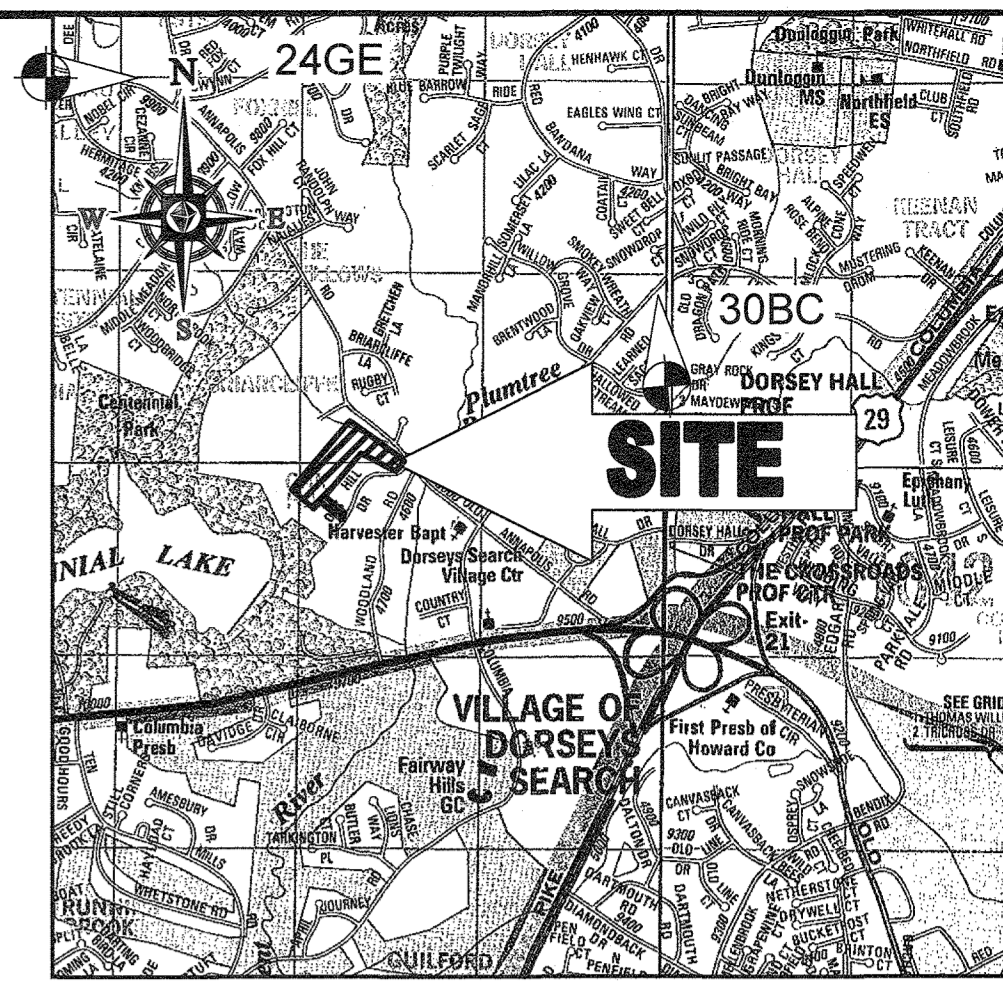


PUBLIC WATER & PUBLIC SEWER PLAN

FOR

OAK HILL SUBDIVISION

LOTS 1 THRU 6 (RESUBDIVISION OF LOT 16)



VICINITY MAP

COPYRIGHT ADC THE MAP PEOPLE
 PERMIT USE NO. 20602153-5
 SCALE: 1"=200'
 ADC MAP COORDINATES: 4935-52

GENERAL NOTES

- APPROXIMATE LOCATIONS OF EXISTING MAINS ARE SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING MAINS AND SERVICES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTOR'S EXPENSE.
- TOPOGRAPHIC FIELD SURVEYS WERE PERFORMED BY CONTROL POINT ASSOCIATES, INC. ON 5/5/2016.
- HORIZONTAL AND VERTICAL CONTROLS:
 - GEODETIC SURVEY CONTROL - 24GE CONC. MON. ELEV. 445.609 N 578.708.500 E 1,352,699.732
 - GEODETIC SURVEY CONTROL - 30BC CONC. MON. ELEV. 366.732 N 576.751.268 E 1,357,633.282
- THE COORDINATES SHOWN ON THE DRAWINGS ARE BASED ON MARYLAND STATE REFERENCE SYSTEM NAD 83/91 AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS NO. 24GE AND NO. 30BC.
- ALL VERTICAL CONTROLS ARE BASED ON NAVD83. VERTICAL CONTROLS PROVIDED ON THE DRAWINGS ARE 24GE.
- ALL PIPE ELEVATIONS SHOWN ARE INVERT ELEVATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
- CLEAR ALL UTILITIES BY A MINIMUM OF 12 INCHES. CLEAR ALL POLES BY 6" MINIMUM OR TUNNEL AS REQUIRED UNLESS OTHERWISE NOTED. THE OWNER HAS CONTACTED THE UTILITY COMPANIES AND HAS MADE ARRANGEMENTS FOR BRACING OF POLES AS SHOWN ON THE DRAWINGS. IN THE EVENT THE CONTRACTOR'S WORK REQUIRES THE BRACING OF ADDITIONAL POLES, ANY COST INCURRED BY THE OWNER FOR THE BRACING OF ADDITIONAL POLES OR DAMAGES SHALL BE DEDUCTED FROM MONIES OWED BY THE CONTRACTOR. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO SECURE THE BRACING OF THE POLES.
- FOR DETAILS NOT SHOWN ON THE DRAWING AND FOR MATERIALS AND CONSTRUCTION METHODS, USE HOWARD COUNTY DESIGN MANUAL VOLUME IV, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION (LATEST EDITION). THE CONTRACTOR SHALL HAVE A COPY OF VOLUME IV ON THE JOB.
- WHERE TEST PITS HAVE BEEN MADE ON EXISTING UTILITIES, THEY ARE NOTED BY THE SYMBOL AT THE LOCATIONS OF THE TEST PITS. A NOTE OR NOTES CONTAINING THE RESULT OF THE TEST PIT OR PITS IS INCLUDED ON THE DRAWINGS. EXISTING UTILITIES IN THE VICINITY OF THE PROPOSED WORK FOR WHICH TEST PITS HAVE NOT BEEN DUG SHALL BE LOCATED BY THE CONTRACTOR TWO WEEKS IN ADVANCE OF CONSTRUCTION OPERATIONS AT HIS OWN EXPENSE.
- THE CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITY COMPANIES OR AGENCIES AT LEAST FIVE WORKING DAYS BEFORE STARTING WORK SHOWN ON THESE PLANS.
 - AT & T 1-800-252-1133
 - BGE (CONSTRUCTION SERVICES) 410-637-8713
 - BGE (EMERGENCY) 410-685-9122
 - BUREAU OF UTILITIES 410-313-4900
 - COLONIAL PIPELINE COMPANY 410-795-1390
 - MISS UTILITY 1-800-257-7777
 - VERIZON 1-800-743-0033
- TREES AND SHRUBS ARE TO BE PROTECTED FROM DAMAGE TO THE MAXIMUM EXTENT. TREES AND SHRUBS LOCATED WITHIN THE CONSTRUCTION STRIP ARE NOT TO BE REMOVED OR DAMAGED BY THE CONTRACTOR.
- THE CONTRACTOR SHALL REMOVE TREES, STUMPS, AND ROOTS ALONG THE LINE OF EXCAVATION. PAYMENT FOR SUCH REMOVAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONSTRUCTION OF THE MAIN.
- THE CONTRACTOR SHALL NOTIFY THE BUREAU OF HIGHWAYS, HOWARD COUNTY, AT (410)313-7450 AT LEAST FIVE WORKING DAYS BEFORE OPEN CUTTING OR BORING/JACKING OF ANY COUNTY ROAD FOR LAYING WATER/SEWER MAINS OR HOUSE CONNECTIONS. THE APPROVAL OF THESE DRAWINGS WILL CONSTITUTE COMPLIANCE WITH DPW REQUIREMENTS PER SECTION 18.114(A) OF THE HOWARD COUNTY CODE.
- WAIVER DMV2-18-008 WAS APPROVED BY DPW ON 3/12/18 TO PROVIDE A 20" STEEL CASING PIPE, 2.11' OF SEPARATION BETWEEN THE STREAM BOTTOM AND STEEL CASING PIPE, AND 2.6' OF COVER OVER THE 8" SANITARY SEWER CARRIER PIPE.

