

# GREENWAY DRIVE AND GREENLOW COURT DRAINAGE IMPROVEMENTS

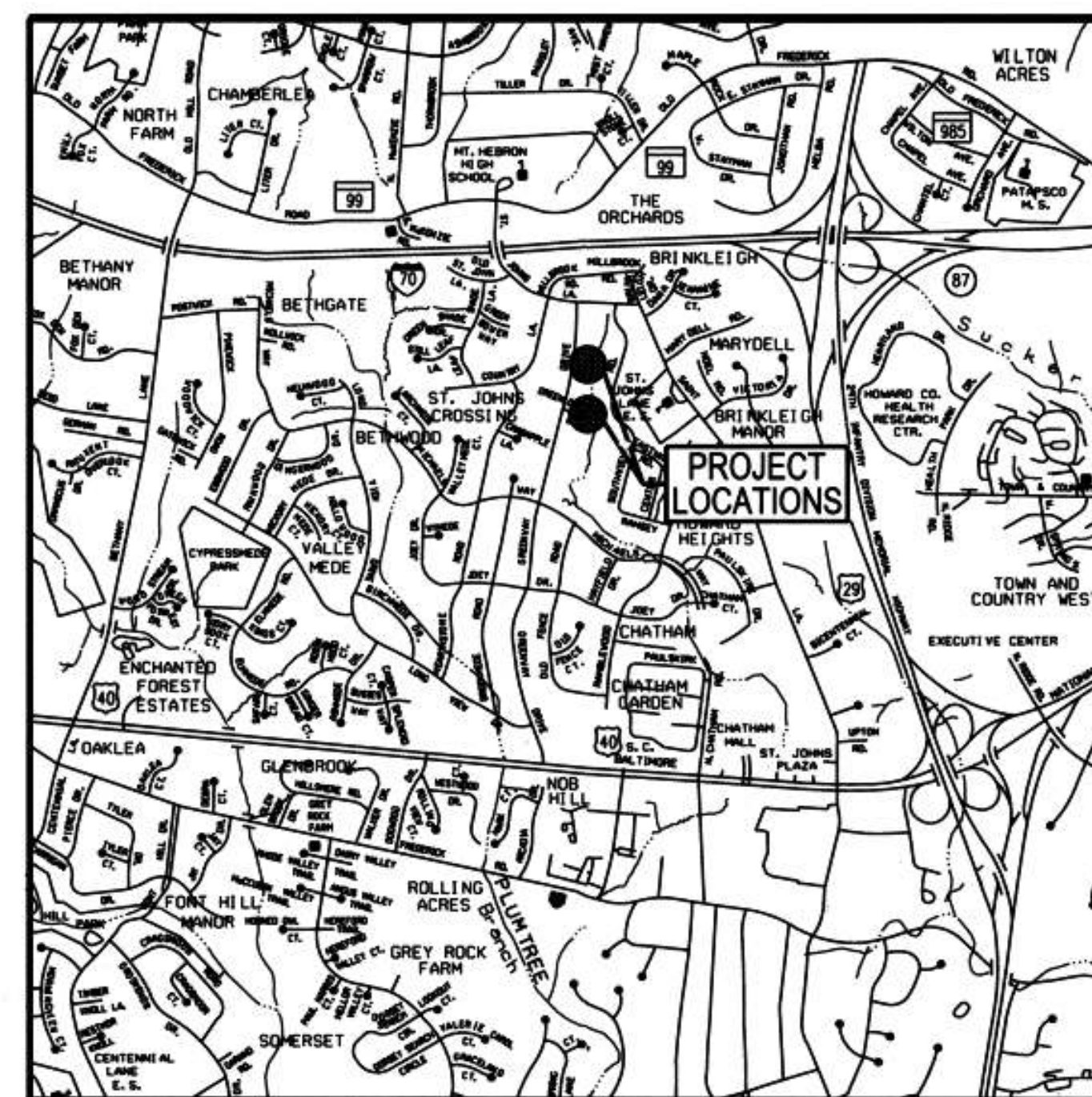
## SHEET INDEX

SHEET NO.	SHEET TITLE
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4	PIPE PROFILES
5-6	STORM DRAIN DETAILS
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9-10	EROSION & SEDIMENT CONTROL NOTES
11	EROSION & SEDIMENT CONTROL DETAILS
12	EROSION & SEDIMENT CONTROL DETAILS

## LEGEND

---	430	EX. CONTOUR
SD	SD	EX. STORM DRAIN
S	S	EX. SANITARY SEWER
W	W	EX. WATER LINE
G	G	EX. GAS LINE
T	T	EX. OVERHEAD TELEPHONE
~ ~ ~		EX. WOODS LINE
(Symbol)		EX. TREE
(Symbol)		TREE TO BE REMOVED
(Symbol)		TREE TO BE SAVED
(Symbol)		EX. MANHOLE
(Symbol)		EX. UTILITY POLE
---		EX. EASEMENT
---		PROPERTY LINE
---		EDGE OF WATER
---		100-YEAR FLOODPLAIN
---	LOD	LIMIT OF DISTURBANCE
---		PROPOSED STORM DRAIN
---		PROPOSED CURB & GUTTER
---		PROPOSED INLET
---		RIPRAP OUTFALL PROTECTION
---		FULL DEPTH PATCH

HOWARD COUNTY, MARYLAND  
STORMWATER MANAGEMENT DIVISION  
CAPITAL PROJECT NUMBER D-1158



VICINITY MAP  
SCALE: 1" = 2000'  
ADC MAP COORD. 5052/K7

HOWARD COUNTY SURVEY CONTROL				
DESIGNATION	PID	NORTHING	EASTING	ELEVATION
17 HA	N/A	590,619.889	1,360,443.4375	437.547
17 ID	N/A	589,445.668	1,360,778.492	421.164

## SITE ANALYSIS DATA CHART

- TOTAL PROJECT AREA: 0.30 ACRES.
- DISTURBED AREA: 0.30 ACRES (13,048 SF).
- PROPOSED USE FOR THE SITE: DRAINAGE IMPROVEMENTS
- APPLICABLE DPZ FILE REFERENCES: PB07-073, PB08-056, PB09-028A.

ENGINEER'S CERTIFICATE  
"I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD COUNTY SOIL CONSERVATION DISTRICT"

*James G. Kester* P.E. • 20903 1/20/16  
SIGNATURE OF ENGINEER (PRINT NAME BELOW SIGNATURE) DATE  
JAMES G. KESTER, PE

DEVELOPER'S CERTIFICATE  
"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE THE BEGINNING OF THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD COUNTY SOIL CONSERVATION DISTRICT"

*Mark S. Richmond* 1/21/16  
SIGNATURE OF DEVELOPER (PRINT NAME BELOW SIGNATURE) DATE  
Mark S. Richmond

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

*Janet De* 1/22/16  
DIRECTOR OF PUBLIC WORKS DATE

*Mark S. Richmond* 1/21/16  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES DATE

*Mark S. Richmond* 1/21/16  
CHIEF, STORMWATER MANAGEMENT DIVISION DATE

DEPARTMENT OF RECREATION AND PARKS, HOWARD COUNTY, MD

*John B. Spill* 1/20/16  
DIRECTOR OF RECREATION AND PARKS DATE

## PERMIT INFORMATION CHART

SUBDIVISION NAME	SECTION/AREA	PARCEL*
BRINKLEIGH	5, 6	389, 445
PLAT* or L/F ORD * ZONING TAX MAP NO. ELECT. DISTR. CENSUS TRACT		
25, 56, 73 0022 R20	17	02 602202
WATER CODE PUBLIC SEWER CODE PUBLIC		

THIS DEVELOPMENT IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

OWNER:  
HOWARD COUNTY  
DEPARTMENT OF PUBLIC WORKS  
6751 COLUMBIA GATEWAY DRIVE  
COLUMBIA, MD 21046  
410-313-6444

*Mark S. Richmond* 1/20/16  
HOWARD SCD DATE  
EP-16-12



PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 20903. EXPIRATION DATE: JULY 18, 2017

## GENERAL INFORMATION

- THE SUBJECT PROPERTIES ARE ZONED R-20 PER COMPREHENSIVE ZONING PLAN AND THE COMP-LITE ZONING AMENDMENTS.
- THERE ARE NO BURIAL GROUNDS OR CEMETERY SITES LOCATED ON THE PROJECT SITE.
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY CONTAINED HEREIN PLUS MSHA STANDARDS AND SPECIFICATIONS, IF APPLICABLE.
- THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS, BUREAU OF ENGINEERING/ CONSTRUCTION INSPECTION DIVISION AT (410) 313-1880 24 HOURS IN ADVANCE OF ANY WORK BEING DONE.
- THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK BEING DONE.
- THE COORDINATES SHOWN HEREON ARE BASED ON HOWARD COUNTY GEODETIC CONTROL, WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NUMBERS 17 HA & 17 ID WERE USED FOR THIS SITE.
- WATER IS PUBLIC.
- SEWER IS PUBLIC.
- EXISTING UTILITIES ARE BASED ON FIELD SURVEYS AND AVAILABLE RECORD DRAWINGS.
- THE WETLAND DELINEATION FOR THIS PROJECT WAS PERFORMED BY KCI TECHNOLOGIES INC. NO WETLANDS ARE LOCATED WITHIN THIS PROJECT.
- THE EXISTING TOPOGRAPHY IS TAKEN FROM FIELD RUN SURVEY WITH ONE FOOT CONTOUR INTERVALS PREPARED BY AB CONSULTANTS, INC., IN JULY 2014 AND MAY 2015.
- ALL WORK SHALL CONFORM TO THE MDE BEST MANAGEMENT PRACTICES FOR WETLANDS AND WATERWAYS AS LISTED IN THE REQUIREMENTS OF THE NONTIDAL WETLANDS AND WATERWAYS PERMIT APPROVED ON 12/22/15 (MDE TRACKING # 15-NT-3279/201561560).
- NO TRAFFIC STUDY IS REQUIRED FOR THIS PROJECT.
- OBSTRUCTIONS SHOWN ON THIS DRAWING ARE FOR THE CONVENIENCE OF THE CONTRACTOR ONLY AND KCI TECHNOLOGIES, INC. DOES NOT WARRANT OR GUARANTEE THE CORRECTNESS OR COMPLETENESS OF THE INFORMATION GIVEN. SHOULD THE CONTRACTOR DISCOVER ANY DISCREPANCIES BETWEEN THE PLANS AND THE FIELD CONDITIONS, THE CONTRACTOR MUST VERIFY SUCH INFORMATION TO HIS OWN SATISFACTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY TO RESOLVE THE SITUATION. SHOULD THE CONTRACTOR MAKE FIELD CORRECTIONS OR ADJUSTMENTS WITHOUT NOTIFYING THE ENGINEER, THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR THOSE CHANGES.
- THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE ANY DAMAGE INCURRED DUE TO THE CONTRACTOR'S OPERATION SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
- THE PROPOSED PROJECT IS LOCATED ALONG GREENWAY DRIVE, SOUTH OF ST. JOHN'S LANE.
- HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS PROJECT MANAGER IS CHRISTINE LOWE, P.E. (410) 313-0522.
- CONTRACTOR SHALL NOTIFY THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS/ BUREAU OF ENGINEERING CONSTRUCTION INSPECTION DIVISION AT (410) 313-1880 AND MISS UTILITY AT 1-800-257-7777 AT LEAST FIVE (5) WORKING DAYS BEFORE STARTING WORK.
- BUREAU OF UTILITY CONTACTS: (410) 313-4900 (WATER AND SANITARY)  
COMCAST: (410) 497-0232  
VERIZON: (301) 282-4508  
BGE: (410) 470-7863 (GAS)  
BGE: (410) 470-7868 (ELECTRIC)
- CONTRACTOR TO UTILIZE STOCKPILE AREAS FROM SOUTHVIEW STREAM RESTORATION PROJECT.
- THE STREAM IS NOT TIER II. THE STREAM IS IMPAIRED FOR SEDIMENT.

## AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

*James G. Kester* 20903 10-11-16  
SIGNATURE PE NO. DATE

## SPECIAL CONTRACTOR NOTES

- 100-YEAR FLOODPLAIN ELEVATION IS SHOWN ON THE PLANS.
- NO STOCKPILE OF ANY MATERIAL IS ALLOWED IN THE 100-YEAR FLOODPLAIN.
- IN-STREAM WORK AT THE GREENLOW COURT PIPE OUTFALL IS PROHIBITED FROM MARCH 1 TO MAY 31, INCLUSIVE. STREAM CLASSIFICATIONS: USE IV-P
- CONTRACTOR SHALL CONTINUALLY MONITOR WEATHER FORECASTS DURING WORK ACTIVITIES AND SCHEDULE WORK DURING FAVORABLE CONDITIONS.
- THE CONTRACTOR SHALL EXERCISE CARE IN ACTIVITIES INVOLVING EITHER CUT AND FILL OR GRADING IN THE VICINITY OF TREES THAT ARE TO REMAIN AT THE CONSTRUCTION SITE. ALL EARTH CUTS AND ACTIVITIES IN THE VICINITY OF TREES TO REMAIN SHALL BE MADE IN A MANNER THAT DOES NOT DISTURB THE CRITICAL ROOT ZONE WITHIN THE DRILINE OF THE TREE. PROTECTIVE ORANGE FENCING SHALL BE INSTALLED AROUND THE PERIMETER OF THE CRITICAL ROOT ZONE PRIOR TO CONSTRUCTION. THE LOCATION OF THE PROTECTIVE ORANGE FENCING SHALL BE APPROVED BY HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS STORMWATER MANAGEMENT DIVISION PRIOR TO CONSTRUCTION.
- CONTRACTOR SHALL NOT STORE EQUIPMENT, MATERIALS AND/OR SUPPLIES BEYOND THE ORANGE FENCING SHOWN ON THE PLANS.
- UPON COMPLETION OF THE WORK, BUT PRIOR TO DE-MOBILIZATION, THE CONTRACTOR SHALL REMOVE ALL REMNANTS OF CONSTRUCTION MATERIALS FROM THE SITE. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO A CONDITION EQUAL TO OR BETTER THAN THE PRE-CONSTRUCTION CONDITIONS.
- PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES, PHOTOGRAPHS OF THE PROPOSED WORK AREA AND ACCESS SHALL BE TAKEN.
- ALL TREES TO BE REMOVED SHALL BE CUT AT THE BASE WITH A SAW AND NOT PUSHED OVER. TREE STUMPS MAY BE LEFT IN PLACE, UNLESS OTHERWISE DIRECTED ON THE PLANS.
- ALL MATERIAL SHALL BE REMOVED AND DISPOSED OF OFFSITE UNLESS OTHERWISE NOTED.
- THE CONTRACTOR SHALL PAY CLOSE ATTENTION TO PEDESTRIANS WALKING NEAR THE WORK SITE.
- WORKING HOURS ARE 7AM TO 5PM MONDAY THROUGH FRIDAY.
- CONTRACTOR TO USE SOUTHVIEW STREAM RESTORATION PROJECT STOCKPILE AREAS. MATERIALS MAY ALSO BE STORED WITHIN LIMITS OF SILT FENCE AT PROJECT SITES.
- CONTRACTOR MAY SPECIFY CAST-IN-PLACE DRAINAGE BOXES IF NECESSARY DURING CONSTRUCTION. THESE CHANGES MUST FIRST BE APPROVED BY THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS PROJECT MANAGER.

