64 E 1365786.30	(2), PRIVATE STRUCTURE	SEE DETAIL SHEET 14
** MH-01	JUNCTION BOX	239.82	238.82	244.05	MD-386.11	N 541392.71 E 1365092.99	(1), PUBLIC STRUCTURE	SEE DETAIL SHEET 14
MH-03	48" MANHOLE	243.67/244.07	243.57	251.35	G 5.12	N 541193.68 E 1365216.80	(1), PRIVATE STRUCTURE	
MH-04	48" MANHOLE	254.68 (2)	254.68	260.06	G 5.12	N 541387.83 E 1365799.73	(1), PRIVATE STRUCTURE	
MH-04A	48" MANHOLE	255.48/255.78	255.38	262.05	G 5.12	N 541335.83 E 1365834.63	(1), PRIVATE STRUCTURE	
MH-05	48" MANHOLE	257.00/256.35	256.25	264.40	G 5.12	N 541321.29 E 1365910.66	(1), PRIVATE STRUCTURE	
MH-06	48" MANHOLE	262.29/265.72	262.19	275.00	G 5.12	N 541008.36 E 1365664.25	(1), PRIVATE STRUCTURE	
MH-07	48" MANHOLE	254.05 (2)	253.80	258.50	G 5.12	N 541533.26 E 1365801.49	(1), PRIVATE STRUCTURE	
MH-08	48" MANHOLE	253.66 (2)	253.56	258.50	G 5.12	N 541439.37 E 1365689.24	(1), PRIVATE STRUCTURE	
MH-09	48" MANHOLE	253.81	253.81	258.50	G 5.12	N 541418.41 E 1365710.57	(1), PRIVATE STRUCTURE	
MH-10	48" MANHOLE	254.35	254.25	259.59	G 5.12	N 541428.34 E 1365777.87	(1), PUBLIC STRUCTURE	

STR #	TYPE	DEPTH REQUIREMENT	TOP/CL STOR	DETAIL	LOCATION	PUBLIC/PRIVATE	REMARKS
PT-1	FLOW THRU	11.9' DEPTH INLET TOP	257.45	D-4.35	0+62.82, 12.43' LT	PUBLIC	SLAB TYPE II-L=11', D=7.5"
PT-2	FLOW THRU	11.9' DEPTH INLET TOP	257.31	D-4.35	0+58.65, 12.43' RT	PUBLIC	SLAB TYPE II-L=11', D=7.5"
PT-3	FLOW THRU	11.9' DEPTH INLET TOP	263.00	D-4.35	4+28.32, 12.43' RT	PUBLIC	SLAB TYPE II-L=11', D=7.5"
PT-4	FLOW THRU	11.9' DEPTH INLET TOP	260.88	D-4.35	5+46.78, 12.43' LT	PUBLIC	SLAB TYPE II-L=11', D=7.5"
PT-5	FLOW THRU	11.9' DEPTH INLET TOP	259.24	D-4.35	6+81.92, 12.43' LT	PUBLIC	SLAB TYPE II-L=11', D=7.5"
PT-6	FLOW THRU	11.9' DEPTH INLET TOP	259.24	D-4.35	6+81.92, 12.43' RT	PUBLIC	SLAB TYPE II-L=11', D=7.5"



GABION BASKET WEIR DETAIL (FLOW THRU)  
 SCALE: N.T.S.

GABION BASKET WEIR DETAIL (FLOW THRU)  
 SCALE: N.T.S.

- NOTES:  
 1. ALL WIRE USED IN GABION CONSTRUCTION SHALL BE GALVANIZED AND PLASTIC COATED.  
 2. FILTER CLOTH SHALL BE PLACED WHEREVER GABIONS COME INTO CONTACT WITH SOIL.  
 3. STONE FILL SHALL CONSIST OF HARD, DURABLE, CLEAN STONE 4"-8" IN DIAMETER.  
 4. CONSTRUCTION MATERIALS AND METHODS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*[Signature]* 11/23/20  
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*[Signature]* 12.2.20  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

APPROVED: HOWARD COUNTY DEPARTMENT OF LAND DEVELOPMENT  
*[Signature]* 12/10/20  
 CHIEF, DIVISION OF LAND DEVELOPMENT

FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN PROFILES  
**GREENWOOD VILLAGE - PHASE 1**  
 LOTS 1-4, NON-BUILDABLE BULKY PARCELS A-C  
 AND OPEN SPACE LOTS S-11  
 A RE-SUBDIVISION OF THE "NORDIA SUBDIVISION" - SECTION E-4  
 LOTS 2-4 (P.B. 3/51), 5R (L16288 F.488), 8R (L16288 F.502) AND 9 (P.B. 3/51)

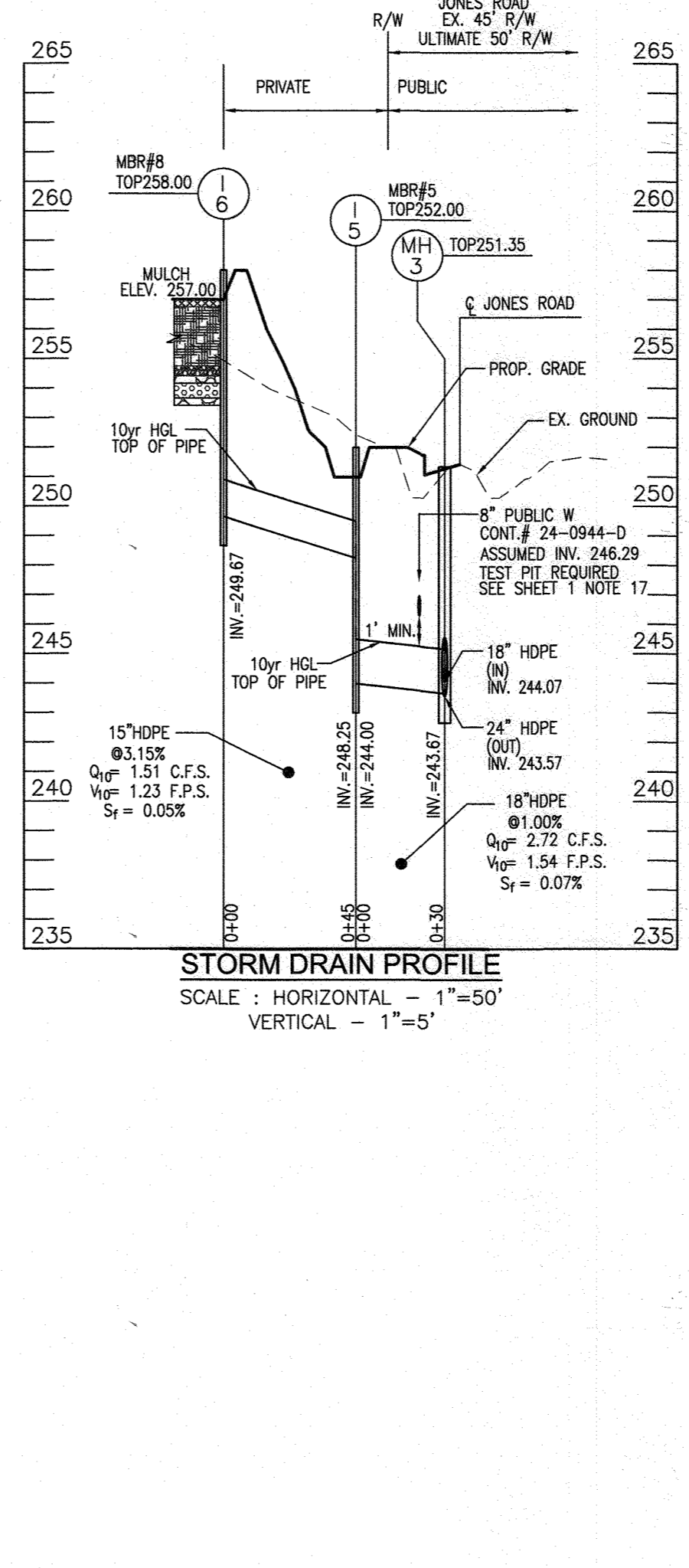
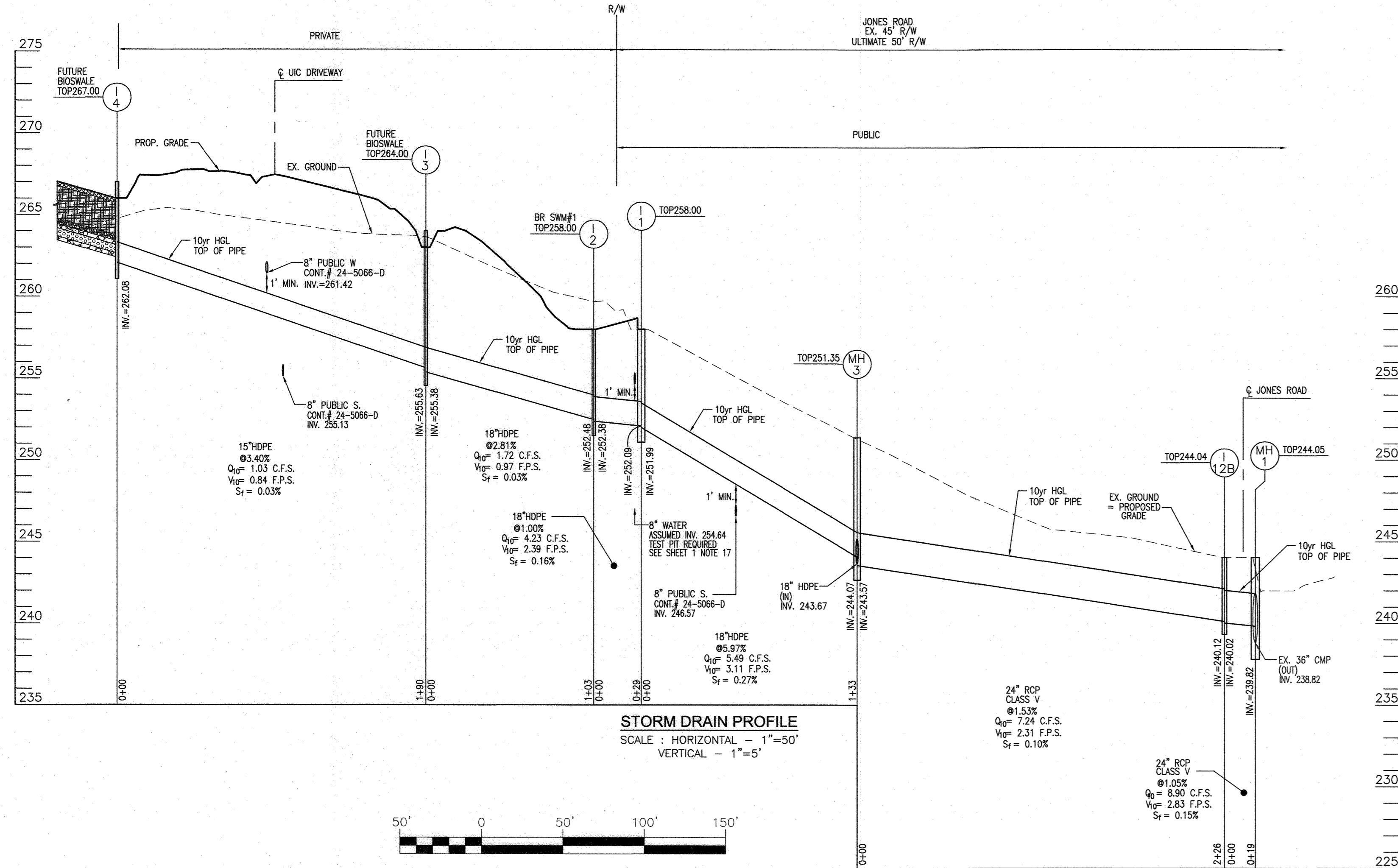
TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140  
 6TH ELECTION DISTRICT ZONED: R-12 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
 TIMMONS GROUP  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7656 F: 410.461.8961 www.timmons.com

PROFESSIONAL CERTIFICATE  
 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. 16193, EXPIRATION DATE 09-27-2020

DESIGN BY: RHV  
 DRAWN BY: VETG  
 CHECKED BY: RHV  
 DATE: MARCH 2020  
 SCALE: AS SHOWN  
 W.O. NO.: 12-05

13 SHEET OF 23



### DETAIL D-4-1-A ROCK OUTLET PROTECTION I

STANDARD SYMBOL: ROP1

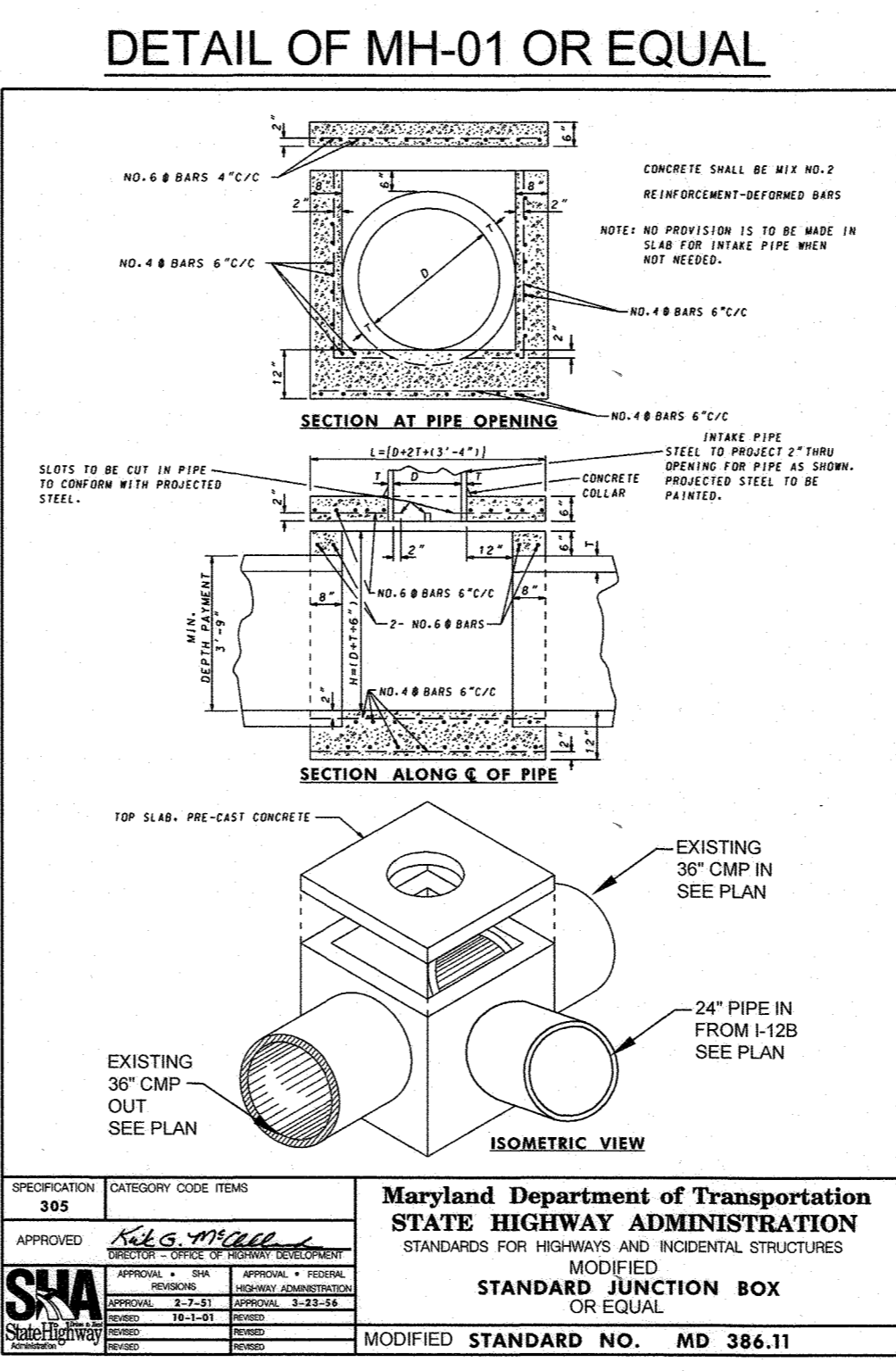
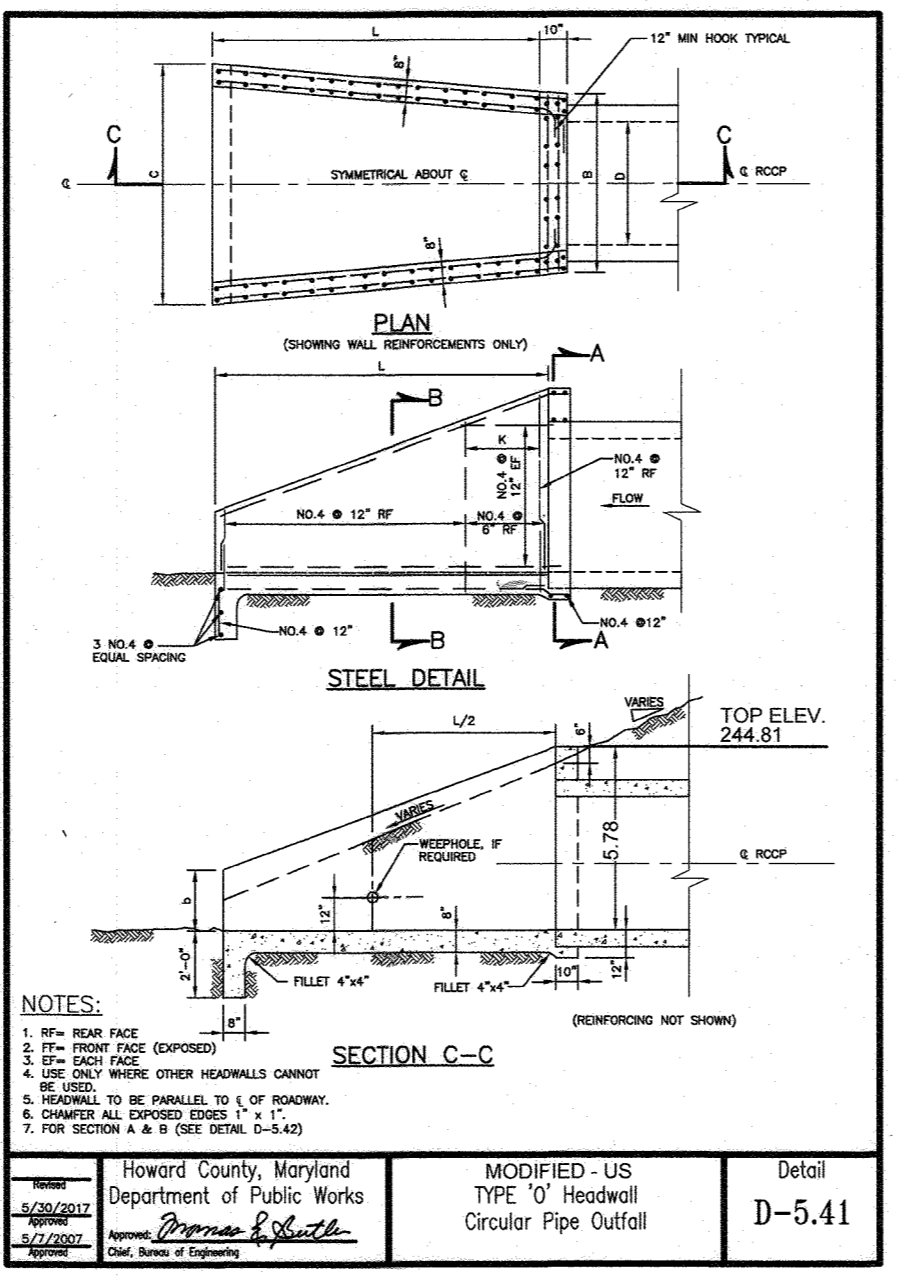
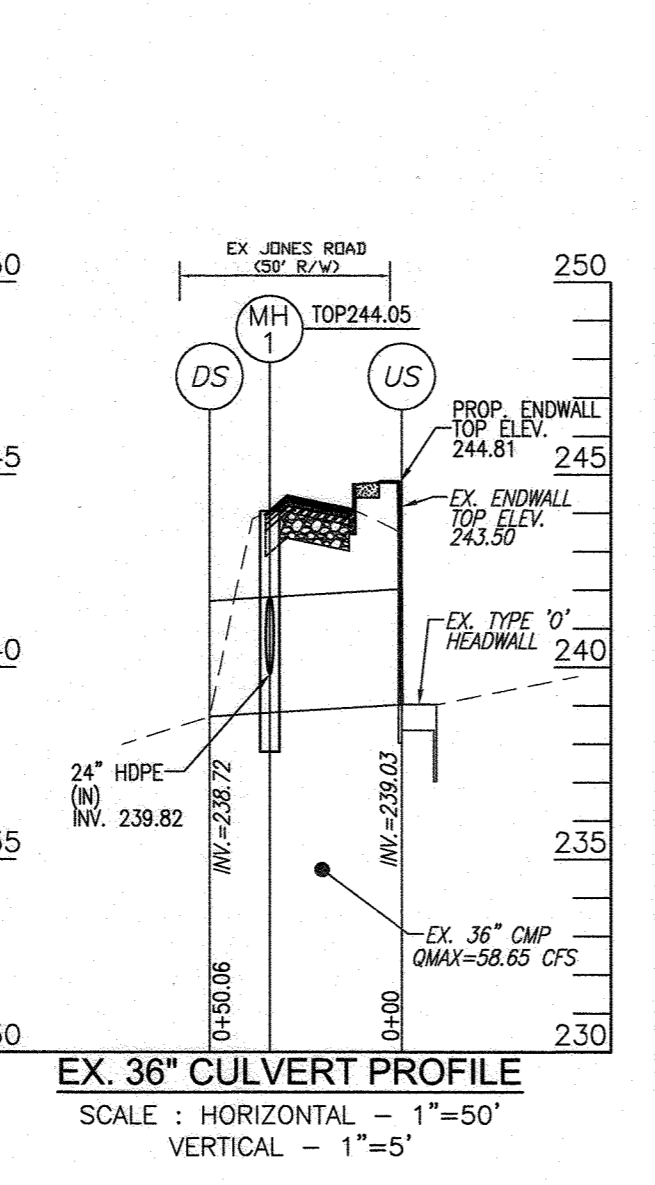
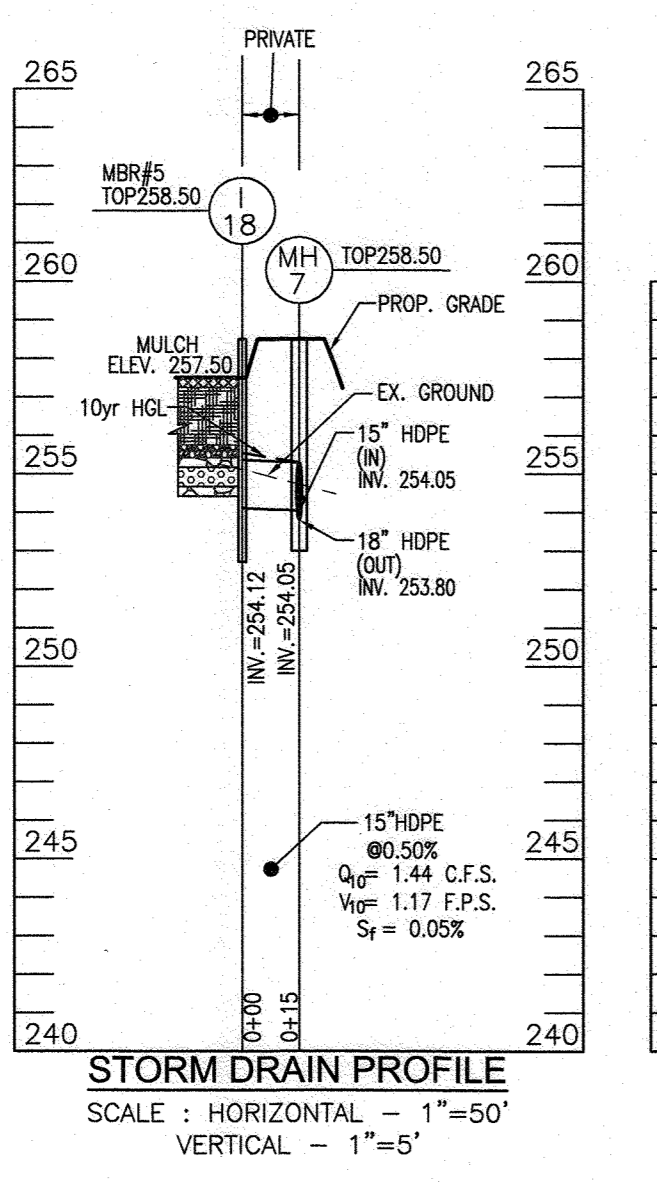
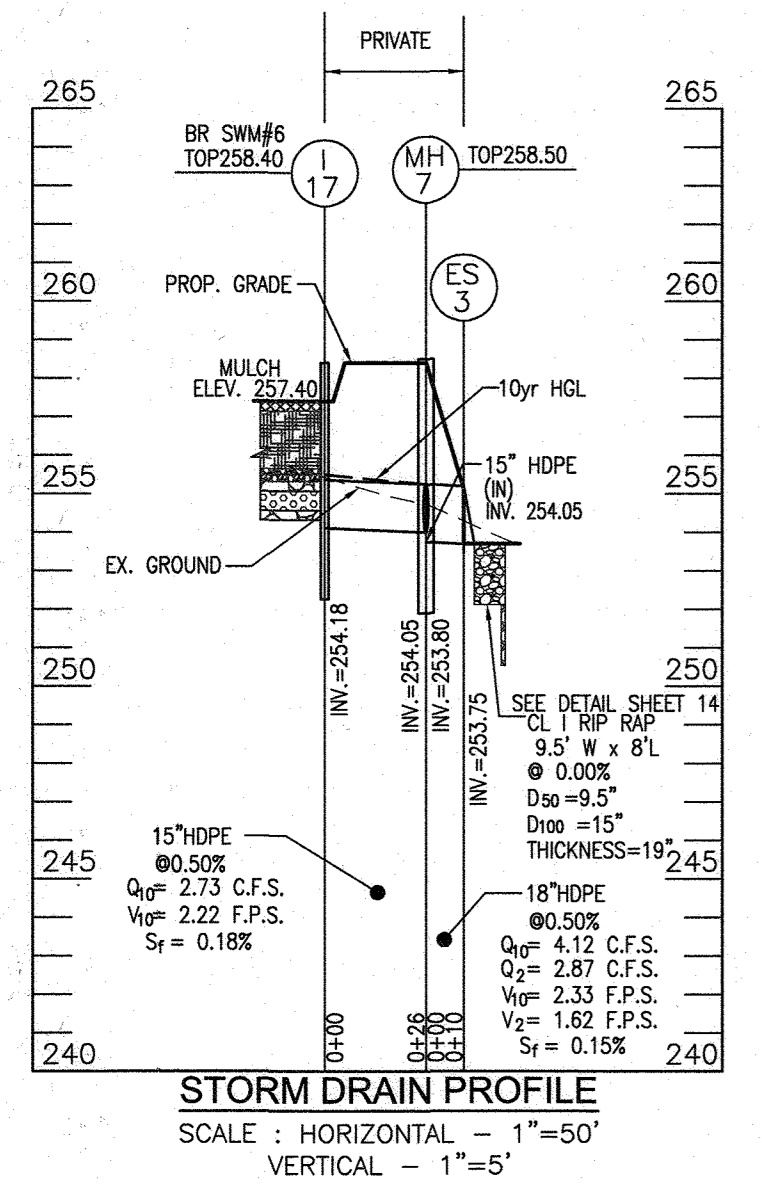
CONSTRUCTION SPECIFICATIONS:

- RIPRAP AND STONE MUST CONFORM TO THE SPECIFIED CLASS.
- USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, AND PROTECT FROM PUNCTURING, CUTTING, OR TEARING. REPAIR ANY DAMAGE OTHER THAN AN OCCASIONAL SMALL HOLE BY PLACING ANOTHER PIECE OF GEOTEXTILE OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE. PROVIDE A MINIMUM OF ONE FOOT OVERLAP FOR ALL REPAIRS AND FOR JOINING TWO PIECES OF GEOTEXTILE TOGETHER.
- PREPARE THE SUBGRADE FOR GEOTEXTILE OR STONE FILTER (3/4 TO 1 1/2 INCH STONE FOR 6 INCH MINIMUM DEPTH) AND RIPRAP TO THE REQUIRED LINES AND GRADES. COMPACT ANY FILL REQUIRED IN THE SUBGRADE TO A DENSITY OF APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED MATERIAL.
- EXTEND GEOTEXTILE AT LEAST 6 INCHES BEYOND EDGES OF RIPRAP AND EMBED AT LEAST 4 INCHES AT SIDES OF THE RIPRAP.
- CONSTRUCT RIPRAP OUTLET TO FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIALS. PLACE STONE FOR RIPRAP OUTLET IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENEOUS WITH THE SMALLER STONES AND SPALLS FILLING THE VOIDS BETWEEN THE LARGER STONES. PLACE RIPRAP IN A MANNER TO PREVENT DAMAGE TO THE STONE FILTER BLANKET OR GEOTEXTILE. HAND PLACE TO THE EXTENT NECESSARY.
- WHERE NO ENDWALL IS USED, CONSTRUCT THE UPSTREAM END OF THE APRON SO THAT THE WIDTH IS TWO TIMES THE DIAMETER OF THE OUTLET PIPE, AND EXTEND THE STONE UNDER THE OUTLET BY A MINIMUM OF 18 INCHES.
- CONSTRUCT APRON WITH 0% SLOPE ALONG ITS LENGTH AND WITHOUT OBSTRUCTIONS. PLACE STONE SO THAT IT BLENDS IN WITH EXISTING GROUND.
- MAINTAIN LINE, GRADE, AND CROSS SECTION. KEEP OUTLET FREE OF EROSION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. AFTER HIGH FLOW INSPECT FOR SCOUR AND DISLODGED RIPRAP. MAKE NECESSARY REPAIRS IMMEDIATELY.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE 2011 MARYLAND DEPARTMENT OF ENVIRONMENT  
NATURAL RESOURCES CONSERVATION SERVICE WATER MANAGEMENT ADMINISTRATION