WATER NOTES

- ALL WATER MAINS TO BE P.V.C. C900 UNLESS OTHERWISE NOTED.
- TOPS OF ALL WATER MAINS TO HAVE A MINIMUM OF 3'-6" OF COVER UNLESS OTHERWISE NOTED.
- VALVES ADJACENT TO TEES SHALL BE STRAPPED TO TEES.
- ALL FITTINGS SHALL BE BUTTRESSED OR ANCHORED WITH CONCRETE IN ACCORDANCE WITH THE STANDARD DETAILS UNLESS OTHERWISE PROVIDED FOR ON THE DRAWINGS.
- FIRE HYDRANTS SHALL BE SET TO THE BURY LINE ELEVATIONS SHOWN ON THE DRAWINGS. ALL FIRE HYDRANTS SHALL BE RESTRAINED AND BUTTRESSED WITH CONCRETE IN ACCORDANCE WITH THE STANDARD DETAILS. THE SOIL AROUND THE FIRE HYDRANT SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 1000 AND 1005 OF THE STANDARD SPECIFICATIONS.
- THE CONTRACTOR SHALL NOT OPERATE ANY WATER MAIN VALVES ON THE EXISTING WATER SYSTEM.
- TRACER WIRES AND CONTINUITY TEST STATION SHALL BE INSTALLED ON ALL DIP AND PVC WATER MAINS IN ACCORDANCE WITH HOWARD COUNTY DESIGN MANUAL.
- FOR PVC WATER MAINS, ALL RECORDS FOR THE QUALITY CONTROL AND QUALIFICATIONS TEST REQUIREMENTS NOTED IN SECTION 5.1 OF THE AWWA STANDARD C900 FOR PVC PRESSURE PIPE SHALL BE SUBMITTED WITH PIPE MATERIALS CERTIFICATIONS OR SHOP DRAWINGS PRIOR TO APPROVAL OF THE MATERIAL FOR USE. THE TEST RECORDS SHALL BE FOR THE PIPE TO BE INSTALLED UNDER THIS CONTRACT. ALL PVC PIPE SHALL CONTAIN MARKINGS TO ALLOW CROSS REFERENCING OF THE PIPE SUPPLIED TO THE TEST RECORDS RECEIVED.
- UNLESS OTHERWISE NOTED ON THE PLANS OR IN THE SPECIFICATIONS SACRIFICIAL ANODES SHALL BE ON ALL VALVES AND METALLIC FITTINGS USED WITH PVC WATER MAINS. IN ACCORDANCE WITH VOLUME IV, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION, SEVENTEEN (17) POUND MAGNESIUM ANODES SHALL BE INSTALLED ON ALL VALVES AND DUCTILE IRON FITTINGS INCLUDING RESTRAINS AND HARNESSES. TWELVE (12) POUND ZINC ANODES SHALL BE INSTALLED ON ALL STAINLESS STEEL FITTINGS AND SADDLES USED WITH PVC MAINS. ALL "TEES" USED WITH PVC MAINS SHALL BE DUCTILE IRON.
- PROPER ASSEMBLY OF GASKETED PVC PIPE JOINTS: THE MANUFACTURER'S INSERTION LINE OF GASKETED PVC PIPE JOINTS INDICATES THE MAXIMUM DEPTH OF INSERTION OF THE SPIGOT INTO THE BELL. AFTER ASSEMBLY OF THE JOINT, THE INSERTION LINE SHALL REMAIN VISIBLE. DUAL INSERTION LINES ON GASKETED PVC PIPE SHALL INDICATE THE MAXIMUM AND MINIMUM DEPTH OF INSERTION OF THE SPIGOT INTO THE BELL. THE CONTRACTOR SHALL NOT OVER INSERT OR OVER HOME THE SPIGOT INTO THE BELL OF PVC PIPE.
- ALL CHANGES IN HORIZONTAL OR VERTICAL DIRECTION OF PVC WATER PIPE SHALL BE MADE WITH STANDARD BENDS, 5-DEGREE SWEEPS OR HIGH DEFLECTION (HD) COUPLINGS. NO BENDING OF THE PIPE OR DEFLECTING OF PVC PIPE JOINTS IS PERMITTED WHERE HIGH DEFLECTION COUPLINGS OR 5-DEGREE SWEEPS ARE PERMITTED. THE CONTRACTOR SHALL PROVIDE ONE FULL PIPE LENGTH (20-FOOT LONG) ON EITHER SIDE OF THE HIGH DEFLECTION COUPLING OR 5-DEGREE SWEEP. THE CONTRACTOR SHALL USE A VIBRATORY PLATE COMPACTOR OR OTHER APPROVED MEANS TO TIGHTLY COMPACT THE 857 STONE ON BOTH SIDES OF THE HIGH DEFLECTION COUPLING OR 5-DEGREE SWEEP, TAKING CARE NOT TO USE COMPACTION EQUIPMENT DIRECTLY OVER THE FITTING.
- PVC HIGH DEFLECTION COUPLINGS SHALL BE LIMITED TO A TOTAL DEFLECTION OF 3-DEGREES (1 1/2-DEGREE ON EITHER END OF THE COUPLING). SHALL BE RATED FOR A MINIMUM 200 PSI MEETING THE REQUIREMENTS OF AWWA C900. SHALL HAVE A MINIMUM LAY LENGTH OF 8-INCHES AND SHALL HAVE CENTER STOPS. PVC HIGH DEFLECTION COUPLINGS SHALL BE CERTAINTY PVC HIGH DEFLECTION (HD) STOP COUPLINGS OR EQUAL.
- FIVE DEGREE SWEEPS SHALL BE BELL BY SPIGOT, RATED FOR A MINIMUM 225 PSI, DR18 MEETING THE REQUIREMENTS OF AWWA C900 AND SHALL BE MULTI FITTINGS (IPEX) BLUE BRUTE DR18 OR EQUAL.
- WHEN PVC HIGH DEFLECTION COUPLINGS OR PVC 5-DEGREE SWEEPS ARE USED TO FACILITATE CHANGES IN HORIZONTAL OR VERTICAL ALIGNMENTS OF AWWA C-900 PVC PIPE, THE CONTRACTOR SHALL INSTALL DEVICES FOR THE PREVENTION OF OVER-INSERTION OF THE PVC PIPE SPIGOTS OR PLAIN ENDS INTO THE PUSH ON BELL JOINT ON BOTH SIDES OF THE HIGH DEFLECTION COUPLINGS AND 5 DEGREE SWEEPS. BELL STOPS SHALL BE PLACED TO PREVENT OVER-INSERTION OF THE FITTING. THE BELL STOP SHALL BE MANUFACTURED OF DUCTILE IRON AND INCORPORATE AN EXPANSION RETENTION SPRING TO ALLOW FOR PIPE EXPANSION AND CONTRACTION. THE BELL STOPS SHALL BE SERIES 5000 MEGA-STOP, AS MANUFACTURED BY EBAA IRON, INC. OR APPROVED EQUAL.
- ALL SINGLE FAMILY DWELLINGS REQUIRE A MINIMUM OF 1'-1 1/2" W/C WITH 1" METER, OUTSIDE SETTING.

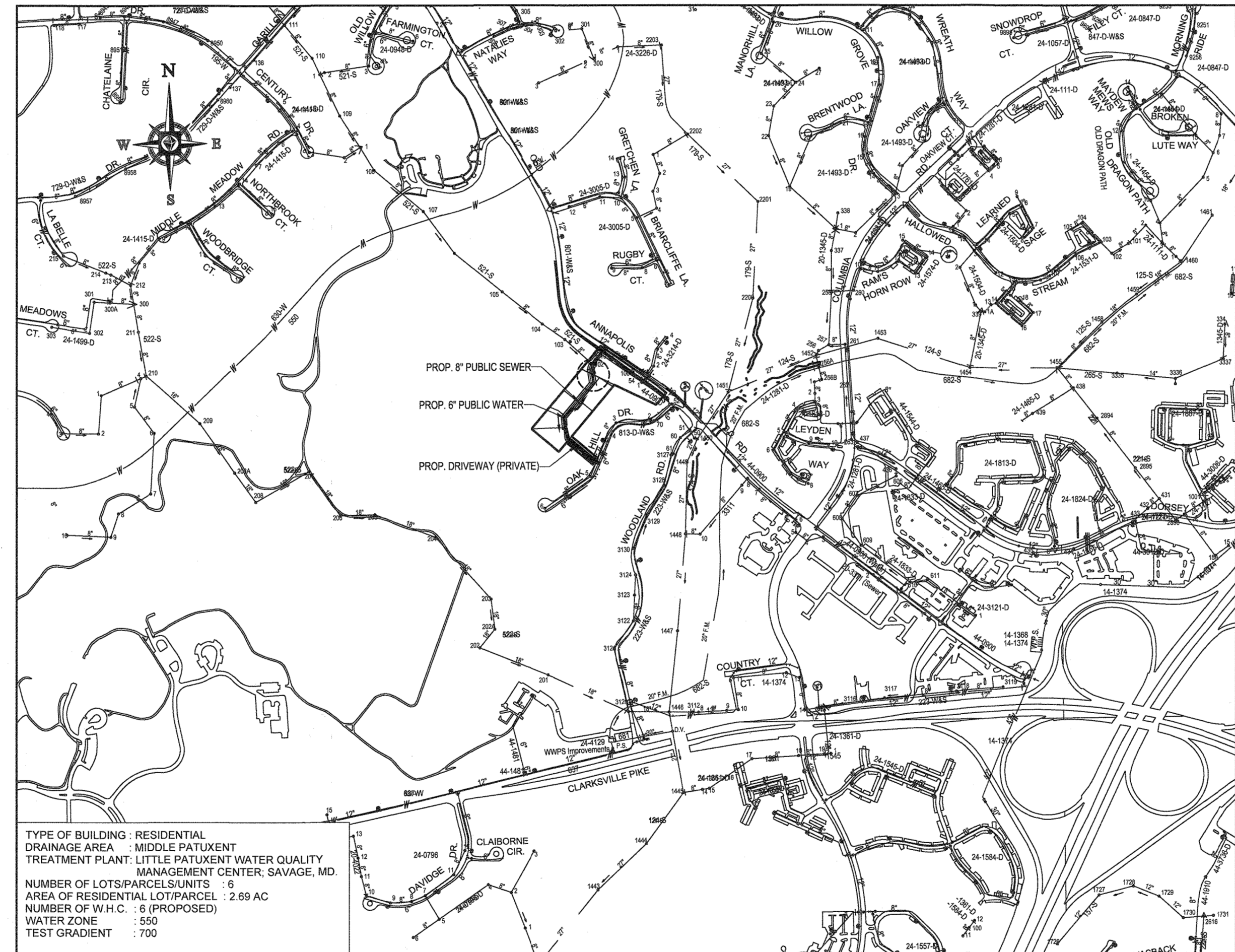
SEWER NOTES

- ALL SEWER MAINS SHALL BE DIP OR P.V.C. UNLESS OTHERWISE NOTED.
- ALL MANHOLES SHALL BE 4' - 0" INSIDE DIAMETER UNLESS OTHERWISE NOTED.
- FORCE MAINS SHALL BE D.I.P. ONLY.
- MANHOLES SHOWN WITH 12" AND 16" WALLS ARE FOR BRICK MANHOLES ONLY.
- MANHOLES DESIGNATED W.T. IN PLAN AND PROFILE SHALL HAVE WATERTIGHT FRAME AND COVERS. STANDARD DETAIL G5.52 WHERE WATER TIGHT FRAME AND COVER IS USED. SET TOP OF FRAME 1' - 6" ABOVE FINISHED GRADE UNLESS OTHERWISE NOTED ON THE DRAWINGS.



THE FOLLOWING STATES REQUIRE NOTIFICATION BY EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN THE STATE OF VIRGINIA, MARYLAND, THE DISTRICT OF COLUMBIA, AND DELAWARE: CALL - 811 (VA 1-800-345-4444) (PA 1-800-342-1776) (DC 1-800-257-7777) (WA 1-800-552-7001) (MD 1-800-257-7777) (DE 1-800-292-8550)

LOCATION OF SITE
 9692 OAK HILL DRIVE
 ELLICOTT CITY, MD
 MAP 30, GRID 3, PARCELS 368 (LOT 16) & 321
 2ND ELECTION DISTRICT, ZONED: R-20
 HOWARD COUNTY
 CONTRACT No. 24-5002-D



LOCATION MAP
 SCALE: 1"=600'

REFERENCE FILES: F-78-191, WP-17-014, F-17-957, DMV2-18-008

TYPE OF BUILDING: RESIDENTIAL
 DRAINAGE AREA: MIDDLE PATUXENT
 TREATMENT PLANT: LITTLE PATUXENT WATER QUALITY MANAGEMENT CENTER, SAVAGE, MD
 NUMBER OF LOTS/PARCELS/UNITS: 6
 AREA OF RESIDENTIAL LOT/PARCEL: 2.69 AC
 NUMBER OF W.H.C.: 6 (PROPOSED)
 WATER ZONE: 550
 TEST GRADIENT: 700

SHEET INDEX	
SHEET TITLE	SHEET NUMBER
TITLE SHEET	1
PROP. PUBLIC 6" WATER & PUBLIC 8" SANITARY SEWER PLAN	2
PROP. PUBLIC 6" WATER & PUBLIC 8" SANITARY SEWER PROFILE	3
STREAM CROSSING, NOTES & DETAILS	4

BENCHMARK	
GEODETIC SURVEY CONTROL - 24GE CONC. MON. ELEV. 445.609 N 578.708.500 E 1,352,699.732	
GEODETIC SURVEY CONTROL - 30BC CONC. MON. ELEV. 366.732 N 576.751.268 E 1,357,633.282	