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
SPARKS, MARYLAND 21152  
TELEPHONE: (410) 316-7800  
FAX: (410) 316-7818  
www.kci.com



GREENWAY DRIVE AND GREENLOW COURT DRAINAGE IMPROVEMENTS  
CAPITAL PROJECT D-1158  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STORMWATER MANAGEMENT DIVISION  
6751 COLUMBIA GATEWAY DRIVE  
COLUMBIA, MD 21046  
PARCELS 389, 445 TAX MAP 17  
ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022

## TITLE SHEET

SCALE:	AS SHOWN
DATE:	JANUARY 2016
KCI JOB NO.:	17133314.50
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	
AS BUILT 09/16/16	
SHEET NO.: 1 OF 12	

STRUCTURE NO.	STRUCTURE TYPE	STRUCTURE COORDINATES		TOP OF CURB	INVERT IN	INVERT OUT	STD. NO.
		NORTHING	EASTING				
I-1	TYPE A-10 INLET PRECAST	592202.41	1358370.20	450.61	445.70	445.60	D-4.03
I-2	TYPE A-10 INLET PRECAST	592214.10	1358348.13	450.57	446.30	446.00	D-4.03
I-3	TYPE A-10 INLET PRECAST	592158.56	1358342.29	451.40	447.00	446.90	D-4.03
I-4	TYPE A-5 INLET PRECAST	592267.10	1358354.17	451.44	447.30	446.60	D-4.01
I-5	TYPE A-10 INLET PRECAST	592320.01	1358359.56	452.66	447.46	447.80	D-4.03
H-1	SPECIAL HEADWALL CAST-IN-PLACE	592171.33	1358547.06		440.94	441.00	

NOTES:  
 1. USE MD STANDARD DETAIL MD-374.65 FOR 2" DEPRESSION AT ALL INLETS.  
 2. FOR LOCATION OF INLET COORDINATES, SEE DETAIL ON SHEET 4.

**LEGEND**

- 430 --- EX. CONTOUR
- SD --- SD EX. STORM DRAIN
- S --- S EX. SANITARY SEWER
- W --- W EX. WATER LINE
- G --- G EX. GAS LINE
- T --- T EX. OVERHEAD TELEPHONE
- WUS --- WUS EX. WATERS OF THE U.S.
- WB --- WB EX. WETLAND
- WB --- WB EX. 25' WETLAND BUFFER
- EX. WOODS LINE --- EX. WOODS LINE
- EX. TREE --- EX. TREE
- TREE TO BE REMOVED --- TREE TO BE REMOVED
- TREE TO BE SAVED --- TREE TO BE SAVED
- EX. MANHOLE --- EX. MANHOLE
- EX. UTILITY POLE --- EX. UTILITY POLE
- EX. EASEMENT --- EX. EASEMENT
- PROPERTY LINE --- PROPERTY LINE
- EDGE OF WATER --- EDGE OF WATER
- 100-YEAR FLOODPLAIN --- 100-YEAR FLOODPLAIN
- PROPOSED STORM DRAIN --- PROPOSED STORM DRAIN
- PROPOSED CURB & GUTTER --- PROPOSED CURB & GUTTER
- PROPOSED INLET --- PROPOSED INLET
- RIPRAP OUTFALL PROTECTION --- RIPRAP OUTFALL PROTECTION
- FULL DEPTH PATCH --- FULL DEPTH PATCH

NO.	REVISIONS DESCRIPTION	DATE

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 SPARKS, MARYLAND 21152  
 TELEPHONE: (410) 316-7800  
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 WWW.KCI.COM

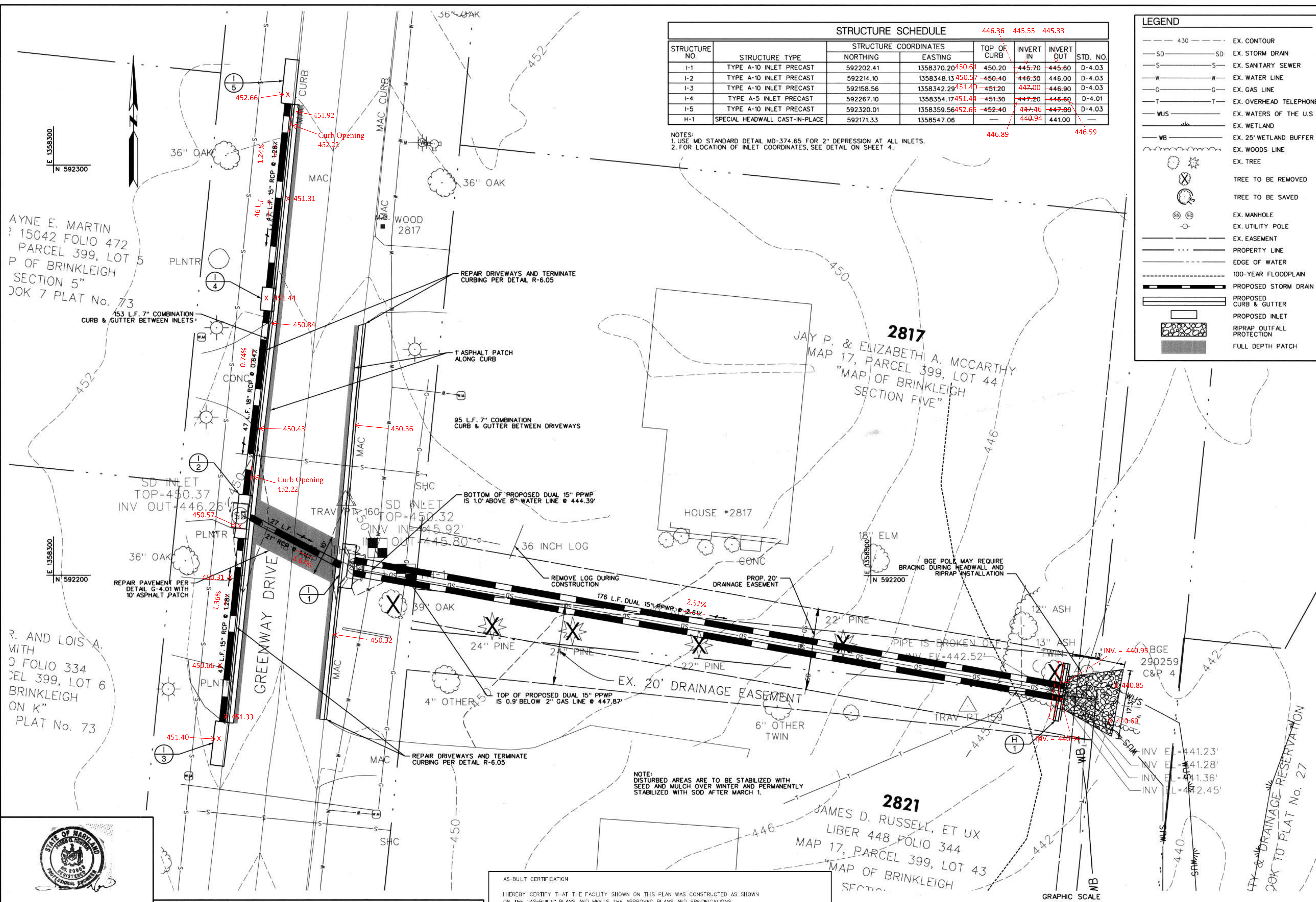


GREENWAY DRIVE AND GREENLOW COURT DRAINAGE IMPROVEMENTS  
 CAPITAL PROJECT D-158  
 HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 STORMWATER MANAGEMENT DIVISION  
 6751 COLUMBIA GATEWAY DRIVE  
 COLUMBIA, MD 21046  
 PARCELS 389, 445 TAX MAP 17  
 ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022

**STORM DRAIN PLAN**

SCALE: 1"=10'  
 DATE: JANUARY 2016  
 KCI JOB NO.: 17133314.50  
 CAPITAL PROJECT NO.: D-158  
 PERMIT ISSUE:  
 CONSTRUCTION ISSUE:

AS BUILT  
 09/16/2016  
 SHEET NO.: 2 OF 12



AYNE E. MARTIN  
 15042 FOLIO 472  
 PARCEL 399, LOT 5  
 P OF BRINKLEIGH  
 SECTION 5"  
 JOK 7 PLAT No. 73

R. AND LOIS A.  
 WITH  
 3 FOLIO 334  
 DEL 399, LOT 6  
 BRINKLEIGH  
 ON "K"  
 PLAT No. 73

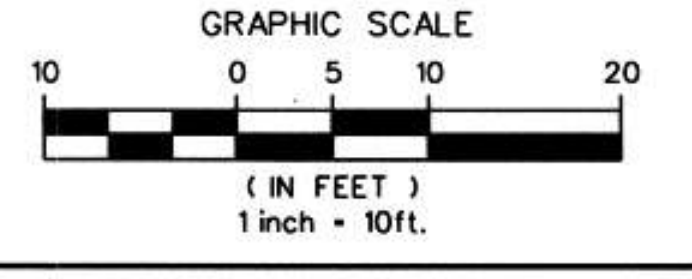
NOTE:  
 DISTURBED AREAS ARE TO BE STABILIZED WITH SEED AND MULCH OVER WINTER AND PERMANENTLY STABILIZED WITH SOD AFTER MARCH 1.



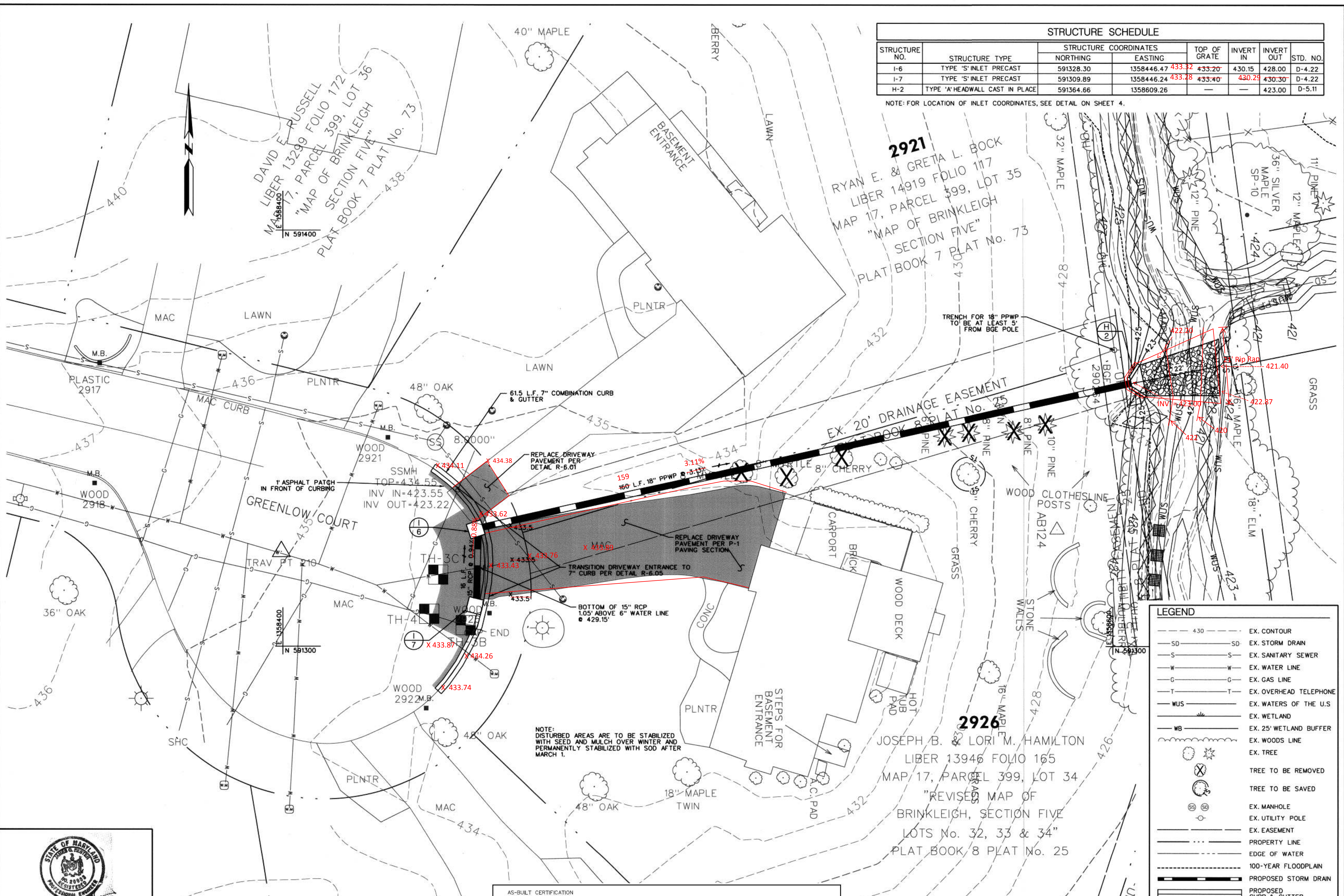
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DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
 1/21/16  
 DATE

AS-BUILT CERTIFICATION  
 I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.  
 SIGNATURE: [Signature] 20903 10-11-16  
 PE NO. DATE



EP - 16 - 12



STRUCTURE NO.	STRUCTURE TYPE	STRUCTURE COORDINATES		TOP OF GRATE	INVERT IN	INVERT OUT	STD. NO.
		NORTHING	EASTING				
I-6	TYPE 'S' INLET PRECAST	591328.30	1358446.47	433.32	433.20	430.15	D-4.22
I-7	TYPE 'S' INLET PRECAST	591309.89	1358446.24	433.28	433.40	430.29	D-4.22
H-2	TYPE 'A' HEADWALL CAST IN PLACE	591364.66	1358609.26	-	-	423.00	D-5.11

NOTE: FOR LOCATION OF INLET COORDINATES, SEE DETAIL ON SHEET 4.