D.20



### FLARED END SECTIONS

PART NO	PIPE SIZE	A	B (MAX)	H	L	W
1210-NP	12"	6.5"	10"	6.5"	25"	29"
1210-NP	300 mm	165 mm	254 mm	165 mm	635 mm	736 mm
1210-NP	15"	6.5"	10"	6.5"	25"	29"
1210-NP	375 mm	165 mm	254 mm	165 mm	635 mm	736 mm
1810-NP	18"	7.5"	15"	6.5"	35"	35"
1810-NP	450 mm	190 mm	380 mm	165 mm	812 mm	890 mm
2410-NP	24"	7.5"	15"	6.5"	35"	35"
2410-NP	600 mm	190 mm	450 mm	165 mm	900 mm	1140 mm
3012-NP	30"	10.5"	N/A	7.0"	55"	66"
3012-NP	750 mm	268 mm	N/A	178 mm	1345 mm	1725 mm
3612-NP	36"	10.5"	N/A	7.0"	55"	66"
3612-NP	900 mm	268 mm	N/A	178 mm	1345 mm	1725 mm

NOTE: PE THREADED ROD W/WING NUTS PROVIDED FOR END SECTIONS 18"-24", 30" & 36" END SECTIONS TO BE WELDED TO PIPE PER MANUFACTURER'S RECOMMENDATIONS.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*[Signature]* for 11/23/20  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*[Signature]* 12-2-20  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF LAND DEVELOPMENT  
*[Signature]* 12/10/20  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Howards County, Maryland  
 Department of Public Works  
 MODIFIED - US  
 TYPE 'O' Headwall  
 Circular Pipe Outfall  
 Detail  
 D-5.41

Maryland Department of Transportation  
 STATE HIGHWAY ADMINISTRATION  
 STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES  
 MODIFIED  
 STANDARD JUNCTION BOX  
 OR EQUAL  
 MODIFIED STANDARD NO. MD 386.11

OWNER/DEVELOPER  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DR., SUITE 100  
 COLUMBIA, MD 21046  
 ATTN: PETER ENGEL  
 (410) 313-6316

NO. REVISION DATE

FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN PROFILES  
**GREENWOOD VILLAGE - PHASE 1**  
 LOTS 1-4, NON-BUILDABLE BULLY PARCELS C-4  
 AND OPEN SPACE LOTS 5-11  
 A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION C-4  
 LOTS 2-4 (P.B. 3/51), 5R (L-16288 F.488), 8R (L-16288 F.502) AND 9 (P.B. 3/51)  
 TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140  
 6TH ELECTION DISTRICT ZONED: R-12 HOWARD COUNTY, MARYLAND

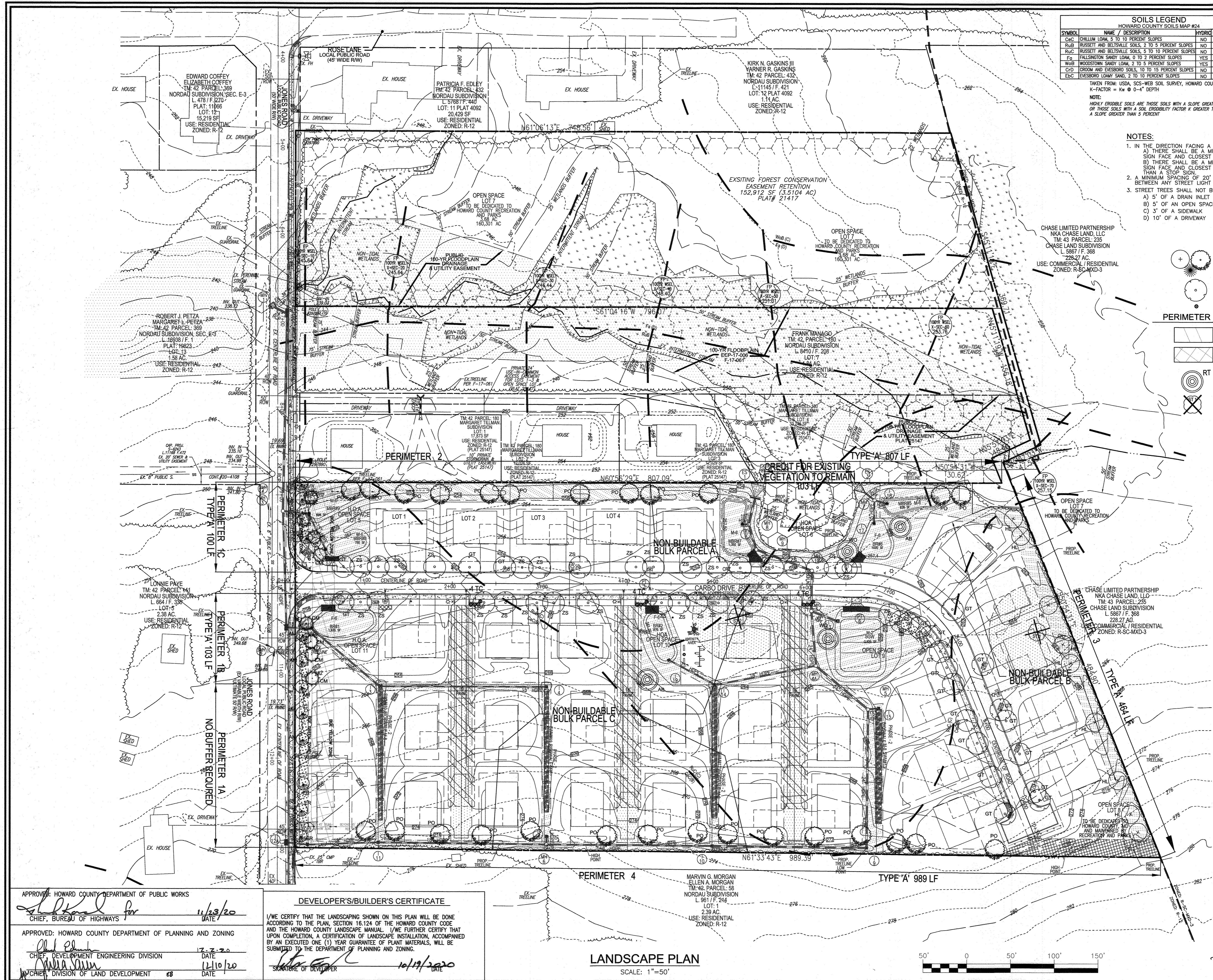
**VOGEL ENGINEERING**  
 TIMMONS GROUP  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7666 F: 410.461.8961 www.timmons.com

PROFESSIONAL CERTIFICATE  
 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. 16193  
 EXPIRATION DATE: 09-27-2020

DESIGN BY: RHY  
 DRAWN BY: VETG  
 CHECKED BY: RHY  
 DATE: MARCH 2020  
 SCALE: AS SHOWN  
 W.O. NO.: 12-05

14 SHEET OF 23

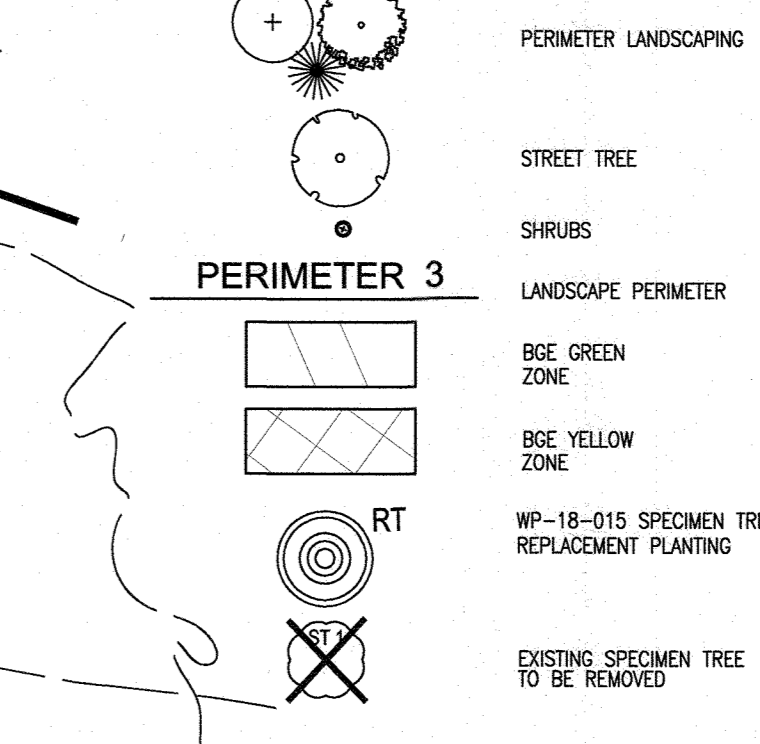
ROBERT H. VOGEL, PE No.16193



SOILS LEGEND				
HOWARD COUNTY SOILS MAP #24				
SYMBOL	NAME / DESCRIPTION	HYDRO GROUP	FACTOR	CRS. SLOPE
CcC	CHILLUM LOAM, 5 TO 10 PERCENT SLOPES	NO	B	0.43
RuB	RUSSETT AND BELTSVILLE SOILS, 2 TO 5 PERCENT SLOPES	NO	C	0.43
RuC	RUSSETT AND BELTSVILLE SOILS, 5 TO 10 PERCENT SLOPES	NO	C	0.43
Fa	FALLSINGTON SANDY LOAM, 0 TO 2 PERCENT SLOPES	YES	D	0.24
WuB	WOODSTOWN SANDY LOAM, 2 TO 5 PERCENT SLOPES	YES	C	0.32
CrD	CRDOM AND EYEBORO SOILS, 10 TO 15 PERCENT SLOPES	NO	C	0.37
Ebc	EYEBORO LOAMY SAND, 2 TO 10 PERCENT SLOPES	NO	A	0.15

LEGEND:	
	PROPERTY LINE
	RIGHT-OF-WAY LINE
	ADJACENT PROPERTY LINE
	EXISTING PAVING
	EXISTING UTILITY POLE
	EXISTING SANITARY MANHOLE
	EXISTING SANITARY LINE
	EXISTING FIRE HYDRANT
	EXISTING WATER LINE
	EXISTING TREELINE
	CENTERLINE OF EXISTING STREAM
	EXISTING SPECIMEN TREE
	EXISTING WETLANDS
	EXISTING WETLAND BUFFER
	PUBLIC 100-YEAR FLOOD PLAIN (PLAT 25147)
	EXISTING FOREST CONSERVATION EASEMENT (RETENTION - PLAT 21417, 25147)
	FOREST CONSERVATION EASEMENT
	PRIVATE USE-IN-COMMON ACCESS EASEMENT
	PUBLIC SEWER, WATER & UTILITY EASEMENT
	PUBLIC WATER & UTILITY EASEMENT
	PRIVATE STORM DRAIN AND STORM WATER MANAGEMENT EASEMENT
	PUBLIC DRAINAGE & UTILITY EASEMENT
	10' PUBLIC TREE MAINTENANCE EASEMENT
	STORMDRAIN
	SIDEWALK
	PROPOSED TREELINE
	CURB & GUTTER
	MICRO-BIOREMEDIATION FACILITY (M-6)
	STREET LIGHT
	SOILS BOUNDARY
	LIMIT OF DISTURBANCE

- NOTES:**
- IN THE DIRECTION FACING A TRAFFIC CONTROL SIGN:
    - THERE SHALL BE A MINIMUM OF 40' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL STOP SIGNS.
    - THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN.
  - A MINIMUM SPACING OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.
  - STREET TREES SHALL NOT BE PLANTED WITHIN:
    - 5' OF A DRAIN INLET STRUCTURE
    - 5' OF AN OPEN SPACE ACCESS STRIP
    - 3' OF A SIDEWALK
    - 10' OF A DRIVEWAY



- NOTES:**
- REFER TO SHEET 17 FOR LANDSCAPE SCHEDULE A, STREET TREE REQUIREMENTS AND LANDSCAPING NOTES AND DETAILS.

**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DR., SUITE 110  
 COLUMBIA, MD 21046  
 ATTN: PETER ENGEL  
 (410) 313-6316

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
 LANDSCAPE PLAN  
**GREENWOOD VILLAGE - PHASE 1**  
 LOTS 1-4, NON-BUILDABLE BULK PARCELS A-C  
 AND OPEN SPACE LOTS 5-11  
 A RE-SUBDIVISION OF THE NORDAU SUBDIVISION - SECTION E-4  
 LOTS 2-4 (P.B. 3/51), 5R (L-16288 F.488), 8R (L-16288 F.502) AND 9 (P.B. 3/51)  
 TAX MAP: 42 GRID: 24 6TH ELECTION DISTRICT ZONED: R-12 PARCEL: 136 & 138-140 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
  
**TIMMONS GROUP**  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7666 F: 410.461.8961 www.timmons.com

**PROFESSIONAL CERTIFICATE**

DESIGN BY:   RHV    
 DRAWN BY:   VETG    
 CHECKED BY:   RHV    
 DATE:   MARCH 2020    
 SCALE:   AS SHOWN    
 W.O. NO.:   12-05  

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. 16193 EXPIRATION DATE: 06-27-2020

15 SHEET OF 23

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE:   11/23/20  

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE:   12/10/20  

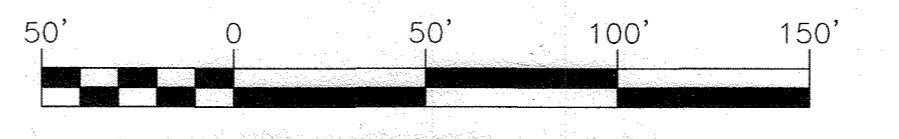
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE:   12/10/20  

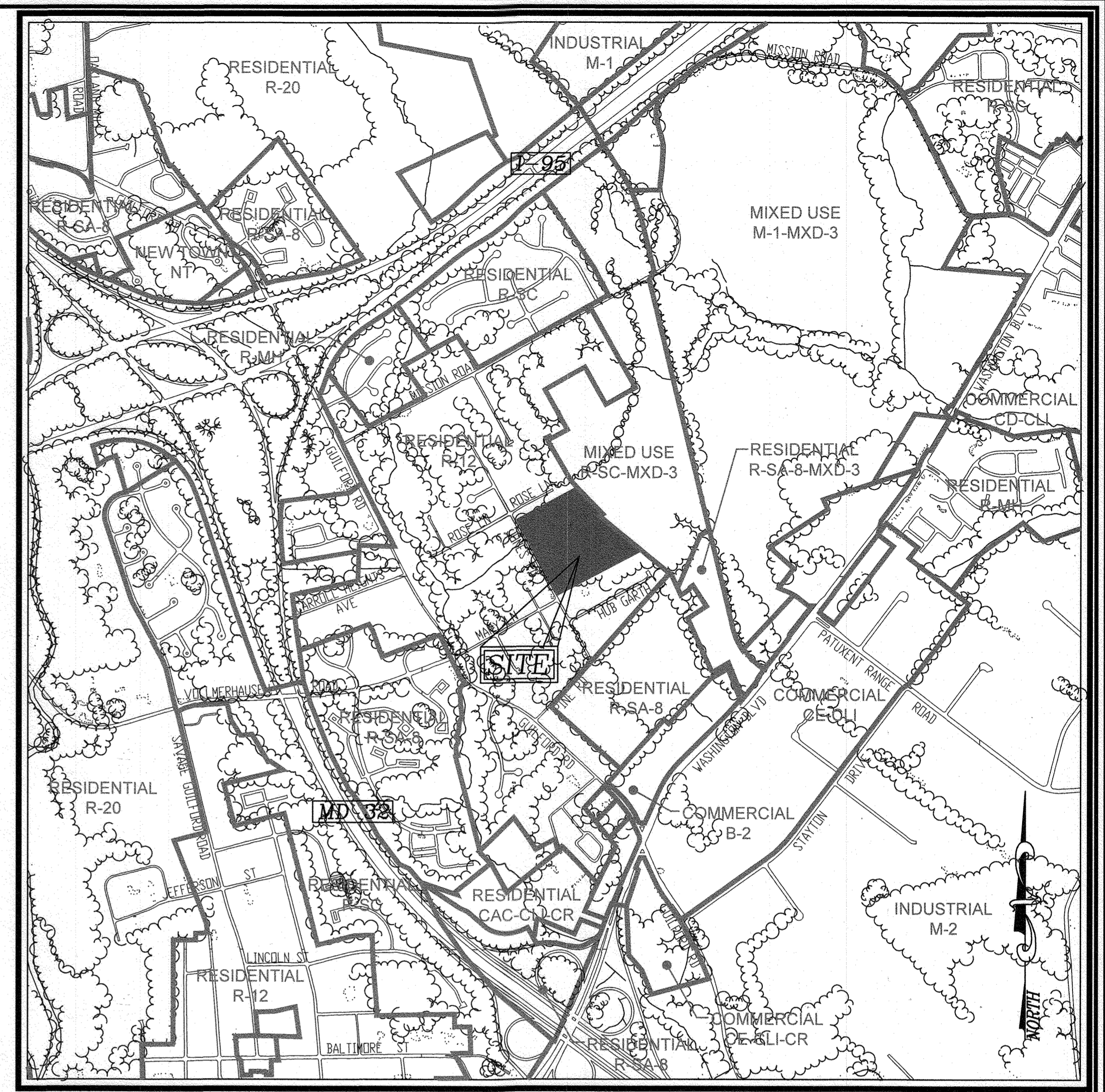
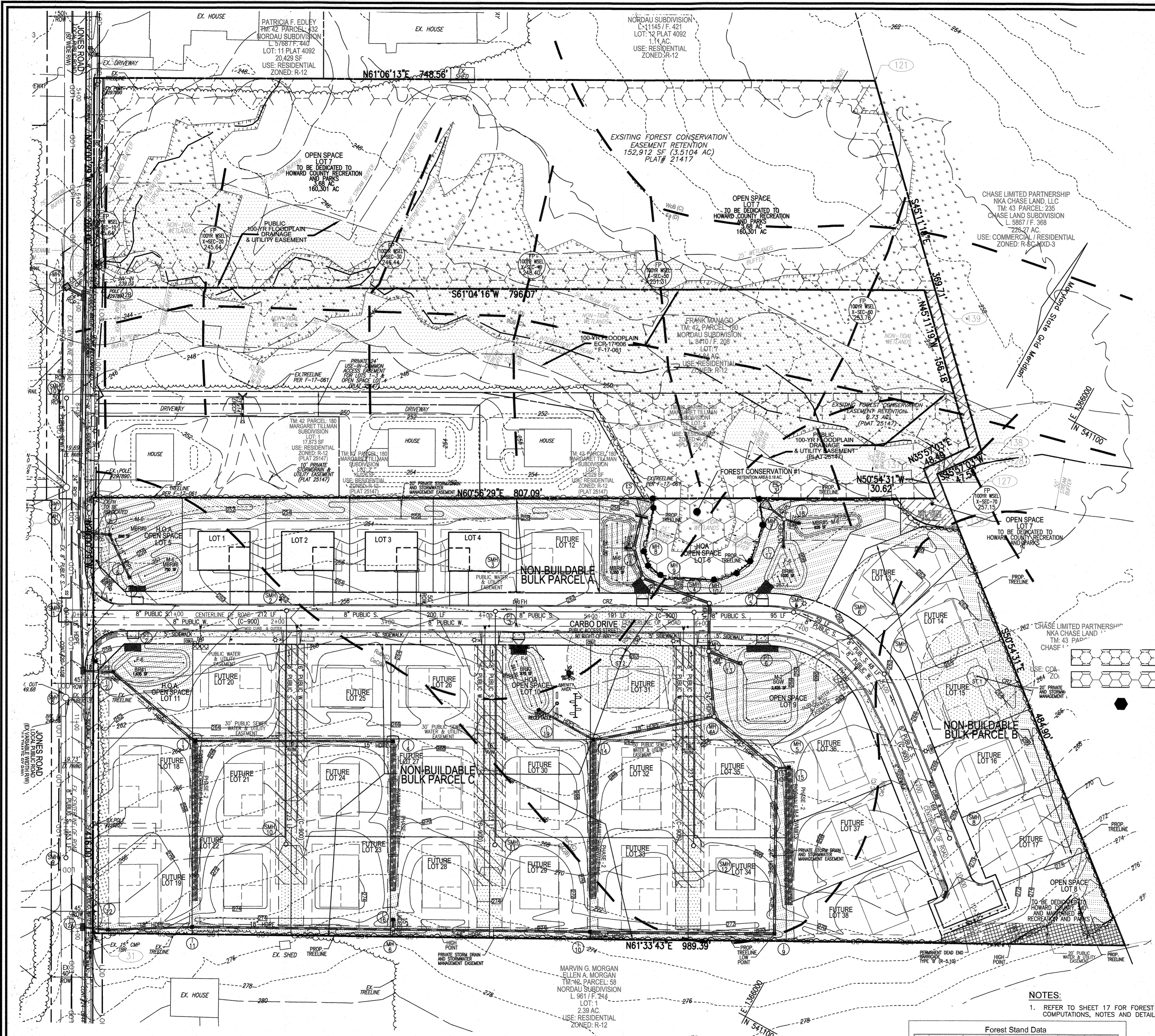
**DEVELOPER'S/BUILDER'S CERTIFICATE**

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A CERTIFICATION OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE (1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

SIGNATURE OF DEVELOPER  
 DATE:   10/19/2020  

**LANDSCAPE PLAN**  
 SCALE: 1" = 50'





**LEGEND:**

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING PAVING
- EXISTING UTILITY POLE
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING TRENCH
- CENTERLINE OF EXISTING STREAM
- EXISTING SPECIMEN TREE
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- PUBLIC 100-YEAR FLOOD PLAN PLAT# 25147
- PRIVATE USE-IN-COMMON ACCESS EASEMENT
- PUBLIC SEWER, WATER & UTILITY EASEMENT
- PUBLIC WATER & UTILITY EASEMENT
- PRIVATE STORM DRAIN AND STORM WATER MANAGEMENT EASEMENT
- 10' PUBLIC TREE MAINTENANCE EASEMENT
- STORMDRAIN
- SIDEWALK
- TRENCH
- CURB & GUTTER
- SOILS BOUNDARY
- LIMIT OF DISTURBANCE

**VICINITY MAP**  
SCALE: 1"=1,000'  
ADC MAP COORDINATE: 41-42

**GENERAL NOTES**

- WATERSHED NAME: LITTLE PATUXENT RIVER
- WATERSHED NUMBER: 2131105
- A. GROSS SITE AREA (PROJECT SITE LOTS 2-4 & 5R = 8.73): 8.73 AC. (PROJECT SITE)
- +0.03 Connecting piece - L16288 F.488 (WP-15-098): 8.78 AC. (PROJECT SITE)
- +0.02 Connecting piece - L16288 F.502 (WP-15-098): 8.78 AC. (PROJECT SITE)
- + LOTS BR & 9 = 3.57 = 12.35 AC.
- NET SITE AREA (PROJECT SITE): 8.73 AC. (PROJECT SITE)
- B. AREA OF 100-YEAR FLOODPLAIN: 0.84 AC. (PROJECT SITE)
- C. AREA OF WETLANDS AND BUFFERS(ONSITE): 2.92 AC. (PROJECT SITE)
- AREA OF STREAM AND BUFFERS(ONSITE): 1.37 AC. (PROJECT SITE)
- D. AREA OF > 25% STEEP SLOPES: 0.00 AC.
- E. EXISTING FOREST: 8.8 AC. (FSD)
- F. ZONED: R-12
- G. EXISTING USE: R-12
- H. PROPOSED USE: VACANT RESIDENTIAL

**NOTES:**  
1. REFER TO SHEET 17 FOR FOREST CONSERVATION COMPUTATIONS, NOTES AND DETAILS.

**Forest Stand Data**

Key	Community Type	Acres	Dominant Species	General Vegetation	General Condition	Priority
F1	Mixed Oak	0.8	Quercus phellos, Quercus alba, Quercus falcata, Acer rubrum, Paspalum gracillimum, Nyssa sylvatica	Good	0.8 acres wetland, bottom, coniferous forest	

**SPECIMEN TREE CHART**

NO.	SIZE	CRZ	COMMON NAME	CONDITION	COMMENTS
ST 1	36.5'	54.75'	AMERICAN BEECH	GOOD CONDITION	
ST 2	34.5'	51.75'	WHITE OAK	FAIR CONDITION, SOME LEAD DAMAGE	TO BE REMOVED

**SOILS LEGEND**

HOWARD COUNTY SOILS MAP #24

SYMBOL	NAME / DESCRIPTION	HYDRO GROUP	PERCENT SAND	PERCENT SILT	PERCENT CLAY	PERCENT ORGANIC
Cec	CHILLUM LOAM, 5 TO 10 PERCENT SLOPES	NO	B	0.43	NO	NO
RuB	RUSSETT AND BELLSVILLE SOILS, 2 TO 5 PERCENT SLOPES	NO	C	0.43	NO	NO
RuC	RUSSETT AND BELLSVILLE SOILS, 5 TO 10 PERCENT SLOPES	NO	C	0.43	NO	NO
F2	FALLSWORTH SANDY LOAM, 0 TO 2 PERCENT SLOPES	YES	D	0.24	NO	NO
Wob	WOODSTOWN SANDY LOAM, 2 TO 5 PERCENT SLOPES	YES	C	0.32	NO	NO
CRD	CROOM AND EVERBROOK SOILS, 10 TO 15 PERCENT SLOPES	NO	C	0.37	YES	NO
Ebc	EVERBROOK LOAMY SAND, 2 TO 10 PERCENT SLOPES	NO	A	0.15	NO	NO

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 11/23/20

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 12/2/20  
DATE: 12/10/20

**FOREST CONSERVATION PLAN**

SCALE: 1"=50'  
50' 0 50' 100' 150'

**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DR., SUITE 100  
COLUMBIA, MD 21046  
ATTN: PETER ENGEL  
(410) 313-6316

**Eco-Science Professionals, Inc.**  
CONSULTING ECOLOGISTS  
10100 WOODBURN RD. SUITE 200  
COLUMBIA, MD 21046  
TEL: 410-391-1100 FAX: 410-391-1101

NO RARE, THREATENED OR ENDANGERED SPECIES OR THEIR HABITAT WERE OBSERVED ON THE PROPERTY. SURROUNDING LAND USE IS HIGH DENSITY RESIDENTIAL DEVELOPMENT AND FOREST. THE ADJACENT PROPERTY IS CURRENTLY UNDEVELOPED BUT IS BEING PROPOSED FOR DEVELOPMENT. APPROXIMATELY 5.2 ACRES OF FOREST IS CURRENTLY PRESENT WITHIN 100 FEET OF THE SUBJECT PROPERTY. SOME OF THIS OFFSITE FOREST WILL BE IMPACTED BY DEVELOPMENT OF ADJACENT PROPERTY. THE SITE LIES WITHIN THE WATERSHED OF THE LITTLE PATUXENT RIVER (02-13-11). THE WETLANDS WILL REQUIRE A 25 FOOT BUFFER AND THE INTERMITTENT STREAM CHANNEL REQUIRES A 50 FOOT BUFFER. NO HISTORIC ELEMENTS OR CEMETERIES ARE KNOWN TO OCCUR ON THIS PROPERTY. THERE IS A 100 YEAR FLOODPLAIN PRESENT ON THE PROPERTY. THERE ARE NO STEEP SLOPES PRESENT ON THE PROPERTY.

**FINAL ROAD CONSTRUCTION PLAN**

**FOREST CONSERVATION PLAN**

**GREENWOOD VILLAGE - PHASE 1**

LOTS 1-4, NON-BUILDABLE BULK PARCELS A-C AND OPEN SPACE LOTS 5-11  
A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4  
LOTS 2-4 (P.B. 3/51), 5R (L16288 F.488), 8R (L16288 F.502) AND 9 (P.B. 3/51)

TAX MAP: 42 GRID: 24  
6TH ELECTION DISTRICT

ZONED: R-12  
PARCEL: 136 & 138-140  
HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
TIMMONS GROUP  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
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DESIGN BY: RHV  
DRAWN BY: VETG  
CHECKED BY: RHV  
DATE: MARCH 2020  
SCALE: AS SHOWN  
W.O. NO.: 12-05

16 SHEET OF 23



HOWARD COUNTY  
FOREST CONSERVATION WORKSHEET

ZONED R-12  
NET TRACT AREA:  
A. TOTAL TRACT AREA: 8.78 AC.  
B. AREA WITHIN 100 YEAR FLOODPLAIN: 0.03 AC.  
C. AREA TO REMAIN IN AGRICULTURAL PRESERVATION: 0.00 AC.  
D. NET TRACT AREA: 8.75 AC.