QUANTITIES TABLE				
ITEMS	QUANTITIES ESTIMATED	QUANTITIES	AS-BUILT TYPE	MANUFACTURER / SUPPLIER
1/8" BEND	2 EA	2		U.S. Pipe
1/16" BEND	6 EA	6		U.S. Pipe
1/32" BEND	1 EA	1		U.S. Pipe
HIGH DEFLECTION COUPLING	0 EA	N/A		
5" SWEEP	0 EA	N/A		
1 1/2" WHC	6 EA	6		Home Concrete
1 1/2" COPPER WATERLINE	90 LF	88'		Cambridge Lee
6" AIR RELEASE VALVE	1 EA	1		Cla-Val
6" PVC C-900 (DR-18) WATERLINE	343 LF	350'		National Pipe
6" DIP CL 54 WATERLINE	572 LF	570'		U.S. Pipe
FIRE HYDRANTS	1 EA	1 EA		American Darling
6" X 6" WET TAP	1 EA	1 EA		American Flow Control/Ford Meter Co.
12" X 6" WET TAP	1 EA	1 EA		American Flow Control/Ford Meter Co.
6" VALVE	3 EA	3 EA		American Flow Control
6" X 6" TEE	3 EA	3 EA		U.S. Pipe
8" DIP SEWER	4 LF	40'		U.S. Pipe
4" SCH. 40 PVC SHC	8 LF	82.1'		National Pipe
8" SDR 35 PVC SANITARY LINE	5 LF	43.1'		National Pipe
SANITARY CLEANOUT	6 EA	6 EA		National Pipe
SANITARY MANHOLE	2 EA	2 EA		Contractor's Precast
TYPE 'A' SANITARY DROP MANHOLE	1 EA	1 EA		Contractor's Precast
TYPE 'B' SANITARY DROP MANHOLE	1 EA	1 EA		Contractor's Precast
20" STEEL CASING PIPE	1 LF	36'		
NAME OF UTILITY CONTRACTOR:				
CHECKBOX				
AS-BUILT DATE				
SURVEY AND DRAFTING DIVISION				

(Included Drop Iron Pipe for Total)

PLAT & FINAL PLAN REFERENCE: F-17-057
 THIS PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD COUNTY SOIL CONSERVATION DISTRICT.
 John R. Robertson
 DATE: 11/20/18

OWNER / DEVELOPER:

6314 GOLDEN STAR PLACE
 COLUMBIA, MD 21044
 CONTACT: BRIAN GOLDSTEIN
 PHONE: 301.875.8480

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND
 Chief, Bureau of Utilities
 DATE: 11-2-18

DEPARTMENT OF PLANNING & ZONING HOWARD COUNTY, MARYLAND
 Chief, Development Engineering Division
 DATE: 11-29-18

BOHLER ENGINEERING
 901 DULANEY VALLEY ROAD, SUITE 801
 TOWSON, MARYLAND 21284
 Phone: (410) 821-7900
 Fax: (410) 821-7987
 www.BohlerEngineering.com

B.R. ROWE
 PROFESSIONAL ENGINEER
 License No. 40986
 State of Maryland
 DATE: 7/23/18

REV.	DATE	DESCRIPTION	BY
1	10/29/18	UPDATED WATER AND SEWER DESIGN PER SITE GRADING CHANGES	RLB

PARCEL NO.	368 (LOT 16) & 321
600' SCALE MAP NO.	30
BLOCK NO.	3

OAK HILL SUBDIVISION
 SCALE AS SHOWN
 SHEET 1 OF 4

WATER MAIN TABULATION CHART

STATION	FITTINGS	NORTHING	EASTING
STA 10+00.00 OFFSET 0.00'	6"X6" WET TAP SLEEVE & 6" VALVE	N 574816.1434	E 1355135.7546
STA 10+38.81 OFFSET 0.00'	1/32 HB	N 574631.9061	E 1355100.2885
STA 12+30.64 OFFSET 0.00'	1/16 HB W/ 2" ROTATION	N 574752.2126	E 1354950.8752
STA 12+51.94 OFFSET 0.00'	1/16 HB W/ 3" ROTATION	N 574770.9026	E 1354940.6608
STA 13+91.35 OFFSET 0.00'	1/8 HB	N 574899.9125	E 1354930.4266
STA 14+04.25 OFFSET 0.00'	HDC (3")	N 574917.3310	E 1354945.2899
STA 14+40.20 OFFSET 0.00'	FIRE HYDRANT #1 6"X6" TEE & VALVE	N 574944.6796	E 1354988.6266
STA 15+84.13 OFFSET 0.00'	5" SWEEP	N 575054.1605	E 1355062.0471
STA 16+54.79 OFFSET 0.00'	1/8 HB	N 575107.9160	E 1355107.9169
STA 16+74.79 OFFSET 0.01'	5" SWEEP	N 575127.8537	E 1355106.3388
STA 17+24.26 OFFSET 0.00'	5" SWEEP	N 575176.6438	E 1355098.1516
STA 17+45.62 OFFSET 0.00'	1/16 HB W/ 14" ROTATION	N 575197.9343	E 1355096.4664
STA 17+77.98 OFFSET 0.00'	1/16 HB	N 575228.7182	E 1355106.4534
STA 17+89.51 OFFSET 0.00'	HDC (3")	N 575237.4863	E 1355113.9352
STA 18+92.11 OFFSET 0.00'	HDC (2")	N 575315.5355	E 1355180.5360
STA 19+14.23 OFFSET 0.00'	12"X6" WET TAP SLEEVE & 6" VALVE	N 575333.5002	E 1355193.4348

SEWER HOUSE CONNECTION AS-BUILT LOCATION TABLE

LOT NUMBER	ADDRESS	LOCATION DIMENSION 1	LOCATION DIMENSION 2
LOT 1	9311	Lot 2 W/C to Lot 1 SHC 20'	SHC to SMH 15'
LOT 2	9315	20' to W/C	29' to SMH 3
LOT 3	9319	11' to W/C	56' to Hydrant
LOT 4	9323	7' to W/C	32' to SHC Lot 5
LOT 5	9320	20' to W/C	32' to SHC Lot 4
LOT 6	9316	20' to W/C	12' to Hydrant

WATER HOUSE CONNECTION AS-BUILT LOCATION TABLE

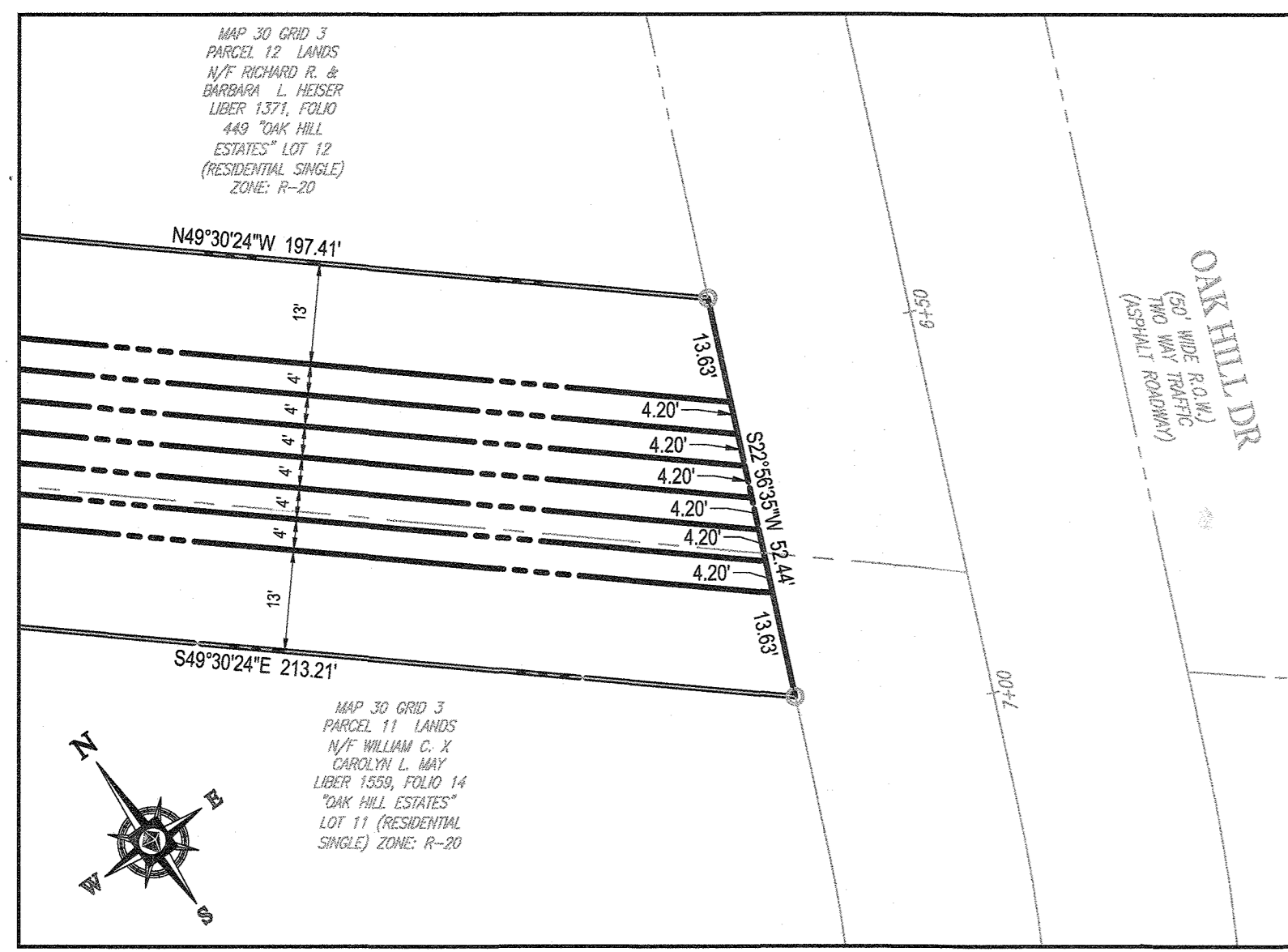
LOT NUMBER	ADDRESS	LOCATION DIMENSION 1	LOCATION DIMENSION 2
LOT 1	9311	20' to SHC	25' to SMH 9
LOT 2	9315	20' to SHC	25' to SMH 9
LOT 3	9319	11' to SHC	46' to Hydrant
LOT 4	9323	7' to SHC	32' to Lot 5 W/C
LOT 5	9320	20' to SHC	32' to SHC Lot 4
LOT 6	9316	20' to SHC	20' to Hydrant