NO.	REVISIONS DESCRIPTION	DATE

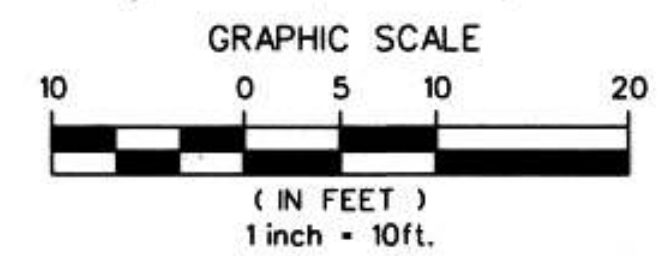
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 SPARKS, MARYLAND 21152  
 TELEPHONE: (410) 316-7800  
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**GREENWAY DRIVE AND GREENLOW COURT DRAINAGE IMPROVEMENTS**  
 CAPITAL PROJECT D-1158  
 HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 STORMWATER MANAGEMENT DIVISION  
 6751 COLUMBIA GATEWAY DRIVE  
 COLUMBIA, MD 21046

STORM DRAIN PLAN	
SCALE:	1" = 10'
DATE:	JANUARY 2016
KCI JOB NO.:	17133314.50
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	
<b>AS BUILT</b>	
09/16/2016	
SHEET NO.: 3 OF 12	

LEGEND	
---	EX. CONTOUR
SD	EX. STORM DRAIN
S	EX. SANITARY SEWER
W	EX. WATER LINE
G	EX. GAS LINE
T	EX. OVERHEAD TELEPHONE
WUS	EX. WATERS OF THE U.S.
WB	EX. 25' WETLAND BUFFER
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---	PROPOSED STORM DRAIN
---	PROPOSED CURB & GUTTER
---	PROPOSED INLET
---	RIPRAP OUTFALL PROTECTION
---	FULL DEPTH PATCH



EP - 16 - 12

STATE OF MARYLAND  
 PROFESSIONAL ENGINEER  
 DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND LICENSE NO. 20903, EXPIRATION DATE: JULY 18, 2017

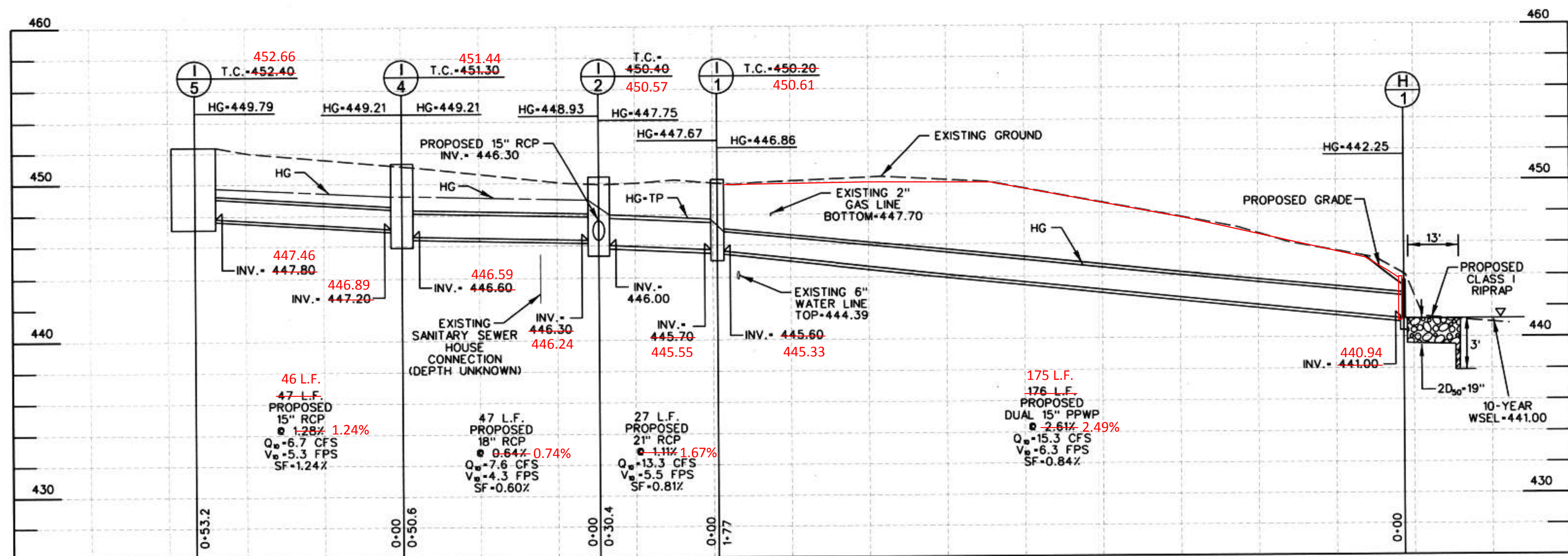
DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 Chief, Bureau of Environmental Services  
 DATE: 10-11-16

AS-BUILT CERTIFICATION  
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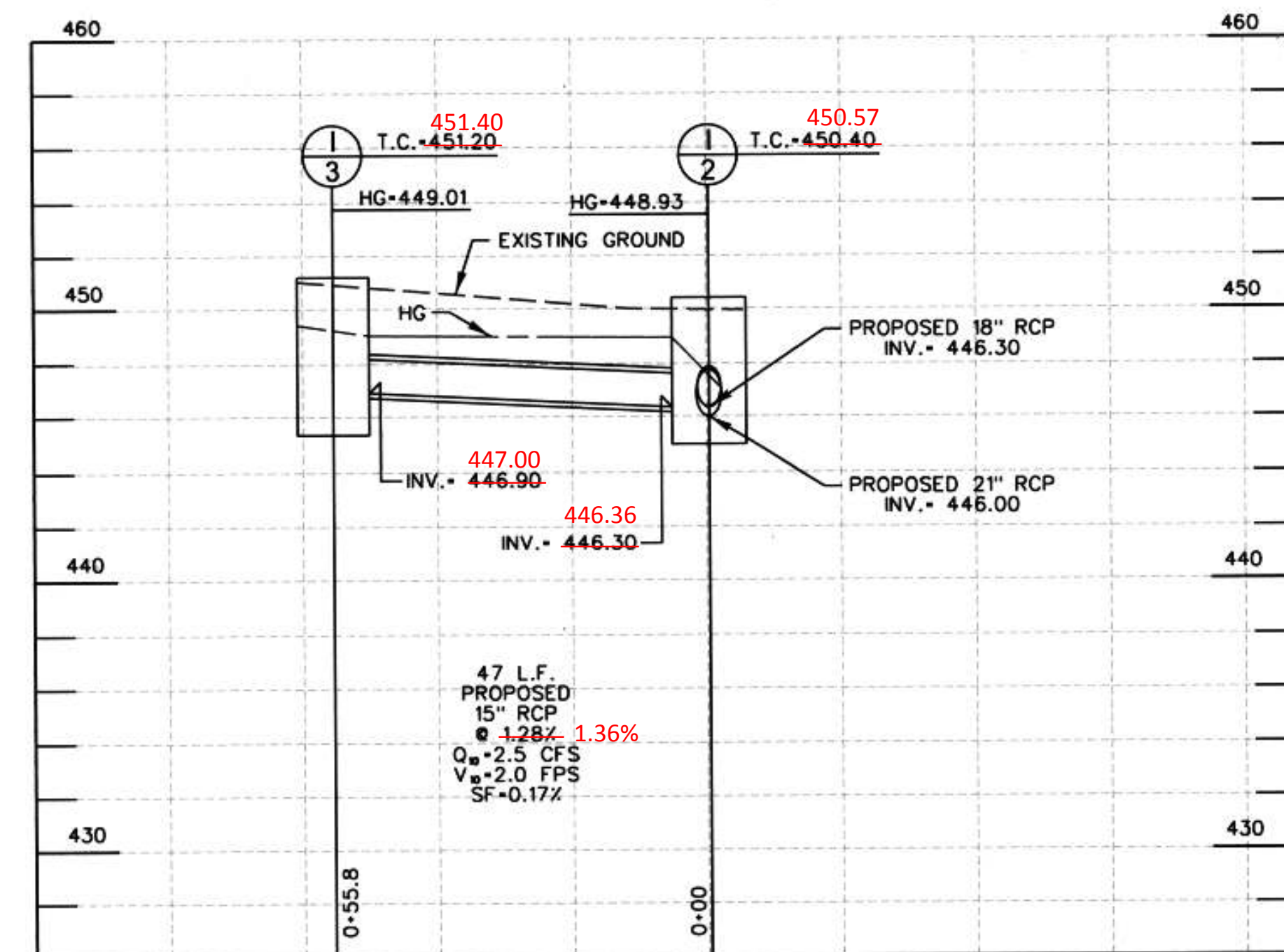
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KCI FILE: M\ 2013 \ 17133314.50

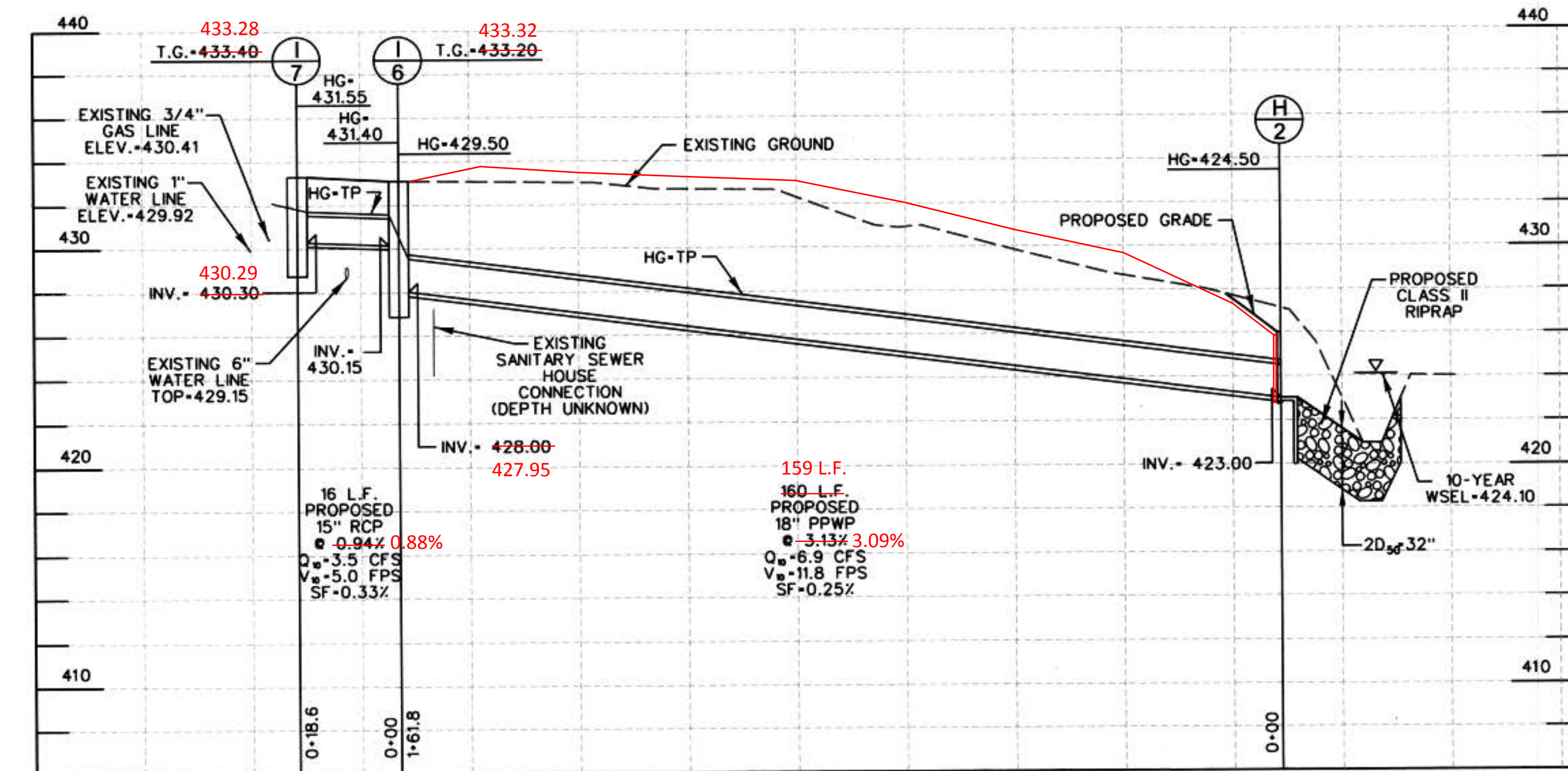
ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022