LAND USE CATEGORY  
INPUT THE NUMBER "1" UNDER THE APPROPRIATE LAND USE ZONING, AND LIMIT TO ONLY ONE ENTRY. ZONED R-12

ARA MDR IDA HDR MPD CIA  
0 0 0 1 0 0

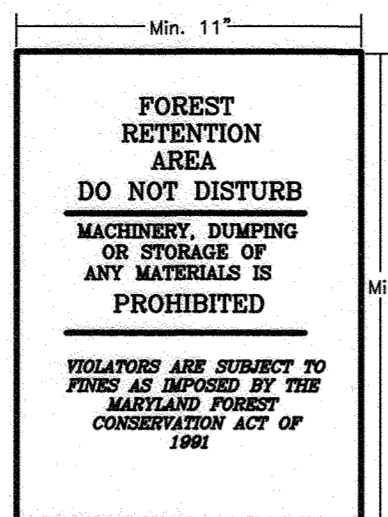
E. AFFOREST THRESHOLD: 15% X 8.75 = 1.31 AC  
F. CONSERVATION THRESHOLD: 20% X 8.75 = 1.75 AC

EXISTING FOREST COVER:  
G. EXISTING FOREST COVER (EXCLUDING FLOODPLAIN) = 8.75 AC  
H. AREA OF FOREST ABOVE AFFORESTATION THRESHOLD = 7.44 AC  
I. AREA OF FOREST ABOVE CONSERVATION THRESHOLD = 7.00 AC

BREAK EVEN POINT:  
(2 X 1) + F = BREAK EVEN POINT (0 AC)  
J. FOREST RETENTION ABOVE THRESHOLD W/ NO MITIGATION = 3.15 AC  
K. CLEARING PERMITTED WITHOUT MITIGATION = 5.60 AC

PROPOSED FOREST CLEARING:  
L. TOTAL AREA OF FOREST TO BE CLEARED = 8.57 AC  
M. TOTAL AREA OF FOREST TO BE RETAINED = 0.18 AC - REMAINING WETLAND AREA

PLANTING REQUIREMENTS:  
N. REFORESTATION FOR CLEARING ABOVE CONSERVATION THRESHOLD (L X 25) = 1.75 AC  
O. REFORESTATION FOR CLEARING BELOW CONSERVATION THRESHOLD = 3.14 AC  
P. CREDIT FOR RETENTION ABOVE CONSERVATION THRESHOLD (M-F) = 0.00 AC  
R. TOTAL REFORESTATION REQUIRED (N+P-Q) = 4.89 AC  
S. TOTAL AFFORESTATION REQUIRED = 0.00 AC  
T. TOTAL PLANTING REQUIREMENT (REFORESTATION AND AFFORESTATION) = 4.89 AC



NOTE:  
1. BOTTOM OF SIGN TO BE HIGHER THAN TOP OF TREE PROTECTION FENCE.  
2. SIGNS TO BE PLACED APPROXIMATELY 50-100' FEET APART. CONDITIONS ON SITE AFFECTING VISIBILITY MAY WARRANT PLACING SIGNS CLOSER OR FARTHER APART. WHERE SIGNS ARE TO BE PLACED AT THE REAR OF PROPOSED LOTS, SPACING SHALL BE APPROX. 25-30' +/-  
3. ATTACHMENT OF SIGNS TO TREES IS PROHIBITED.  
4. ALL FOREST CONSERVATION SIGNAGE SHALL BE IN PLACE FOR PERPETUITY.  
5. SIGN LOCATION SYMBOL =

FOREST CONSERVATION AREA SIGNS

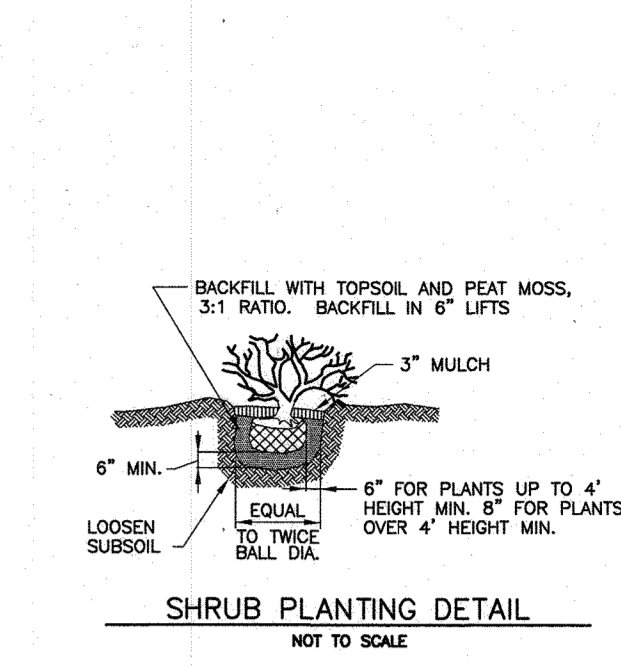
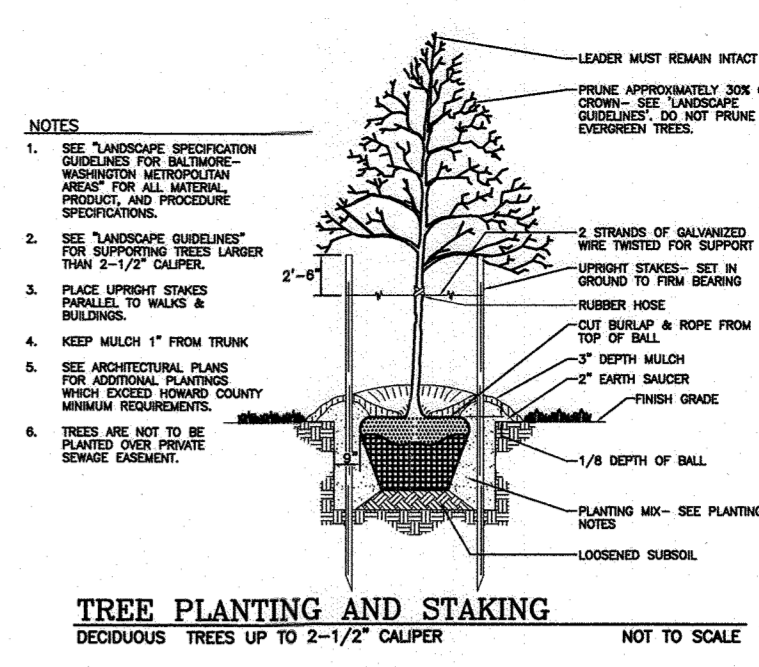
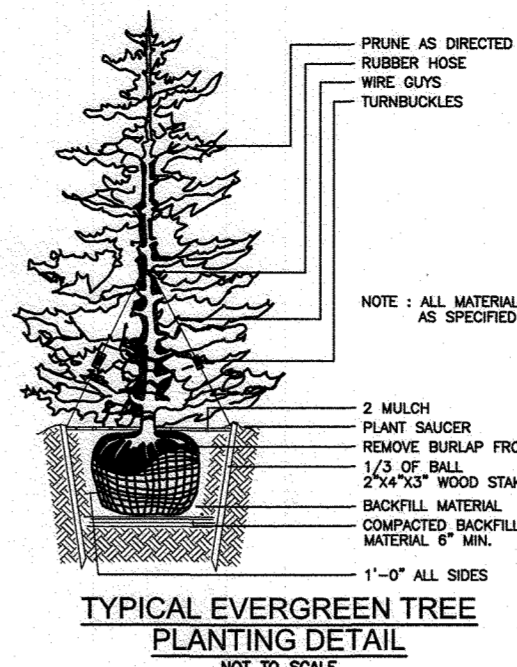
IF NOT INSTALLED, PROVIDE SIGNAGE AROUND THE NORDAU SUBDIVISION - SECTION E-4, LOTS 8 & 9 (PLAT 21417) FOREST BANK.

GENERAL NOTES:

- THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL.  
A. FINANCIAL SURETY IN THE AMOUNT OF \$13,200 FOR THE REQUIRED LANDSCAPING SHALL BE POSTED WITH THE FINAL PLANNING DEVELOPERS AGREEMENT.  
B. 40 SHADE TREES @ \$300 = \$12,000  
C. 4 SHADE TREES / SPECIMEN TREE REPLACEMENT @ \$300 = \$1,200
- PUBLIC STREET TREES ARE PROVIDED FOR THIS PROJECT IN ACCORDANCE WITH SECTION 16.124(a)(1) OF THE SUBDIVISION REGULATIONS AND THE LANDSCAPE MANUAL.  
FINANCIAL SURETY (\$ 18,900) SHALL BE COLLECTED WITH THE DEPARTMENT OF PUBLIC WORKS COST ESTIMATE FOR THE REQUIRED 63 STREET TREES.  
(52 LARGE AND 11 SMALL STREET TREES)  
-TRASH PAD PLANTINGS ARE PROVIDED FOR THIS PROJECTS USE-IN-COMMON DRIVEWAYS.  
FINANCIAL SURETY (\$ 360) SHALL BE COLLECTED WITH THE DEPARTMENT OF PUBLIC WORKS COST ESTIMATE FOR THE REQUIRED 12 SHRUBS.
- IN A REPORT/PLAN TITLED "WETLAND DELINEATION AND FOREST STAND DELINEATION REPORT" PREPARED BY ECO-SYSTEM PROFESSIONALS, INC. DATED DECEMBER 16, 2016 MR. JOHN CANOLES IDENTIFIED THE ON-SITE FOREST, WETLANDS AND STREAMS.  
- MR. CANOLES IDENTIFIED TWO (2) SPECIMEN TREES. PER PROJECT PROPOSAL AND THIS PROJECT BEING SUBJECT TO WP-18-015 THE TREES SHALL BE REMOVED AND REPLACED WITH FOUR SHADE TREES.
- NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE WETLANDS, STREAM(S) OR THEIR BUFFERS, FOREST CONSERVATION EASEMENT AREAS AND 100-YEAR FLOODPLAIN.

LANDSCAPE NOTES

- AT THE TIME OF PLANT INSTALLATION, ALL SHRUBS AND TREES LISTED AND APPROVED ON THE LANDSCAPE PLAN, SHALL COMPLY WITH THE PROPER HEIGHT REQUIREMENT IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL. IN ADDITION, NO SUBSTITUTIONS OR RELOCATIONS OF THE REQUIRED PLANTINGS MAY BE MADE WITHOUT PRIOR REVIEW AND APPROVAL FROM THE DEPARTMENT OF PLANNING AND ZONING, ANY DEVIATION FROM THE APPROVED LANDSCAPE PLAN MAY RESULT IN DENIAL OR DELAY IN THE RELEASE OF LANDSCAPE SURETY UNTIL SUCH TIME AS ALL REQUIRED MATERIALS ARE PLANTED AND/OR REVISIONS ARE MADE TO THE APPLICABLE PLANS.
- THE OWNER, TENANT AND/OR THEIR AGENTS SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE REQUIRED LANDSCAPING INCLUDING BOTH PLANT MATERIALS AND BERRMS, FENCES AND WALLS. ALL PLANT MATERIALS SHALL BE MAINTAINED IN GOOD GROWING CONDITION AND WHEN NECESSARY, REPLACED WITH NEW MATERIALS TO ENSURE CONTINUED COMPLIANCE WITH APPLICABLE REGULATIONS. ALL OTHER REQUIRED LANDSCAPING SHALL BE PERMANENTLY MAINTAINED IN GOOD CONDITION, AND WHEN NECESSARY, REPAIRED OR REPLACED.
- SHOULD ANY TREE DESIGNATED FOR PRESERVATION FOR WHICH LANDSCAPING CREDIT IS GIVEN, DIE PRIOR TO RELEASE OF BONDS, THE OWNER WILL BE REQUIRED TO REPLACE THE TREE WITH THE EQUIVALENT SPECIES OR WITH A TREE WHICH WILL OBTAIN THE SAME HEIGHT, SPREAD, AND GROWTH CHARACTERISTICS. THE REPLACEMENT TREE MUST BE A MINIMUM OF 3 INCHES IN CALIPER AND INSTALLED AS REQUIRED IN THE HOWARD COUNTY LANDSCAPE MANUAL.
- PLANTINGS SHOWN HEREON ARE THE RESPONSIBILITY OF THE DEVELOPER TO INSTALL DURING THE CONSTRUCTION OF THE FINAL PLAN.
- SURETY FOR THE PROPOSED LANDSCAPING SHALL BE BASED ON THE NUMBER OF PLANTINGS REQUIRED.



STREET TREE CALCULATIONS			
STREET NAME	LINEAR FEET	NO. REQUIRED	NO. PROVIDED
CARBO DRIVE	207/40	52	52
JONES ROAD	330/30	11	11

STREET TREE PLANTING SCHEDULE					
SYM.	KEY	QUAN.	BOTANICAL NAME	SIZE	CAT
⊙	ZS	32	ZELKOVA SERRATA 'VILLAGE GREEN' VILLAGE GREEN JAPANESE ZELKOVA	2 1/2"-3" CAL.	B & B
⊙	GT	20	GLEDITSIA TRIACANTHOS INERMIS 'IMPERIAL' IMPERIAL THRONLESS HONEY LOCUST	2 1/2"-3" CAL.	B & B
⊙	ER(1)	6	EASTERN REDBUD CERCIS CANADENSIS	2 1/2"-3" CAL.	B & B
⊙	AM(1)	5	AMUR MAPLE ACER GINNALA	2 1/2"-3" CAL.	B & B

NOTE: WITH PERMISSION FROM HOWARD COUNTY, PLANTINGS SPECIFIED HEREON MAY BE SUBSTITUTED WITH APPROVED SPECIES LISTED IN APPENDIX B & C OF THE HOWARD COUNTY LANDSCAPE MANUAL.  
(1) BGE COMPLIANT

STREET TREE NOTES:

- WHEN THE DISTANCE BETWEEN THE CURB AND SIDEWALK IS 6 FEET OR GREATER, TREES SHALL BE LOCATED WITHIN THE RIGHT OF WAY AND SHALL BE CENTERED BETWEEN THE CURB AND THE SIDEWALK.
- WHEN THE DISTANCE BETWEEN THE CURB AND THE SIDEWALK IS LESS THAN 6 FEET, AND WHERE TREES ARE PLANTED CLOSER THAN 3 FEET TO THE SIDEWALK, A BIOLOGIC ROOT INHIBITOR BARRIER OR PHYSICAL CONTAINER BARRIER SHALL BE REQUIRED.
- WHEN THE DISTANCE BETWEEN THE CURB AND THE SIDEWALK IS LESS THAN 6 FEET, TREES MAY BE PLANTED 3 FEET FROM THE SIDEWALK IN THE DIRECTION AWAY FROM THE ROAD, A 10 FOOT WIDE TREE MAINTENANCE EASEMENT SHALL BE REQUIRED IF THE RIGHT OF WAY IS LIMITED.
- TREES SHALL BE PLACED A MINIMUM OF 30 FEET FROM ALL SIGNS AND INTERSECTIONS WHEN PLANTED WITH APPROVED WITH CONSIDERATION OF UNDERGROUND UTILITIES AND STRUCTURES. STREET TREES MAY NOT BE PLANTED WITHIN 5 FEET OF A DRAIN INLET STRUCTURE, 5 FEET OF AN OPEN SPACE ACCESS STRIP, OR 10 FEET OF A DRIVEWAY.

TRASH PAD LANDSCAPING				
SYMBOL	QTY.	DESCRIPTION	SIZE	REMARKS
⊙	12	TAXUS CUSPIDATA 'NANA' DWARF JAPANESE YEW	18"-24" SPREAD	B & B

-THE TOTAL SURETY OF \$360 FOR THE SHRUBS SHALL BE POSTED WITH THIS PLAN.  
TRASH PAD REQUIRED AT CARBO DRIVE  
STATION 2+24.89 - 18.1' RT  
STATION 4+14.88 - 18.1' RT  
STATION 6+05.40 - 18.1' RT - MAX HEIGHT OF SHRUBS SHALL BE MAINTAINED TO A HEIGHT OF 18" TO ENSURE ADEQUATE SIGHT DISTANCE

ZONE	DISTANCE FROM THE BGE POWER LINE OR TRANSMISSION RIGHT-OF-WAY	MAXIMUM HEIGHT OF VEGETATION
GREEN	UP TO 20 FEET	25 FEET
YELLOW	BETWEEN 20 FEET AND 45 FEET	40 FEET
RED	BEYOND 45 FEET	ABOVE 40 FEET

B G & E NOTES:

- BGE RESERVES THE RIGHT TO TRIM, TOP OR CUT DOWN ANY TREE IN PROXIMITY TO THE LINE THAT IN THE OPINION OF BGE SHALL BE DEEMED A HAZARD TO THE SAFE AND RELIABLE DELIVERY OF ELECTRICITY.
- THE DEPARTMENT OF PLANNING AND ZONING MAY AUTHORIZE THE TRIMMING OR REMOVAL OF TREES OR VEGETATION IMMEDIATELY ADJACENT TO THE BGE R/W OR EASEMENT, IF BGE DETERMINES THE TREES ARE COMPROMISING THE SAFETY OR A TRANSMISSION LINE LOCATED WITHIN THEIR UTILITY R/W OR EASEMENT. IF BGE INTENDS TO TRIM OR REMOVE TREES WITHIN A FOREST CONSERVATION EASEMENT, A LETTER SPECIFYING THE LOCATION AND SCOPE OF WORK NEEDS TO BE SENT TO DPZ AT LEAST 30 DAYS IN ADVANCE OF UNDERTAKING THE WORK. DPZ UNDERSTANDS CONSERVATION EASEMENTS NEED TO PROTECT ITS TRANSMISSION LINES AND WILL NOT UNREASONABLY WITHHOLD PERMISSION.
- CALL MISS UTILITY TO MARK UP THE LOCATION OF EXISTING GAS LINES BEFORE PLANTING STREET TREES ALONG JONES ROAD & PLANT STREET TREES 15' AWAY FROM EXISTING GASLINES AS REQUIRED.

SEQUENCE OF CONSTRUCTION-FOREST CONSERVATION

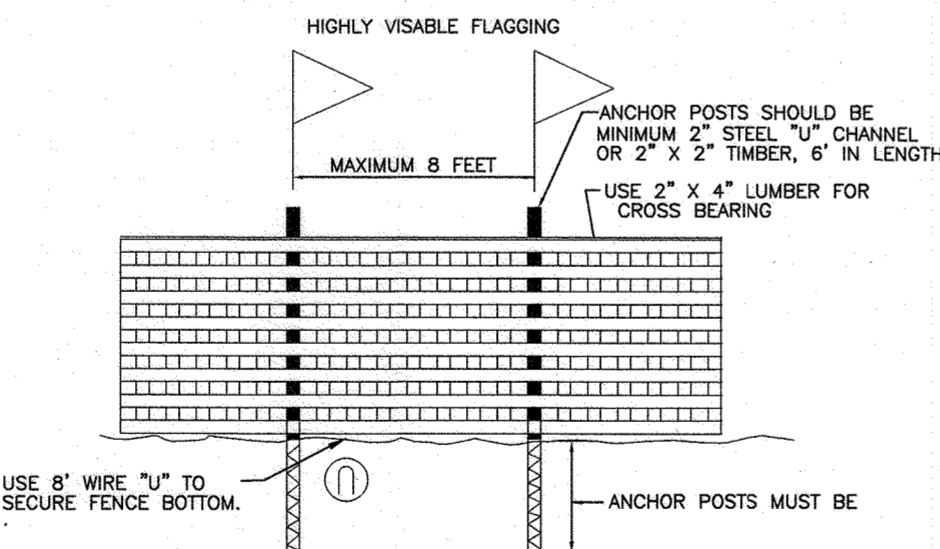
- PRECONSTRUCTION MEETING /SITE WALK WITH CONTRACTORS AND OTHER RESPONSIBLE PARTIES TO DEFINE PROTECTION MEASURES TO BE UTILIZED AND TO POINT OUT PARTICULAR TREES TO BE SAVED.
- STAKE OUT LIMITS OF DISTURBANCE AND TREE PROTECTION FENCING LOCATIONS.
- INSTALL TREE PROTECTION FENCING TO BE INSPECTED BY THE PROJECT ENGINEER OR THE PROJECT ECOLOGIST AND HOWARD COUNTY.
- PROCEED WITH TREE REMOVAL AND SITE IMPROVEMENTS AS PER APPROVED SEDIMENT CONTROL PLAN - TO BE INSPECTED BY HOWARD COUNTY
- TEMPORARY TREE PROTECTION DEVICES SHALL BE REMOVED AFTER ALL FINISHED GRADING AND UTILITY CONSTRUCTION HAS OCCURRED AND WITH APPROVAL FROM HOWARD COUNTY.

FOREST RETENTION AREAS AND NOTES

- THERE ARE WETLANDS OR WETLAND BUFFERS LOCATED ON-SITE.
- NO RARE, THREATENED OR ENDANGERED SPECIES WERE OBSERVED ON THIS SITE.
- FORESTED AREAS ADJACENT TO FLOODPLAINS AND STREAM BUFFERS ARE SUBSTANTIALLY RETAINED IN OPEN SPACE LOTS.
- CHANGES IN GRADING AND RUNOFF WITHIN CONSTRUCTION/INSTALLATION AREAS WILL NOT ADVERSELY AFFECT THE SOILS WITHIN THE FOREST RETENTION AREA. SEDIMENT CONTROL MEASURES WILL REDIRECT CONCENTRATED FLOW RUNOFF TO STORMWATER MANAGEMENT FACILITIES, RETAIN SEDIMENT WITHIN THE CONSTRUCTION SITE, AND/OR REDIRECT CLEAN WATER AWAY FROM CONSTRUCTION AREAS.
- THE FOREST CONSERVATION EASEMENT HAS BEEN ESTABLISHED TO FULFILL THE REQUIREMENTS OF SECTION 16.1200 OF THE HOWARD COUNTY CODE. NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION EASEMENT, HOWEVER, FOREST MANAGEMENT PRACTICES AS DEFINED IN THE DEED OF FOREST CONSERVATION EASEMENT ARE ALLOWED.

CONSTRUCTION PERIOD PROTECTION AND MANAGEMENT NOTES FOR FOREST CONSERVATION

- PRE-CONSTRUCTION PHASE  
1. FOR RETENTION AREAS, INSTALL BLAZE ORANGE FENCE AND RETENTION SIGNS BEFORE CONSTRUCTION BEGINS.  
2. FENCING SHALL BE MAINTAINED IN GOOD CONDITION AND PROMPTLY REPAIRED OR RESTORED AS THE SITUATION WARRANTS.  
3. A QUALIFIED TREE CARE EXPERT SHALL DETERMINE IF ROOT PRUNING IS REQUIRED ALONG THE LIMIT OF DISTURBANCE. ROOT PRUNE TREES AS REQUIRED, WATER ANY ROOT IMMEDIATELY AFTER ROOT-PRUNING AND MONITOR FOR SIGNS OF STRESS DURING CONSTRUCTION.
- CONSTRUCTION PHASE  
1. NO DISTURBANCE OR DUMPING IS ALLOWED INSIDE THE TREE RETENTION AREA.  
2. NO EQUIPMENT SHALL BE OPERATED INSIDE THE TREE RETENTION AREA INCLUDING TREE CANOPIES.  
3. THE LIMIT OF DISTURBANCE OF THE PROTECTED TREES SHALL BE MONITORED FOR SIGNS OF STRESS AND WATERED AS NEEDED.
- POST-CONSTRUCTION PHASE  
1. AT THE DIRECTION OF A QUALIFIED TREE CARE EXPERT, DAMAGES TO RETAINED TREES SHALL BE REPAIRED BY THE CONTRACTOR.  
2. FENCE REMOVAL AND STABILIZATION SHALL BE AS PER THE SEDIMENT AND EROSION CONTROL PLAN.  
3. DO NOT REMOVE SIGNS.



BLAZE ORANGE PLASTIC MESH  
TYPICAL TREE PROTECTION FENCE DETAIL  
ANY SPECIMEN TREE DESIGNATED AS TO REMAIN AND LOCATED WITHIN THE LIMITS OF DISTURBANCE SHALL BE PROTECTED WITH BLAZE ORANGE TREE PROTECTION FENCING.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
DATE: 11/23/20

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
DATE: 12-2-20

APPROVED: DIVISION OF LAND DEVELOPMENT  
DATE: 12/10/20

DEVELOPER'S/BUILDER'S CERTIFICATE

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A CERTIFICATION OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE (1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

SIGNATURE OF DEVELOPER  
DATE: 10/19/2020

SPECIMEN TREE CHART					
NO.	SIZE	CRZ	COMMON NAME	CONDITION	COMMENTS
ST 1	36.5"	54.75'	AMERICAN BEECH	GOOD CONDITION	TO BE REMOVED
ST 2	34.5"	51.75'	WHITE OAK	FAIR CONDITION, SOME LIMB DIEBACK NOTED. A BEER FEED STATION HAS BEEN ATTACHED TO THE TRUNK.	TO BE REMOVED

NOTE: THE DEVELOPER SHALL PLANT FOUR 2-1/2" MINIMUM CALIPER NATIVE SHADE TREES IN ADDITION TO THE REQUIRED PERIMETER LANDSCAPING TO MITIGATE THE REMOVAL OF THE TWO SPECIMEN TREES. FOR WP-18-015 APPROVED ON AUGUST 30, 2017, THE ADDITIONAL TREES ON ALL FUTURE SUBSEQUENT PLANS WILL BE INCLUDED. THESE TREES WILL BE BONDED ALONG WITH THE REQUIRED PERIMETER LANDSCAPING AS PART OF THE FINAL SUBDIVISION PLAN.

SPECIMEN TREE - REPLACEMENT CALCULATIONS			
NO. TO BE REMOVED	NO. REPLACEMENT REQUIRED	NO. PROVIDED	
2	4	4	2-1/2" CAL.

REFER TO WP-18-015 - 2-1/2" CALIPER NATIVE SHADE TREES REQUIRED SEE SHEET 1 GENERAL NOTE 44

SPECIMEN TREE REPLACEMENT - PLANTING SCHEDULE					
SYM.	KEY	QUAN.	BOTANICAL NAME	SIZE	CAT
⊙	WO	2	QUERCUS BICOLOR SWAMP WHITE OAK	2 1/2" CAL.	B & B
⊙	AB	2	ACER RUBRUM 'BOWHALL' BOWHALL RED MAPLE	2 1/2" CAL.	B & B

NOTE:  
-REPLACEMENT TREES REQUIRED PER THE APPROVED REMOVAL OF 2 SPECIMEN TREES REFER TO WP-18-015.  
-THE TOTAL SURETY OF \$1,200 FOR THE SPECIMEN TREE REPLACEMENT SHALL BE POSTED WITH THIS PLAN.

CATEGORY	PERIMETER LANDSCAPE EDGE					TOTAL
	1A	1B	2	3	4	
PERIMETER/FRONTAGE DESIGNATION	NONE	A	A	A	A	
LANDSCAPE TYPE	187	103	100	807	464	989
FRONTAGE/PERIMETER						
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET DESCRIBE BELOW IF NEEDED)	NO	NO	NO	YES 103 LF	NO	NO
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET DESCRIBE BELOW IF NEEDED)	NO	NO	NO	NO	NO	NO
NUMBER OF PLANTS REQUIRED			704 LF	1:60 8	1:60 16	919 LF
SHADE TREES	---	1:60 2	1:60 12	1:60 8	1:60 16	40
EVERGREEN TREES	---	---	---	---	---	---
SHRUBS	---	---	---	---	---	---
CREDIT FOR EX. INDIVIDUAL TREES						
SHADE TREES TO REMAIN	---	---	---	---	---	---
EVERGREEN TREES TO REMAIN	---	---	---	---	---	---
NUMBER OF PLANTS PROVIDED				12	8	16
SHADE TREES	---	---	---	---	---	36
EVERGREEN TREES	---	---	---	---	---	---
OTHER TREES (2:1 SUBSTITUTION) SHRUBS (10:1 SUBSTITUTION)	---	4	4	---	---	8

PERIMETER LANDSCAPE SCHEDULE - REQUIRED PLANTING

SYM	KEY	QUAN.	BOTANICAL NAME	SIZE	CAT
SHADE					
⊙	HL	9	GLEDITSIA TRIACANTHOS INERMIS 'IMPERIAL' IMPERIAL THRONLESS HONEY LOCUST	2 1/2"-3" CAL.	B & B
⊙	PO	27	QUERCUS PALUSTRIS PIN OAK	2 1/2"-3" CAL.	B & B
ORNAMENTAL					
⊙	CM(1)	8	LAGERSTROMIA INDICA CRAPEMYRTLE (BGE COMPLIANT)	6-8" HT.	B & B

NOTE: WITH PERMISSION FROM HOWARD COUNTY, PLANTINGS SPECIFIED HEREON MAY BE SUBSTITUTED WITH APPROVED SPECIES LISTED IN APPENDIX B & C OF THE HOWARD COUNTY LANDSCAPE MANUAL.  
(1) BGE COMPLIANT

LANDSCAPE SCHEDULE NOTE:

- ALL PLANT MATERIALS SHALL BE FULL AND HEAVY, BE WELL FORMED AND SYMMETRICAL, CONFORM TO THE MOST CURRENT AAN SPECIFICATIONS AND BE INSTALLED IN ACCORDANCE WITH HRD PLANTING SPECIFICATIONS.
- CONTRACTOR SHALL VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DIGGING.
- FINAL LOCATION OF PLANT MATERIAL MAY NEED TO VARY TO MEET FINAL FIELD CONDITIONS. TREES SHALL NOT BE PLANTED IN THE BOTTOM OF DRAINAGE SWALES.
- CONTRACTOR SHALL VERIFY PLANT QUANTITIES PRIOR TO BIDDING. IF PLAN DIFFERS FROM LANDSCAPE SCHEDULE, THE PLAN SHALL GOVERN.