SANITARY STRUCTURE SCHEDULE

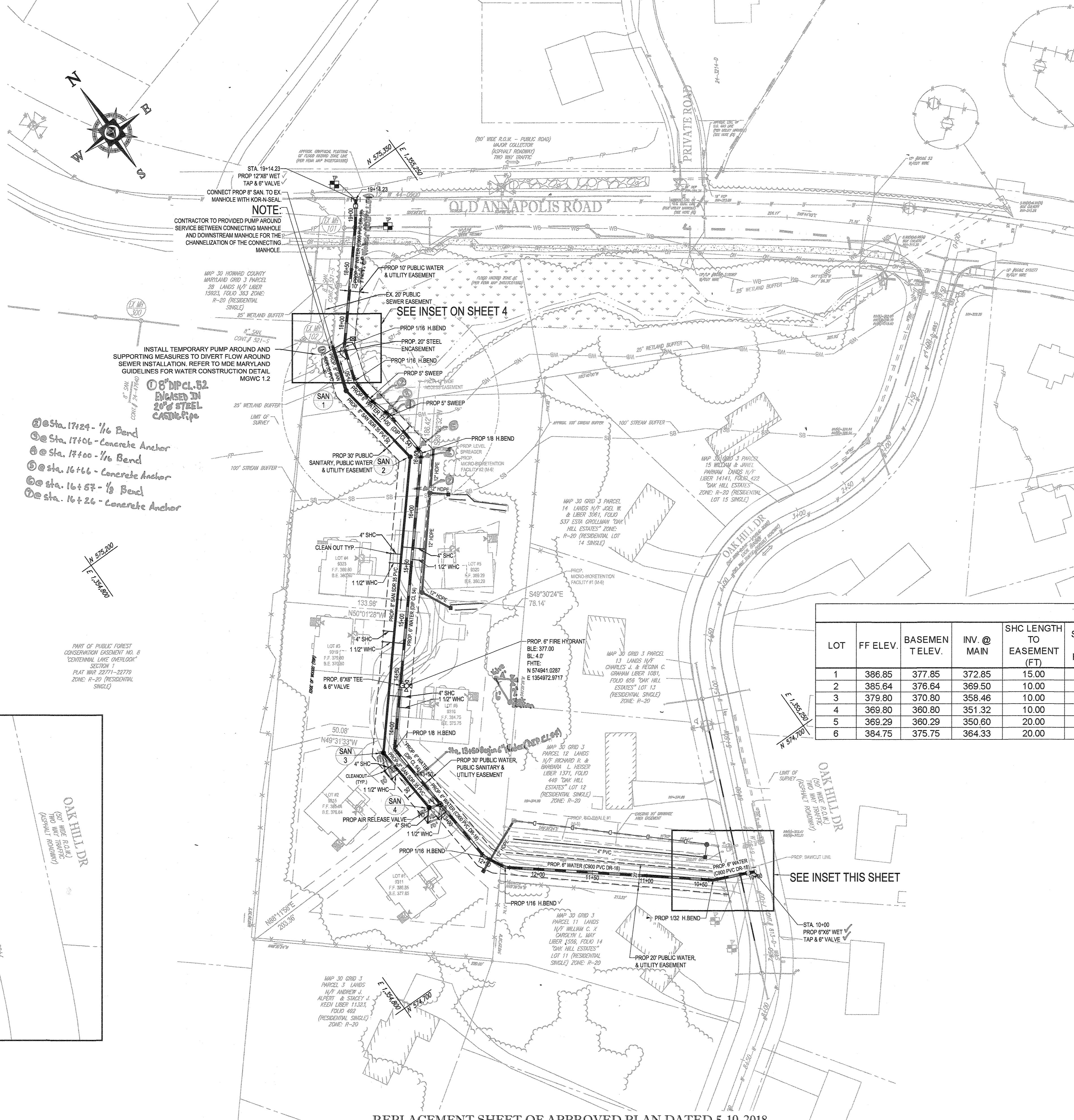
MANHOLE	NORTHING	EASTING	RIM ELEV. (FT.)
1	N 575195.0485	E 1355084.6756	328.11
2	N 575110.9370	E 1355097.3489	349.75
3	N 574903.2527	E 1354920.1309	383.19
4	N 574837.8550	E 1354925.3074	383.55
102	N 575236.5024	E 1355096.4660	328.81

SHC TABLE

LOT	FF ELEV.	BASEMENT T ELEV.	INV. @ MAIN	SHC LENGTH TO EASEMENT (FT)	SHC SLOPE WITHIN EASEMENT	INVERT @ EASEMENT	SHC SLOPE WITHIN LOT	MAX. SHC LENGTH (FT)	2.50 FT BELOW BASEMENT	MIN. BASEMENT ELEV. (MBE)	CONNECTION TYPE
1	386.85	377.85	372.85	15.00	2.0%	373.15	2.0%	105.00	2.50	377.75	STD SHC
2	385.64	376.64	369.50	10.00	2.0%	369.70	2.0%	110.00	2.50	374.40	STD SHC
3	379.80	370.80	358.46	10.00	2.0%	358.66	2.0%	63.00	2.50	362.42	DROP TYPE A
4	369.80	360.80	351.32	10.00	2.0%	351.52	2.0%	63.00	2.50	355.28	DROP TYPE A
5	369.29	360.29	350.60	20.00	2.0%	351.00	2.0%	68.00	2.50	354.86	DROP TYPE A
6	384.75	375.75	364.33	20.00	2.0%	364.73	2.0%	68.00	2.50	368.59	DROP TYPE A



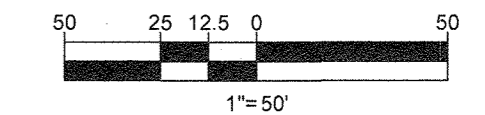
FRONT FOOT SKETCH
SCALE: 1" = 20'



REPLACEMENT SHEET OF APPROVED PLAN DATED 5-10-2018

TEST PIT NOTE:

CONTRACTOR TO TEST PIT FOR EXACT LOCATION OF EXISTING UTILITY AND SUBMIT ANY DISCREPANCIES AT BOHLER ENGINEERING IN WRITING.



DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND

 CHIEF, BUREAU OF UTILITIES
 DATE: 11-2-18

DEPARTMENT OF PLANNING & ZONING HOWARD COUNTY, MARYLAND

 CHIEF, DEVELOPMENT ENGINEERING DIVISION
 DATE: 11-2-18

BOHLER ENGINEERING
 901 DULANEY VALLEY ROAD, SUITE 801
 TOWSON, MARYLAND 21204
 Phone: (410) 821-7900
 Fax: (410) 821-7987
 www.BohlerEngineering.com

B.R. ROWE

 PROFESSIONAL ENGINEER
 LICENSE NO. 40808, EXPIRATION DATE: 12/31/19

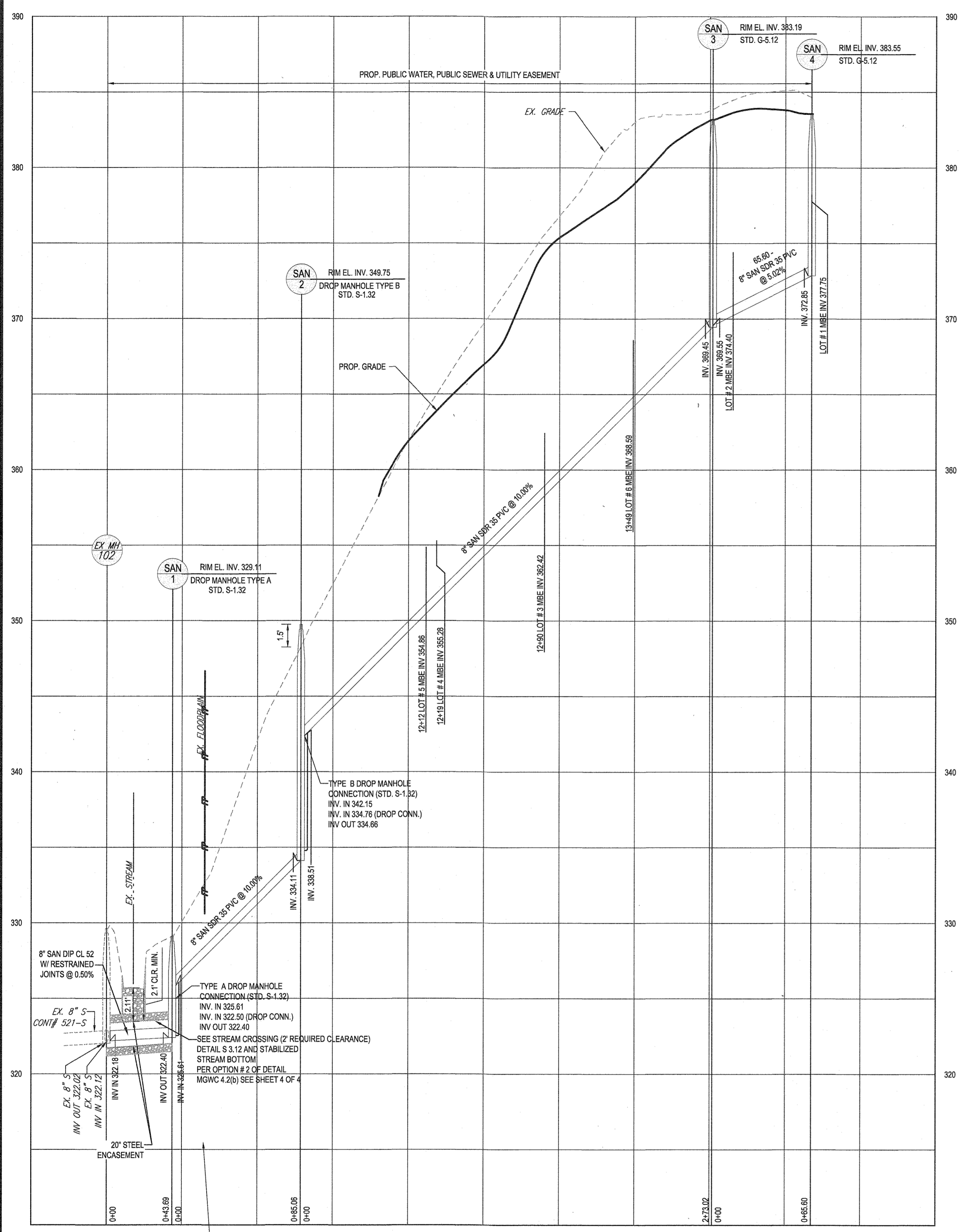
REV.	DATE	DESCRIPTION	BY
1	10/29/18	UPDATED WATER AND SEWER DESIGN PER SITE GRADING CHANGES	RLB

PROP. PUBLIC 6" WATER & PUBLIC 8" SANITARY SEWER PLAN

PARCEL NO. 368 (LOT 16) & 321
 600' SCALE MAP NO. 30 BLOCK NO. 3

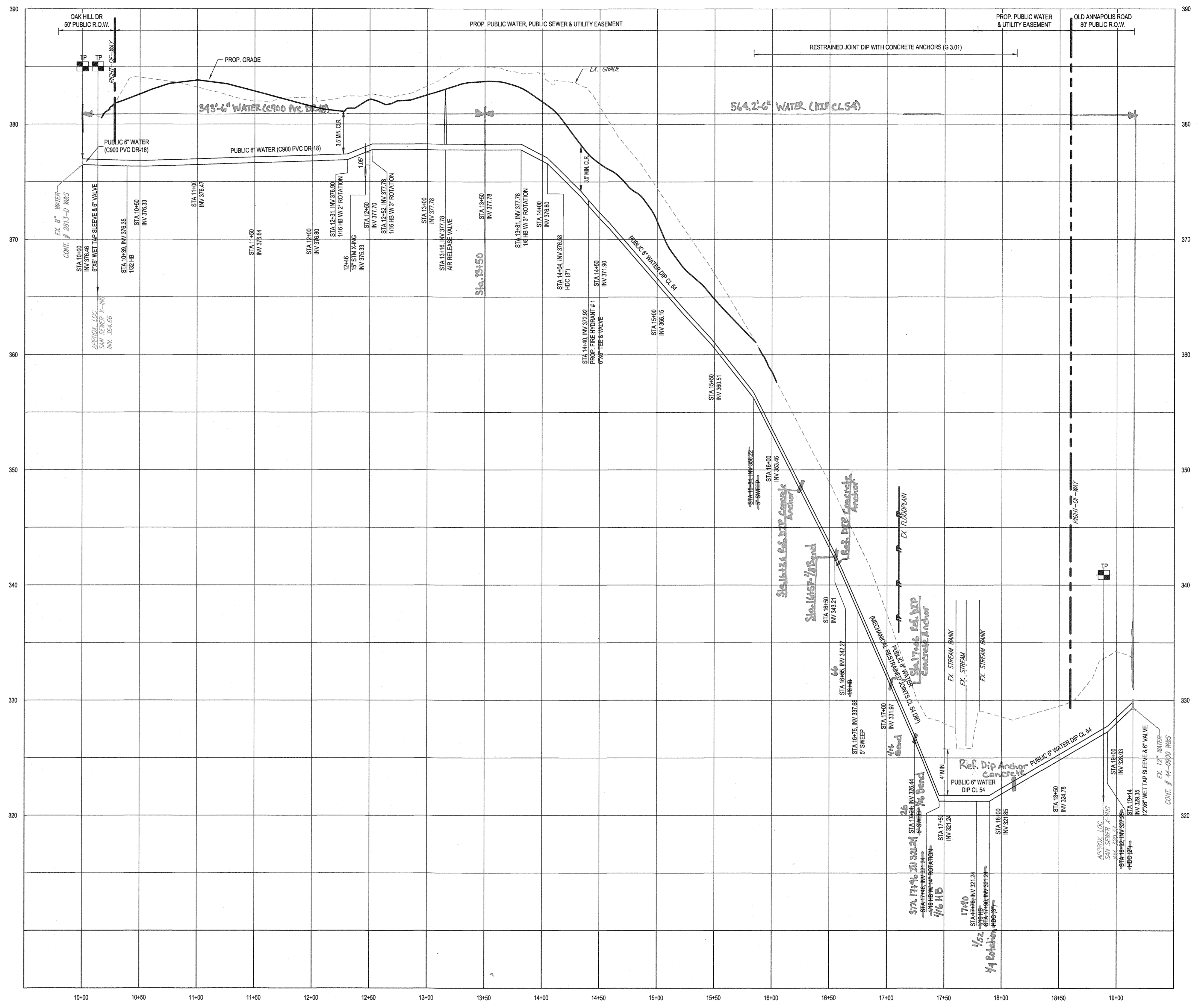
OAK HILL SUBDIVISION
 LOTS 1 - 6
 (RE-SUBDIVISION OF LOT 16)
 9692 OAK HILL DRIVE ELLICOTT CITY, MD
 MAP 30, GRID 3, PARCELS 368 (LOT 16) & 321
 2ND ELEC. DISTRICT, ZONED: R-12 HOWARD COUNTY
 CONTRACT No.: 24-5002-D