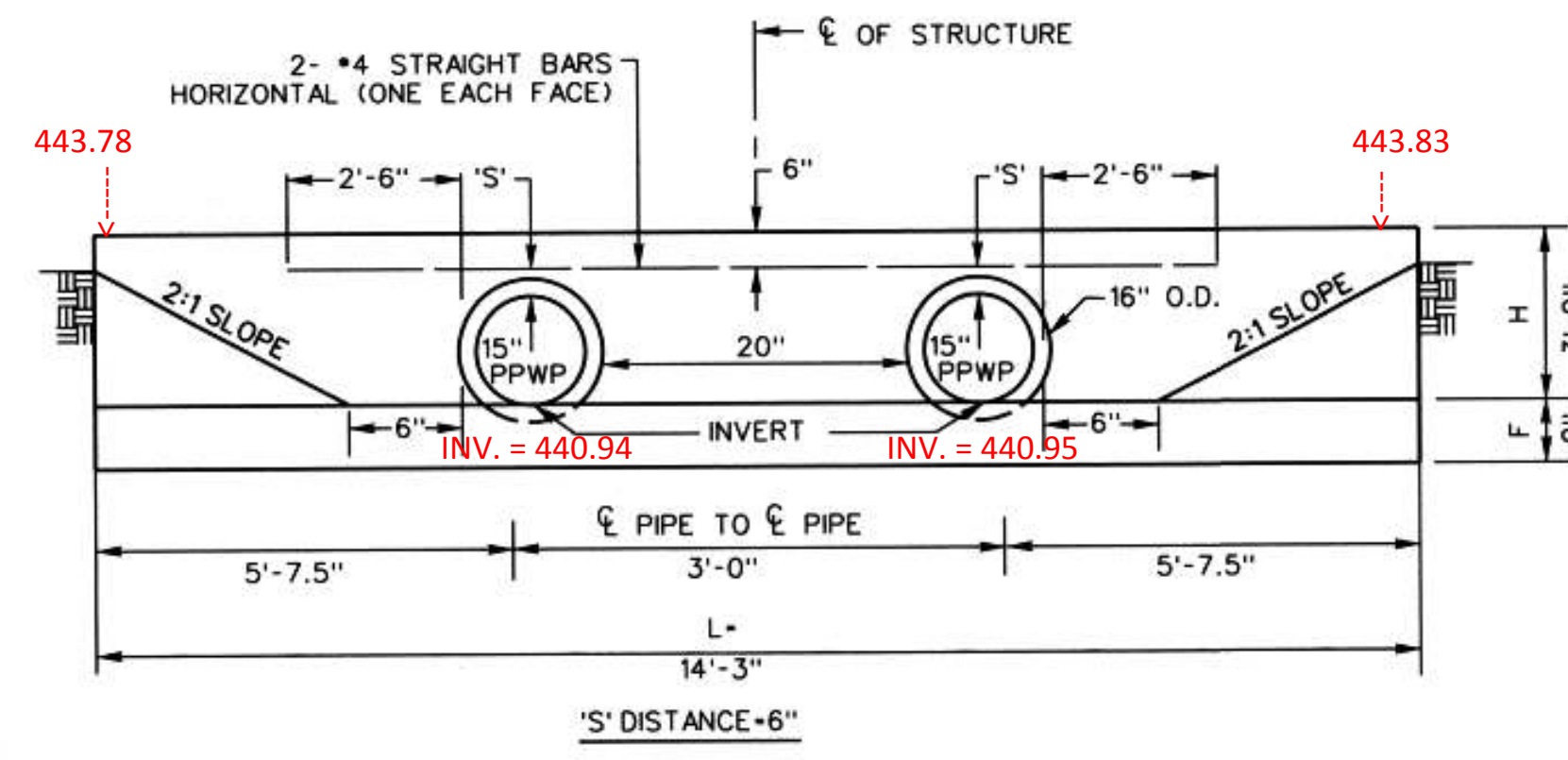
**PIPE PROFILE I-5 TO H-1**  
 SCALE: HOR: 1" = 20'  
 VERT: 1" = 5'



**PIPE PROFILE I-3 TO I-2**  
 SCALE: HOR: 1" = 20'  
 VERT: 1" = 5'



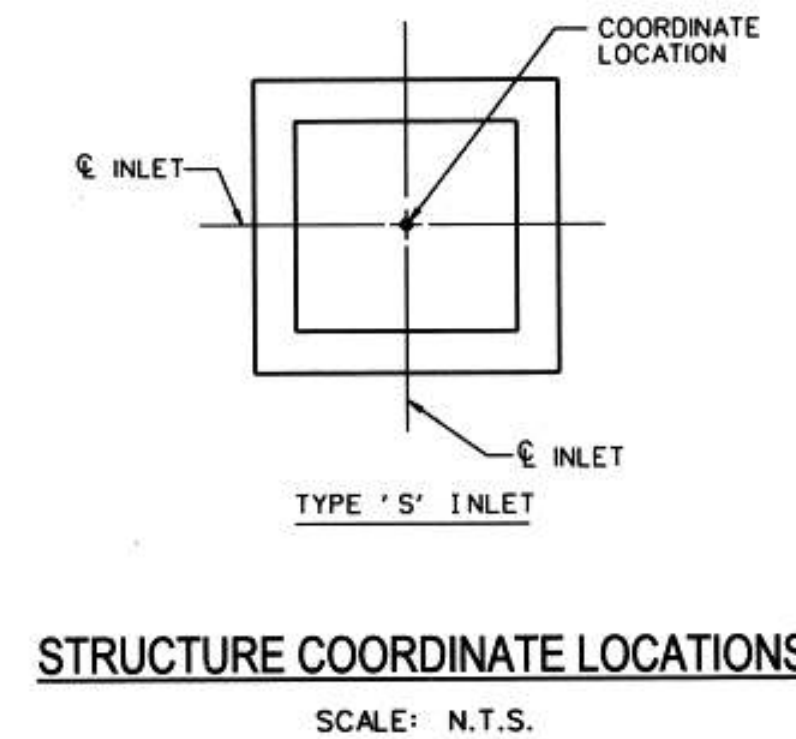
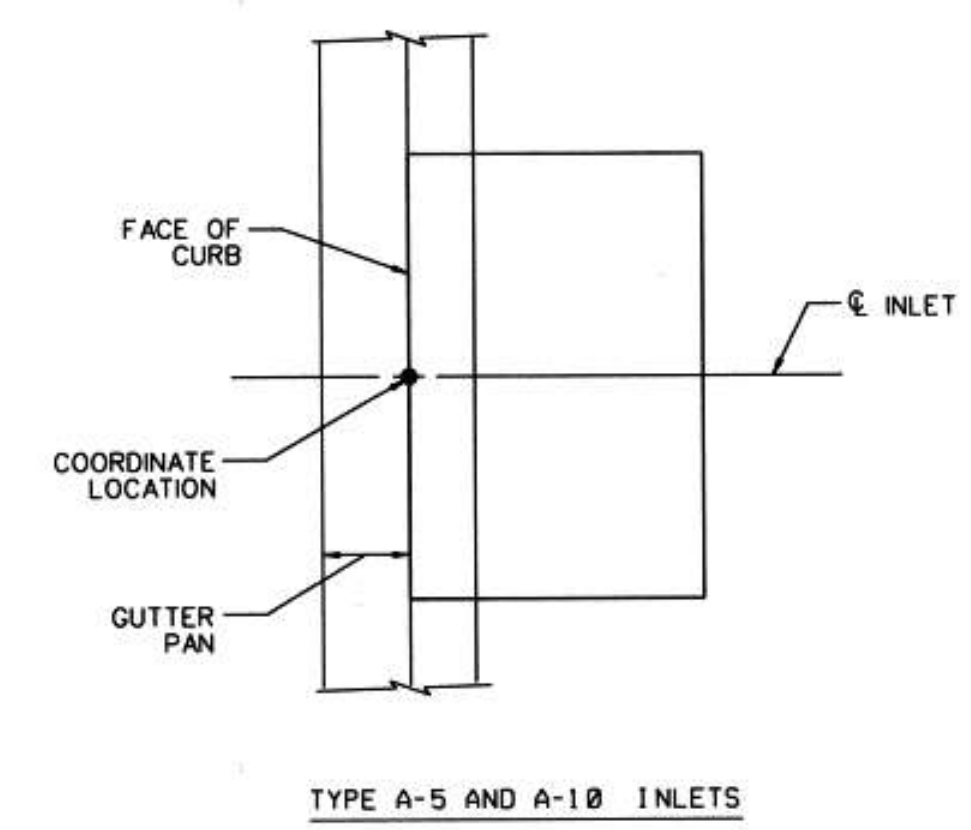
**PIPE PROFILE I-7 TO H-2**  
 SCALE: HOR: 1" = 20'  
 VERT: 1" = 5'



OPENINGS		DIMENSIONS						
SIZE	AREA (S.F.)	A	B	C	E	F	H	L
15" PPWP	2.5	9"	6"	6"	1'-9"	9"	2'-0"	14'-3"

**SPECIAL HEADWALL H-1 DETAIL**  
 SCALE: N.T.S.

NOTE:  
 THIS DETAIL IS A MODIFICATION OF HOWARD COUNTY, STD. TYPE 'C' ENDWALL. SEE DETAIL FOR STATIONS AND OFFSETS AND REFER TO D-5.21 FOR ADDITIONAL REINFORCING DETAILS AND DETAILS OF DIMENSIONS A, B, C, D, AND E.



- NOTES:
- USE CAUTION WHEN EXCAVATING IN VICINITY OF EXISTING UNDERGROUND UTILITIES AND BGE POLE, SPECIFICALLY AT GREENLOW COURT.
  - HG= HYDRAULIC GRADE LINE  
 TP= TOP OF PIPE