OWNER/DEVELOPER

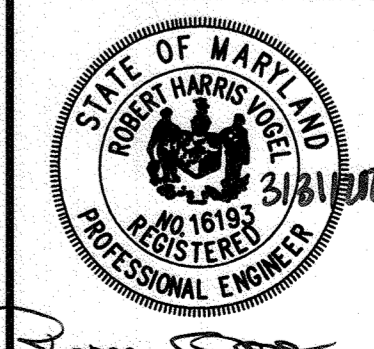
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DR., SUITE 110  
COLUMBIA, MD 21046  
ATTN: PETER ENGEL  
(410) 313-6316

NO.	REVISION	DATE

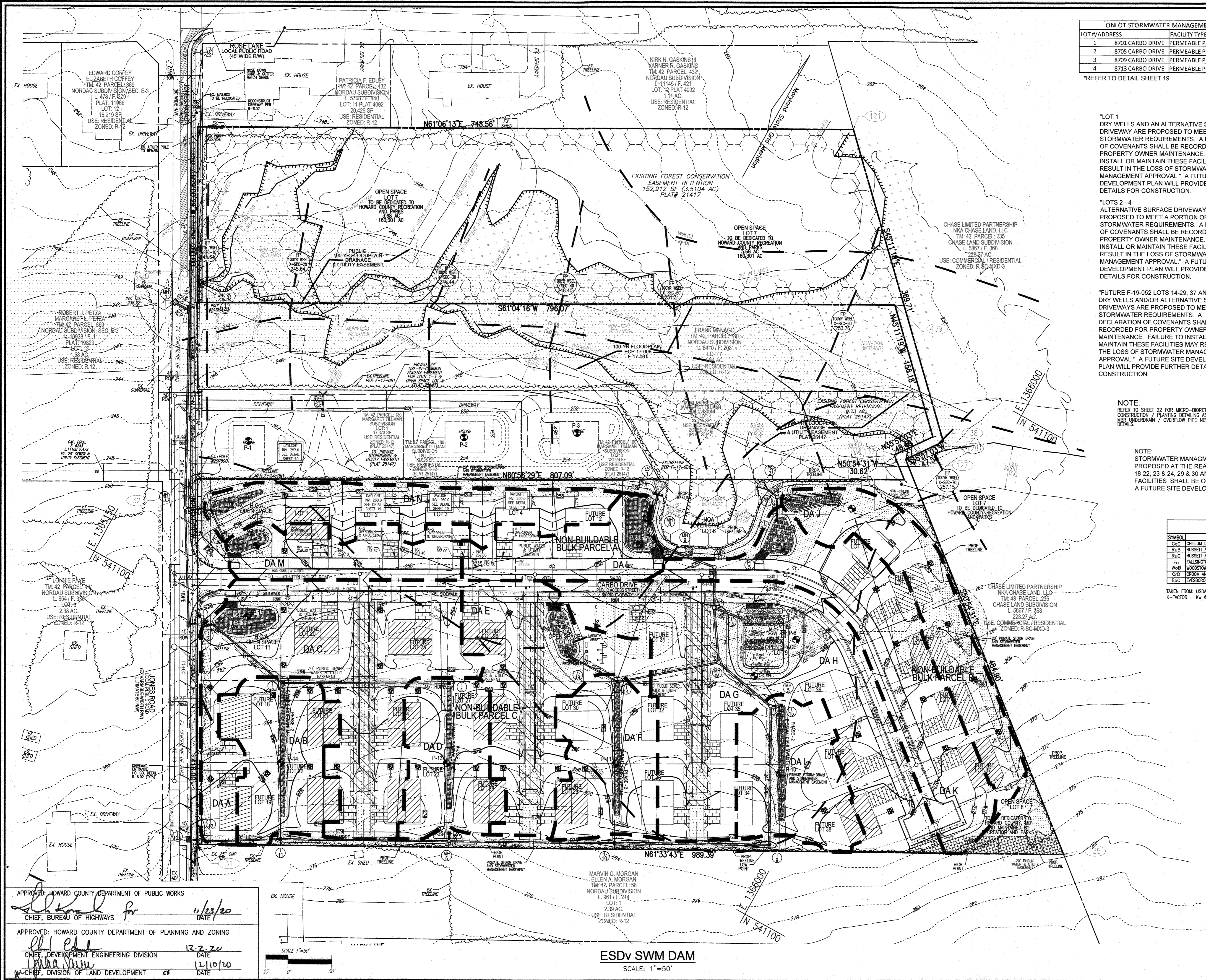
FINAL ROAD CONSTRUCTION PLAN  
LANDSCAPE & FOREST  
CONSERVATION PLAN - NOTES AND DETAILS  
GREENWOOD VILLAGE - PHASE 1

LOTS 1-4, NON BUILDABLE BULK PARCELS A-C  
AND OPEN SPACE LOTS 5-11  
A RE-SUBDIVISION OF THE NORDAU SUBDIVISION - SECTION E-4  
LOTS 2-4 (P.B. 3/51), 5R (L16288 F.468), 8R (L16288 F.502) AND 9 (P.B. 3/51)  
TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140  
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ZONED: R-12  
**VOGEL ENGINEERING**  
**TIMMONS GROUP**  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com



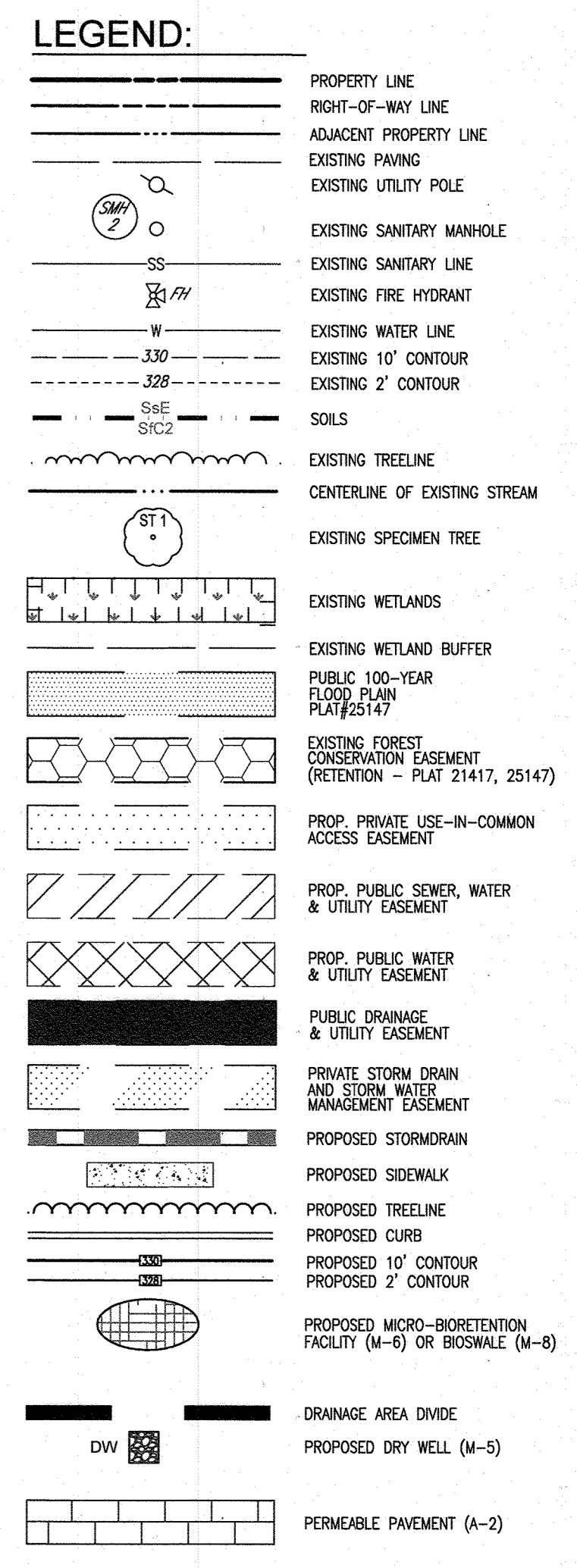
DESIGN BY: RHW  
DRAWN BY: VETG  
CHECKED BY: RHW  
DATE: MARCH 2020  
SCALE: AS SHOWN  
W.O. NO.: 12-05  
PROFESSIONAL CERTIFICATE  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. MY EXPIRATION DATE IS 09-27-2020  
17 SHEET OF 23



**ONLOT STORMWATER MANAGEMENT PRACTICE CHART**

LOT #/ADDRESS	FACILITY TYPE
1 8701 CARBO DRIVE	PERMEABLE PAVEMENT (A-2), DRYWELL (M-5)
2 8705 CARBO DRIVE	PERMEABLE PAVEMENT (A-2)
3 8709 CARBO DRIVE	PERMEABLE PAVEMENT (A-2)
4 8713 CARBO DRIVE	PERMEABLE PAVEMENT (A-2)

\*REFER TO DETAIL SHEET 19



"LOT 1 DRY WELLS AND AN ALTERNATIVE SURFACE DRIVEWAY ARE PROPOSED TO MEET ESD STORMWATER REQUIREMENTS. A DECLARATION OF COVENANTS SHALL BE RECORDED FOR PROPERTY OWNER MAINTENANCE. FAILURE TO INSTALL OR MAINTAIN THESE FACILITIES MAY RESULT IN THE LOSS OF STORMWATER MANAGEMENT APPROVAL." A FUTURE SITE DEVELOPMENT PLAN WILL PROVIDE FURTHER DETAILS FOR CONSTRUCTION.

"LOTS 2 - 4 ALTERNATIVE SURFACE DRIVEWAYS ARE PROPOSED TO MEET A PORTION OF THE ESD STORMWATER REQUIREMENTS. A DECLARATION OF COVENANTS SHALL BE RECORDED FOR PROPERTY OWNER MAINTENANCE. FAILURE TO INSTALL OR MAINTAIN THESE FACILITIES MAY RESULT IN THE LOSS OF STORMWATER MANAGEMENT APPROVAL." A FUTURE SITE DEVELOPMENT PLAN WILL PROVIDE FURTHER DETAILS FOR CONSTRUCTION.

"FUTURE F-19-052 LOTS 14-29, 37 AND 38 HAVE DRY WELLS AND/OR ALTERNATIVE SURFACE DRIVEWAYS ARE PROPOSED TO MEET ESD STORMWATER REQUIREMENTS. A DECLARATION OF COVENANTS SHALL BE RECORDED FOR PROPERTY OWNER MAINTENANCE. FAILURE TO INSTALL OR MAINTAIN THESE FACILITIES MAY RESULT IN THE LOSS OF STORMWATER MANAGEMENT APPROVAL." A FUTURE SITE DEVELOPMENT PLAN WILL PROVIDE FURTHER DETAILS FOR CONSTRUCTION.

NOTE: REFER TO SHEET 22 FOR MICRO-BIORETENTION CONSTRUCTION / PLANTING DETAILING AS WELL AS MFR UNDERDRAIN / OVERFLOW PIPE NETWORK DETAIL.

NOTE: STORMWATER MANAGEMENT BIOSWALES ARE PROPOSED AT THE REAR OF FUTURE LOTS 18-22, 23 & 24, 29 & 30 AND 34 & 35. THESE FACILITIES SHALL BE CONSTRUCTED UNDER A FUTURE SITE DEVELOPMENT PLAN.

**SOILS LEGEND**  
HOWARD COUNTY SOILS MAP #24

SYMBOL	NAME / DESCRIPTION	HYDRO GROUP	K FACTOR	<10% SLOPE PERCENT
C4c	CHILLUM LOAM, 5 TO 10 PERCENT SLOPES	NO	B	0.43
R4b	RUSSETT AND BELTSVILLE SOILS, 2 TO 5 PERCENT SLOPES	NO	C	0.43
R4c	RUSSETT AND BELTSVILLE SOILS, 5 TO 10 PERCENT SLOPES	NO	C	0.43
F4	FALLSINGTON SANDY LOAM, 0 TO 2 PERCENT SLOPES	YES	D	0.24
W4b	WOODSTOWN SANDY LOAM, 2 TO 5 PERCENT SLOPES	YES	C	0.32
C4d	CROOM AND EYEBORO SOILS, 10 TO 15 PERCENT SLOPES	NO	C	0.37
E4c	EYEBORO LOAMY SAND, 2 TO 10 PERCENT SLOPES	NO	A	0.15

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY, MD  
NOTE: HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT  
K-FACTOR =  $K_w @ 0-4" \text{ DEPTH}$

**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATENT WOODS DR., SUITE 100  
COLUMBIA, MD 21046  
ATTN: PETER ENGEL  
(410) 313-6316

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
ESDv STORMWATER MANAGEMENT  
DRAINAGE AREA MAP  
**GREENWOOD VILLAGE - PHASE 1**  
LOTS 1-4, NON-BUILDABLE BULK PARCELS A-C  
AND OPEN SPACE LOTS 5-11  
A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4  
LOTS 2-4 (P.B. 3/51), 5R (L16288 F.488), 8R (L16288 F.502) AND 9 (P.B. 3/51)  
TAX MAP: 42 GRID: 24  
8TH ELECTION DISTRICT  
ZONED: R-12  
PARCEL: 136 & 138-140  
HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
**TIMMONS GROUP**  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com

PROFESSIONAL CERTIFICATE

DESIGN BY: RHY  
DRAWN BY: VETG  
CHECKED BY: RHY  
DATE: MARCH 2020  
SCALE: AS SHOWN  
W.O. NO.: 12-05

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED BY APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 09-27-2020

18 SHEET OF 23

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
CHIEF, BUREAU OF HIGHWAYS  
11/23/20

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
12-7-20

CHIEF, DIVISION OF LAND DEVELOPMENT  
12/10/20

**ESDv SWM DAM**  
SCALE: 1"=50'

APPENDIX B.4.C SPECIFICATIONS FOR MICRO-BIORETENTION, RAIN GARDEN, LANDSCAPE INFILTRATION & INFILTRATION BERMS

- 1. MATERIAL SPECIFICATIONS
THE ALLOWED 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 DAMPED WITH THE MICRO-BIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH...

MICROBIORETENTION NOTES:

- 1. ONLY THE SIDES OF MICRO BIORETENTION ARE TO BE WRAPPED IN FILTER FABRIC, FABRIC BETWEEN LAYER OR AT THE BOTTOM OF THE MICRO-BIORETENTION WILL CAUSE THE MIER TO FAIL, AND THEREFORE SHALL NOT BE INSTALLED.
2. WRAP THE PERFORATED MBR UNDERDRAIN PIPE WITH 1/4" MESH (4x4) OR SMALLER GALVANIZED HARDWARE CLOTH, SEE APPENDIX B.4.C.6.
3. PROVIDE 3" MINIMUM SPACING BETWEEN UNDER DRAIN AND PERFORATED PIPE THROUGH STONE RESERVOIR OR SPACES SHALL BE EQUALY ACROSS BOTTOM FOR SMALL BIOS.

BIORETENTION (UNDERDRAIN) (F-6) AND MICRO-BIORETENTION (UNDERDRAIN) (M-6) NOT TO SCALE

BIORETENTION (OVERFLOW) (F-6) AND MICRO-BIORETENTION (OVERFLOW) (M-6) NOT TO SCALE

GREENWOOD VILLAGE - MEASURED SUBAREA - ESDv COMPUTATIONS

Table with columns: SITE DEVELOPABLE AREA, TARGET PERCENT, ESDv COMPUTATIONS (DA, IMPERV, PERM, GREEN, VOLUME, etc.), and REMARKS.

GREENWOOD VILLAGE - MEASURED SUBAREA - ESDv COMPUTATIONS

Table with columns: MATERIAL, SPECIFICATION, QUANTITY, and UNIT. Lists materials like mulch, gravel, pipe, fabric, etc.

OPERATION AND MAINTENANCE SCHEDULE FOR LANDSCAPE INFILTRATION (M-3), MICRO-BIORETENTION (M-5), RAIN GARDENS (M-7), BIORETENTION SWALE (M-8), ENHANCED FILTERS (M-9) AND BIORETENTION (F-6)

- 1. 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 PRUNING.
2. REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARKLAND STORMWATER DESIGN MANUAL, VOLUME 1, TABLE A.4.1 AND 2.

Table with columns: G & H, I, J, K, L, M, N, PROJECT TOTALS. Contains ESDv data for various subareas and project totals.

Appendix B.4. Construction Specifications for Environmental Site Design Practices

Table B.4.1 Materials Specifications for Micro-Bioretenion, Rain Gardens & Landscape Infiltration. Lists materials like mulch, gravel, pipe, fabric, etc. with specifications.

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED PERMEABLE PAVEMENT (A-2)

- 1. THE OWNER SHALL PERIODICALLY SWEEP (OR VACUUM POROUS CONCRETE PAVEMENT) THE PAVEMENT SURFACES TO REMOVE DEBRIS AND ENSURE CONTINUED SURFACE POROSITY. SWEEPING SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY WITH A COMMERCIAL CLEANING UNIT. WASHING SYSTEMS AND COMPRESSED AIR UNITS SHOULD NOT BE USED TO PERFORM SURFACE CLEANING.

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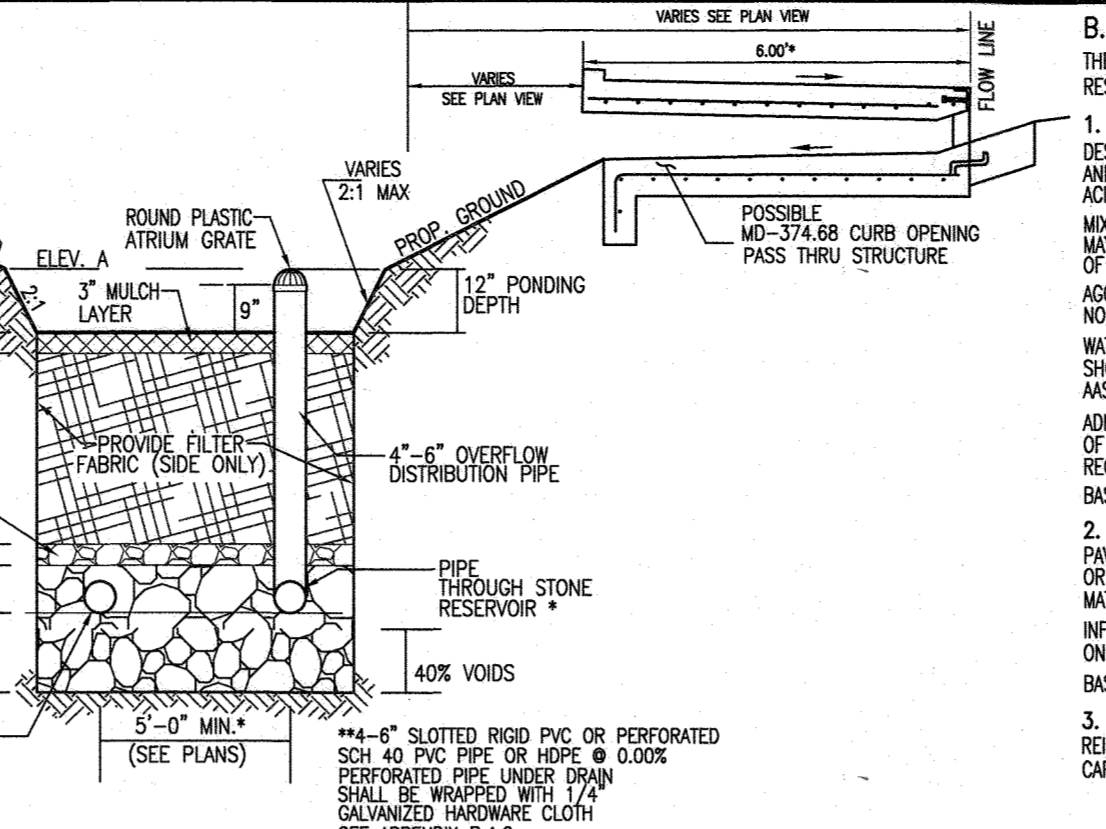
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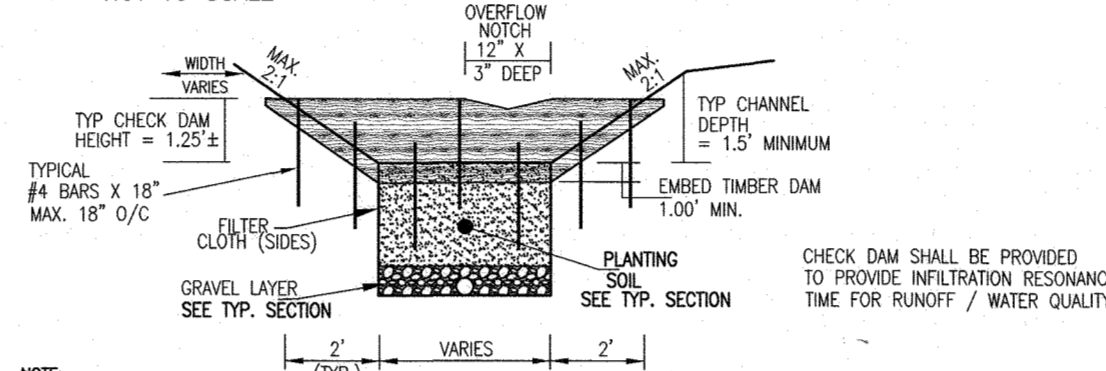
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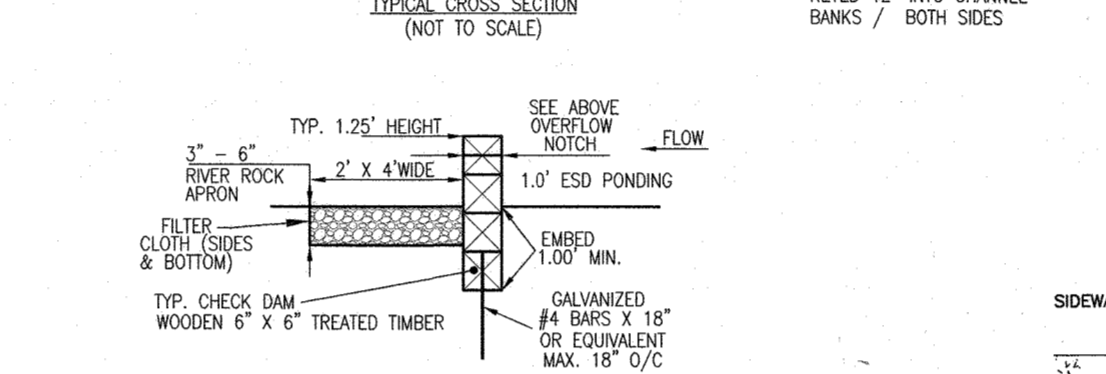
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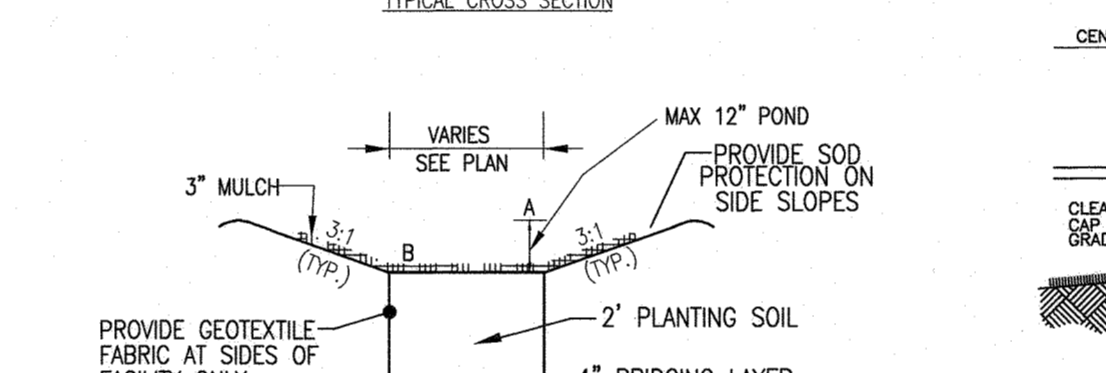
BIO-SWALE CHECK DAM - VIEW 1 (NOT TO SCALE)



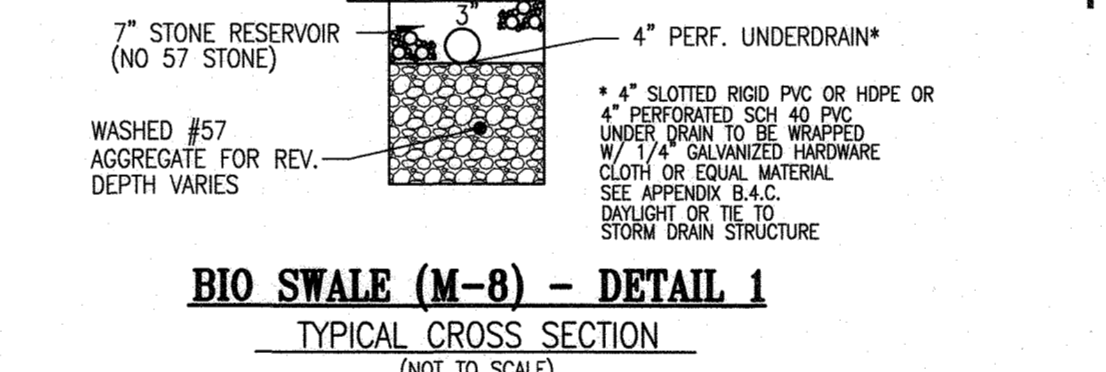
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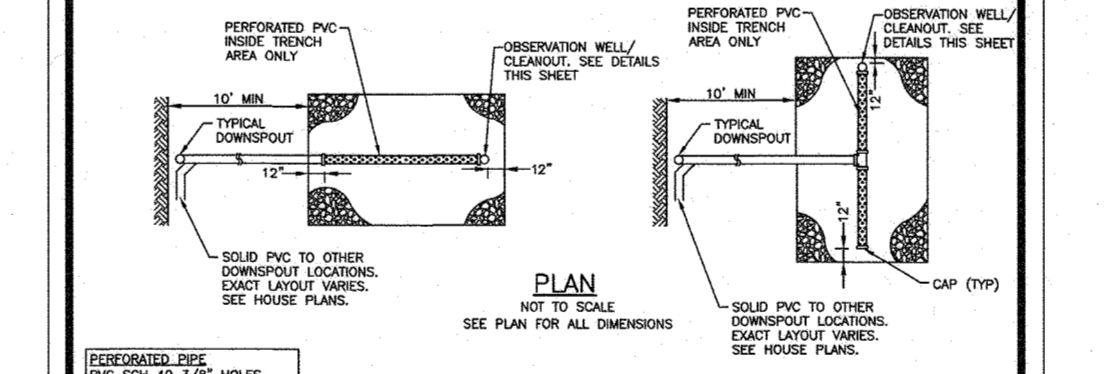
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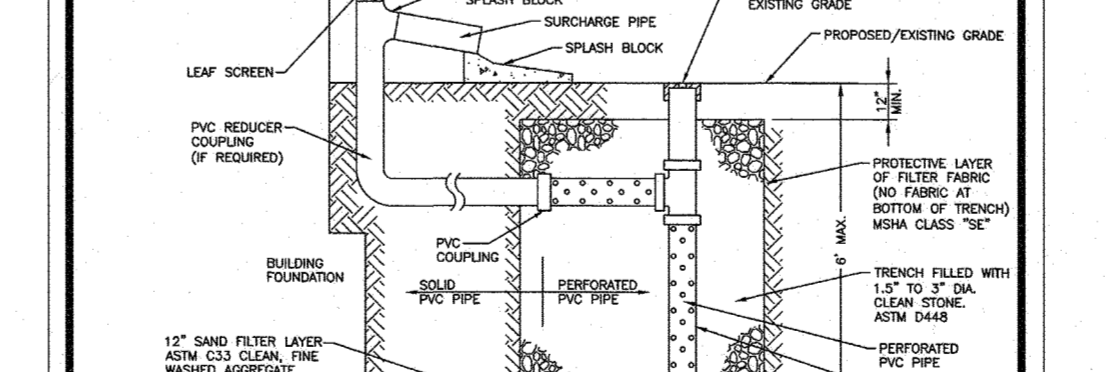
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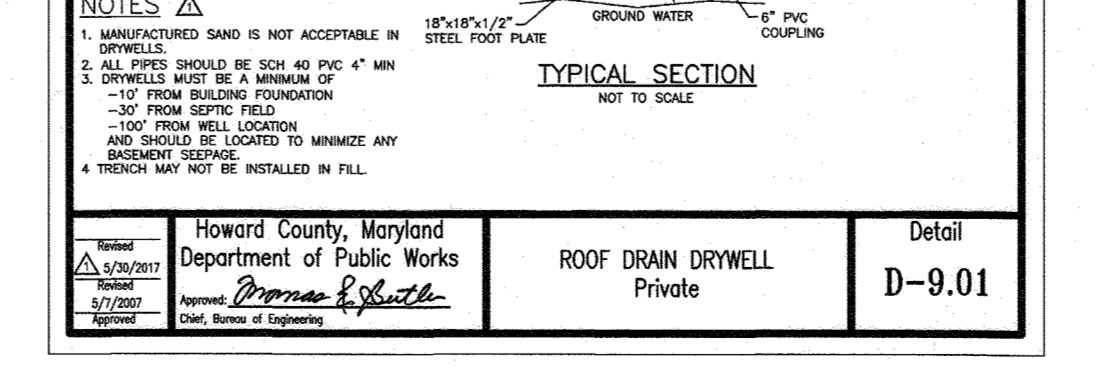
BIO-SWALE CHECK DAM - VIEW 1 (NOT TO SCALE)



BIO-SWALE CHECK DAM - VIEW 2 (NOT TO SCALE)



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BIO-SWALE CHECK DAM - VIEW 2 (NOT TO SCALE)

B.4.B SPECIFICATIONS FOR PERMEABLE PAVEMENTS & REINFORCED TURF

- 1. PERVIOUS CONCRETE SPECIFICATIONS
DESIGN THICKNESS - PERVIOUS CONCRETE APPLICATIONS SHALL BE DESIGNED SO THAT THE THICKNESS OF THE CONCRETE SLAB SUPPORTING THE TRAFFIC AND VEHICLE TYPES THAT WILL BE CARRIED, APPLICATIONS MAY BE DESIGNED USING EITHER STANDARD PAVEMENT PROCEDURES (E.G., MSHTD. A2.325R).