SCALE: 1" = 40'
 SHEET: 2 OF 4



8" SANITARY - PROFILE
 SCALE: 1"=50' HORIZONTAL
 1"=5' VERTICAL

NOTE: CONTRACTOR TO PROVIDED PUMP AROUND SERVICE BETWEEN CONNECTING MANHOLE AND DOWNSTREAM MANHOLE FOR THE CHANNELIZATION OF THE CONNECTING MANHOLE.



6" PUBLIC WATERLINE - PROFILE
 SCALE: 1"=50' HORIZONTAL
 1"=5' VERTICAL

REPLACEMENT SHEET OF APPROVED PLAN DATED 5-10-2018

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND
 Chief, Bureau of Utilities
 11-7-18

DEPARTMENT OF PLANNING & ZONING HOWARD COUNTY, MARYLAND
 Chief, Development Engineering Division
 11-29-18

BOHLER ENGINEERING
 901 DULANEY VALLEY ROAD, SUITE 801
 TOWSON, MARYLAND 21284
 Phone: (410) 821-7900
 Fax: (410) 821-7987
 www.BohlerEngineering.com

B.R. ROWE
 PROFESSIONAL ENGINEER
 MARYLAND LICENSE NO. 4008
 I, BRUCE R. ROWE, 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. 4008, EXPIRATION DATE: 12/31/19.

DES. AVG			
DRN. AVG			
CK. M.K.			
DATE: 7/23/18			
REV.	DATE	DESCRIPTION	BY
1	10/29/18	UPDATED WATER AND SEWER DESIGN PER SITE GRADING CHANGES	RLB

PROP. PUBLIC 6" WATER & PUBLIC 8" SANITARY SEWER PROFILE
 PARCEL NO. 368 (LOT 16) & 321
 600' SCALE MAP NO. 30 BLOCK NO. 3

OAK HILL SUBDIVISION
 LOTS 1 - 6
 (RE-SUBDIVISION OF LOT 16)
 9692 OAK HILL DRIVE ELLICOTT CITY, MD
 MAP 30, GRID 3, PARCELS 368 (LOT 16) & 321
 2ND ELEC. DISTRICT, ZONED: R-12 HOWARD COUNTY
 CONTRACT No.: 24-5002-D

SCALE
 1"=40' HOR.
 1"=4' VERT.
 SHEET
 3 OF 4

THE FOLLOWING STATES REQUIRE NOTIFICATION BY EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN THE STATE OF VIRGINIA, MARYLAND, THE DISTRICT OF COLUMBIA, AND DELAWARE CALL 811 (WV 1-800-245-4444) (PA 1-800-242-1776) (DC 1-800-257-7777) (VA 1-800-552-7801) (MD 1-800-257-7777) (DE 1-800-282-8355)

20.0 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION

DEFINITION
Using vegetation as cover for barren soil to protect it from forces that cause erosion.

PURPOSE
Vegetative stabilization specifications are used to promote the establishment of vegetation on exposed soil. When soil is stabilized with vegetation, the soil is less likely to erode and more likely to allow infiltration of rainfall, thereby reducing sediment loads and runoff to downstream areas, and improving wildlife habitat and visual resources.

CONDITIONS WHERE PRACTICE APPLIES
This practice shall be used on denuded areas as specified on the plans and may be used on highly erodible or critically eroding areas. This specification is divided into Temporary Seeding to quickly establish vegetative cover for short duration (up to one year), and Permanent Seeding for long term vegetative cover. Examples of applicable areas for Temporary Seeding are Temporary Soil Stockpiles, cleared areas being left idle between construction phases, dikes, ditches, and for Permanent Seeding are lanes, dunes, cut and fill slopes and other areas of final grade, former stockpiles and staging areas, etc.

EFFECTS OF WATER QUALITY AND QUANTITY
Planting vegetation in disturbed areas will have an effect on the water budget, especially on volumes and rates of run-off, infiltration, evaporation, transpiration, percolation, and groundwater recharge. Vegetation over time, will increase organic matter content and improve the water holding capacity of the soil and subsequent plant growth. Vegetation will help reduce the movement of sediment, nutrients and other chemicals carried by run-off to receiving waters. Plants will also help protect groundwater supplies by assimilating those substances present within the root zone. Sediment control devices must remain in place during grading, seeding, mulching and vegetative establishment to prevent large quantities of sediment and associated chemicals and nutrients from washing into surface waters.

SECTION 1 - VEGETATIVE STABILIZATION METHODS AND MATERIALS

A. Site Preparation

- Install erosion and sediment control structures (either temporary or permanent) such as diversion, grade stabilization structures, berms, waterways, or sediment control basins.
- Perform all grading operations at right angles to the slope. Final grading and shaping is not usually necessary for topsoil seeding.
- Schedule required soil tests to determine soil amendment composition and application rates for sites having disturbed area over 5 acres.

B. Soil Amendments (Fertilizer and Lime Specifications)

- Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas over 5 acres. Soil analysis may be performed by the University of Maryland or a recognized commercial laboratory. Soil samples taken for engineering purposes may also be used for chemical analysis.
- Fertilizers shall be uniform in composition, free flowing and suitable for accurate application by approved equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers shall be delivered to the site fully labeled according to the applicable state fertilizer laws and shall bear the name, trade name or trademark and warranty of the producer.
- Lime materials shall be ground limestone (hydrated or burnt lime may be substituted) which contains at least 50% total oxides (calcium oxide plus magnesium oxide). Limestone shall be ground to such fineness that at least 50% will pass through a #100 mesh sieve and 90-100% will pass through a #20 mesh sieve. iv. Incorporate lime and fertilizer into the top 3-5" of soil by disking or other suitable means.

C. Seeded Preparation

- Temporary Seeding** a. Seeded preparation shall consist of loosening soil to a depth of 3" to 5" by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or ripplers mounted on tractors. After the soil is loosened, it shall be rolled or dragged smooth, but left in the roughened condition. Sloped areas (greater than 3:1) should be tracked leaving the surface in an irregular condition with ridges running parallel to the contour of the slope. b. Apply fertilizer and lime as prescribed on the plans. c. In corporate lime and fertilizer into the top 3-5" of soil by disking or other suitable means.
- Permanent Seeding**
 - Minimum soil conditions required for permanent vegetative establishment:
 - Soil pH shall be between 6.0 and 7.0.
 - Soluble salts shall be less than 500 parts per million (ppm).
 - The soil shall contain less than 40% clay, but enough fine grained material (>30% silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception is if loesslike or silica loesslike or a sandy soil (<30% silt plus clay) would be acceptable.
 - Soil shall contain 1% minimum organic matter by weight.
 - Soil must contain sufficient pore space to permit adequate root penetration.
 - If these conditions cannot be met by soils on site, adding topsoil is required in accordance with Section 21 Standards and Specifications for Topsoil.
 - Areas previously graded in conformance with the drawings shall be maintained in a true and even grade, then scarified or otherwise loosened to a depth of 3-5" to permit bonding of the topsoil to the surface area and to create horizontal erosion check slots to prevent topsoil to the surface area and to create horizontal erosion check slots to prevent topsoil from sliding down a slope.

D. Seed Specifications

- All seed must meet the requirements of the Maryland State Seed Law. All seed shall be subject to re-testing by a recognized seed laboratory. All seed used shall have been tested within the 6 months immediately preceding the date of sowing such material on this job. Note: Seed tags shall be made available to the inspector to verify type and grade of seed used.
- Inoculant** - The inoculant for treating legume seed in the seed mixtures shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species. Inoculants shall not be used later than the date indicated in the container, and fresh inoculant as directed on package. Use four times the recommended rate when hydrosowing. Note: It is very important to keep inoculant as cool as possible until used. Temperature above 75°-80°F. can weaken bacteria and make the inoculant less effective.

E. Methods of Seeding

- Hydrosowing:** Apply seed uniformly with hydroseder (slurry includes seed and fertilizer), broadcast or drop seeded, or a cultipacker seeder.
 - If fertilizer is being applied at the time of seeding, the application rates amounts will not exceed the following: nitrogen: maximum of 100 lbs. per acre total of soluble nitrogen: P205 (phosphorus); 200 lbs/acre; K2O (potassium); 200 lbs/acre.
 - Lime - use only ground agricultural limestone. (Up to 3 tons per acre may be applied by hydrosowing). Normally, not more than 2 tons are applied by hydrosowing at any one time. Do not use burnt or hydrated lime when hydrosowing.
- Seed and fertilizer shall be mixed on site and seeding shall be done immediately and without interruption.
- Dry Seeding:** This includes use of conventional drop or broadcast spreaders. a. Seed spread dry shall be incorporated into the subsoil at the rates prescribed on the Temporary or Permanent Seeding Summaries or Tables 265 or 26. The seeded area shall then be rolled with a weighted roller to provide good seed to soil contact. b. Where practical, seed should be applied in two directions perpendicular to each other. Apply half the seeding rate in each direction.
- Drill or Cultipacker Seeding:** Mechanized seeders that apply and cover seed with soil.
 - Cultipacker seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering. Seedbed must be firm after planting.
 - Where practical, seed should be applied in two directions perpendicular to each other. Apply half the seed rate in each direction.

F. Mulch Specifications (In order of preference)

- Straw shall consist of thoroughly threshed wheat, rye or oat straw, reasonable bright in color, and shall not be rusty, moldy, caked, decayed, or excessively dusty and shall be free of noxious weed seeds as specified in the Maryland Seed Law.
- Wood Cellulose Fiber Mulch (WCFM)**
 - WCFM shall consist of specially prepared wood cellulose processed into a uniform fibrous physical state.
 - WCFM shall be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry.
 - WCFM, including dye, shall contain no germination or growth inhibiting factors. d. WCFM materials shall be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material shall form a blotter-like ground cover, on application, having moisture absorption and percolation properties and shall cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings.