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

Signature: *[Handwritten Signature]* PE NO. 20903 DATE 10-11-16

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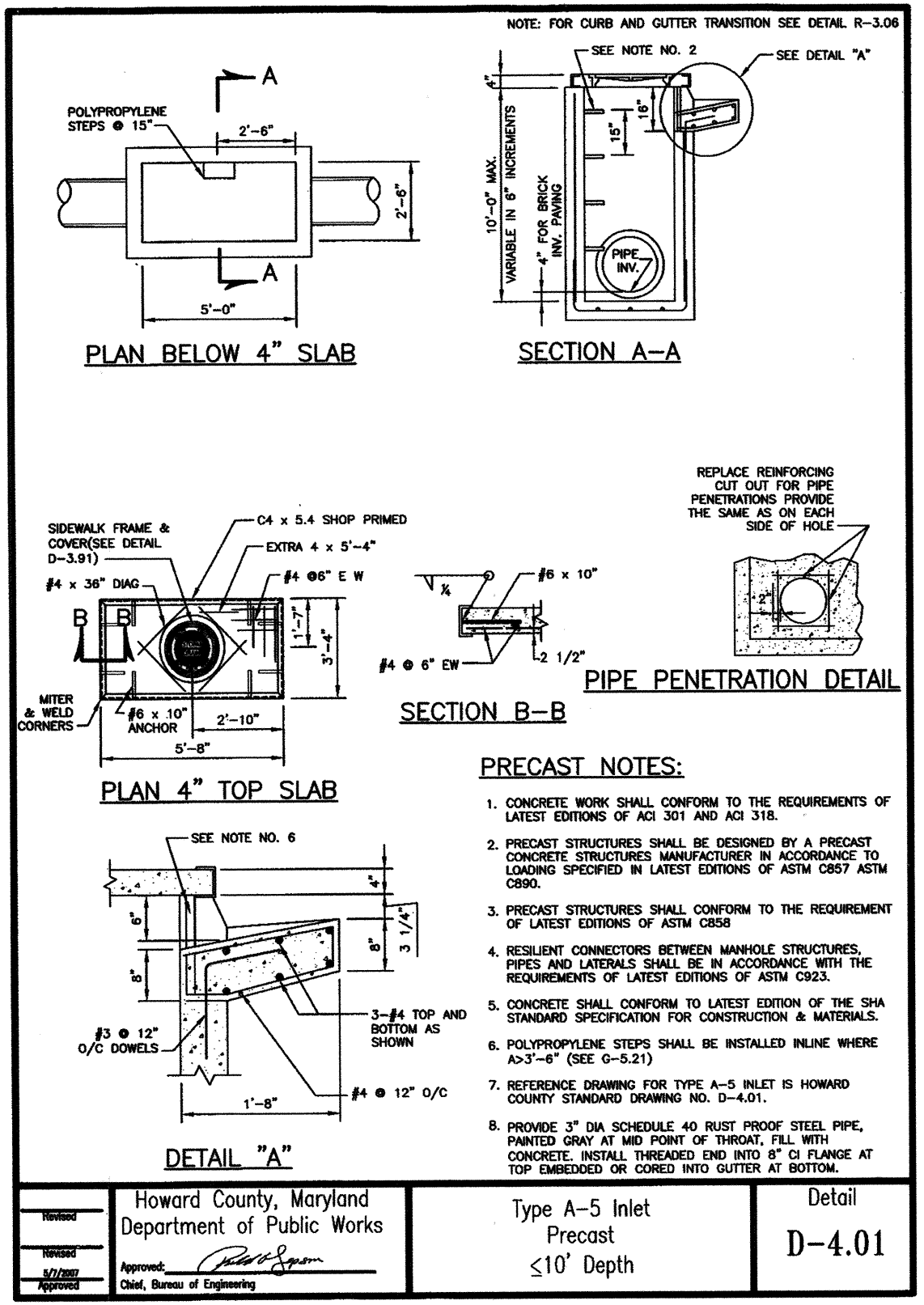
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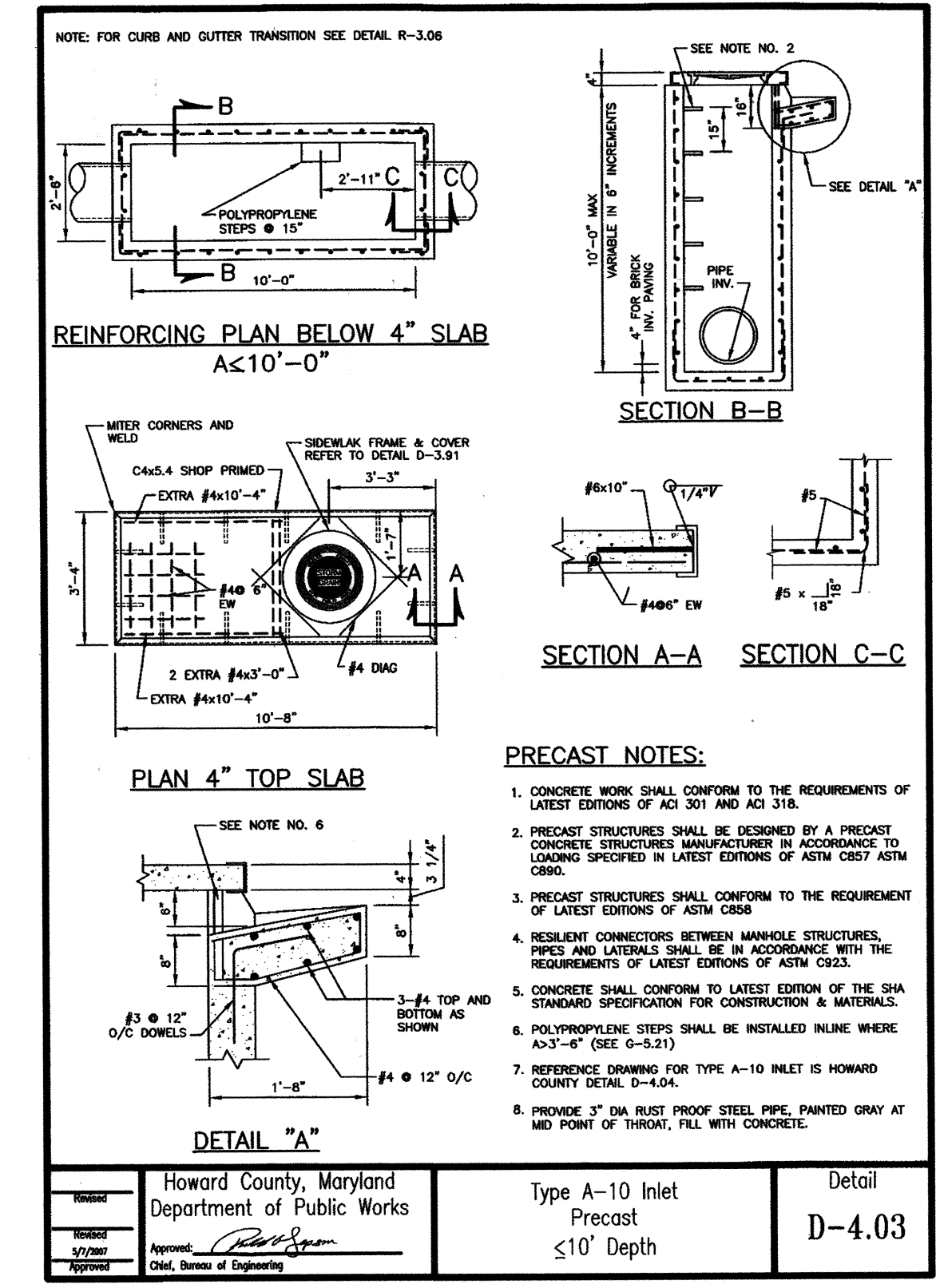
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 6751 COLUMBIA GATEWAY DRIVE  
 COLUMBIA, MD 21046  
 PARCELS 389, 445 TAX MAP 17  
 ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022

**PROFILES & DETAILS**

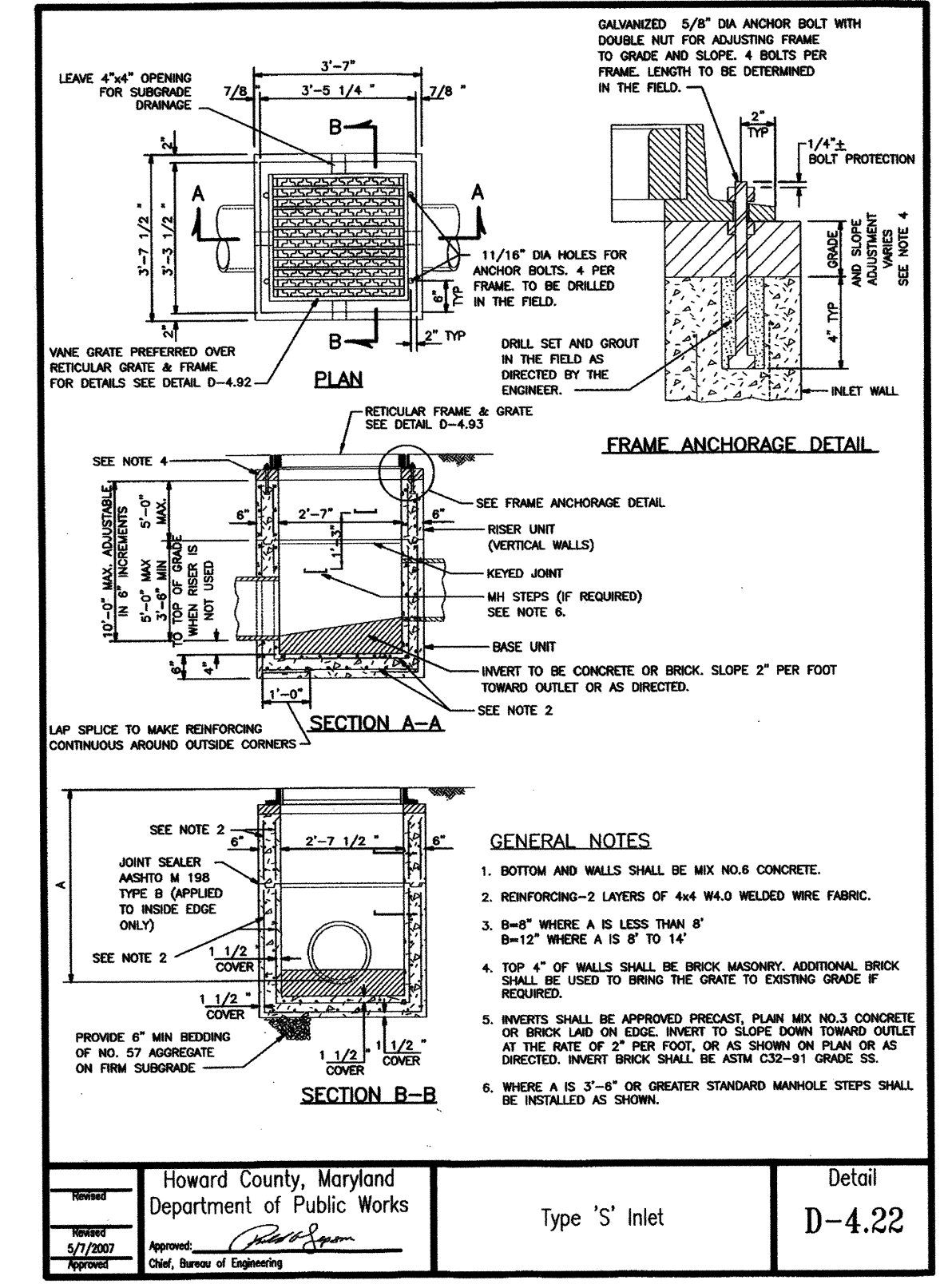
SCALE:	AS SHOWN
DATE:	JANUARY 2016
KCI JOB NO.:	17133314.50
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	