- 2. PERMEABLE INTERLOCKING CONCRETE PAVEMENTS (PICP)
PAVER BLOCKS - BLOCKS SHOULD BE EITHER 3" IN. OR 4" IN. THICK, AND MEET ASTM C 936 OR CSA A231.2 REQUIREMENTS. APPLICATIONS SHOULD HAVE 20% OR MORE (40% PREFERRED) OF THE SURFACE AREA OPEN. INSTALLATION SHOULD FOLLOW MANUFACTURER'S INSTRUCTIONS, EXCEPT THAT INFILL AND BASE COURSE MATERIALS AND DIMENSIONS SPECIFIED IN THIS APPENDIX SHALL BE FOLLOWED.

- 3. REINFORCED TURF
REINFORCED GRASS PAVEMENT (RGP) - WHETHER USED WITH GRASS OR GRAVEL, THE RGP THICKNESS SHALL BE AT LEAST 1-3/4" THICK WITH A LOAD CAPACITY CAPABLE OF SUPPORTING THE TRAFFIC AND VEHICLE TYPES THAT WILL BE CARRIED.

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- 2. THE OWNER SHALL PERIODICALLY CLEAN DRAINAGE PIPES, INLETS, STONE EDGE DRAINS AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SURFACE.

- 3. THE OWNER SHALL USE DECKERS IN MAINTENANCE OPERATIONS THAT SHALL BE NON-TOXIC AND BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PREPARED SALT. SNOW PLOWING SHALL BE DONE CAREFULLY WITH BLADES SET ONE-INCH HIGHER THAN NORMAL FLOWED SNOW PILES AND SNOW MELT SHOULD NOT BE DIRECTED TO PERMEABLE PAVEMENT.

- 4. UNDERDRAIN SHALL COMBINE WITH UNDERDRAIN OR DAYLIGHT SEPARATELY.

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- 3. THE OWNER SHALL USE DECKERS IN MAINTENANCE OPERATIONS THAT SHALL BE NON-TOXIC AND BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PREPARED SALT. SNOW PLOWING SHALL BE DONE CAREFULLY WITH BLADES SET ONE-INCH HIGHER THAN NORMAL FLOWED SNOW PILES AND SNOW MELT SHOULD NOT BE DIRECTED TO PERMEABLE PAVEMENT.

- 4. UNDERDRAIN SHALL COMBINE WITH UNDERDRAIN OR DAYLIGHT SEPARATELY.

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED PERMEABLE PAVEMENT (A-2)

- 1. THE OWNER SHALL PERIODICALLY SWEEP (OR VACUUM POROUS CONCRETE PAVEMENT) THE PAVEMENT SURFACES TO REMOVE DEBRIS AND ENSURE CONTINUED SURFACE POROSITY. SWEEPING SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY WITH A COMMERCIAL CLEANING UNIT. WASHING SYSTEMS AND COMPRESSED AIR UNITS SHOULD NOT BE USED TO PERFORM SURFACE CLEANING.

- 2. THE OWNER SHALL PERIODICALLY CLEAN DRAINAGE PIPES, INLETS, STONE EDGE DRAINS AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SURFACE.

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- 4. UNDERDRAIN SHALL COMBINE WITH UNDERDRAIN OR DAYLIGHT SEPARATELY.

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED PERMEABLE PAVEMENT (A-2)

- 1. THE OWNER SHALL PERIODICALLY SWEEP (OR VACUUM POROUS CONCRETE PAVEMENT) THE PAVEMENT SURFACES TO REMOVE DEBRIS AND ENSURE CONTINUED SURFACE POROSITY. SWEEPING SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY WITH A COMMERCIAL CLEANING UNIT. WASHING SYSTEMS AND COMPRESSED AIR UNITS SHOULD NOT BE USED TO PERFORM SURFACE CLEANING.

- 2. THE OWNER SHALL PERIODICALLY CLEAN DRAINAGE PIPES, INLETS, STONE EDGE DRAINS AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SURFACE.

- 3. THE OWNER SHALL USE DECKERS IN MAINTENANCE OPERATIONS THAT SHALL BE NON-TOXIC AND BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PREPARED SALT. SNOW PLOWING SHALL BE DONE CAREFULLY WITH BLADES SET ONE-INCH HIGHER THAN NORMAL FLOWED SNOW PILES AND SNOW MELT SHOULD NOT BE DIRECTED TO PERMEABLE PAVEMENT.

- 4. UNDERDRAIN SHALL COMBINE WITH UNDERDRAIN OR DAYLIGHT SEPARATELY.

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED PERMEABLE PAVEMENT (A-2)

- 1. THE OWNER SHALL PERIODICALLY SWEEP (OR VACUUM POROUS CONCRETE PAVEMENT) THE PAVEMENT SURFACES TO REMOVE DEBRIS AND ENSURE CONTINUED SURFACE POROSITY. SWEEPING SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY WITH A COMMERCIAL CLEANING UNIT. WASHING SYSTEMS AND COMPRESSED AIR UNITS SHOULD NOT BE USED TO PERFORM SURFACE CLEANING.

- 2. THE OWNER SHALL PERIODICALLY CLEAN DRAINAGE PIPES, INLETS, STONE EDGE DRAINS AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SURFACE.

- 3. THE OWNER SHALL USE DECKERS IN MAINTENANCE OPERATIONS THAT SHALL BE NON-TOXIC AND BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PREPARED SALT. SNOW PLOWING SHALL BE DONE CAREFULLY WITH BLADES SET ONE-INCH HIGHER THAN NORMAL FLOWED SNOW PILES AND SNOW MELT SHOULD NOT BE DIRECTED TO PERMEABLE PAVEMENT.

- 4. UNDERDRAIN SHALL COMBINE WITH UNDERDRAIN OR DAYLIGHT SEPARATELY.

A-2. PERMEABLE PAVEMENTS

CONSTRUCTION CRITERIA:

- THE FOLLOWING ITEMS SHOULD BE ADDRESSED DURING CONSTRUCTION OF PROJECTS WITH PERMEABLE PAVEMENT:
- EROSION AND SEDIMENT CONTROL: FINAL GRADING FOR INSTALLATION SHOULD NOT TAKE PLACE UNTIL THE SURROUNDING SITE IS STABILIZED. IF THIS CANNOT BE ACCOMPLISHED, RUNOFF FROM DISTURBED AREAS SHALL BE DIVERTED AROUND PROPOSED PAVEMENT LOCATIONS.

- REGULAR INSPECTIONS SHALL BE MADE DURING THE FOLLOWING STAGES OF CONSTRUCTION:
- DURING EXCAVATION TO SUB GRADE
- DURING PLACEMENT AND BACKFILL OF ANY DRAINAGE OR DISTRIBUTION SYSTEMS)
- DURING PLACEMENT OF THE CRUSHED STONE SUBBASE MATERIAL.
- DURING PLACEMENT OF THE SURFACE MATERIAL.
UPON COMPLETION OF FINAL GRADING AND ESTABLISHMENT OF PERMANENT STABILIZATION.

MAINTENANCE CRITERIA:

- THE FOLLOWING PROCEDURES SHOULD BE CONSIDERED ESSENTIAL FOR MAINTAINING PERMEABLE PAVEMENT SYSTEMS:
- PAVEMENTS SHOULD BE USED ONLY WHERE REGULAR MAINTENANCE CAN BE PERFORMED. MAINTENANCE AGREEMENTS SHOULD SPECIFY HOW TO CONDUCT ROUTINE TASKS TO ENSURE LONG-TERM PERFORMANCE.

- DRAINAGE PIPES, INLETS, STONE EDGE DRAINS, AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SURFACE SHOULD BE CLEANED OUT AT REGULAR INTERVALS.
- TRUCKS AND OTHER HEAVY VEHICLES CAN GRIND DIRT AND GRIT INTO THE POROUS SURFACES, LEADING TO CLOGGING AND PREMATURE FAILURE. THESE VEHICLES SHOULD BE PREVENTED FROM TRACKING AND SPLILING MATERIAL ONTO THE PAVEMENT.

- DECKERS SHOULD BE USED IN MAINTENANCE, WHEN USED, DECKERS SHOULD BE NON-TOXIC AND ORGANIC AND CAN BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PREPARED SALT. SNOW PLOWING SHALL BE DONE CAREFULLY WITH BLADES SET ONE-INCH HIGHER THAN NORMAL FLOWED SNOW PILES AND SNOW MELT SHOULD NOT BE DIRECTED TO PERMEABLE PAVEMENT.

- 1. PAVEMENT CROSS SECTION/THICKNESS TO BE CONFIRMED BY GEOTECHNICAL ENGINEER
2. UNDERDRAIN SHALL BE LOCATED SUCH THAT IT CAN DAYLIGHT.
3. OVERDRAIN SHALL COMBINE WITH UNDERDRAIN OR DAYLIGHT SEPARATELY
4. AN UNDERDRAIN COMBINE SHALL BE PROVIDED ON THE HIGH AND LOW SIDE OF THE DRIVEWAY

DETAIL - PERMEABLE CONCRETE DRIVEWAY - 5% OR LESS

NOT TO SCALE
\*ALL PERMEABLE CONCRETE THICKNESS, MIX AND SUB-BASE TO BE DETERMINED BY GEOTECHNICAL ENGINEER ONSITE.

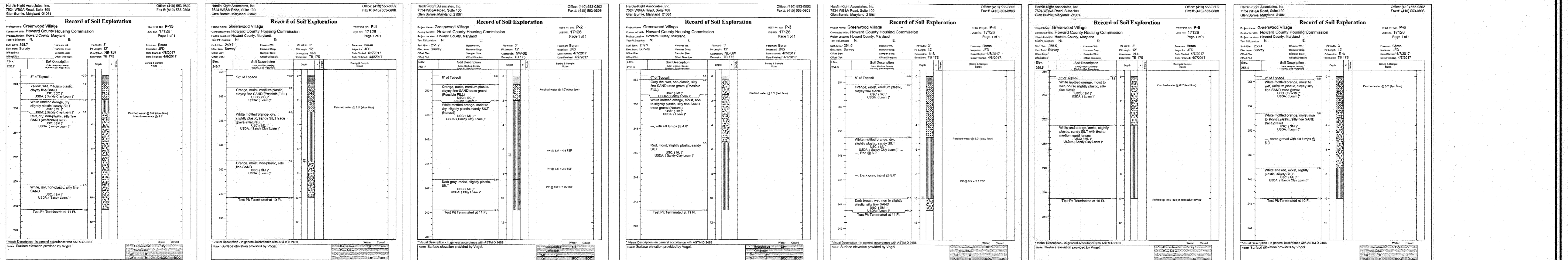
Table with columns: LOT#, UNDERDRAIN MIN. INVERT, PERMEABLE SURFACE UNDERDRAIN OUTFALL, and OUTFALL LOCATION.

OWNER/DEVELOPER
HOWARD COUNTY HOUSING COMMISSION
9770 PATUXENT WOODS DR., SUITE 100
COLUMBIA, MD 21046
ATTN: PETER GENG
(410) 313-6316

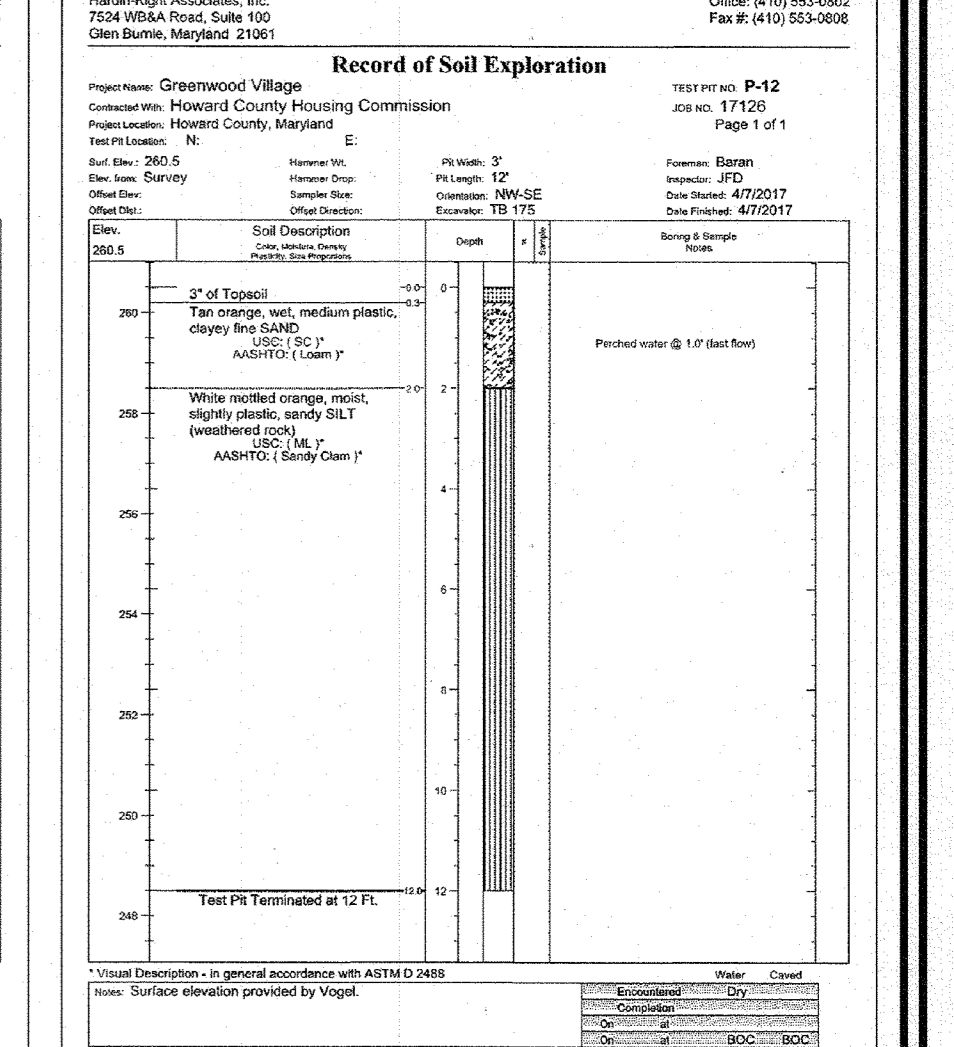
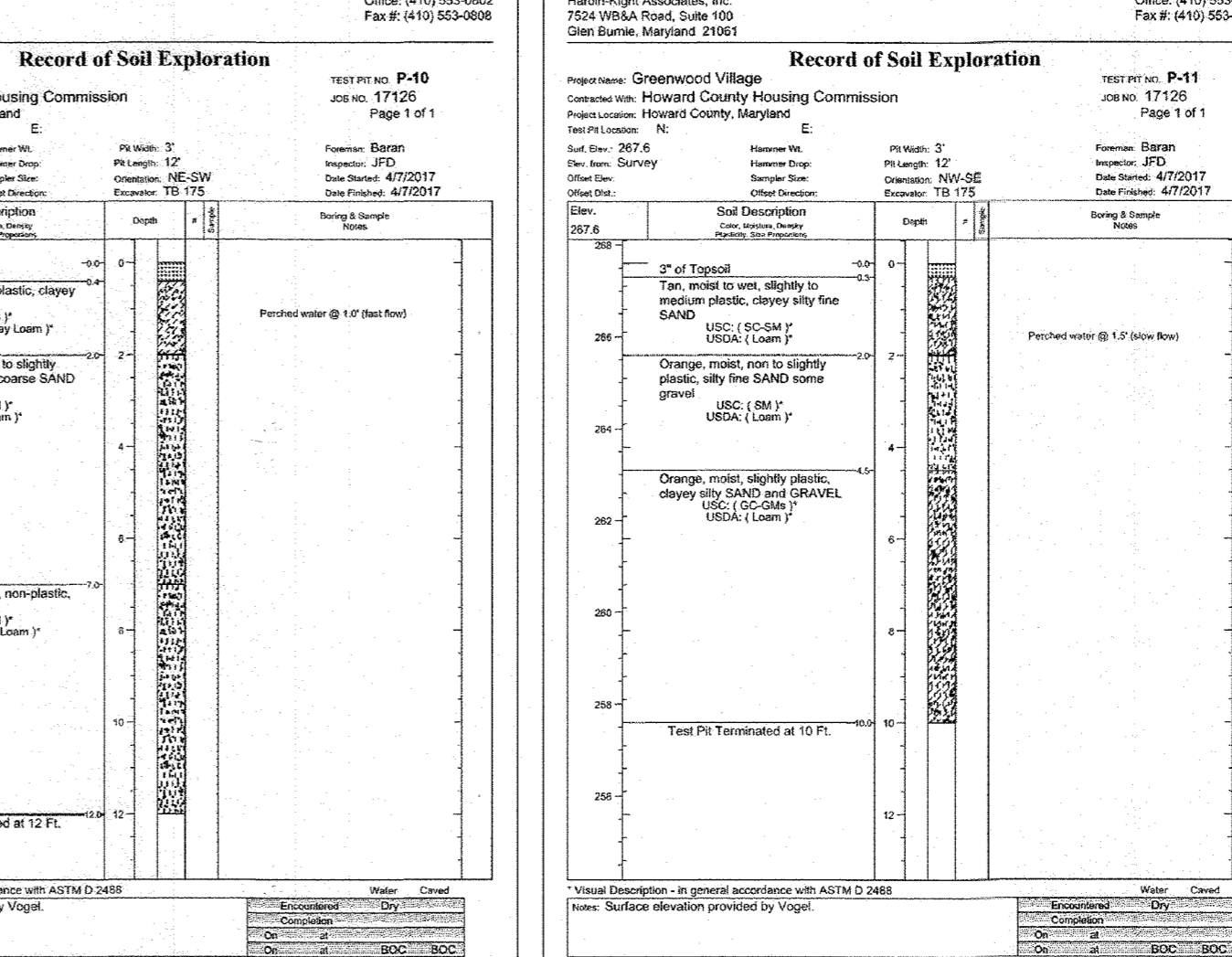
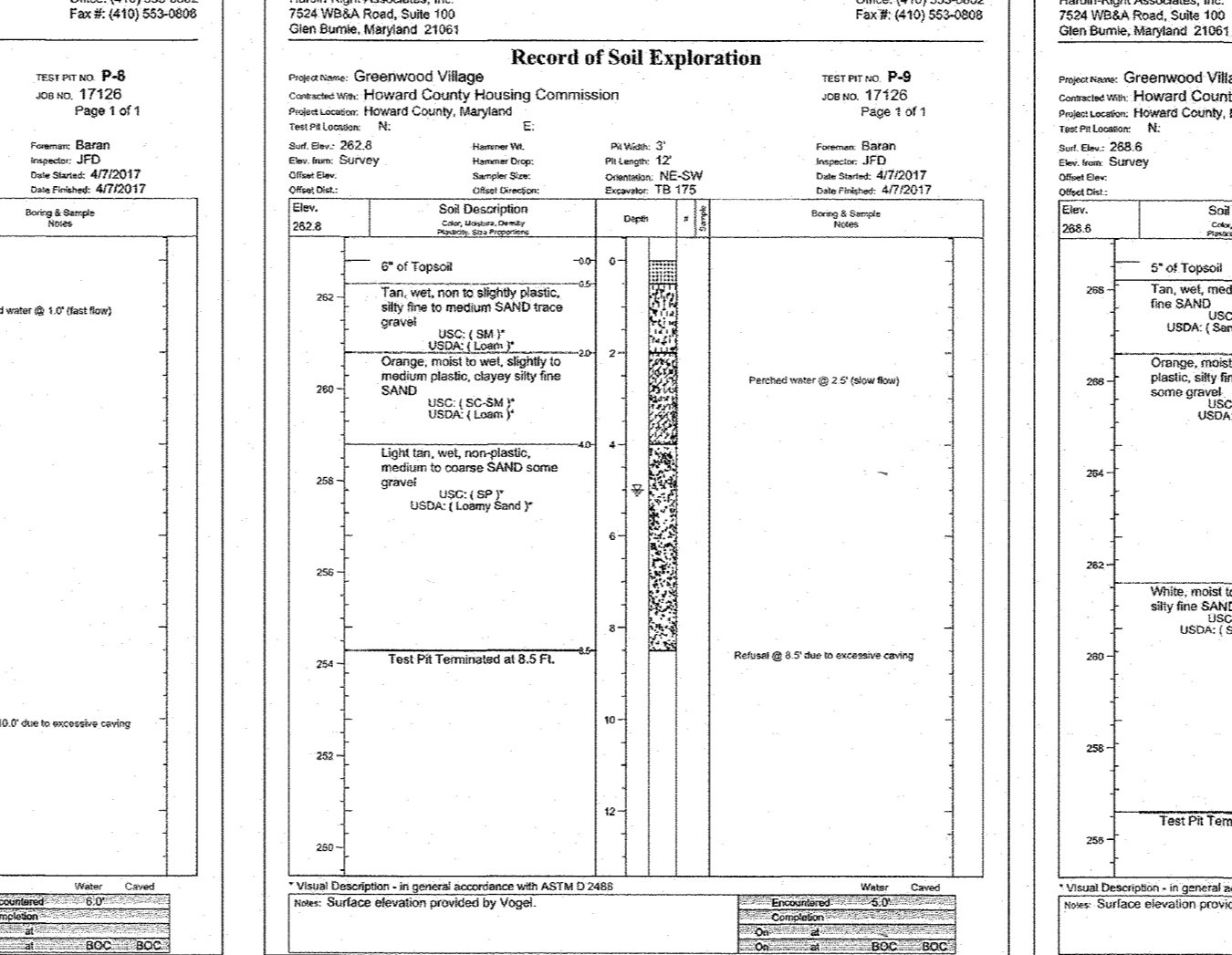
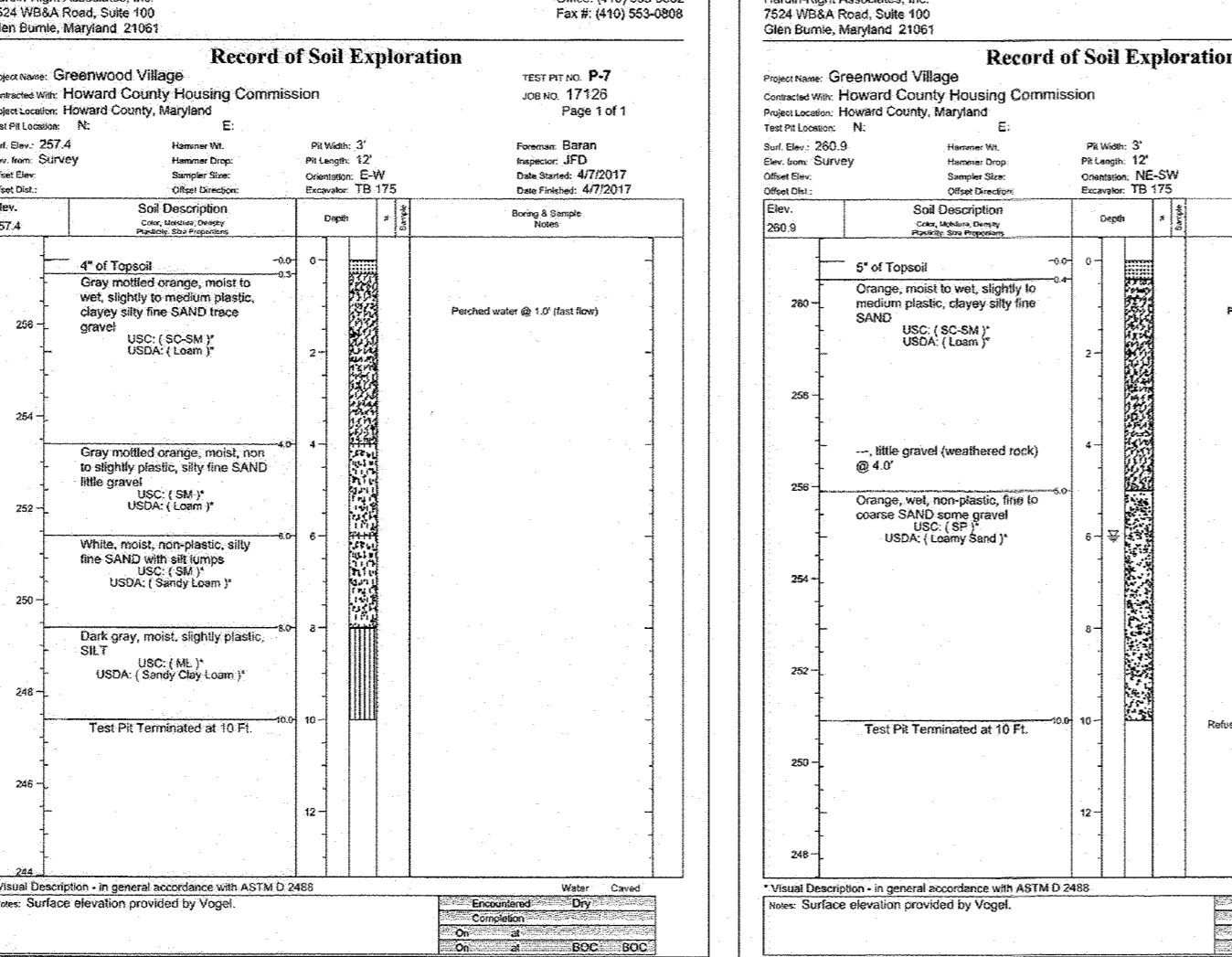
Table with columns: NO., REVISION, and DATE.

FINAL ROAD CONSTRUCTION PLAN ESDv STORMWATER MANAGEMENT

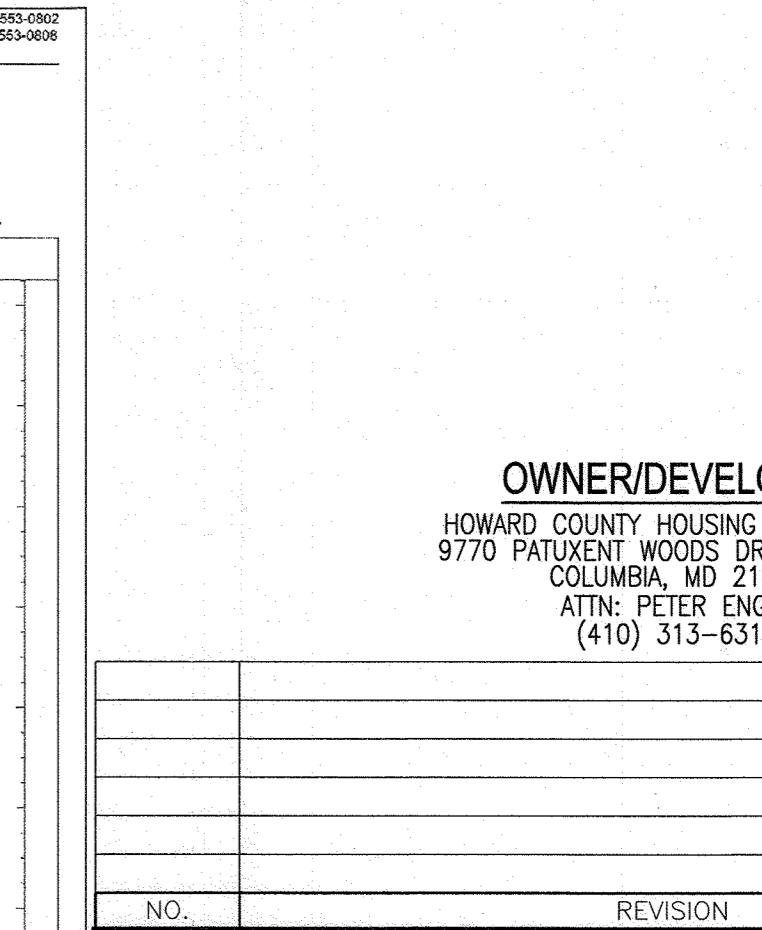
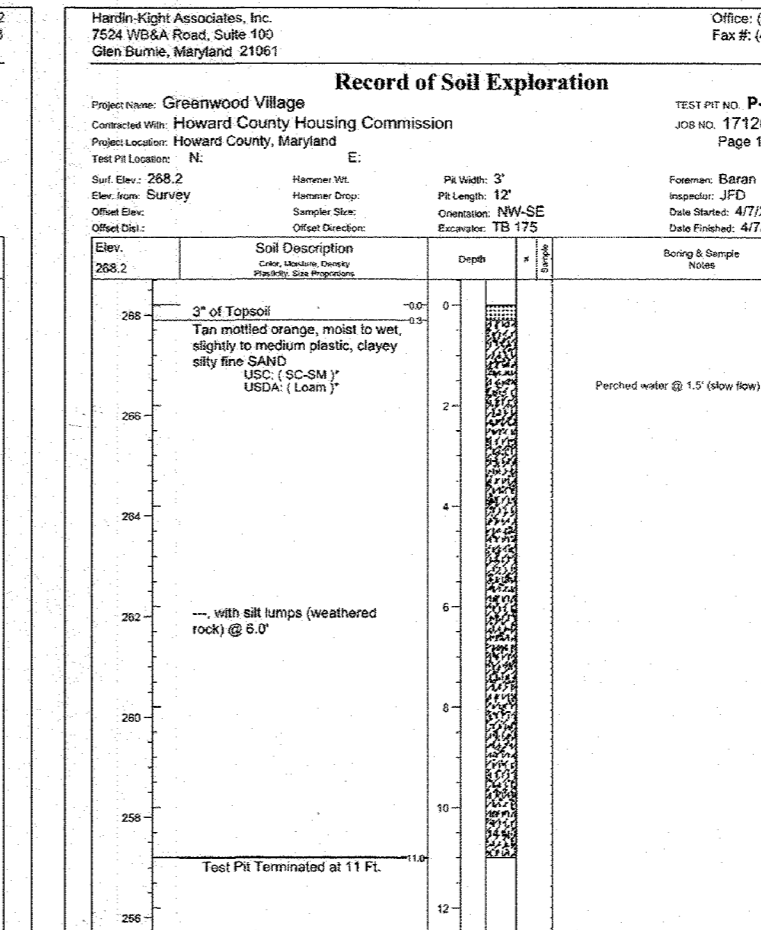
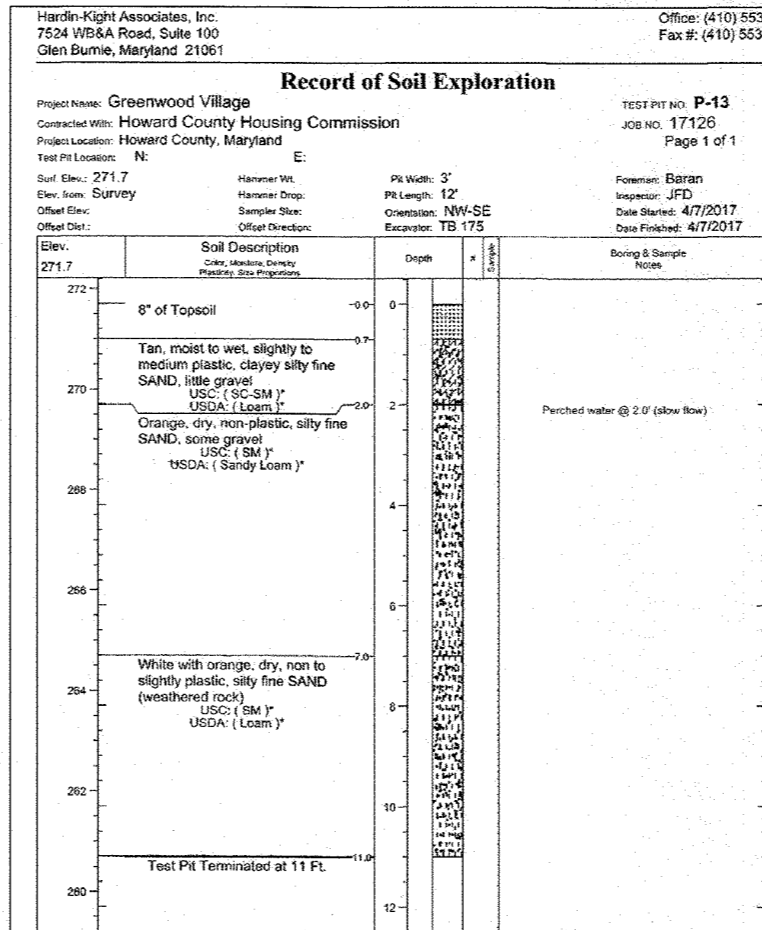
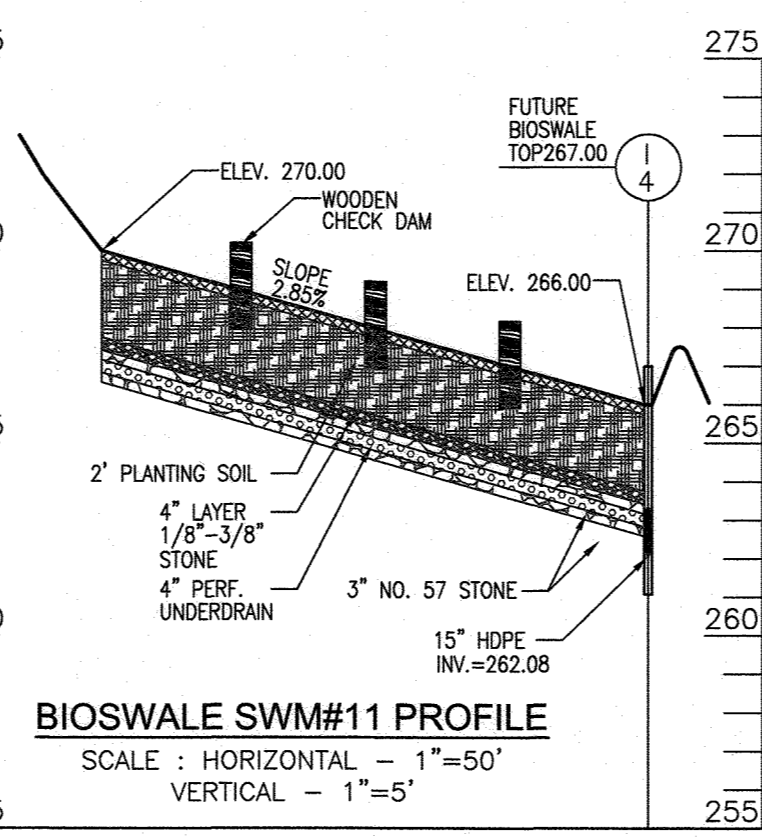
TEST PIT LOGS