E. WCFM material shall contain no elements or compounds at concentration levels that will be phytotoxic.

F. WCFM must conform to the following physical requirements: fiber length to approximately 10 mm., diameter approximately 1 mm., pH range of 4.0 to 8.5, ash content of 1.0% maximum and water holding capacity of 4.0 minimum. Note: Only sterile straw mulch should be used in areas where one species of grass is desired.

G. Mulching Seeded Areas - Mulch shall be applied to all seeded areas immediately after seeding.

I. If grading is completed outside of the seeding season, mulch along shall be applied as prescribed in this section and maintained until the seeding season returns and seeding can be performed in accordance with these specifications.

ii. When straw mulch is used, it shall be spread over all seeded areas at the rate of 2 tons/acre. Mulch shall be applied to a uniform loose depth of between 1" and 2". Mulch applied shall achieve a uniform distribution and depth so that the soil surface is not exposed. If a mulch anchoring tool is to be used, the rate should be increased to 2.5 tons/acre. iii. Wood cellulose fiber used as a mulch shall be applied at a net dry weight of 1,000 lbs. per acre. The wood cellulose fiber shall be mixed with water, and the mixture shall contain a maximum of 50 lbs. of wood cellulose fiber per 100 gallons of water.

H. Securing Straw Mulch (Muh Anchoring): Mulch anchoring shall be performed immediately following mulch application to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon size of area and erosion hazard:

i. A mulch anchoring tool is a tractor draw implement designed to punch and anchor mulch into the soil surface a minimum of two (2) inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. If used on a sloping land, this practice should be used on the contour if possible.

ii. Wood cellulose fiber may be used for anchoring straw. The fiber binder shall be applied at a net dry weight of 75 lbs./acre. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.

iii. Application of liquid binders should be heavier at the edges where wind catches mulch, such as in valleys and crest of banks. The remainder of area should appear uniform after binder application. Synthetic binders - such as Acrylic DLR (Agro-Tack), DCA-70 Perotect, Terra Tax II, Terra Tack AF or other approved equal may be used at rates recommended by the manufacturer to anchor mulch.

iv. Lightweight plastic netting may be stapled over the mulch according to manufacturer's recommendations. Netting is usually available in rolls 4' to 15' wide and 300 to 3,000 feet long.

J. Incremental Stabilization - Cut Slopes

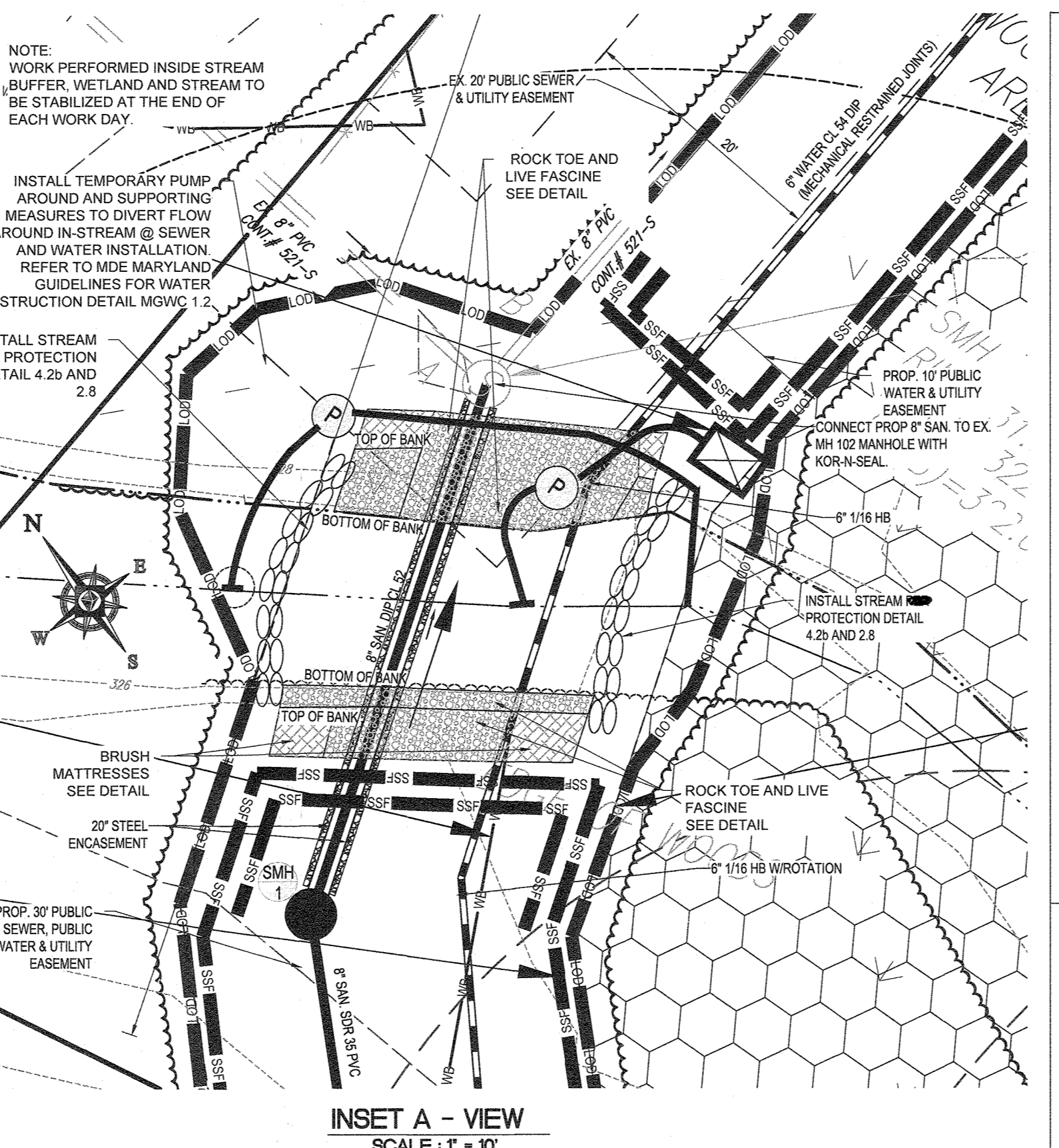
- All cut slopes shall be dressed, prepared, seeded and mulched as the work progresses. Slopes shall be excavated and stabilized in equal increments not to exceed 15'.
- Construction sequence (Refer to Figure 3 below):
 - Excavate and stabilize all temporary swales, side ditches, or berms that will be used to convey runoff from the excavation.
 - Perform Phase 1 excavation, dress, and stabilize.
 - Perform Phase 2 excavation, dress, and stabilize. Overseed previously seeded areas as necessary. Note: Once excavation has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation of completing out of the seeding season will necessitate the application of temporary stabilization.

K. Incremental Stabilization of Embankments - Fill Slopes

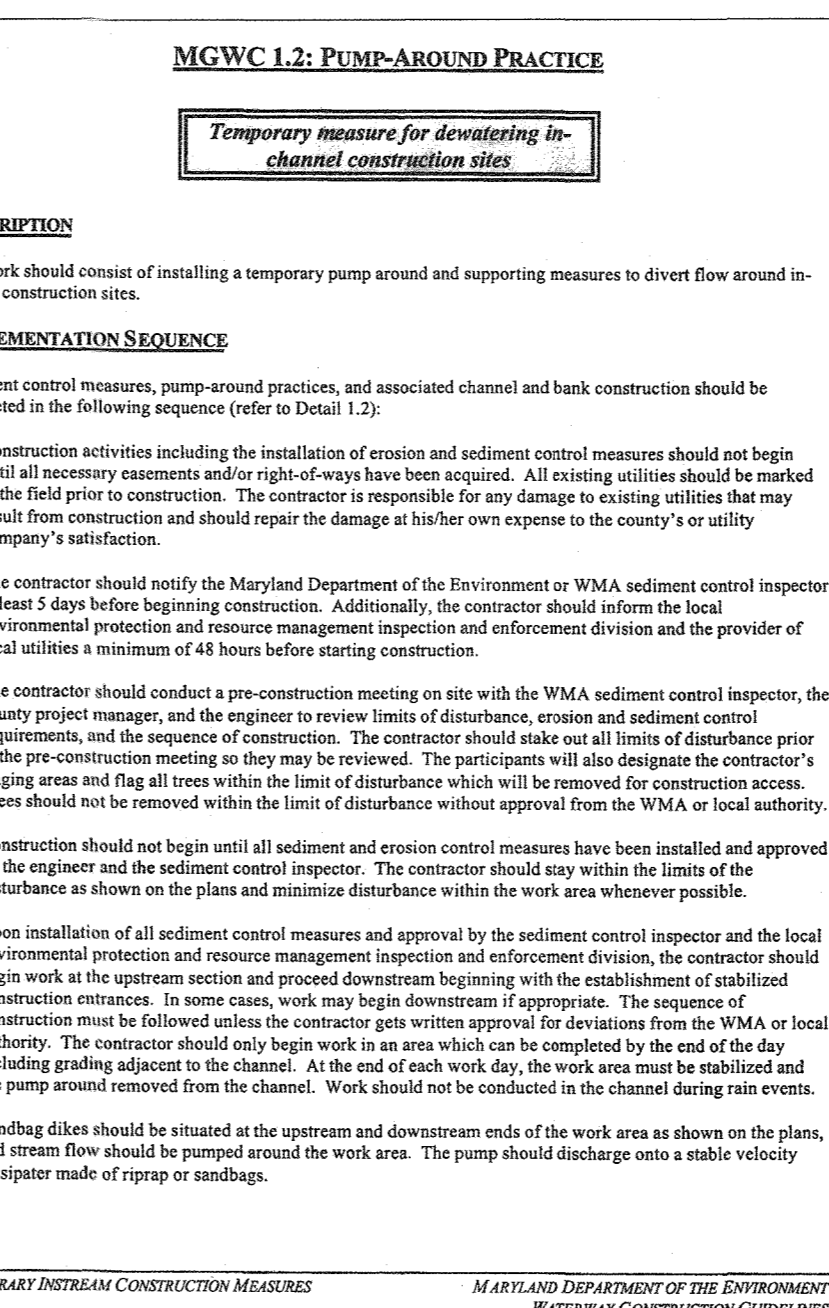
- Embankments shall be constructed in lifts as prescribed on the plans.
- Slopes shall be stabilized immediately when the vertical height of the multiple lifts reaches 15', or when the grading operation ceases as prescribed in the plans. a sediment trapping device.
- At the end of each day, temporary berms and pipe slope drains should be constructed along the top edge of the embankment to temporarily surface runoff and convey it down the slope in a non-erosive manner to
- Construction sequence: Refer to Figure 4 (below).
 - Excavate and stabilize all temporary swales, side ditches, or berms that will be used to divert runoff around the fill. Construct slope silt fence on low side of fill as shown in Figure 5, unless other methods shown on the plans address this area.
 - Place Phase 1 embankment, dress, and stabilize.
 - Place Phase 2 embankment, dress, and stabilize.
 - Place final phase embankment, dress, and stabilize. Overseed previously seeded areas as necessary. Note: Once the placement of fill has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