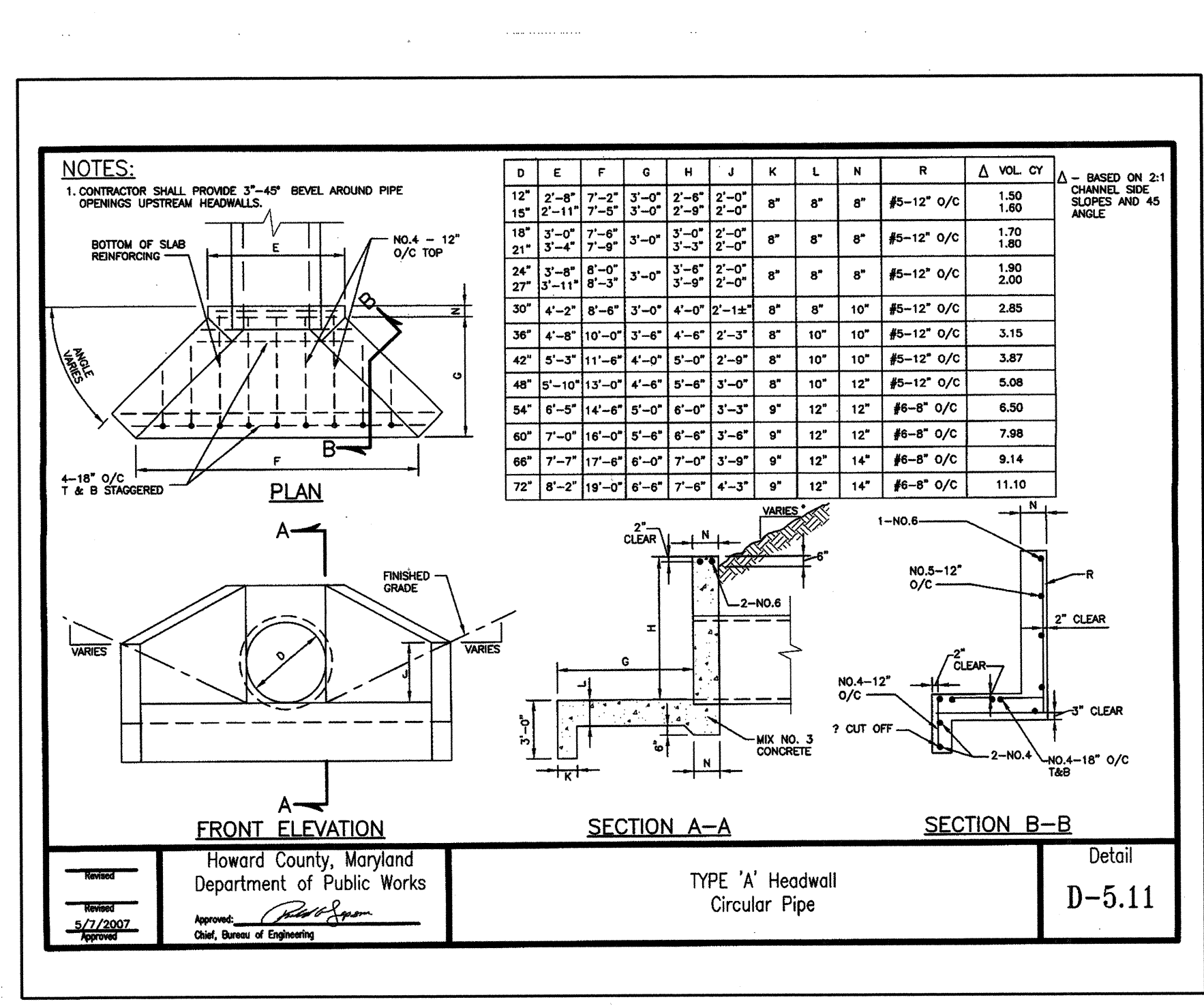
Howards County, Maryland Department of Public Works	Type A-5 Inlet Precast ≤10' Depth	Detail D-4.01
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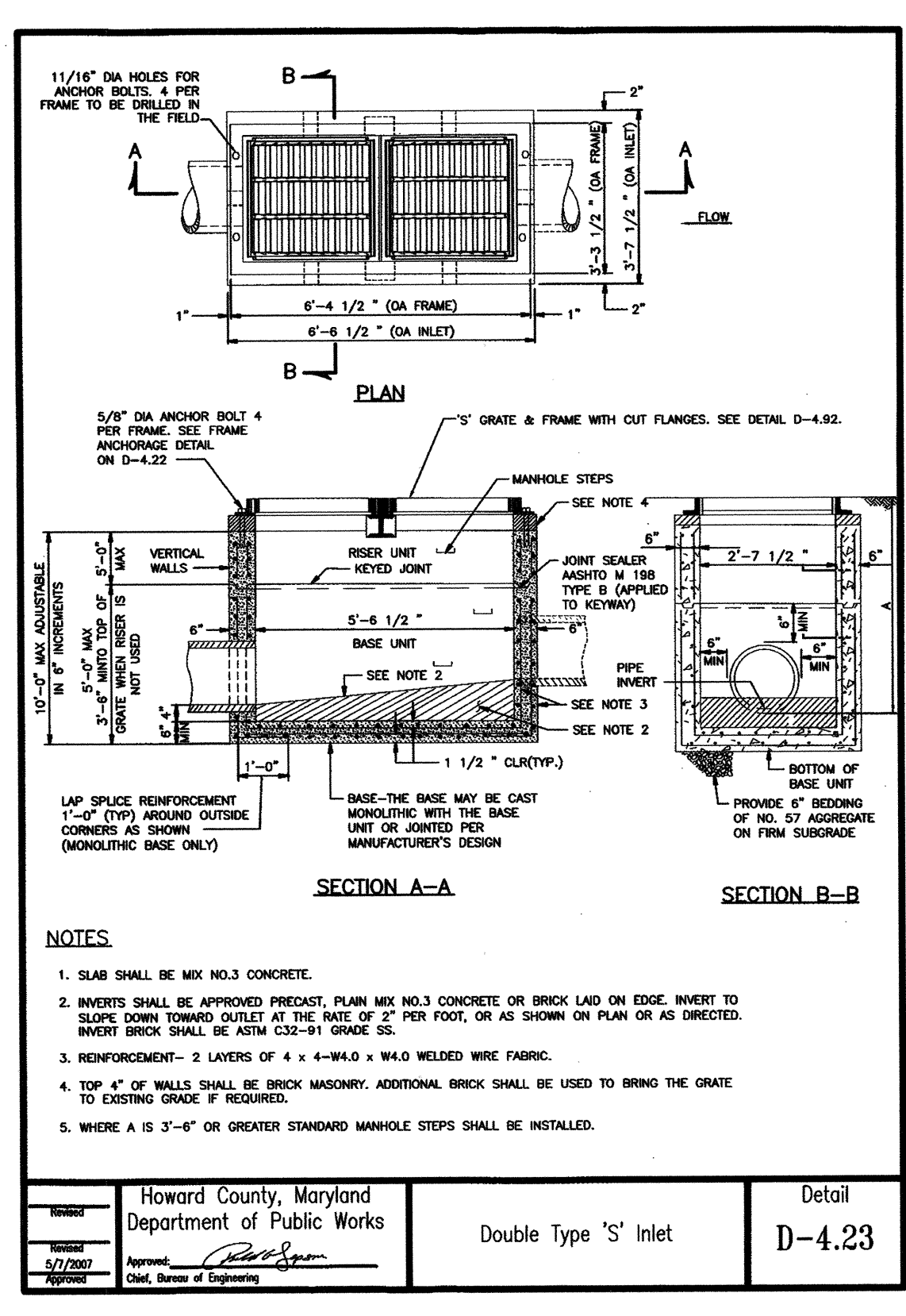
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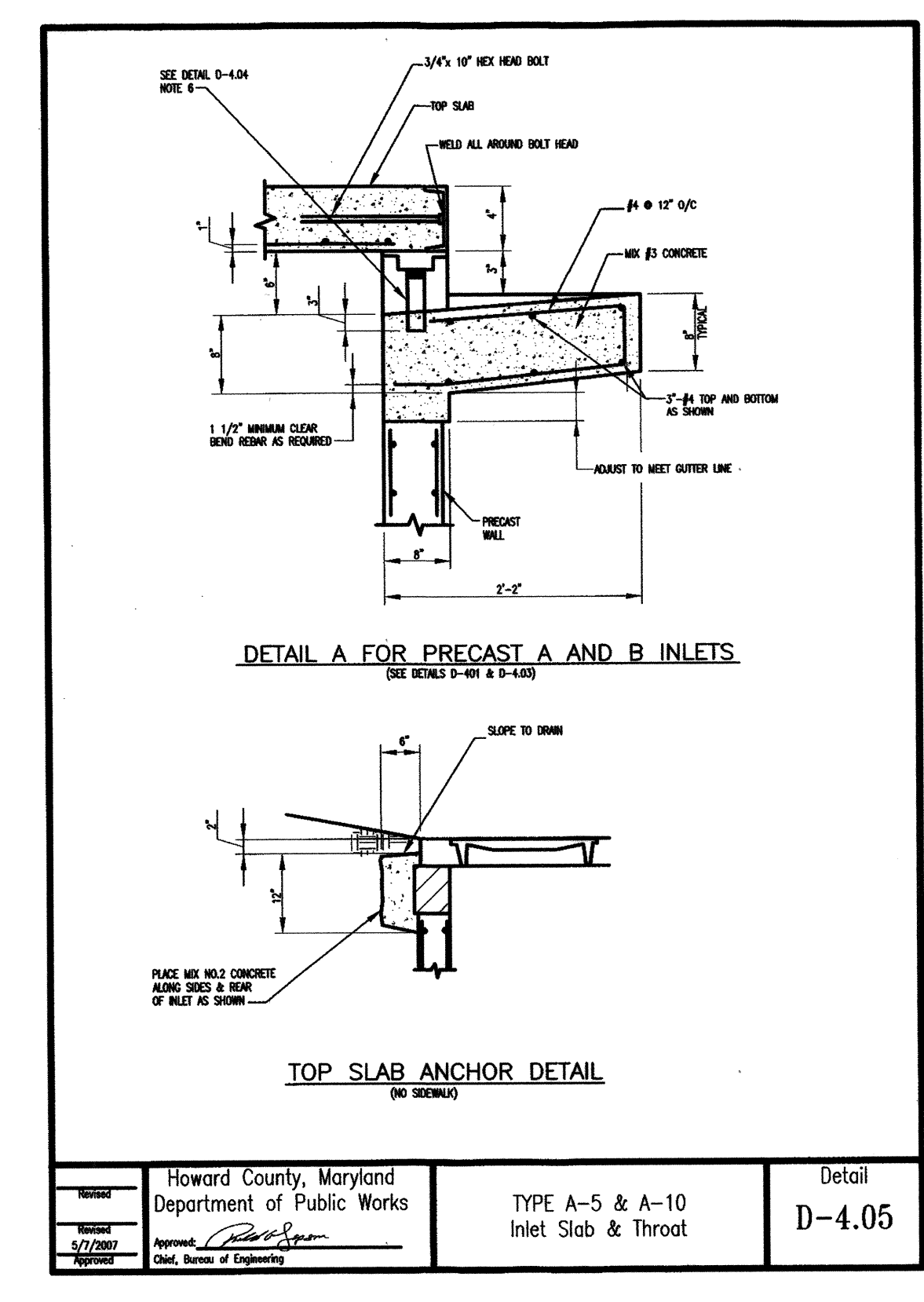
Howards County, Maryland Department of Public Works	Type 'S' Inlet	Detail D-4.22
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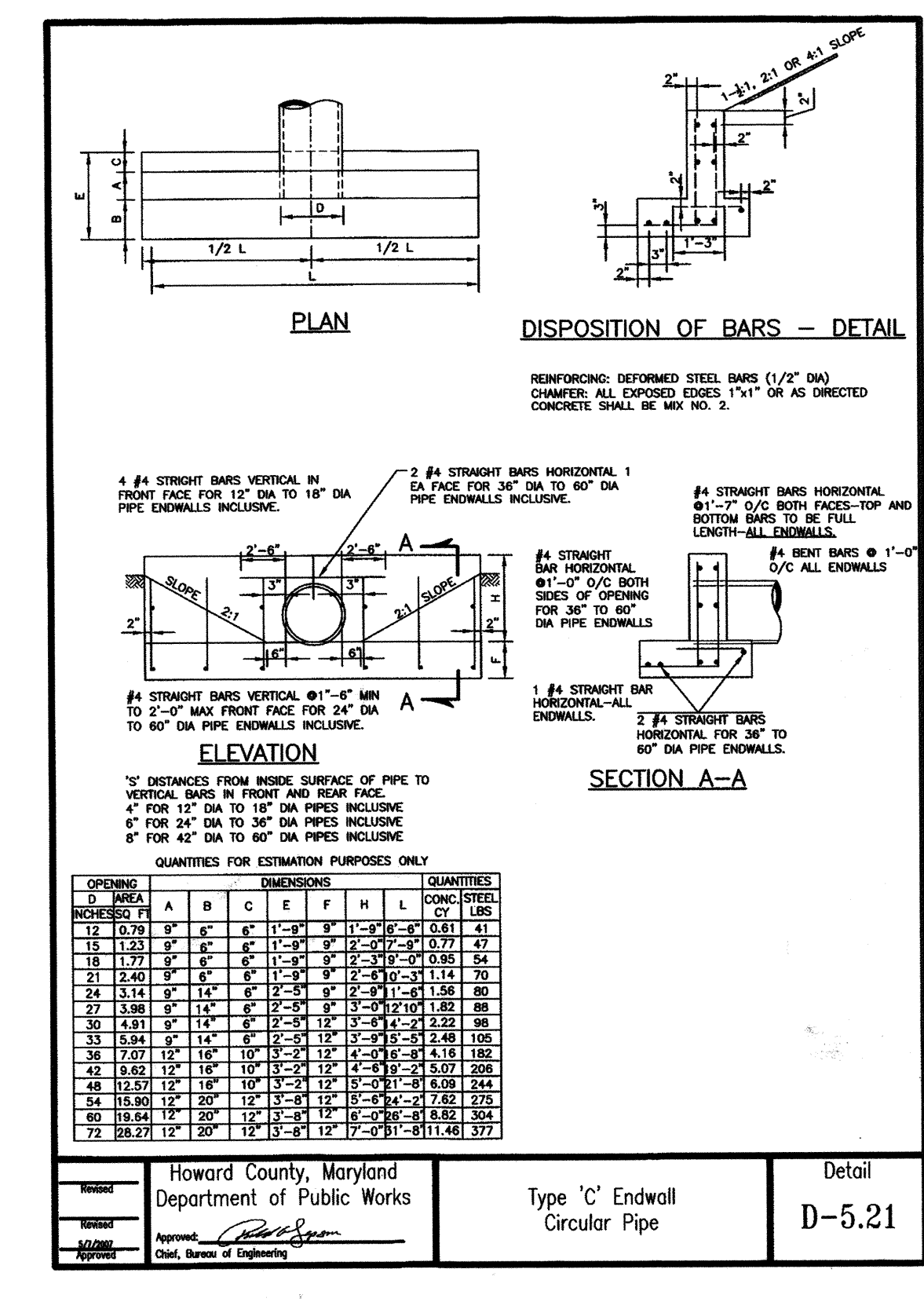
Howards County, Maryland Department of Public Works	Type 'A' Headwall Circular Pipe	Detail D-5.11
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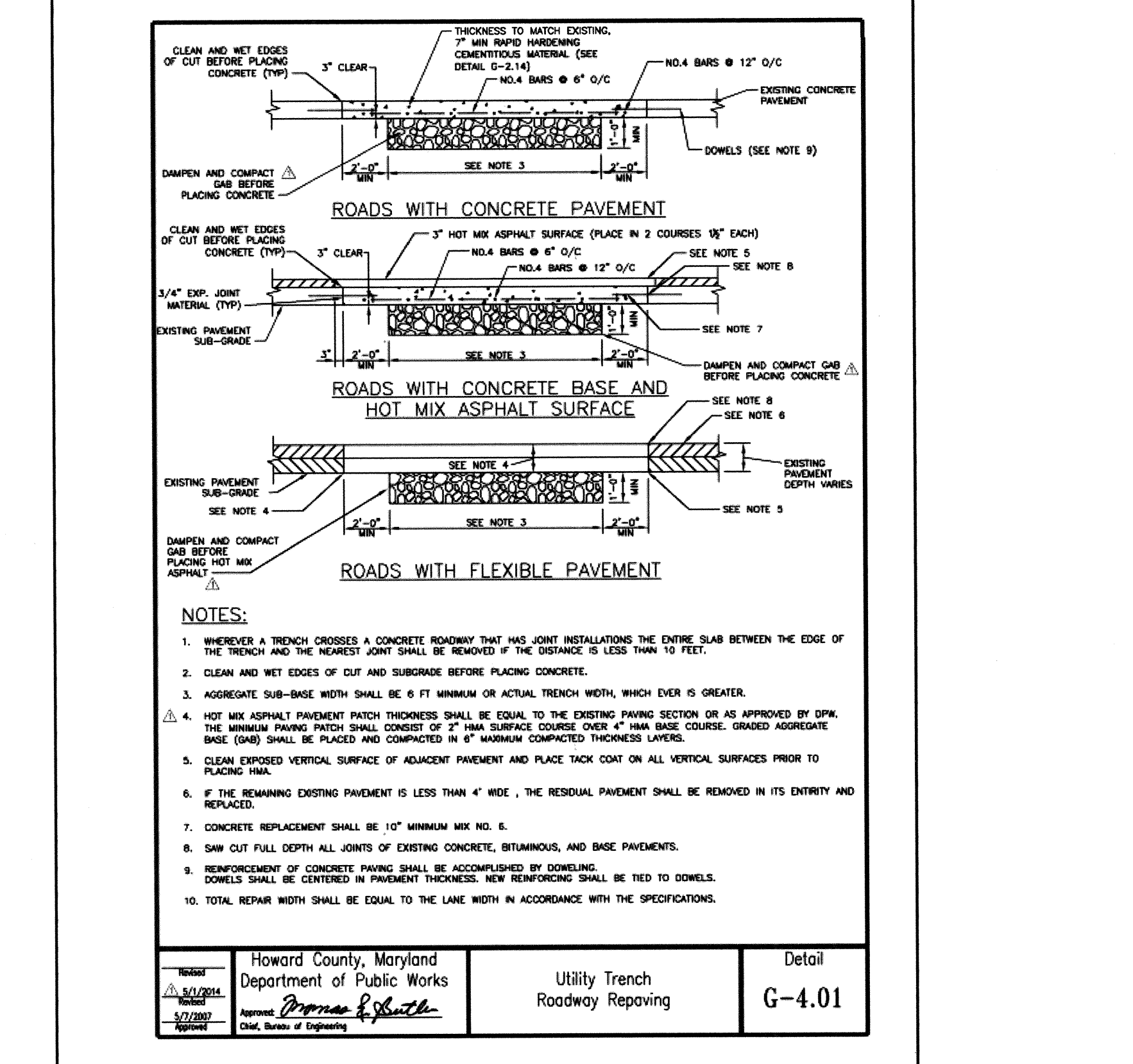
Howards County, Maryland Department of Public Works	Double Type 'S' Inlet	Detail D-4.23
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Howards County, Maryland Department of Public Works	Type A-5 & A-10 Inlet Slab & Throat	Detail D-4.05
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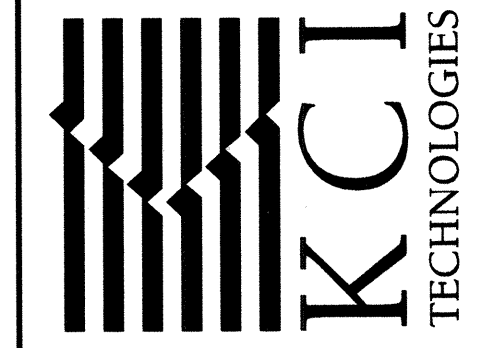
Howards County, Maryland Department of Public Works	Type 'C' Endwall Circular Pipe	Detail D-5.21
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Howards County, Maryland Department of Public Works	Utility Trench Roadway Repaving	Detail G-4.01
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NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
SPARKS, MARYLAND 21152  
TELEPHONE: (410) 316-7800  
FAX: (410) 316-7818  
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GREENWAY DRIVE AND  
GREENLOW COURT  
DRAINAGE IMPROVEMENTS  
CAPITAL PROJECT D-1158  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STORMWATER MANAGEMENT DIVISION  
67571 COLUMBIA, MD 21046  
PARCELS 389, 445 TAX MAP 17  
ZONING: RE2 ELECTION DISTRICT 02 GRIDBLOCK 0022