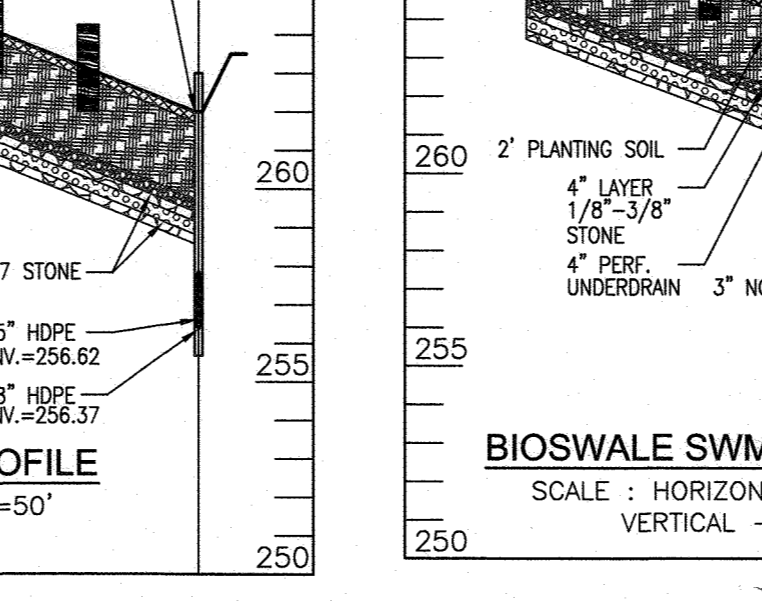
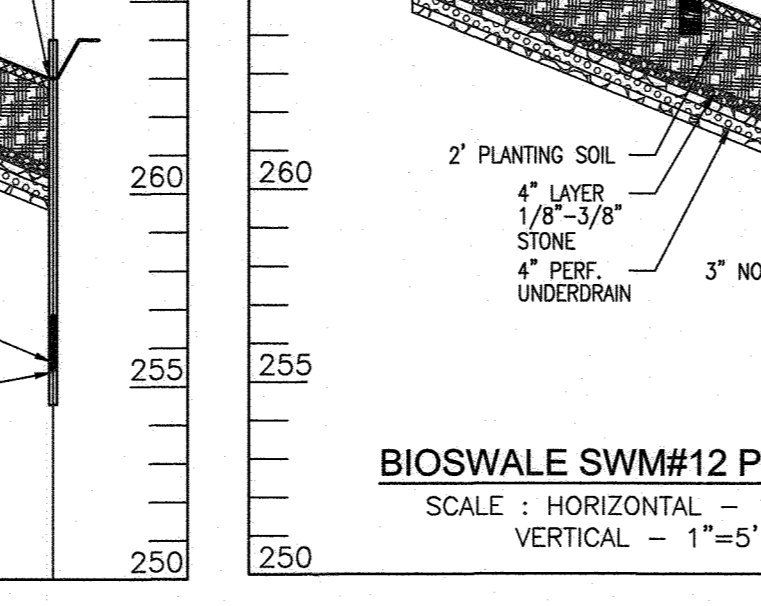
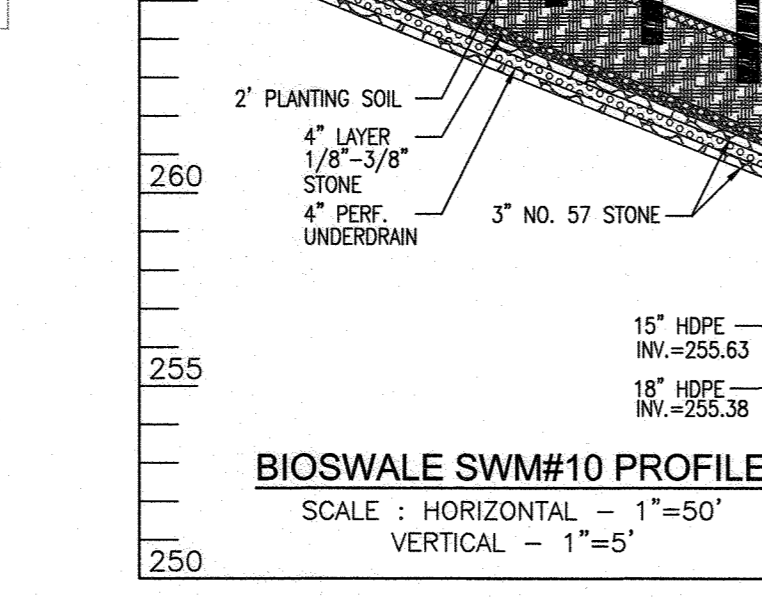
ON-LOT DRYWELL - DESIGN ELEVATION CHART. Table with columns: SWM DA, DW #, DW LOCATION, NUMBER OF DW'S, PROP GRADE\*, TOP STONE\*, INV STONE\*, SURFACE SIZE (1) FT X FT, STONE DEPTH FT, SAND DEPTH FT. Lists 28 drywell units (FUT# 19-28) with their respective elevations and dimensions.



BIO-SWALE - DESIGN ELEVATION CHART. Table with columns: SWALE FACILITY, BIOSWALE DETAIL, LOW PT. ESD WSEL, TOP MULCH, BOTTOM PLANT SOIL, BOTTOM PEA GRAVEL, INV PIPE (1), INV STONE, WIDTH FT, LENGTH FT. Lists 13 bioswale units.



BIORETENTION / MICRO-BIORETENTION - DESIGN ELEVATION CHART. Table with columns: FACILITY #, FACILITY TYPE, ESD WSEL, TOP MULCH, TOP PLANT SOIL, BOTTOM PLANT SOIL, BOTTOM PEA GRAVEL, INV PIPE (1), INV STONE, SURFACE AREA SF, APPROX DIM. Lists 9 bioretention units.



\* DESIGN SHALL BE FINE TUNED UNDER FUTURE SITE DEVELOPMENT PLAN(S)
# FRONT OF LOT # REAR OF LOT
#FUT# FUTURE LOT. REFER TO F-19-XXX
(1) DRYWELL SIZE CAN BE ADJUSTED PER FIELD CONDITIONS, HOLDING DEPTH CONSISTENT AND ADJUSTING SQUARE FOOTAGE.

\* 18" PLANTING SOIL
(1) UNDERDRAIN PIPE AND OVERFLOW DISTRIBUTION PIPE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
[Signature] for 11/22/20
CHIEF, BUREAU OF HIGHWAYS DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
[Signature] 12-2-20
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE
[Signature] 12/10/20
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

OWNER/DEVELOPER
HOWARD COUNTY HOUSING COMMISSION
9770 PATUXENT WOODS DR., SUITE 100
COLUMBIA, MD 21046
ATTN: PETER ENDEL
(410) 313-6316

Table with columns: NO., REVISION, DATE. Contains one revision entry.

FINAL ROAD CONSTRUCTION PLAN
ESDV STORMWATER MANAGEMENT
COMPUTATIONS, NOTES AND DETAILS AND TEST PIT LOGS
GREENWOOD VILLAGE - PHASE 1
LOTS 1-4, NON-BUILDABLE BULK PARCELS A-C
AND OPEN SPACE LOTS 5-11
A RE-SUBDIVISION OF THE 'NORDAU SUBDIVISION' - SECTION E-4
LOTS 2-4 (P.B. 3/51), 5R (L16288 F.488), 8R (L16288 F.502) AND 9 (P.B. 3/51)
TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140
6TH ELECTION DISTRICT ZONED: R-12 HOWARD COUNTY, MARYLAND

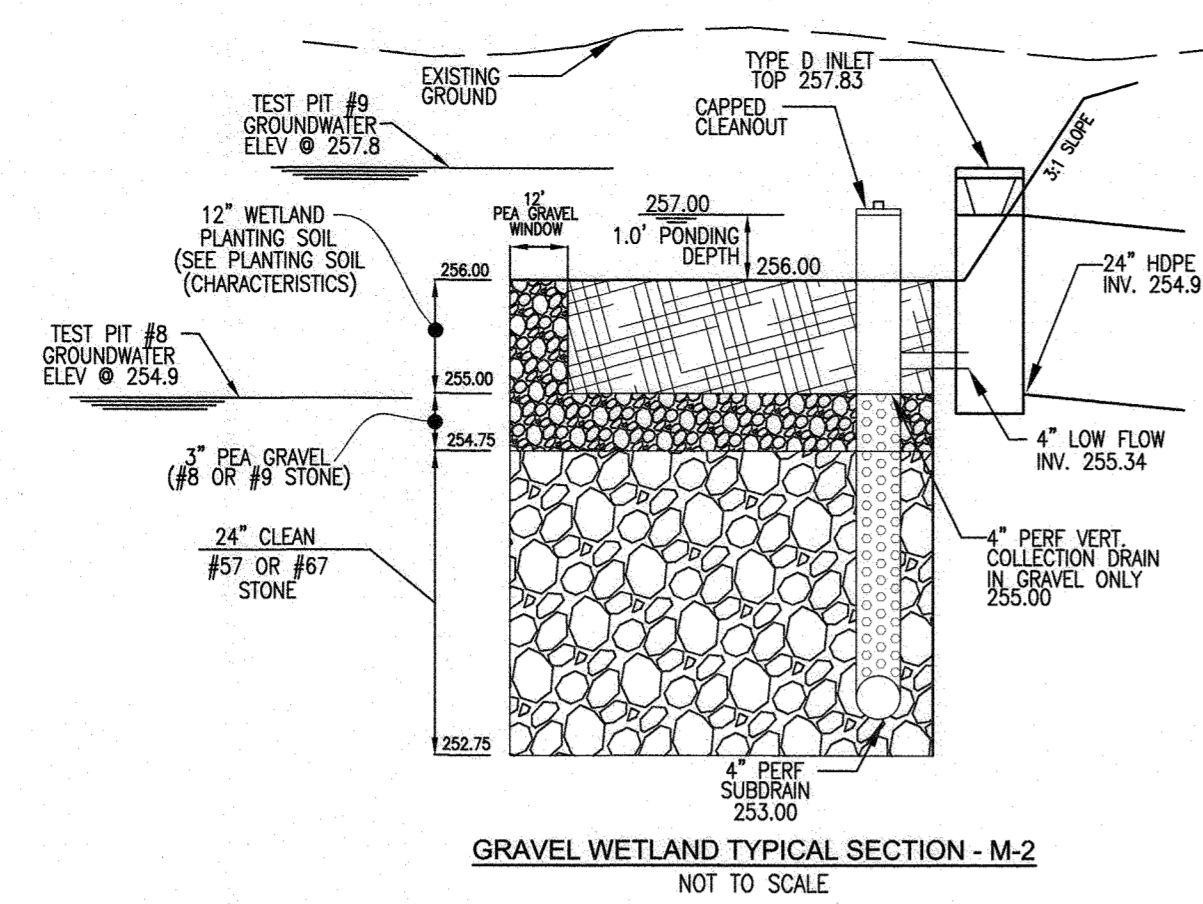
VOGEL ENGINEERING
TIMMONS GROUP
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043
P: 410.461.7666 F: 410.461.8961 www.timmons.com

PROFESSIONAL CERTIFICATE
DESIGN BY: RHV
DRAWN BY: VETG
CHECKED BY: RHV
DATE: MARCH 2020
SCALE: AS SHOWN
W.O. NO.: 12-05
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM AN EIGHTY-THREE (83) YEAR OLD REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 16193 EXPIRES 09-27-2020
20 SHEET OF 23
ROBERT H. VOGEL, PE No. 16193

**WETLAND SOIL SPECIFICATIONS**

THE SURFACE INFILTRATION RATES OF THE GRAVEL WETLAND SOIL SHOULD BE SIMILAR TO A LOW HYDRAULIC CONDUCTIVITY WETLAND SOIL (0.1-0.01 FT/DAY = 3.5 X 10<sup>-6</sup> CM/SEC TO 3.5 X 10<sup>-6</sup> CM/SEC). THIS SOIL CAN BE MANUFACTURED USING COMPOST, SAND, AND SOME FINE SOILS TO BLEND TO A HIGH % ORGANIC MATTER CONTENT SOIL (>15% ORGANIC MATTER).  
 AVOID USING CLAY CONTENTS IN EXCESS OF 15% BECAUSE OF POTENTIAL MIGRATION OF FINES INTO SUBSURFACE GRAVEL LAYER. DO NOT USE GEOTEXTILES BETWEEN THE HORIZONTAL LAYERS OF THIS SYSTEM AS THEY WILL CLOG DUE TO FINES AND MAY RESTRICT ROOT GROWTH.

- IMPERVIOUS LINER:  
 IF NATIVE A LOW HYDRAULIC CONDUCTIVITY NATIVE SOIL IS NOT PRESENT BELOW THE GRAVEL LAYER, A LOW PERMEABILITY LINER OR SOIL SHOULD BE USED TO:  
 - MINIMIZE INFILTRATION  
 - PRESERVE HORIZONTAL FLOW IN THE GRAVEL  
 - MAINTAIN THE WETLAND PLANTS  
 IF GEOTECHNICAL TESTS CONFIRM THE NEED FOR A LINER, ACCEPTABLE OPTIONS INCLUDE:  
 (A) 6 TO 12 INCHES (15 - 30 CM) OF CLAY SOIL (MINIMUM 15% PASSING THE #200 SIEVE AND A MINIMUM PERMEABILITY OF 1 X 10<sup>-7</sup> CM/SEC).  
 (B) A 30 ML HDPE LINER.  
 (C) BENTONITE.  
 (D) USE OF CHEMICAL ADDITIVES (SEE NRCS AGRICULTURAL HANDBOOK NO. 386, DATED 1981, OR ENGINEERING FIELD MANUAL).  
 (E) A DESIGN PREPARED BY A PROFESSIONAL ENGINEER.



**(OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED SUBMERGED GRAVEL WETLANDS (M-2))**

- During the first year of operation, the Owner shall inspect the facility after every heavy storm and replace vegetation as needed.
- The Owner shall remove sediment accumulated in the pretreatment areas as necessary.
- Signs of uneven flow within the wetland may mean that the gravel or underdrain is clogged. The gravel or underdrain shall be removed, cleaned, and replaced, as needed.
- The Owner shall ensure a dense stand of wetland vegetation is maintained through the life of the facility and replace vegetation as needed.
- The Owner shall ensure the inlets and outlets to each gravel wetland cell are free from debris.
- The Owner shall repair erosion at inflow points and ensure flow splitters are functional to prevent storm water from bypassing the facility.

1. CONTRACTOR SHALL BE FAMILIAR WITH APPENDIX B.4.C. CONSTRUCTION SPECIFICATIONS AND TABLE B.4.1 MATERIAL SPECIFICATIONS. IN ADDITION THE "2000 MARYLAND STORMWATER DESIGN MANUAL - VOLUME II - APPENDIX A OFFERS ADDITIONAL HELPFUL INFORMATION. SHRUB OR HERBACEOUS SPECIES.  
 2. NO TREES SHALL BE PLANTED WITHIN A THE GRAVEL WETLAND. USE ONLY SHRUB OR HERBACEOUS SPECIES.  
 3. REFER TO ABOVE TABLE A.4.1 FOR ADDITIONAL PLANTING SUBSTITUTIONS. LANDSCAPE CONTRACTOR SHALL INSTALL PLANTINGS SPECIFIED OR USE APPROVED EQUAL SPECIES WHICH ARE TOLERANT TO FLUCTUATING WATER LEVELS.  
 4. PLANTINGS SHOWN HEREON ARE THE RESPONSIBILITY OF THE DEVELOPER TO INSTALL DURING THE CONSTRUCTION OF THIS FINAL PLAN.

PLANTING SCHEDULE (SHRUB/ORNAMENTAL GRASSES)				
LEGEND/KEY	QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
TS	15	SCIRPUS PUNGENS COMMON THREE-SQUARE	PLANT STOCK	CONT
DP	15	SAGITTARIA LATIFOLIA ARROWHEAD/DUCK POTATO	PLANT STOCK	9-12" SPACE
AA	15	PANTANDRA VIRGINICA ARROW ARUM	PLANT STOCK	9-12" SPACE
PV	15	PANICUM VIRGATUM SWITCHGRASS	1 GAL.	-

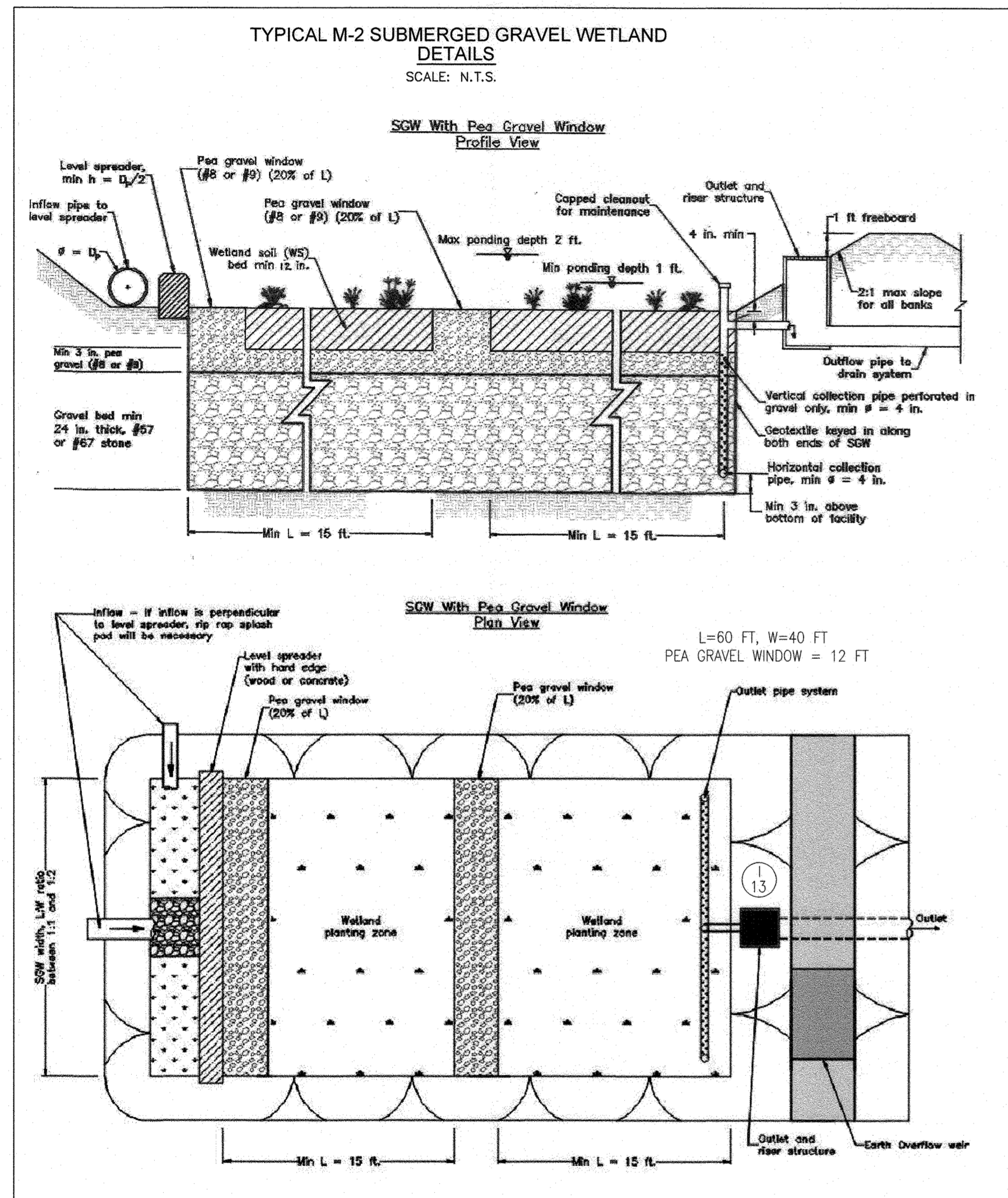
  

BIORETENTION PERENNIALS/GROUNDCOVER PLANTING SCHEDULE				
LEGEND	QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
	91	BAPTISIA AUSTRALIS FALSE INDIGO	4" POT	12"-15" O.C. FOR SIDES AND BOTTOM OF MBR. MIX ALL VARIETIES IN A NATURALIZED RANDOM PATTERN THROUGHOUT.
	91	ACORUS GRAMINEUS 'OGON' GOLDEN VARIEGATED SWEET FLAG	1 QT.	PLANT IN GROUPS OF NO LESS THAN 9 PLANTS PER CLUMP

GRAVEL WETLAND PLANTING REQUIREMENTS		PLANTINGS PROVIDED		PERENNIALS/GROUND COVER						
MBR #	AREA	REQUIRE (0.0227)	PROVIDED	TS	DP	AA	PV	BA	AG	TOTAL
GW	2625	60	60	15	15	15	15	91	91	362
TOTALS:				60	60	15	15	15	15	362

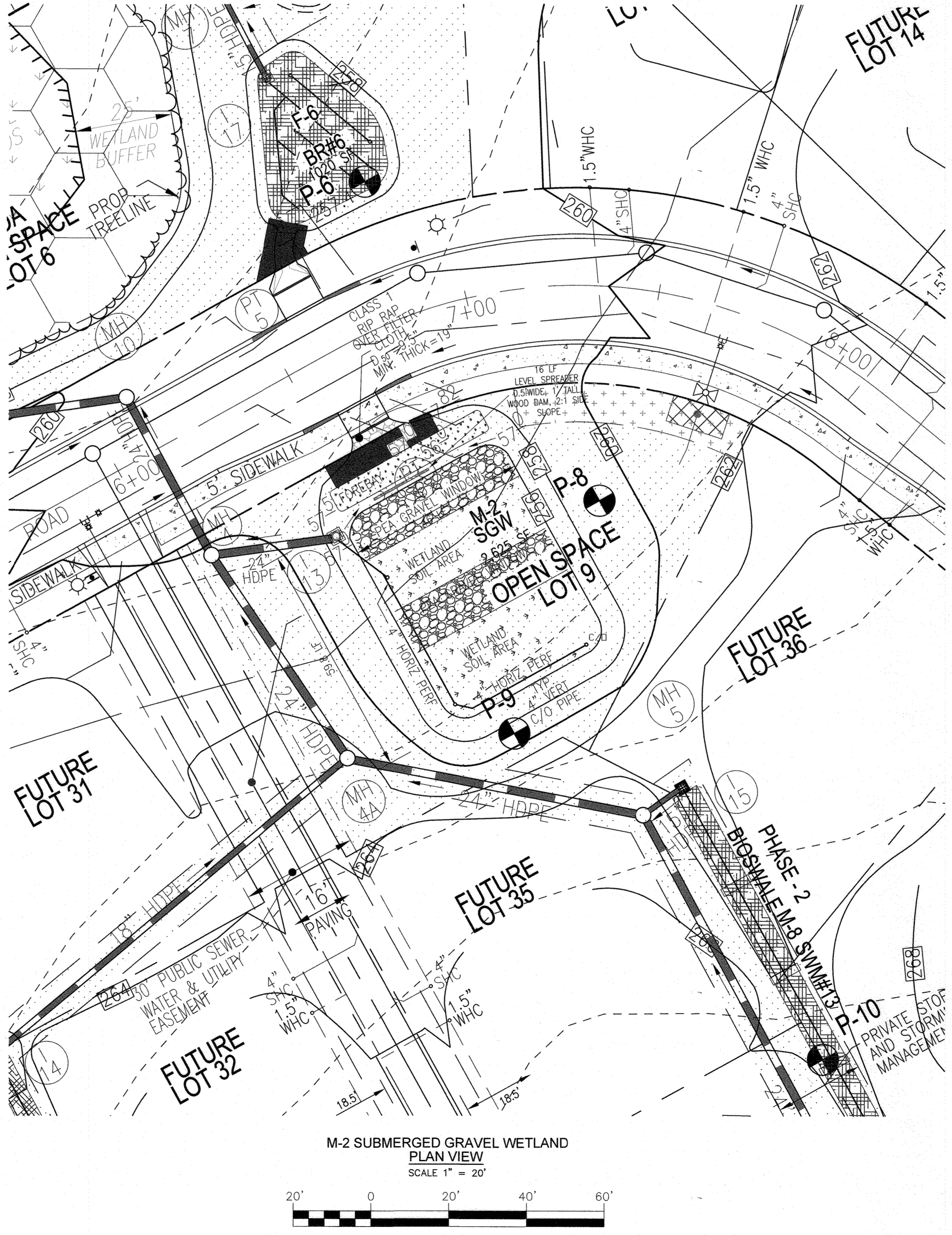
BIORETENTION AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0227 STEMS PER SQUARE FOOT).