SEQUENCE OF CONSTRUCTION

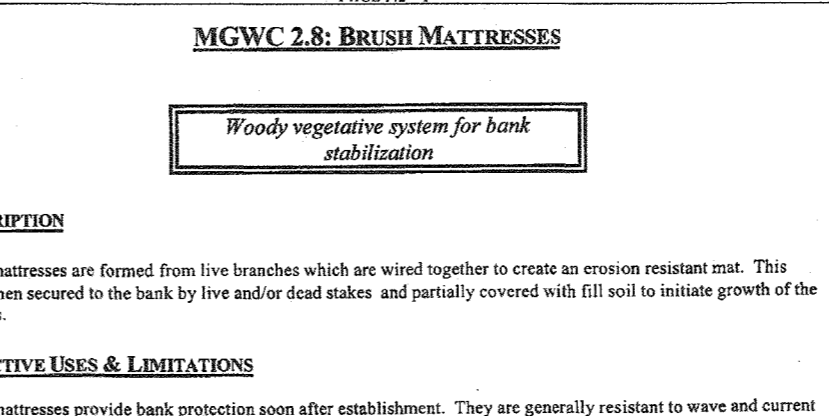
- DUE TO FISH SPAWING OR MIGRATION THE STREAM CHANNEL SHALL NOT BE DISTURBED FROM OCTOBER THROUGH APRIL 30. NO CONSTRUCTION SHALL BE DONE DURING THIS PERIOD.
- OBTAIN GRADING PERMIT.
- ONCE ALL PERMIT ARE IN HAND SCHEDULE MEETING IN THE FIELD WITH THE SEDIMENT CONTROL INSPECTOR - 1 DAY
- INSTALL ANY PERIMETER SEDIMENT CONTROLS AS NEEDED PARALLEL TO THE STREAM BANKS AS SHOWN - 3 DAYS
- INSTALL PUMP AROUND PRACTICE PER DETAIL MGWC 1.2 - 2 DAYS
- INSTALL 8" SEWER MAIN & 6" WATER MAIN PIPES. STABILIZE STREAM BOTTOM PER OPTION # 2 OF DETAIL MGWC 4.2(b) - 1 WEEK
- STABILIZE SLOPES UP GRADIENT OF THE STREAM BOTTOM PROTECTION WITH MATRESSES PER DETAIL MGWC 2.8 4 DAYS BRUSH
- SEED AND STABILIZE AREAS OUTSIDE OF THE STREAM BANKS PER STANDARDS SPECIFICATIONS FOR VEGETATIVE STABILIZATION - 2 DAYS
- REMOVE TEMPORARY PUMP AND PRACTICE - 1 DAY
- CONSTRUCT ENOUGH FOR ONE DAY'S WORK INCLUDING BACKFILL AND STABILIZING AREA DISTURBED.
- ONCE SEDIMENT CONTROL INSPECTORS SATISFIED THAT THE DISTURBED AREAS HAVE BEEN STABILIZED REMOVE SEDIMENT CONTROL - 3 DAYS



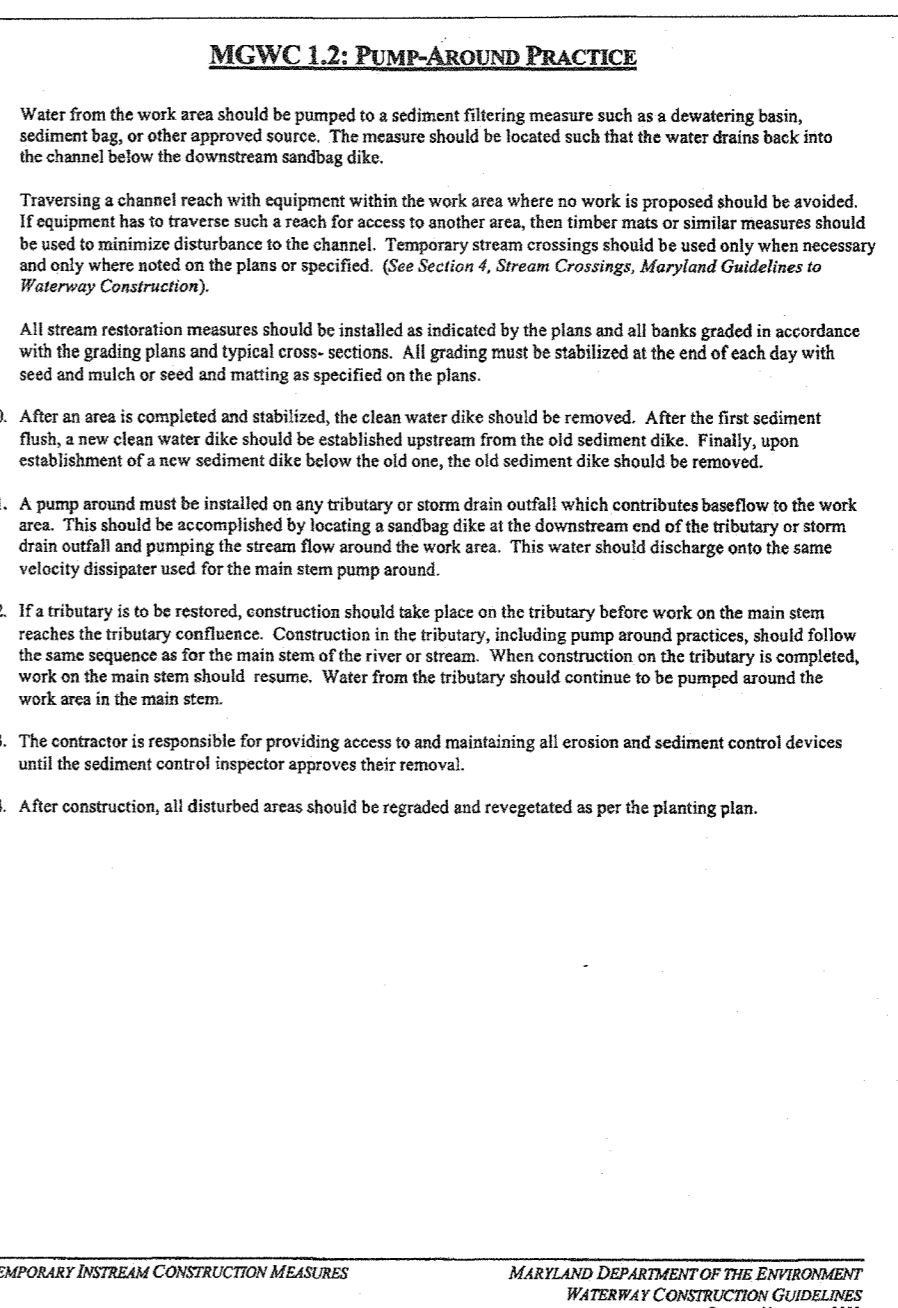
INSET A - VIEW SCALE: 1" = 10'