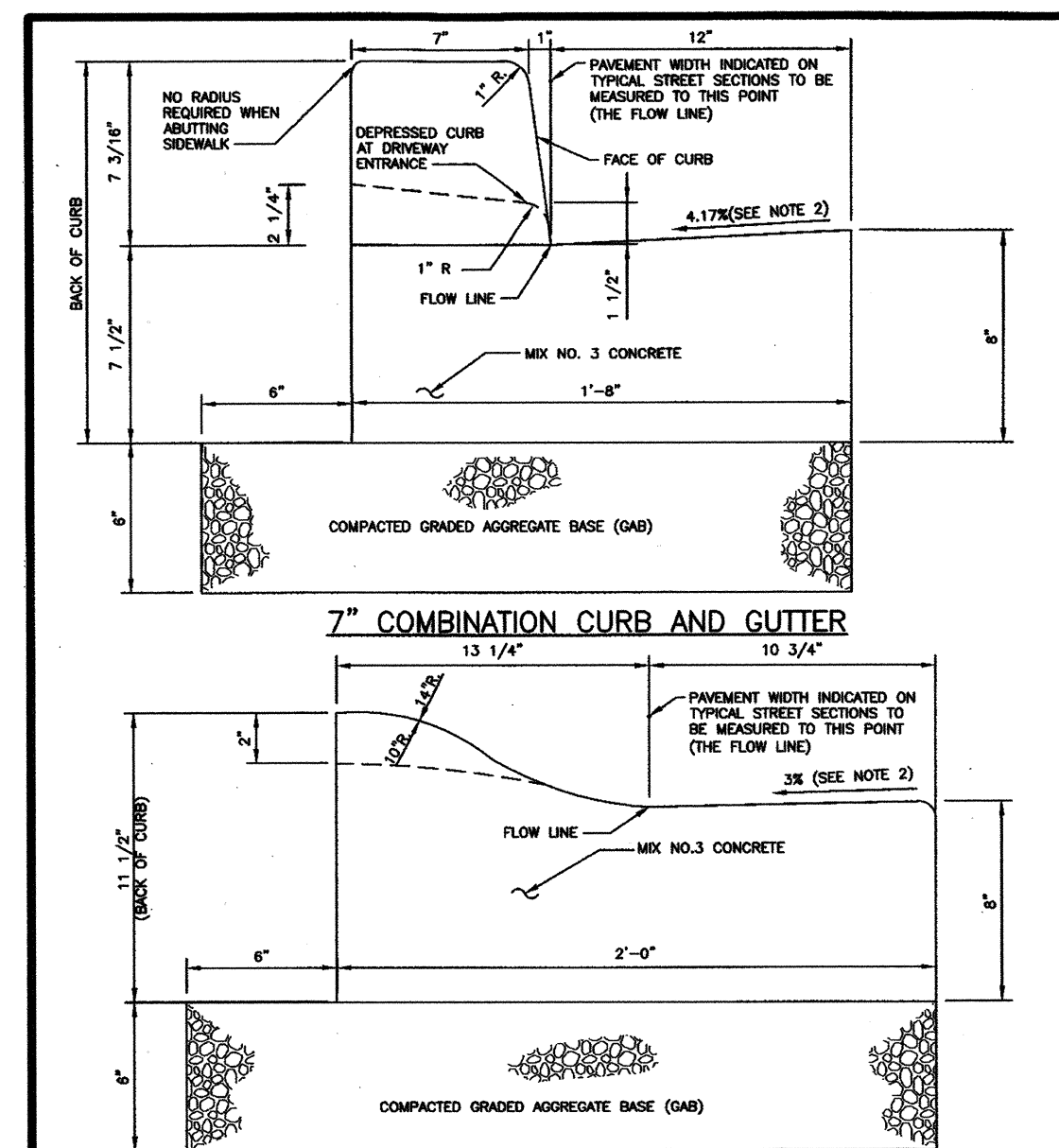
STORM DRAIN  
DETAILS

SCALE:	AS SHOWN
DATE:	JANUARY 2016
KCI JOB NO.:	17133314.50
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	



PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THE 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. 20903, EXPIRATION DATE: JULY 18, 2017.

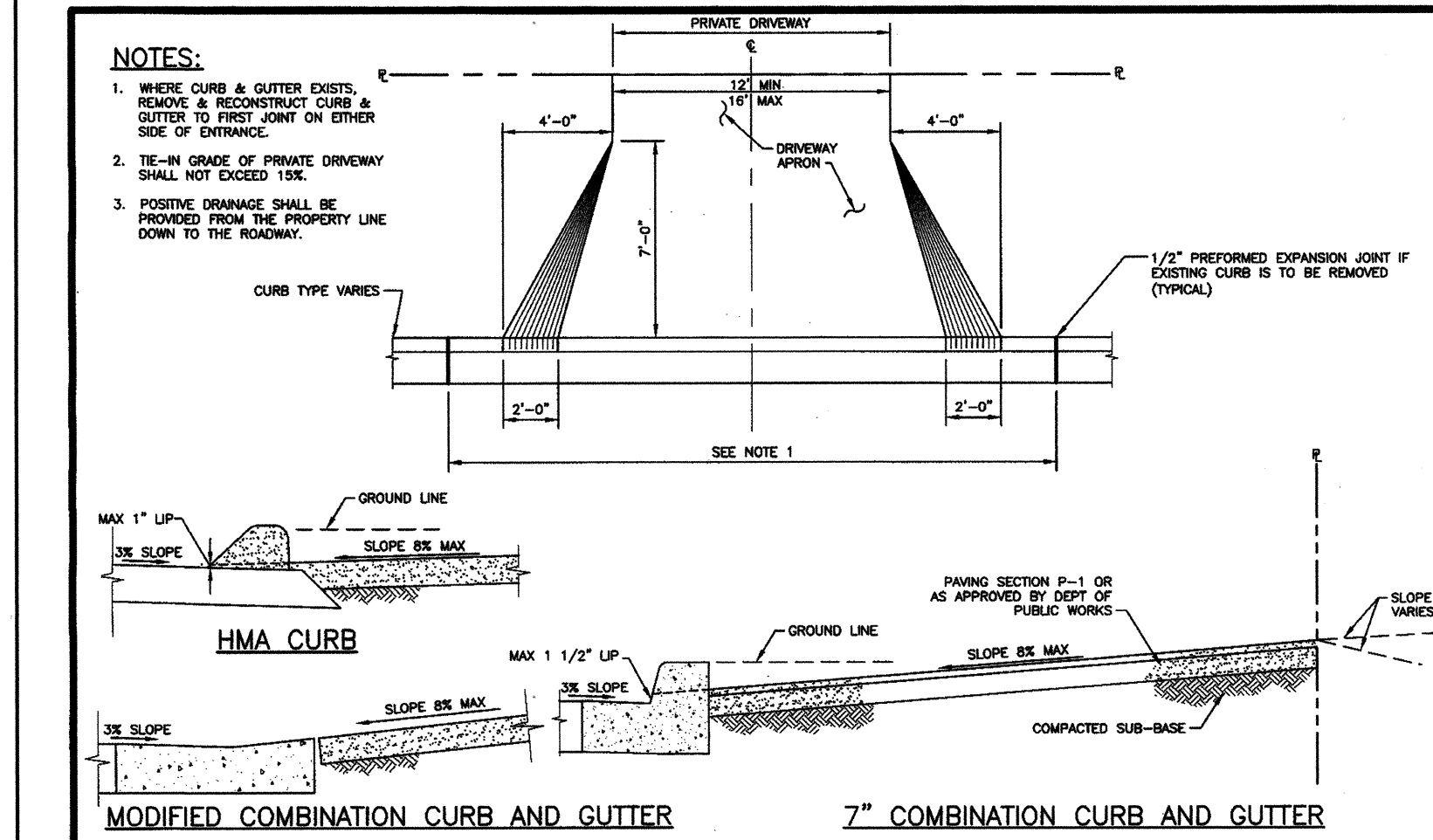
DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
M. K. ...  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
DATE: 1/21/16



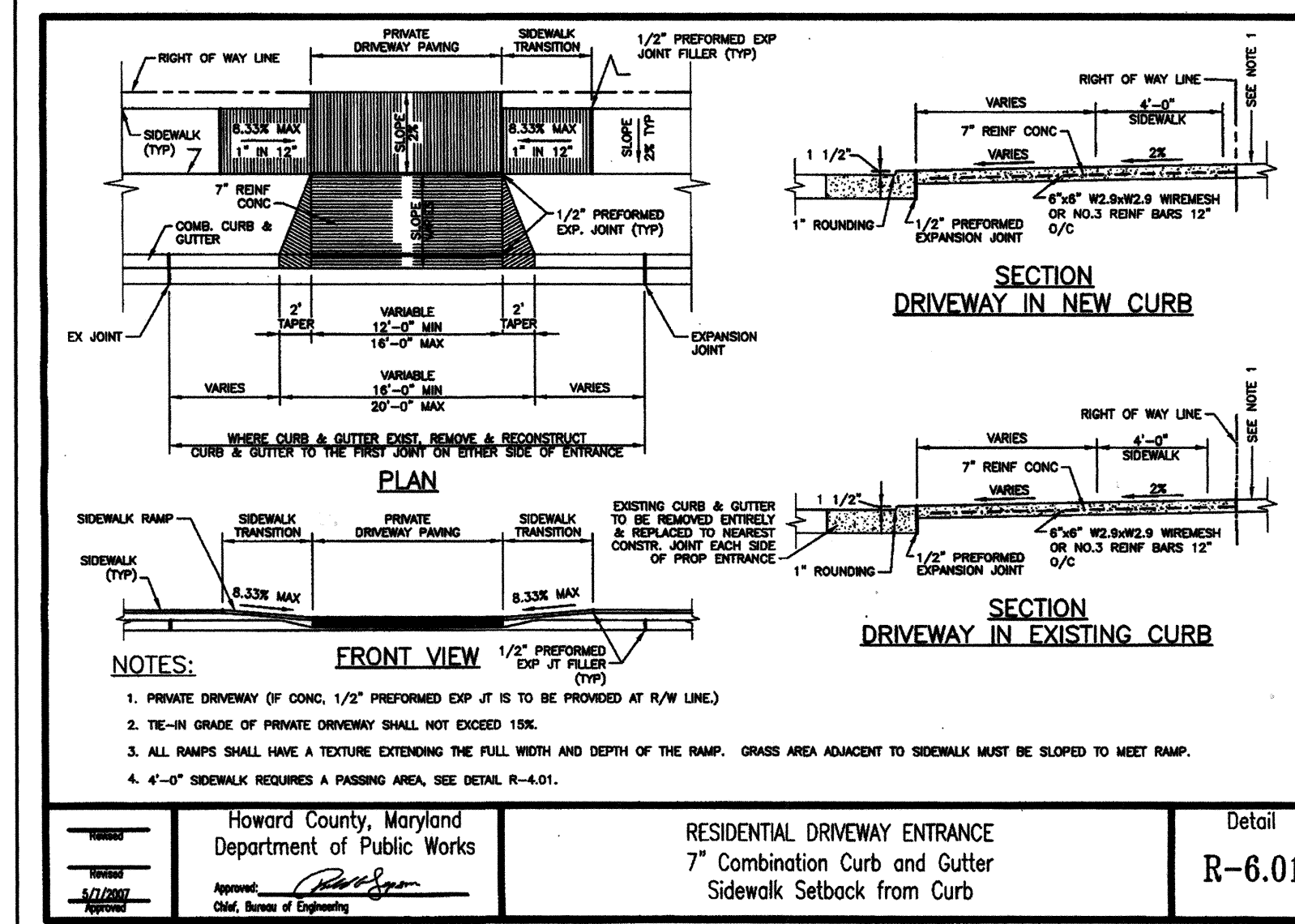
**NOTE: MODIFIED COMBINATION CURB AND GUTTER**

- A REVERSE GUTTER PAN SHALL HAVE A GUTTER SLOPE OF 4:1% AWAY FROM THE FLOW LINE, AND SHALL NOT BE USED WHERE THE DRAINAGE CREATES A HAZARDOUS CONDITION.
- GUTTER PAN AT THE MEDIUM EDGE OF INTERMEDIATE ARTERIALS OR THE HIGH SIDE OF SUPERELEVATED SECTIONS SHALL BE SLOPED AT THE SAME RATE AND IN THE SAME DIRECTION AS THE PAVEMENT. MATCH PAVEMENT CROSS SLOPE WHEN CURB IS LOCATED ON THE LOW SIDE OF SUPERELEVATED SECTION AND THE RATE OF SUPERELEVATION IS GREATER THAN 2% FOR MODIFIED CURB & GUTTER.
- A MINIMUM OF TWO (2) FEET OF COMPACTED STABILIZED EARTH, OR EQUIVALENT, SHALL SUPPORT THE ENTIRE BACK OF CURB.
- POSITIVE DRAINAGE SHALL BE PROVIDED BOTH BEHIND THE CURB AND ALONG THE GUTTER AND FLOW LINE.