- "GRAVEL WETLAND" PLANTING SCHEDULE NOTES:**
- ALL PLANT MATERIALS SHALL BE FULL AND HEAVY, BE WELL FORMED AND SYMMETRICAL, CONFORM TO THE MOST CURRENT AN SPECIFICATIONS AND BE INSTALLED IN ACCORDANCE WITH HOWARD COUNTY PLANTING SPECIFICATIONS.
  - CONTRACTOR SHALL VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DIGGING.
  - FINAL LOCATION OF PLANT MATERIAL MAY NEED TO VARY TO MEET FINAL FIELD CONDITIONS. TREES SHALL NOT BE PLANTED IN THE BOTTOM OF DRAINAGE SWALES.
  - CONTRACTOR SHALL VERIFY PLANT QUANTITIES PRIOR TO BIDDING. IF PLAN DIFFERS FROM LANDSCAPE SCHEDULE, THE PLAN SHALL GOVERN.
  - MICROBIORETENTION AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0227 STEMS PER SQUARE FOOT), ABOVE PLANTING RATIOS ARE TO BE APPLIED TO THE AREAS PROVIDED IN THE ESDY SUMMARY.
  - FILTER AREA SHALL BE 50% COVERED BY PLANTINGS AT FULL GROWTH



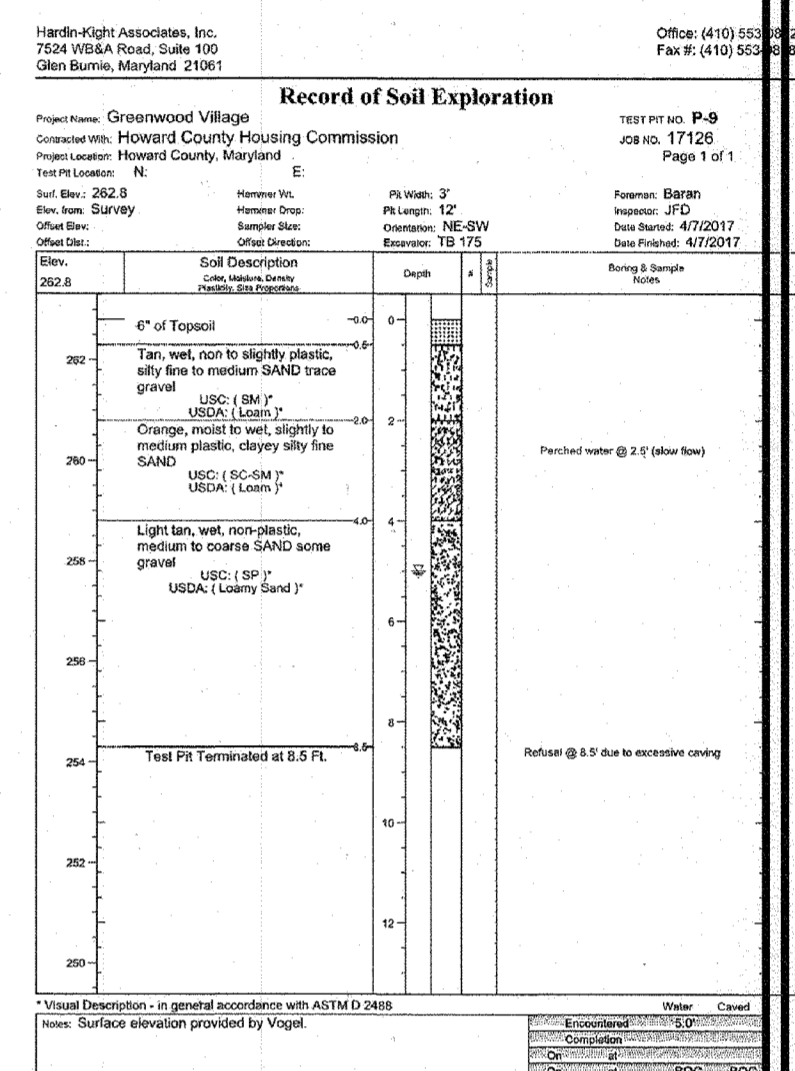
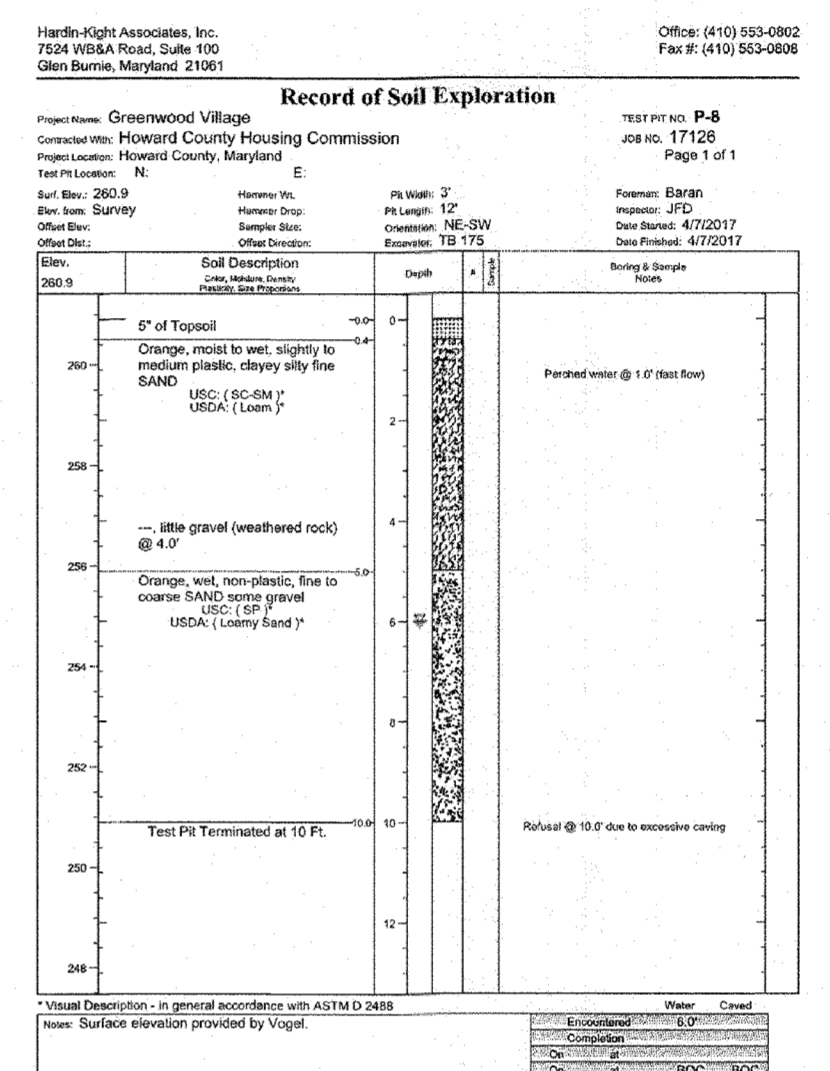
**GRAVEL WETLAND FACILITY - DESIGN ELEVATION CHART**

MBR FACILITY #	ESD WSEL	TOP PLANT SOIL	BOTTOM PLANT SOIL	BOTTOM PEA GRAVEL	INV PIPE	INV STONE	SURFACE AREA SF	APPROX DIM
1	257.00	256.00	255.00	254.75	253.00	252.75	2625	SEE PLAN



**SUBMERGED GRAVEL WETLAND**  
 TYPE: NON-MD 378  
 HAZARD CLASS: A  
 PROP. DRAINAGE AREA: 2.65 AC.  
 BOTTOM ELEV.: 256.0  
 GRAVEL WETLAND: 252.75 - 256.0 (SURFACE)  
 TOP: 258.5± (GUTTER)  
 EMERGENCY SPILLWAY: N/A  
 Q1 (DEV.): 5.5 CFS  
 Q10 (DEV.): 11.1 CFS  
 Q100 (DEV.): 16.1 CFS  
 Q1 (SWM): 3.3 CFS  
 1 YR SWM WSEL = 257.31  
 Q10 (SWM): 8.3 CFS  
 10 YR SWM WSEL = 257.84  
 Q100 (SWM): 12.6 CFS  
 100 YR SWM WSEL = 258.27

- NOTES**
- 4" SUBDRAIN PIPE PERFORATE HORIZONTAL SECTIONS OF PIPE ONLY. SEE DETAIL FOR REQUIRED PERFORATED SECTION IN VERTICAL PIPE.
  - RISER SOLID PIPES SHALL BE CAPPED AT ELEV 257.00
  - REFER TO SHEET 19 TABLE B.4.1. FOR PIPE SPECIFICATIONS
  - WETLAND SOIL THE SURFACE INFILTRATION RATES OF THE GRAVEL WETLAND SOIL SHOULD BE SIMILAR TO A LOW HYDRAULIC CONDUCTIVITY WETLAND SOIL (0.1-0.01 FT/DAY = 3.5 X 10<sup>-6</sup> CM/SEC TO 3.5 X 10<sup>-6</sup> CM/SEC). THIS SOIL CAN BE MANUFACTURED USING COMPOST, SAND, AND SOME FINE SOILS TO BLEND TO A HIGH % ORGANIC MATTER CONTENT SOIL (>15% ORGANIC MATTER). AVOID USING CLAY CONTENTS IN EXCESS OF 15% BECAUSE OF POTENTIAL MIGRATION OF FINES INTO SUBSURFACE GRAVEL LAYER DO NOT USE GEOTEXTILES BETWEEN THE HORIZONTAL LAYERS OF THIS SYSTEM AS THEY WILL CLOG DUE TO FINES AND MAY RESTRICT ROOT GROWTH. WETLAND MULCH CAN BE SUBSTITUTED FOR WETLAND SOIL.
  - PLANTINGS MAY BE SUBSTITUTED WITH NATIVE WETLAND PLANT STOCK OBTAINED FROM A LOCAL AQUATIC PLANT NURSERY.



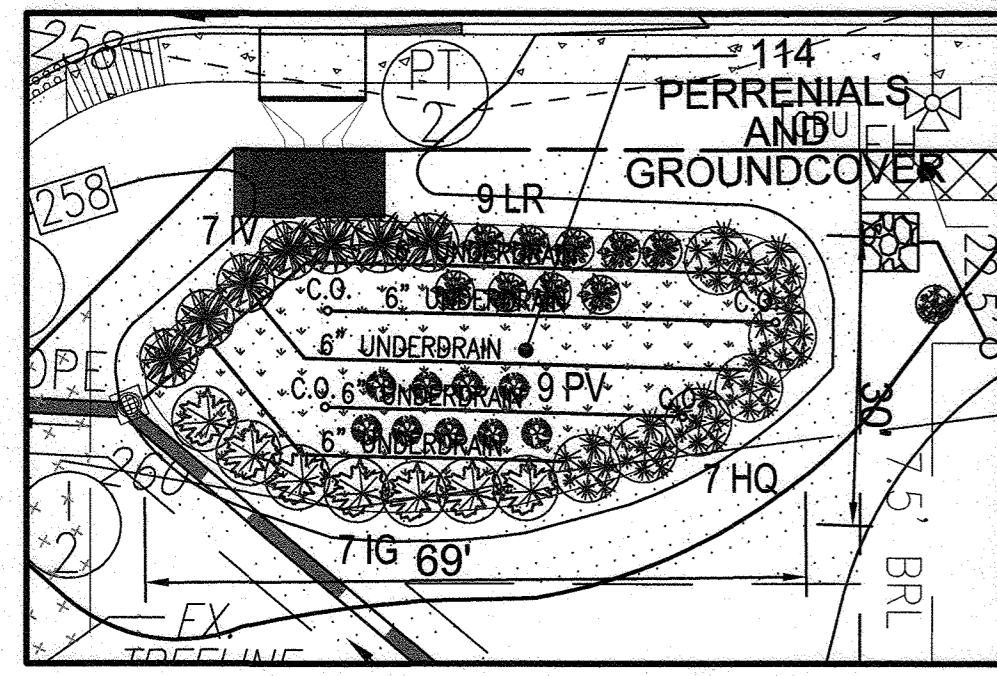
**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DR., SUITE 100  
 COLUMBIA, MD 21046  
 ATTN: PETER ENGEL  
 (410) 313-6316

NO.	REVISION	DATE

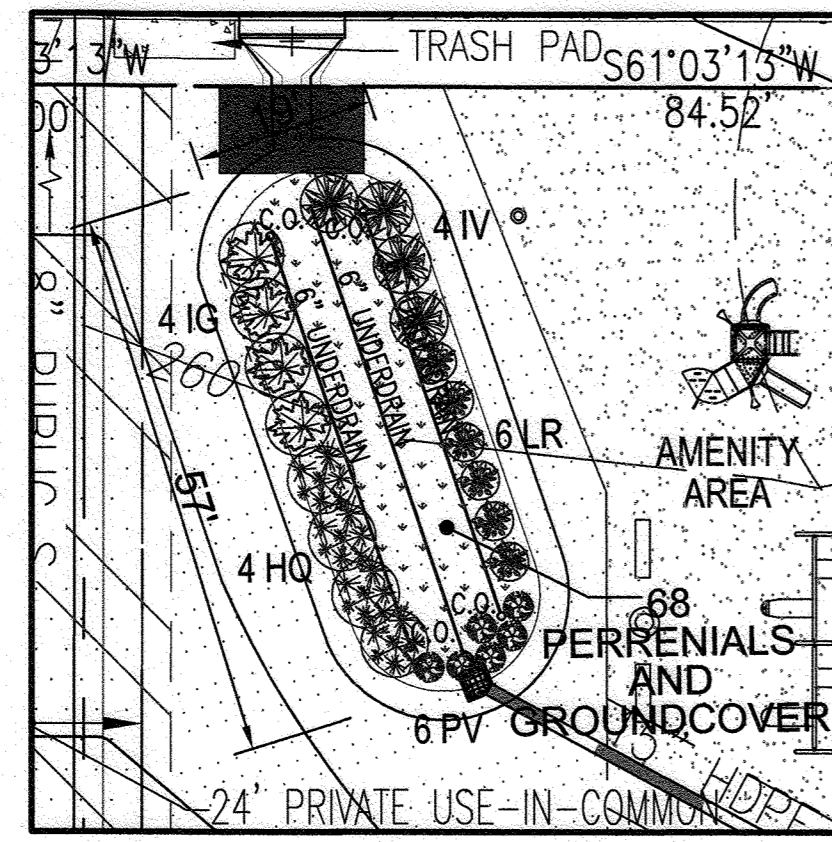
**FINAL ROAD CONSTRUCTION PLAN**  
**GRAVEL WETLAND NOTES AND DETAILS**  
**GREENWOOD VILLAGE - PHASE 1**  
 LOTS 1-4, NON-BUILDABLE BULKY PARCELS A-C AND OPEN SPACE LOTS 5-11  
 A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4  
 LOTS 2-4 (P.B. 3/51), 5R (L16288 F.488), 8R (L16288 F.502) AND 9 (P.B. 3/51)  
 TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140  
 6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND  
 ZONED: R-12  
**VOGEL ENGINEERING**  
**TIMMONS GROUP**  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7666 F: 410.461.8961 www.timmons.com

**PROFESSIONAL CERTIFICATE**  
 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. MY LICENSE NO. IS 16193 AND MY EXPIRATION DATE IS 09-27-2020.  
 DESIGN BY: RHV  
 DRAWN BY: VETG  
 CHECKED BY: RHV  
 DATE: MARCH 2020  
 SCALE: AS SHOWN  
 W.O. NO.: 12-05  
**21 SHEET OF 23**

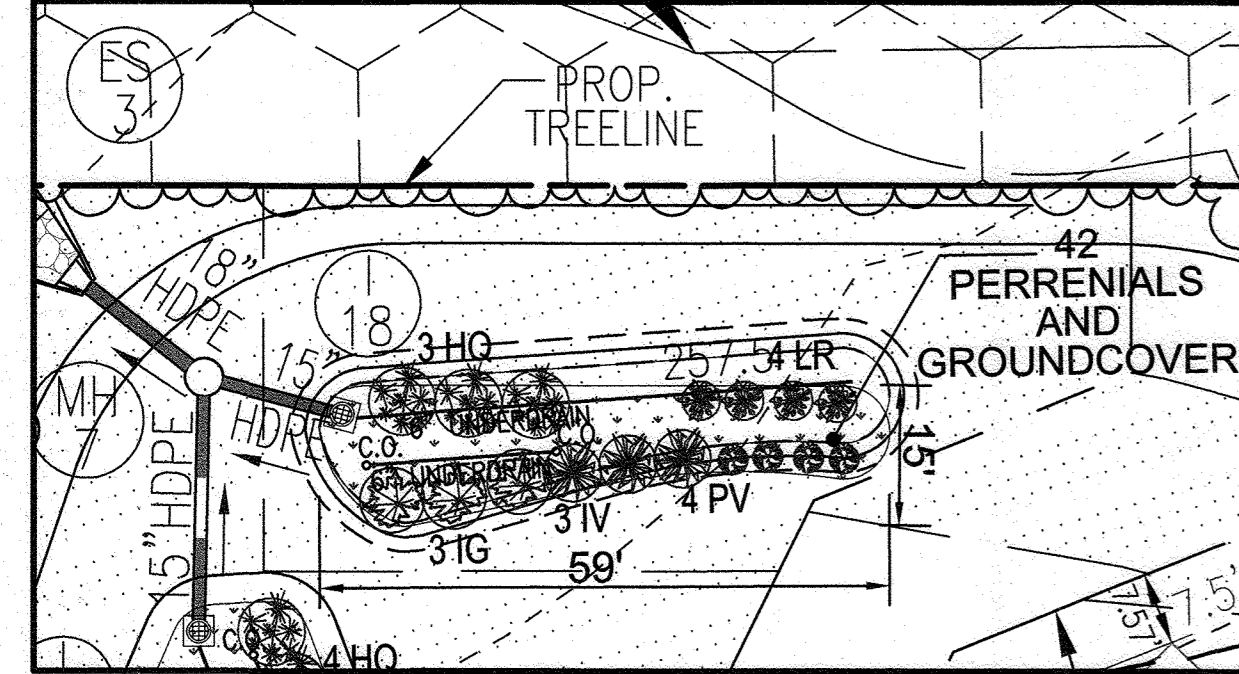
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/23/20  
 CHIEF, BUREAU OF HIGHWAYS DATE  
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12-2-20  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE  
 [Signature] 12/10/20  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE



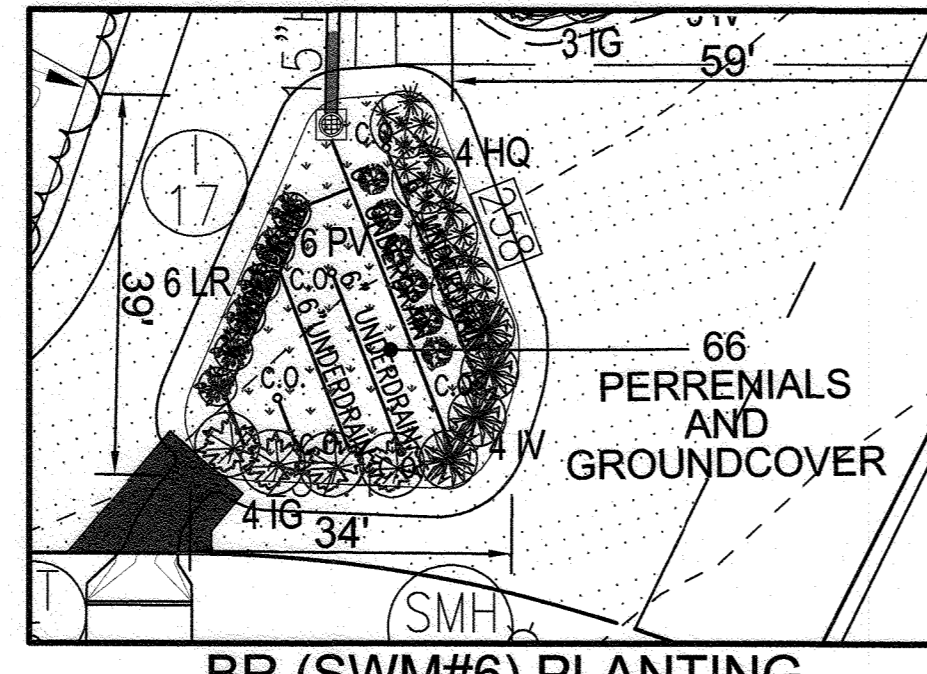
**BR (SWM#1) PLANTING**  
SCALE: 1"=20'



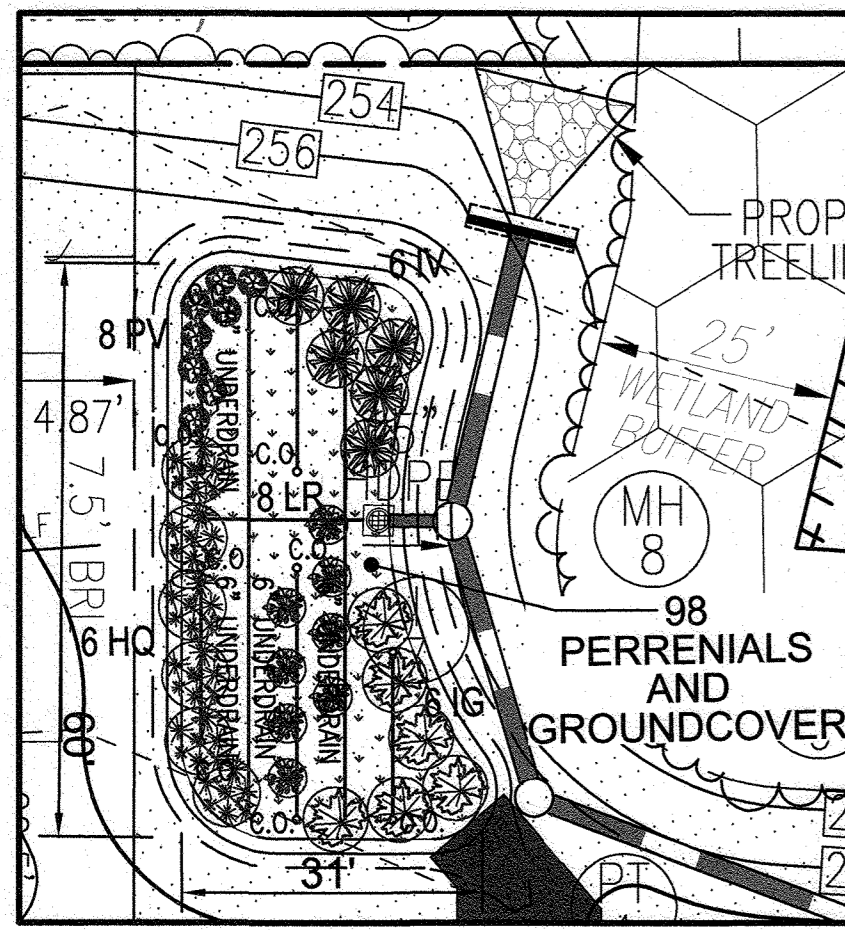
**BR (SWM#2) PLANTING**  
SCALE: 1"=20'



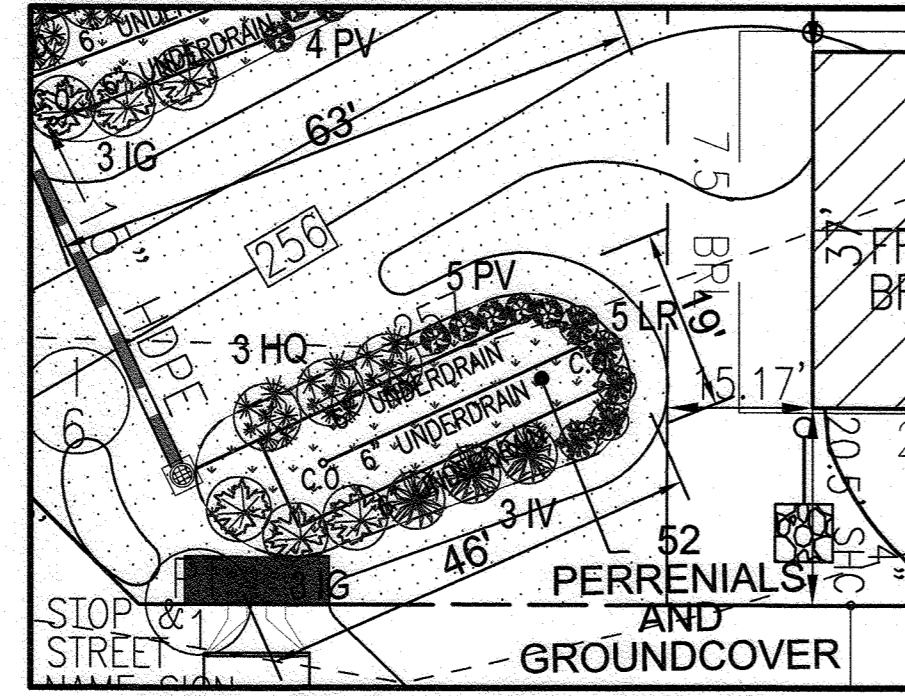
**MBR (SWM#5) PLANTING**  
SCALE: 1"=20'



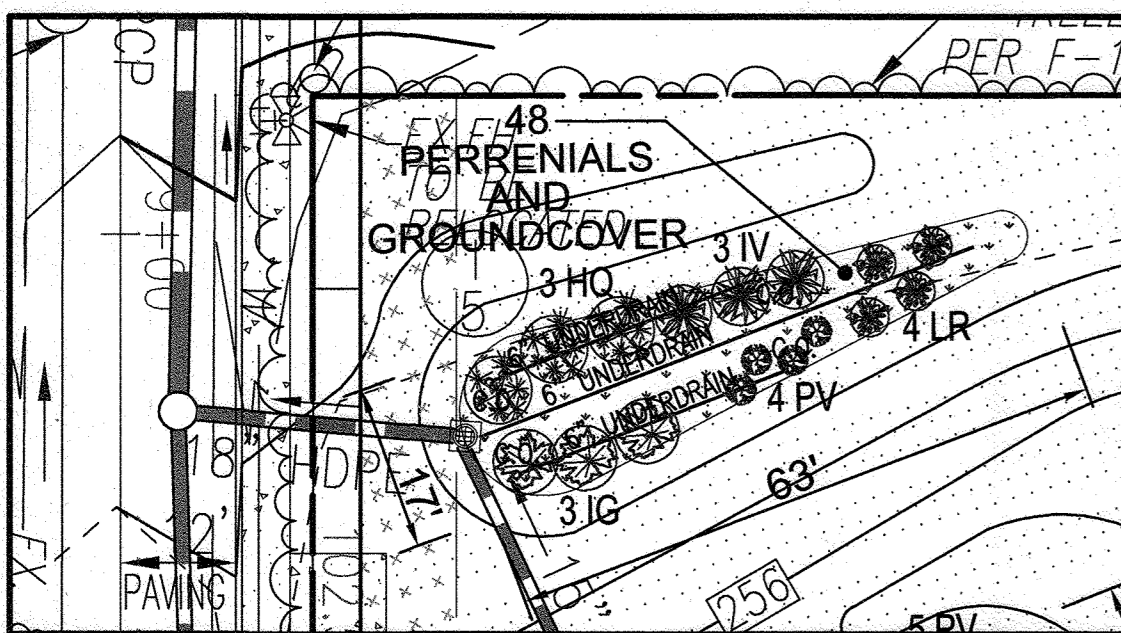
**BR (SWM#6) PLANTING**  
SCALE: 1"=20'



**MBR (SWM#7) PLANTING**  
SCALE: 1"=20'



**MBR (SWM#8) PLANTING**  
SCALE: 1"=20'



**MBR (SWM#9) PLANTING**  
SCALE: 1"=20'

**Appendix A. Landscaping Guidance for Stormwater BMPs..... Specific Landscaping Criteria**

**Table A.4 Commonly Used Species for Bioretention Areas**

Trees	Shrubs	Herbaceous Species
Acer rubrum Red Maple	Aesculus parviflora Bottlebrush Buckeye	Andropogon virginicus Broomsedge
Azalea	Cephalanthus occidentalis Butterbush	Eupatorium purpureum Joe Pye Weed
Juniperus virginiana Eastern Red Cedar	Hamelia virginiana Witch Hazel	Scirpus pungens Three Square Bulrush
Chionodoxa virginiana Fringe-tree	Vaccinium corymbosum Highbush Blueberry	Iris versicolor Blue Flag
Nyssa sylvatica Black Oak	Ilex glabra Hollyhury	Loelia cardinalis Cardinal Flower
Disopygia virginiana Persimmon	Iris versicolor Witchberry	Panicum virgatum Switchgrass
Pistia stratiotes Sycamore	Thalictrum dasycarpum Arrowwood	Dichanthium aegyptium Brooms Pate Grass
Quercus phellos Willow Oak	Lindera benzoin Bayberry	Rudbeckia lactinosa Tall Coneflower
Salix nigra Black willow	Myrica pennsylvanica Sedges	Scirpus operatus Woolgrass
		Vernonia noveboracensis New York Ironweed

Note 1: For more options on plant selection for bioretention, consult Bioretention Manual (ET&B, 1993) or the Design of Stormwater Filtering Systems (Clayton and Scholer, 1997).

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 [Signature] 12-2-20  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 12/10/20  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

- TABLE A.4 IS TAKEN FROM THE "2000 MARYLAND STORMWATER DESIGN MANUAL VOLUME II - APPENDIX A."
- CONTRACTOR SHALL BE FAMILIAR WITH APPENDIX B.4.C. CONSTRUCTION SPECIFICATIONS AND TABLE B.4.1 MATERIAL SPECIFICATIONS. IN ADDITION THE "2000 MARYLAND STORMWATER DESIGN MANUAL - VOLUME II - APPENDIX A OFFERS ADDITIONAL HELPFUL INFORMATION."
- NO TREES SHALL BE PLANTED WITHIN A MICRO-BIORETENTION FACILITY. USE ONLY SHRUB OR HERBACEOUS SPECIES.
- ABOVE TABLE A.4. IS FOR INFORMATIONAL PURPOSES ONLY. LANDSCAPE CONTRACTOR SHALL INSTALL PLANTINGS SPECIFIED OR USE APPROVED EQUAL SPECIES WHICH ARE TOLERANT TO FLUCTUATING WATER LEVELS.
- PLANTINGS SHOWN HEREON ARE THE RESPONSIBILITY OF THE DEVELOPER TO INSTALL DURING THE CONSTRUCTION OF THIS FINAL PLAN.