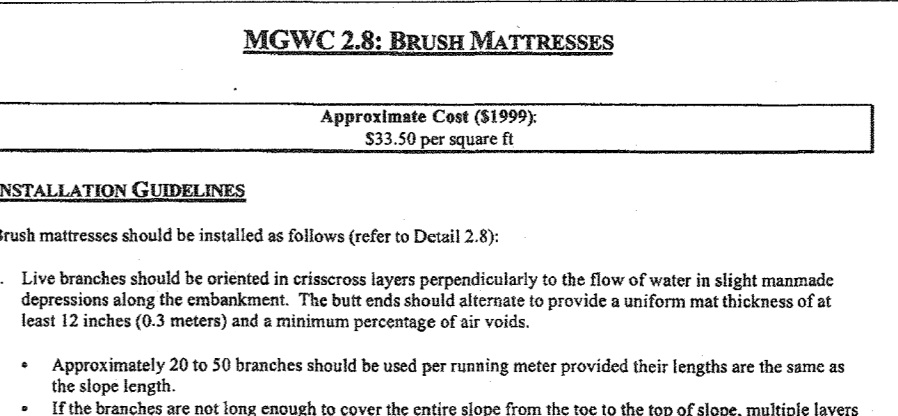
MGWC 1.2: PUMP-AROUND PRACTICE



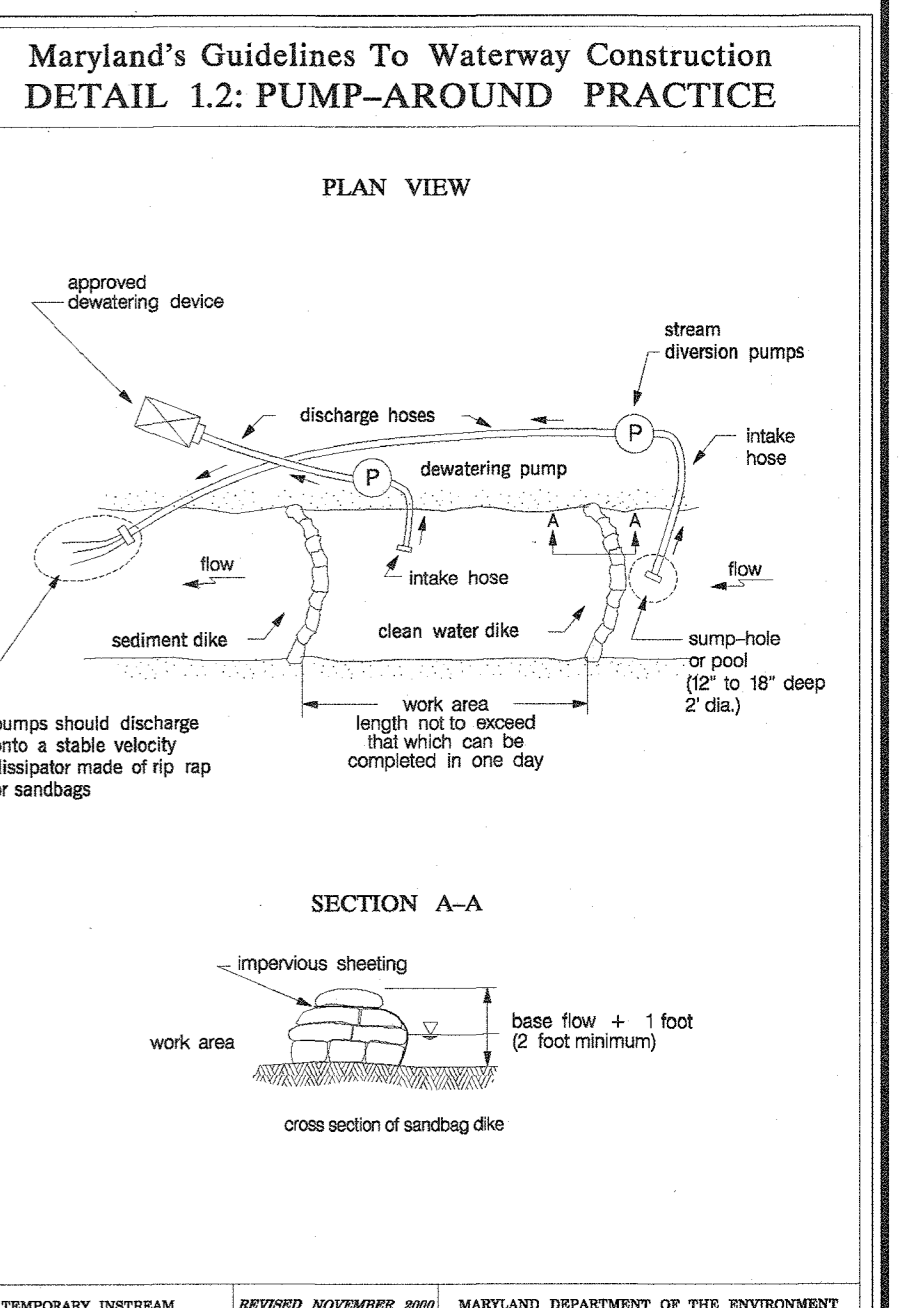
MGWC 2.8: BRUSH MATRESSES



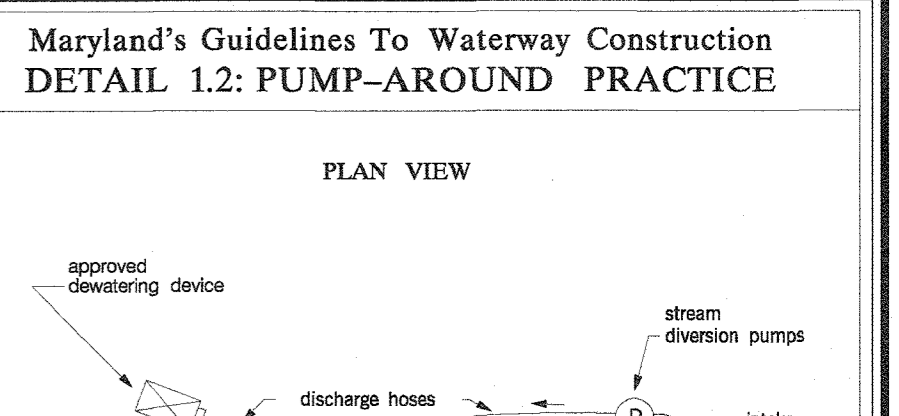
MGWC 1.2: PUMP-AROUND PRACTICE



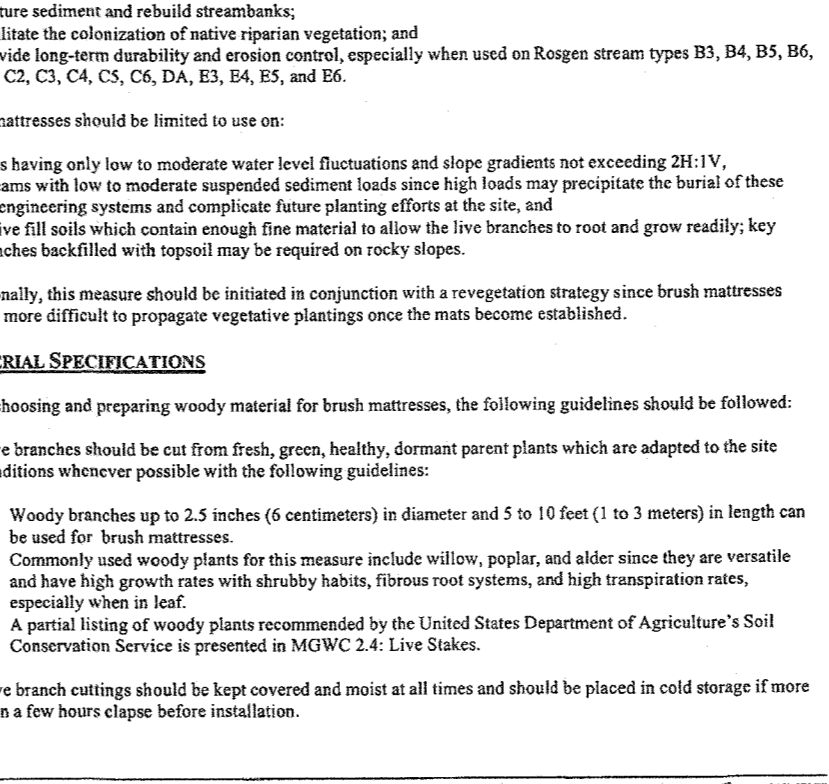
MGWC 2.8: BRUSH MATRESSES



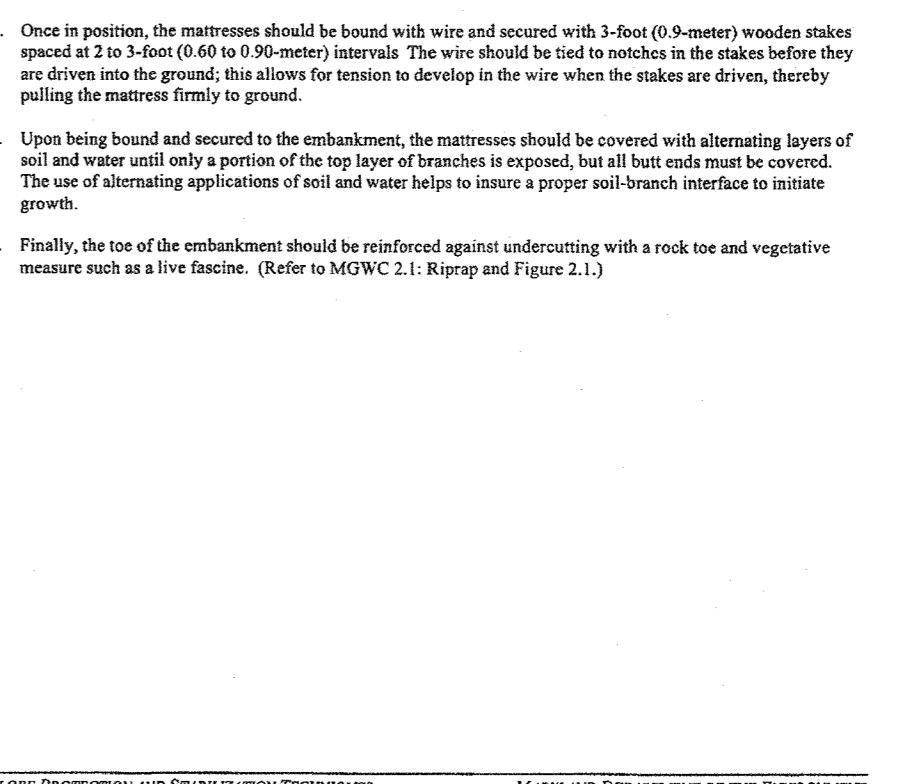
Maryland's Guidelines To Waterway Construction DETAIL 1.2: PUMP-AROUND PRACTICE



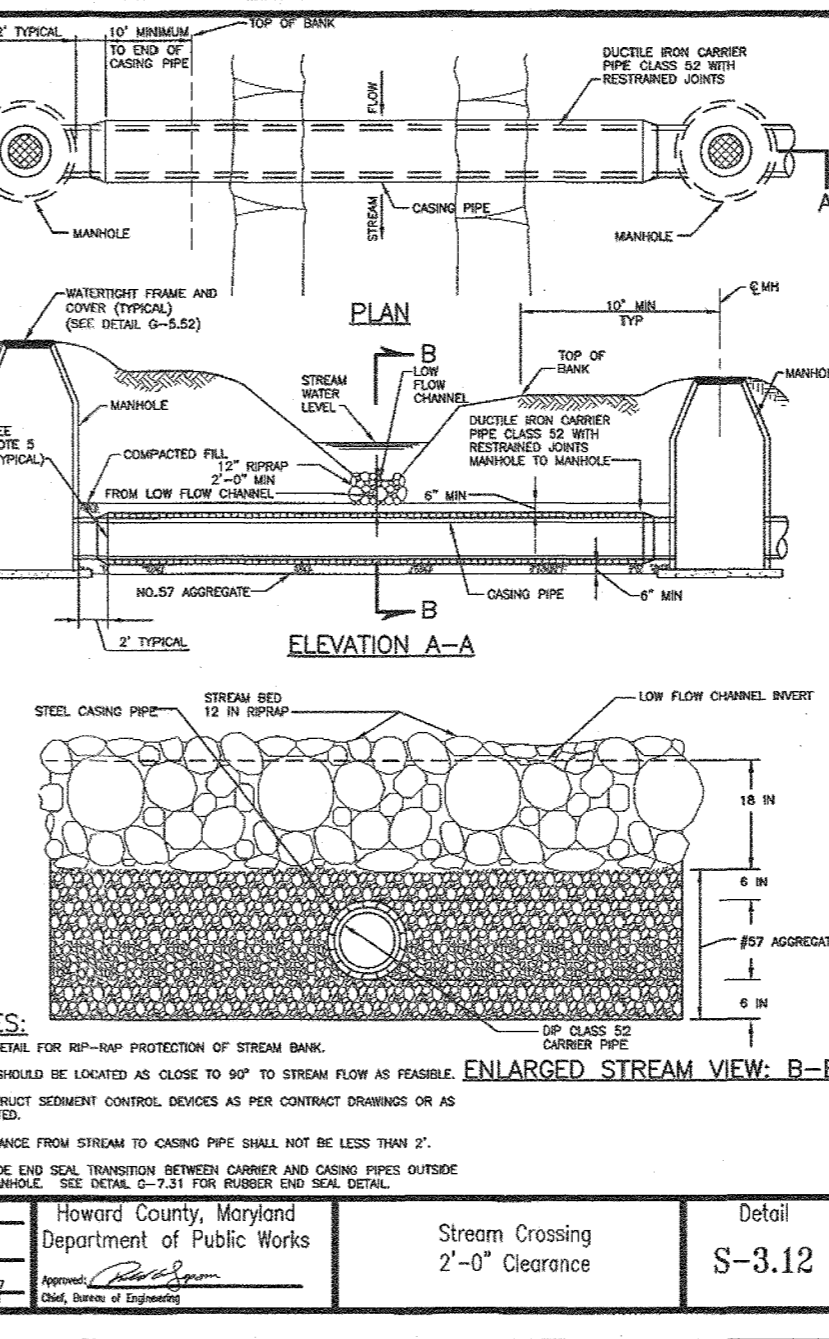
Maryland's Guidelines To Waterway Construction DETAIL 1.2: PUMP-AROUND PRACTICE



SLOPE PROTECTION AND STABILIZATION TECHNIQUES



SLOPE PROTECTION AND STABILIZATION TECHNIQUES



ENLARGED STREAM VIEW: B-B



ENLARGED STREAM VIEW: B-B

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND

3/17/18

CHIEF, BUREAU OF UTILITIES

DEPARTMENT OF PLANNING & ZONING HOWARD COUNTY, MARYLAND

BOHLER ENGINEERING

901 DULANEY VALLEY ROAD, SUITE 801 TOWSON, MARYLAND 21204

Phone: (410) 821-7900 Fax: (410) 821-7987

www.BohlerEngineering.com

5-21-18

CHIEF, DEVELOPMENT ENGINEERING DIVISION

B.R. ROWE

PROFESSIONAL ENGINEER

BRANDYwine ENGINEERING

1000 W. PATENT AVENUE, SUITE 100, COLLEGE PARK, MD 20740

PHONE: (301) 441-1111 FAX: (301) 441-1112

DATE: 4/18/18

DES. AVG	DRN. AVG	CK. M.K.	DATE: 4/18/18
REV.	DATE	DESCRIPTION	BY

PARCEL NO.	368 (LOT 16) & 321
800' SCALE MAP NO.	30
BLOCK NO.	3

STREAM CROSSING, NOTES & DETAILS

2'-0" Clearance

DETAIL S-3.12

OAK HILL SUBDIVISION

LOTS 1 - 6

(RE-SUBDIVISION OF LOT 16)

9692 OAK HILL DRIVE ELLICOTT CITY, MD

MAP 30, GRID 3, PARCELS 368 (LOT 16) & 321

2ND ELEC. DISTRICT, ZONED:R-12 HOWARD COUNTY

CONTRACT No.: 24-5002-D

SCALE AS SHOWN SHEET 4 OF 4