BIORETENTION / MICRO-BIORETENTION PLANTING REQUIREMENTS		PLANTINGS PROVIDED							PERENNIALS/GROUND COVER PROVIDED		
MBR #	AREA	STEMS REQUIRED (0.0227)	STEMS PROVIDED	IG	IV	HQ	LR	PV	BA	AG	TOTAL
BR #1	1635	38	39	7	7	7	9	9	57	57	114
BR #2	978	23	24	4	4	4	6	6	34	34	68
MBR #5	628	15	17	3	3	3	4	4	21	21	42
BR #6	956	22	24	4	4	4	6	6	33	33	66
MBR #7	1418	33	34	6	6	6	8	8	49	49	98
MBR #8	750	18	19	3	3	3	5	5	26	26	52
MBR #9	700	16	17	3	3	3	4	4	24	24	48
<b>TOTALS:</b>	<b>7065</b>	<b>165</b>	<b>174</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>42</b>	<b>42</b>	<b>244</b>	<b>244</b>	<b>488</b>

BIORETENTION AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0227 STEMS PER SQUARE FOOT).

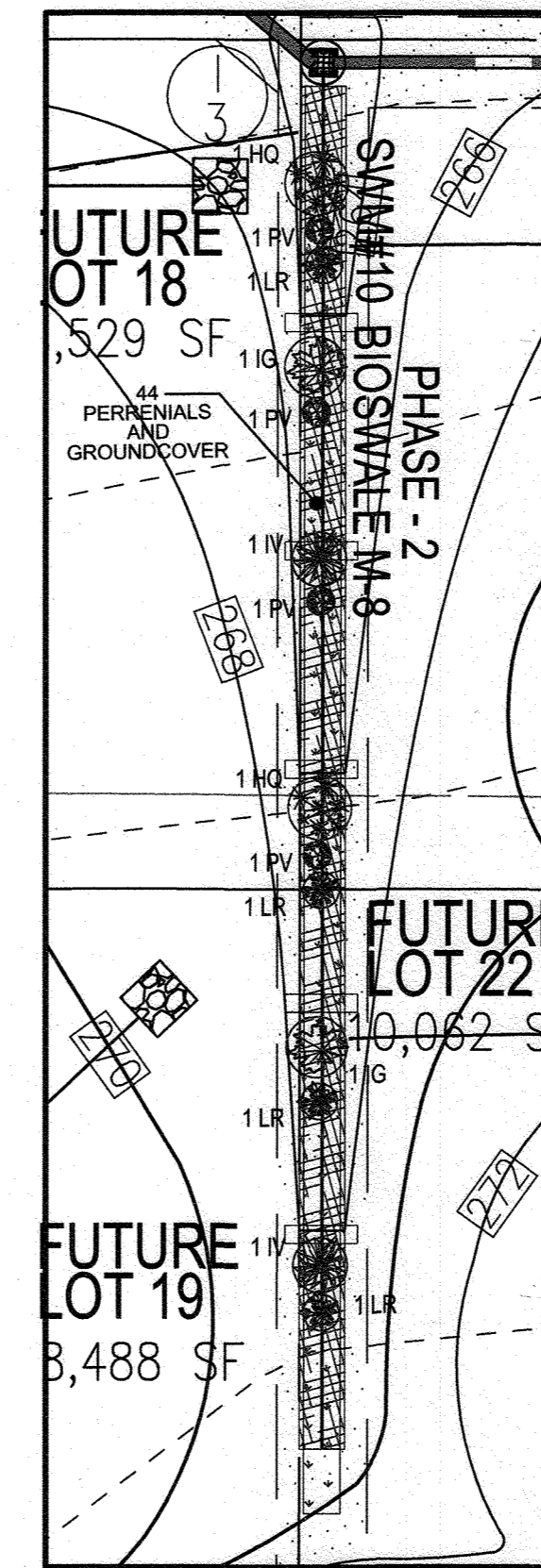
**"MICRO-BIORETENTION/RAINGARDEN" PLANTING SCHEDULE NOTES:**

- ALL PLANT MATERIALS SHALL BE FULL AND HEAVY, BE WELL FORMED AND SYMMETRICAL, CONFORM TO THE MOST CURRENT IAN SPECIFICATIONS AND BE INSTALLED IN ACCORDANCE WITH HOWARD COUNTY PLANTING SPECIFICATIONS.
- CONTRACTOR SHALL VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DIGGING.
- FINAL LOCATION OF PLANT MATERIAL MAY NEED TO VARY TO MEET FINAL FIELD CONDITIONS. TREES SHALL NOT BE PLANTED IN THE BOTTOM OF DRAINAGE SWALES.
- CONTRACTOR SHALL VERIFY PLANT QUANTITIES PRIOR TO BIDDING. IF PLAN DIFFERS FROM LANDSCAPE SCHEDULE, THE PLAN SHALL GOVERN.
- MICROBIORETENTION AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0229 STEMS PER SQUARE FOOT). ABOVE PLANTING RATIOS ARE TO BE APPLIED TO THE AREAS PROVIDED IN THE ESD SUMMARY. FILTER AREA SHALL BE 50% COVERED BY PLANTINGS AT FULL GROWTH.

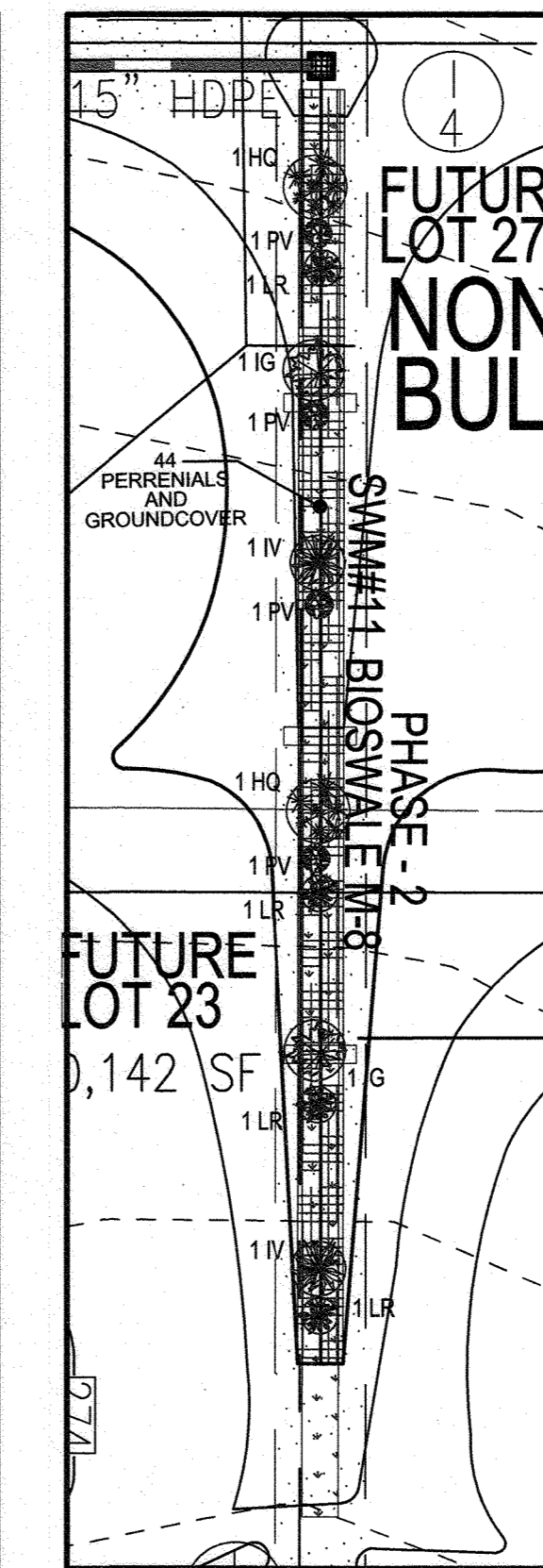
BIORETENTION PLANTING SCHEDULE (SHRUB/RHIZOMATOUS GRASSES)			
LEGEND/KEY	QTY	BOTANICAL NAME/COMMON NAME	REMARKS
IG	30	ILEX GLABRA 'SHAMROCK' INKBERRY HOLLEY	1 GALLON
IV	30	ITEA VIRGINICA 'HENRY'S GARNETT' VIRGINIA SWEETSPIRE	1 GALLON
HQ	30	HYDRANGEA QUERCIFOLIA OAKLEAF HYDRANGEA	1 GALLON
LR	42	LEUCOETHA RACEMOSA FETTERBUSH	1 GAL.
PV	42	PANICUM VIRGATUM SWITCHGRASS	1 GAL.

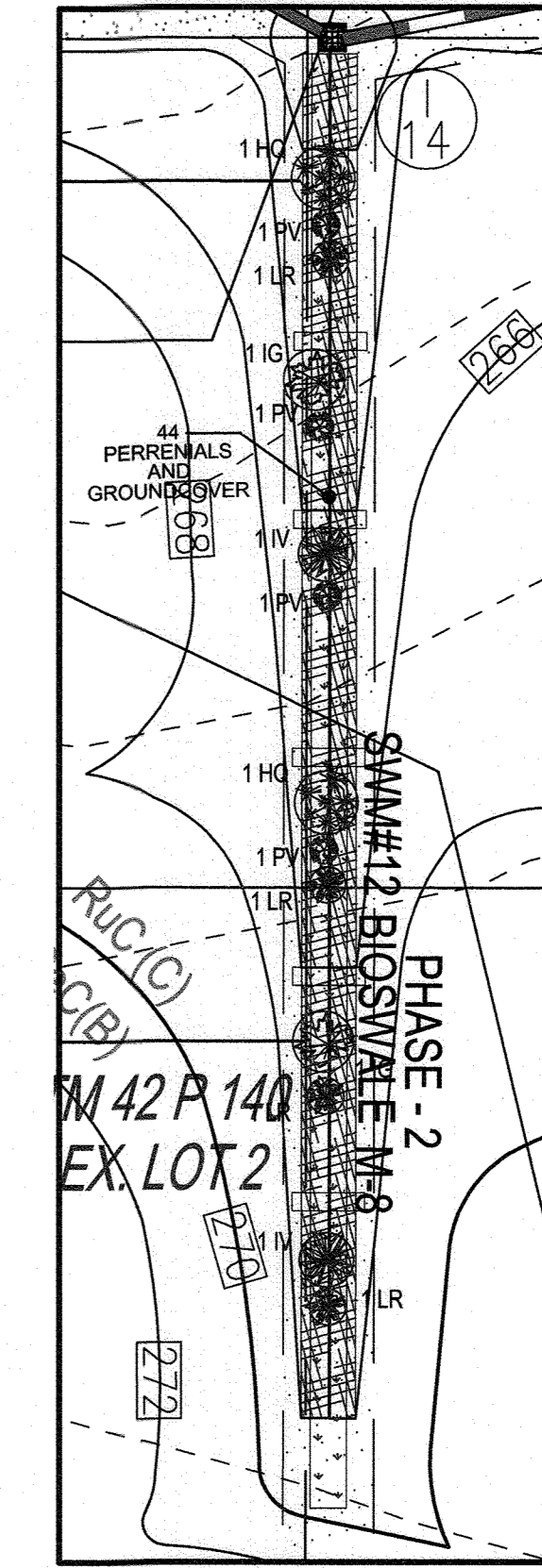
BIORETENTION PERENNIALS/GROUND COVER PLANTING SCHEDULE			
LEGEND	QTY	BOTANICAL NAME/COMMON NAME	REMARKS
[Pattern]	244	BAPTISIA AUSTRALIS FALSE INDIGO	12"-15" O.C. FOR SIDES AND BOTTOM OF MBR. MIX ALL VARIETIES IN A NATURALIZED RANDOM PATTERN THROUGHOUT. PLANT IN GROUPS OF NO LESS THAN 9 PLANTS PER CLUMP
[Pattern]	244	ACORUS GRAMINEUS 'OGON' GOLDEN VARIEGATED SWEET FLAG	1 QT.



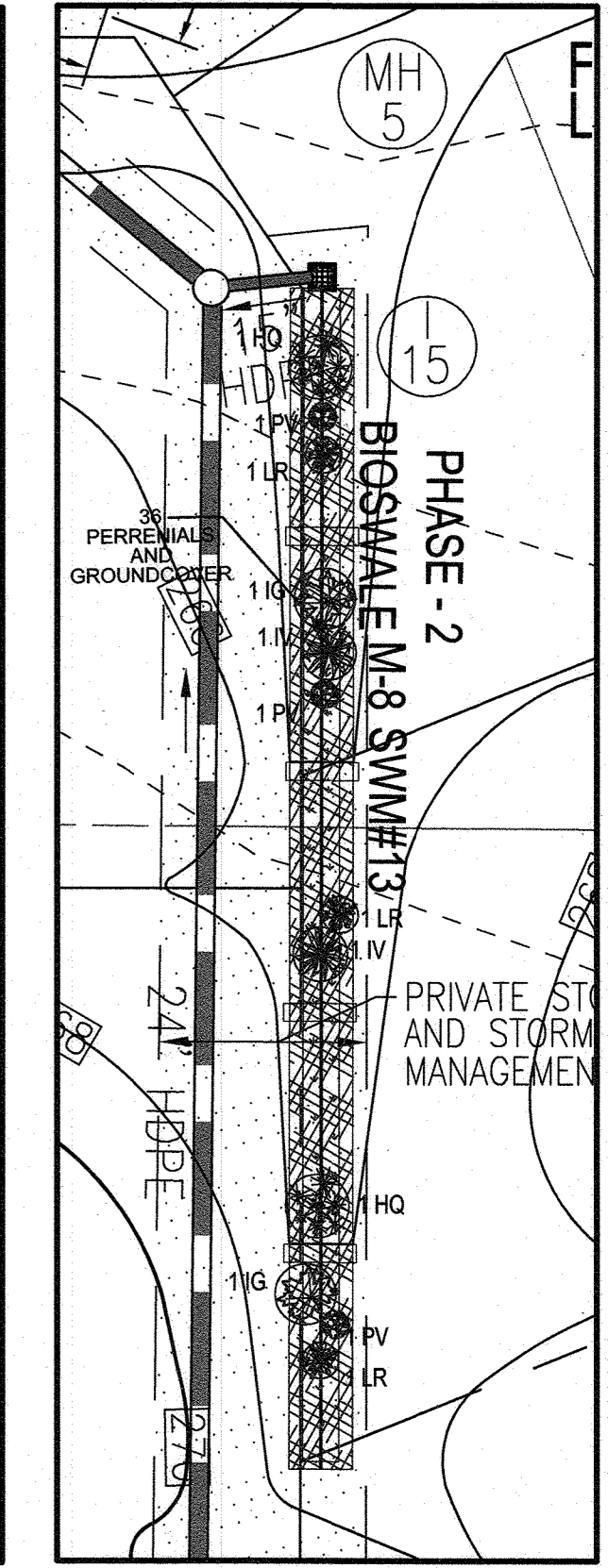
**BIOSWALE 10 PLANTING**  
SCALE: 1"=20'



**BIOSWALE 11 PLANTING**  
SCALE: 1"=20'



**BIOSWALE 12 PLANTING**  
SCALE: 1"=20'



**BIOSWALE 13 PLANTING**  
SCALE: 1"=20'

BIO-SWALE FACILITY PLANTING REQUIREMENTS					
SWALE FACILITY	MULCH FOOTPRINT	PLANTINGS REQUIRED	PLANTINGS OR EQUAL SUBSTITUTION		
			SWITCHGRASS	BLUE FLAG - IRIS VERSICOLOR	LILY TURF
#	SF	TOTAL	NUMBER	SF	SF
10	629	14	144	72	72
11	629	14	16	8	8
12	640	15	146	73	73
13	517	12	118	59	59
<b>TOTALS:</b>	<b>2415</b>	<b>55</b>	<b>424</b>	<b>212</b>	<b>212</b>

BIOSWALE AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0229 STEMS PER SQUARE FOOT).

BIO-SWALE PLANTING SCHEDULE			
BOTANICAL NAME/COMMON NAME	SIZE	REMARKS	
PANICUM VIRGATUM SWITCHGRASS	1 GALLON	CONT	
IRIS VERSICOLOR BLUE FLAG	2" POT	1' O.C.	
LILY TURF MAJESTIC MAJESTIC LILY TURF	2" POT	1' O.C.	

- BIOSWALE AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0229 STEMS PER SQ. FT).
- 50 SF WASTIC LAY TURF / BLUE FLAG = 1 PLANTING UNIT
- PLANTINGS SHALL BE AS SPECIFIED ABOVE OR WITH EQUAL SUBSTITUTION

NOTE:  
STORMWATER MANAGEMENT BIOSWALES ARE PROPOSED AT THE REAR OF FUTURE LOTS 18-22, 23 & 24, 29 & 30 AND 34 & 35. THESE FACILITIES SHALL BE CONSTRUCTED UNDER A FUTURE SITE DEVELOPMENT PLAN.

OWNER/DEVELOPER  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DR., SUITE 1100  
 COLUMBIA, MD 21046  
 ATTN: PETER ENGEL  
 (410) 313-6316

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN  
 MICRO-BIORETENTION PLANTING  
 NOTES & DETAILS  
 GREENWOOD VILLAGE - PHASE 1**

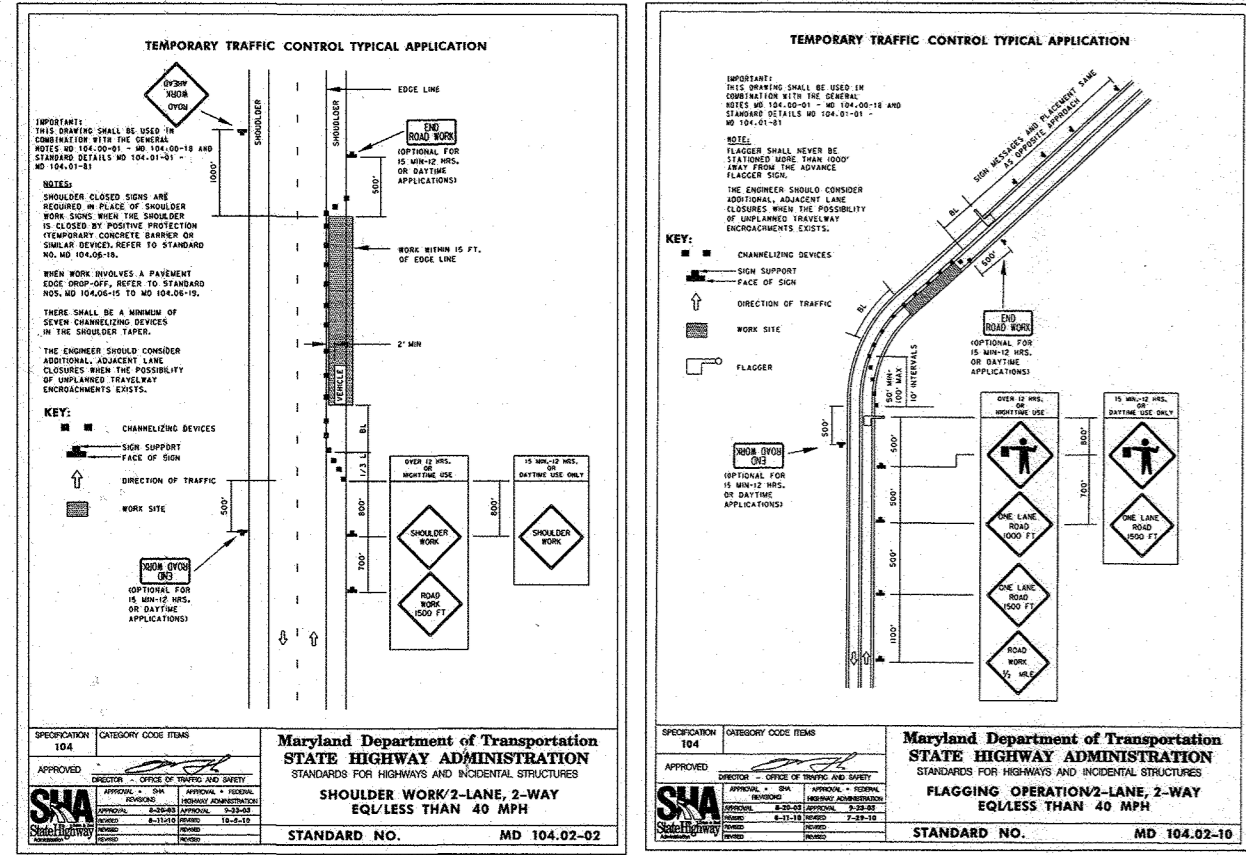
LOTS 1-4, NON-BUILDABLE BULK PARCELS A-C AND OPEN SPACE LOTS 5-11  
 A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4  
 LOTS 2-4 (P.B. 3/51), 5R (L16288 F.488), 8R (L16288 F.502) AND 9 (P.B. 3/51)  
 TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140  
 6TH ELECTION DISTRICT ZONED: R-12 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
 (Logo)  
**TIMMONS GROUP**  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7666 F: 410.461.8961 www.timmons.com

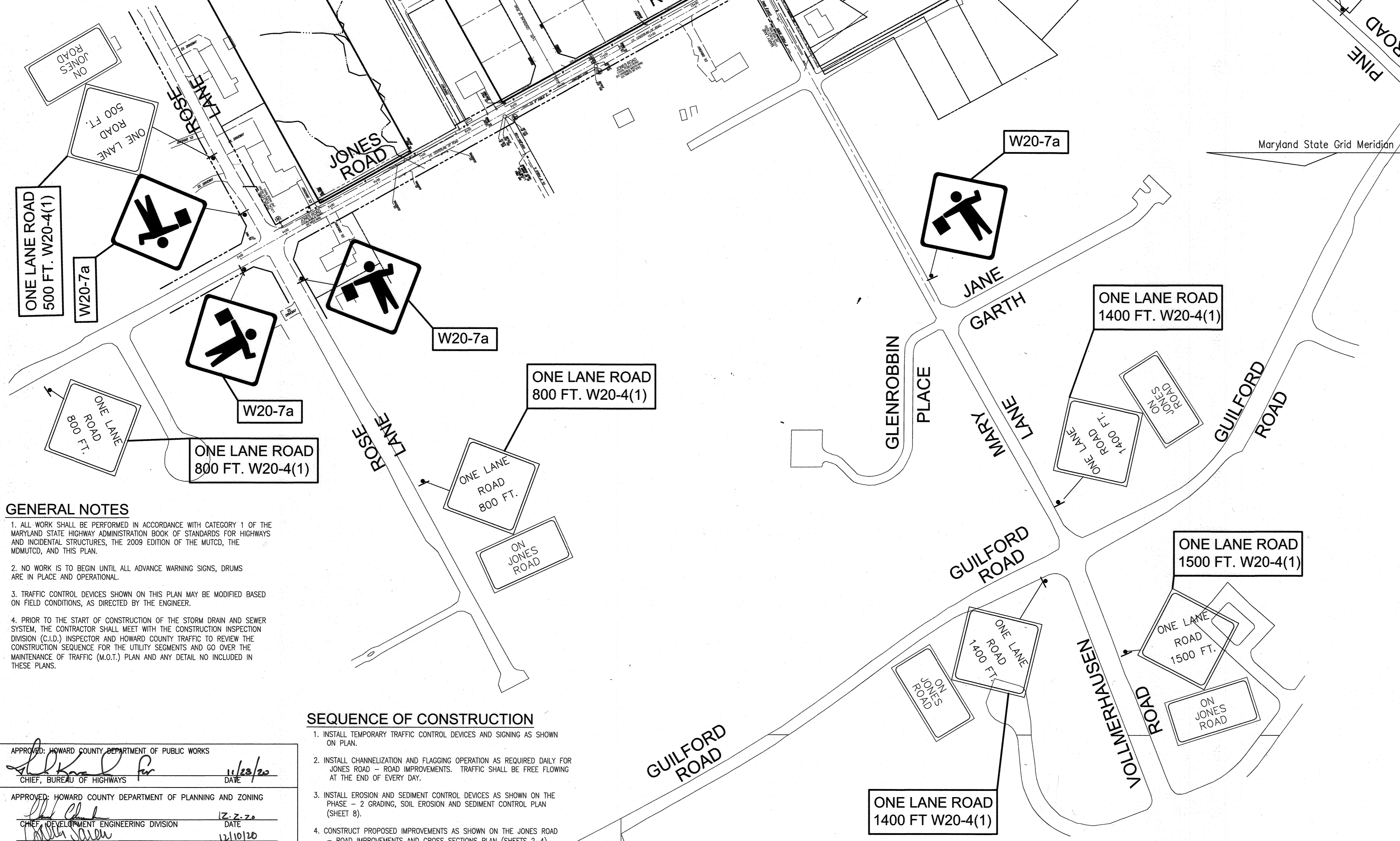
PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. NO. 16193 EXPIRATION DATE: 08-27-2020

DESIGN BY: RHV  
 DRAWN BY: VETG  
 CHECKED BY: RHV  
 DATE: MARCH 2020  
 SCALE: AS SHOWN  
 W.O. NO.: 12-05

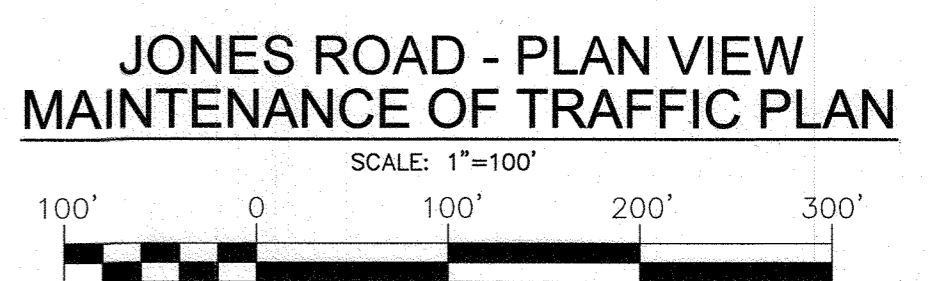
22 SHEET OF 23



**JONES ROAD TYPICAL WORK ZONE TRAFFIC CONTROL DETAILS**  
 ALL WORK WITHIN THE JONES ROAD PUBLIC RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH THE STANDARD MARYLAND STATE HIGHWAY ADMINISTRATION DETAILS: MD 104.02-02 & MD 104.02-10 OR AS DIRECTED BY THE HOWARD COUNTY - TRAFFIC ENGINEERING DIVISION.



**NOTE:**  
 A PRE-CONSTRUCTION MEETING WITH THE TRAFFIC DIVISION AND C.I.D. WILL BE REQUIRED.  
 1. PRIOR TO THE START OF CONSTRUCTION ON JONES ROAD, THE CONTRACTOR SHALL MEET WITH THE CONSTRUCTION INSPECTION DIVISION (C.I.D.) INSPECTOR AND HOWARD COUNTY TRAFFIC TO REVIEW THE CONSTRUCTION SEQUENCE FOR THE ROAD IMPROVEMENTS AND GO OVER THE MAINTENANCE OF TRAFFIC (M.O.T.) PLAN AND ANY DETAILS NOT INCLUDED ON THESE PLANS.



**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DR., SUITE 100  
 COLUMBIA, MD 21046  
 ATTN: PETER ENGEL  
 (410) 313-6316

- GENERAL NOTES**
- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH CATEGORY 1 OF THE MARYLAND STATE HIGHWAY ADMINISTRATION BOOK OF STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES, THE 2009 EDITION OF THE MUTCD, THE MD MUTCD, AND THIS PLAN.
  - NO WORK IS TO BEGIN UNTIL ALL ADVANCE WARNING SIGNS, DRUMS ARE IN PLACE AND OPERATIONAL.
  - TRAFFIC CONTROL DEVICES SHOWN ON THIS PLAN MAY BE MODIFIED BASED ON FIELD CONDITIONS, AS DIRECTED BY THE ENGINEER.
  - PRIOR TO THE START OF CONSTRUCTION OF THE STORM DRAIN AND SEWER SYSTEM, THE CONTRACTOR SHALL MEET WITH THE CONSTRUCTION INSPECTION DIVISION (C.I.D.) INSPECTOR AND HOWARD COUNTY TRAFFIC TO REVIEW THE CONSTRUCTION SEQUENCE FOR THE UTILITY SEGMENTS AND GO OVER THE MAINTENANCE OF TRAFFIC (M.O.T.) PLAN AND ANY DETAIL NO INCLUDED IN THESE PLANS.

- SEQUENCE OF CONSTRUCTION**
- INSTALL TEMPORARY TRAFFIC CONTROL DEVICES AND SIGNING AS SHOWN ON PLAN.
  - INSTALL CHANNELIZATION AND FLAGGING OPERATION AS REQUIRED DAILY FOR JONES ROAD - ROAD IMPROVEMENTS. TRAFFIC SHALL BE FREE FLOWING AT THE END OF EVERY DAY.
  - INSTALL EROSION AND SEDIMENT CONTROL DEVICES AS SHOWN ON THE PHASE - 2 GRADING, SOIL EROSION AND SEDIMENT CONTROL PLAN (SHEET 8).
  - CONSTRUCT PROPOSED IMPROVEMENTS AS SHOWN ON THE JONES ROAD - ROAD IMPROVEMENTS AND CROSS SECTIONS PLAN (SHEETS 2-4).

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 11/23/20  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 12-2-20  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 11/10/20  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN  
 MAINTENANCE OF TRAFFIC PLAN**

**GREENWOOD VILLAGE - PHASE 1**  
 LOTS 1-4, NON-BUILDABLE BULK PARCELS A-C  
 AND OPEN SPACE LOTS 5-11  
 A RE-SUBDIVISION OF THE "NORDAU SUBDIVISION" - SECTION E-4  
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TAX MAP: 42 GRID: 24 PARCEL: 136 & 138-140  
 8TH ELECTION DISTRICT ZONED: R-12 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
 +  
**TIMMONS GROUP**  
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DESIGN BY: RHV  
 DRAWN BY: RHV  
 CHECKED BY: RHV  
 DATE: MARCH 2020  
 SCALE: AS SHOWN  
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PROFESSIONAL CERTIFICATE  
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23 SHEET OF 23

ROBERT H. VOGEL, PE No. 16193