HOWARD COUNTY, MARYLAND DEPARTMENT OF PUBLIC WORKS CURB AND GUTTER 7" & Modified R-3.01	Detail R-6.05
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HOWARD COUNTY, MARYLAND DEPARTMENT OF PUBLIC WORKS MODIFIED COMBINATION CURB AND GUTTER 7" COMBINATION CURB AND GUTTER R-6.05	Detail R-6.05
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HOWARD COUNTY, MARYLAND DEPARTMENT OF PUBLIC WORKS SECTION DRIVEWAY IN NEW CURB SECTION DRIVEWAY IN EXISTING CURB R-6.01	Detail R-6.01
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**ULTRA CORR™ / ULTRA RIB™**  
 ASTM F-794/949 PVC PROFILE WALL SEWER PIPE  
 SUBMITTAL AND DATA SHEET

**ULTRA RIB™ SEWER PIPE ASTM F794 & AASHTO M304**

NOMINAL PIPE SIZE (IN)	MIN. I.D. (IN)	APPROX. O.D. (IN)	APPROX. BELL O.D. (IN)	MIN. T. (IN)	APPROX. PIPE WEIGHT (LBS/100 FT)
8	7.863	8.81	10.20	0.080	250
10	9.825	11.02	12.80	0.070	350
12	11.687	13.10	15.26	0.085	490
15	14.303	15.91	18.04	0.105	730
18	17.510	19.32	22.02	0.130	1050
21	20.656	22.92	26.17	0.160	1450
24	23.412	25.77	28.91	0.180	2120
27*	26.371	29.14	32.85	0.205	2470
30	29.388	32.38	36.68	0.235	3550

Product Standard: ASTM F794, AASHTO M304  
 Pipe Compound: ASTM D 1784 Cells Class 12454  
 Gasket: ASTM F477  
 Integral Bell Joint: ASTM D3212  
 Pipe Stiffness: ASTM D2412 F/Y = 48 PSI  
 Pipe Length: 14 feet laying length  
 Installation: JM Eagle™ Installation Guide

**ULTRA RIB™ STORM DRAIN PIPE AASHTO M304**

NOMINAL PIPE SIZE (IN)	MIN. I.D. (IN)	APPROX. O.D. (IN)	APPROX. BELL O.D. (IN)	MIN. WATERWAY WALL (IN)	APPROX. PIPE WEIGHT (LBS/100 FT)
18	17.510	19.32	22.25	0.085	884.6
21	20.656	21.73	26.38	0.100	1107.7
24	23.412	25.48	28.13	0.115	1430.8
30	29.388	32.30	N/A	0.135	N/A

Product Standard: ASTM F794, AASHTO M304  
 Pipe Compound: ASTM D 1784 Cells Class 12454  
 Gasket: ASTM F477  
 Integral Bell Joint: ASTM D3212  
 Pipe Length: 14 feet laying length  
 Installation: JM Eagle™ Installation Guide

**ULTRA CORR™ SEWER PIPE ASTM F949/F794 & AASHTO M304**

NOMINAL PIPE SIZE (IN)	MIN. I.D. (IN)	APPROX. O.D. BARREL (IN)	MIN. WALL THICKNESS			APPROX. WEIGHT (LBS/FT)	APPROX. BELL O.D. (IN)
			INNER WALL t <sub>1</sub> (IN)	OUTER WALL t <sub>2</sub> (IN)	AT VALLEY t <sub>3</sub> (IN)		
24	23.412	25.58	0.110	0.085	0.123	18.2	28.7
27	26.371	28.86	0.120	0.091	0.137	20.2	32.5
30	29.388	32.15	0.130	0.105	0.147	26.0	35.8
36	35.370	39.74	0.150	0.125	0.171	36.1	43.4

Product Standard: ASTM F949/F794, AASHTO M304  
 Pipe Compound: ASTM D 1784 Cells Class 12454  
 Gasket: ASTM F477  
 Integral Bell Joint: ASTM D3212  
 Pipe Stiffness: ASTM D2412 F/Y = 48 PSI  
 Pipe Length: 14 feet laying length  
 Installation: JM Eagle™ Installation Guide

NOTE: PPWP SHALL BE ULTRA RIB OR APPROVED EQUIVALENT.

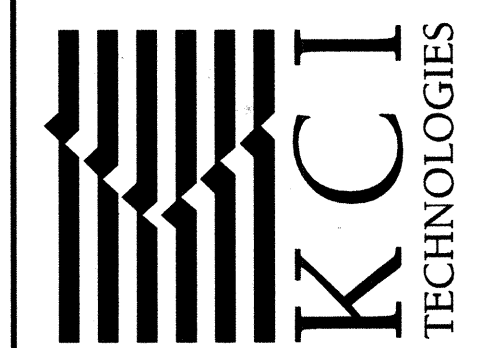


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DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 Chief, Bureau of Environmental Services  
 Date: 1/21/16

NO.	REVISIONS DESCRIPTION	DATE

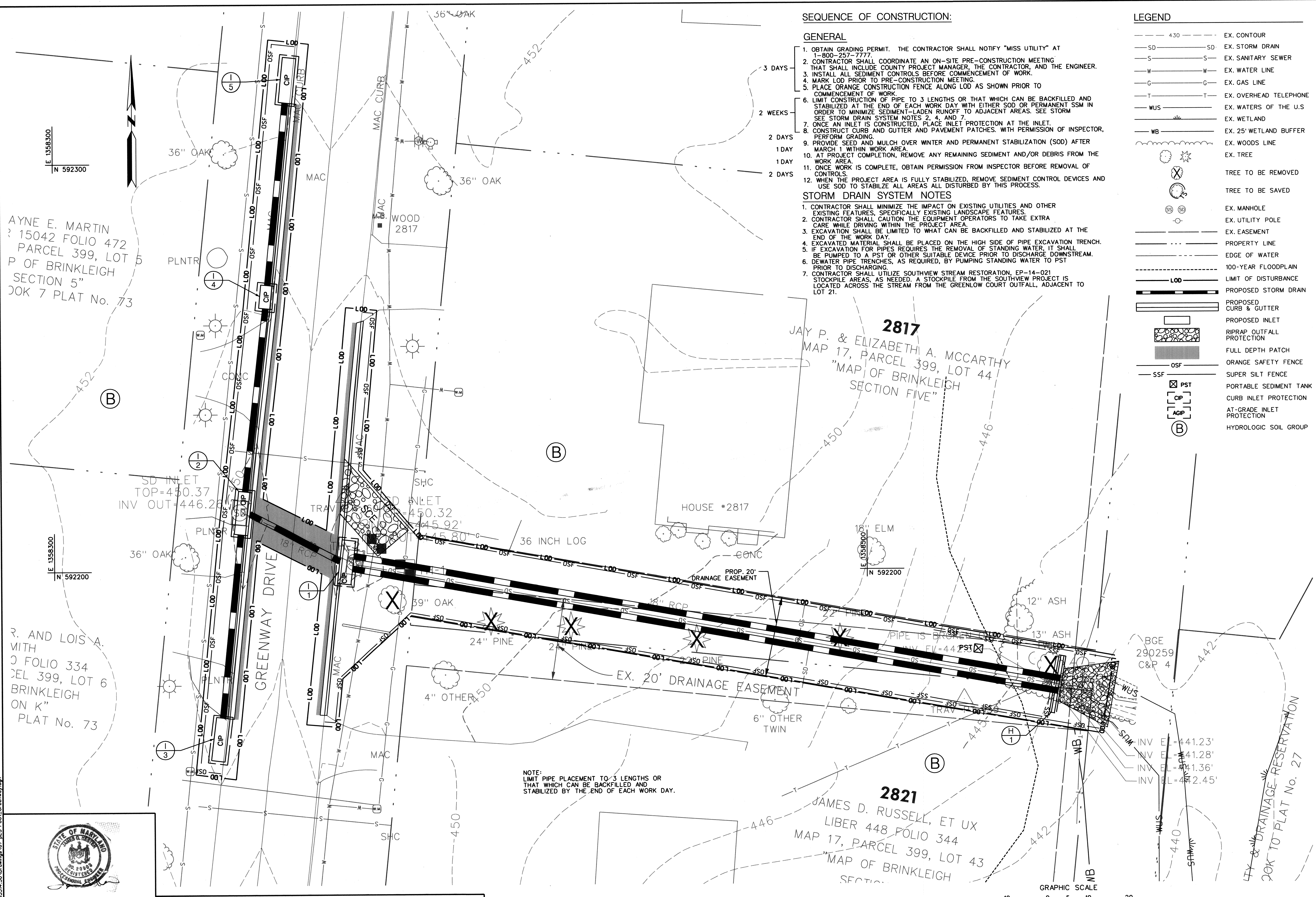
936 RIDGEBROOK ROAD  
 SPARKS, MARYLAND 21152  
 TELEPHONE: (410) 316-7800  
 FAX: (410) 316-7818  
 www.kci.com



GREENWAY DRIVE AND GREENLOW COURT DRAINAGE IMPROVEMENTS  
 CAPITAL PROJECT D-1158  
 HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 STORMWATER MANAGEMENT DIVISION  
 6751 COLUMBIA GATEWAY DRIVE  
 COLUMBIA, MD 21046  
 PAFCELS 388, 445 TAX MAP 17  
 ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022

**STORM DRAIN DETAILS**

SCALE:	AS SHOWN
DATE:	JANUARY 2016
KCI JOB NO.:	17133314.50
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	



**SEQUENCE OF CONSTRUCTION:**

**GENERAL**

1. OBTAIN GRADING PERMIT. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777.
2. CONTRACTOR SHALL COORDINATE AN ON-SITE PRE-CONSTRUCTION MEETING THAT SHALL INCLUDE COUNTY PROJECT MANAGER, THE CONTRACTOR, AND THE ENGINEER.
3. INSTALL ALL SEDIMENT CONTROLS BEFORE COMMENCEMENT OF WORK.
4. MARK LOD PRIOR TO PRE-CONSTRUCTION MEETING.
5. PLACE ORANGE CONSTRUCTION FENCE ALONG LOD AS SHOWN PRIOR TO COMMENCEMENT OF WORK.
6. LIMIT CONSTRUCTION OF PIPE TO 3 LENGTHS OR THAT WHICH CAN BE BACKFILLED AND STABILIZED AT THE END OF EACH WORK DAY WITH EITHER SOD OR PERMANENT SSM IN ORDER TO MINIMIZE SEDIMENT-LADEN RUNOFF TO ADJACENT AREAS. SEE STORM DRAIN SYSTEM NOTES 2, 4, AND 7.
7. ONCE AN INLET IS CONSTRUCTED, PLACE INLET PROTECTION AT THE INLET.
8. CONSTRUCT CURB AND GUTTER AND PAVEMENT PATCHES. WITH PERMISSION OF INSPECTOR, PERFORM GRADING.
9. PROVIDE SEED AND MULCH OVER WINTER AND PERMANENT STABILIZATION (SOD) AFTER MARCH 1 WITHIN WORK AREA.
10. AT PROJECT COMPLETION, REMOVE ANY REMAINING SEDIMENT AND/OR DEBRIS FROM THE WORK AREA.
11. ONCE WORK IS COMPLETE, OBTAIN PERMISSION FROM INSPECTOR BEFORE REMOVAL OF CONTROLS.
12. WHEN THE PROJECT AREA IS FULLY STABILIZED, REMOVE SEDIMENT CONTROL DEVICES AND USE SOD TO STABILIZE ALL AREAS ALL DISTURBED BY THIS PROCESS.

**STORM DRAIN SYSTEM NOTES**

1. CONTRACTOR SHALL MINIMIZE THE IMPACT ON EXISTING UTILITIES AND OTHER EXISTING FEATURES, SPECIFICALLY EXISTING LANDSCAPE FEATURES.
2. CONTRACTOR SHALL CAUTION THE EQUIPMENT OPERATORS TO TAKE EXTRA CARE WHILE DRIVING WITHIN THE PROJECT AREA.
3. EXCAVATION SHALL BE LIMITED TO WHAT CAN BE BACKFILLED AND STABILIZED AT THE END OF THE WORK DAY.
4. EXCAVATED MATERIAL SHALL BE PLACED ON THE HIGH SIDE OF PIPE EXCAVATION TRENCH.
5. IF EXCAVATION FOR PIPES REQUIRES THE REMOVAL OF STANDING WATER, IT SHALL BE PUMPED TO A PST OR OTHER SUITABLE DEVICE PRIOR TO DISCHARGE DOWNSTREAM.
6. DEWATER PIPE TRENCHES, AS REQUIRED, BY PUMPING STANDING WATER TO PST PRIOR TO DISCHARGING.
7. CONTRACTOR SHALL UTILIZE SOUTHVIEW STREAM RESTORATION, EP-14-021 STOCKPILE AREAS, AS NEEDED. A STOCKPILE FROM THE SOUTHVIEW PROJECT IS LOCATED ACROSS THE STREAM FROM THE GREENLOW COURT OUTFALL, ADJACENT TO LOT 21.

**LEGEND**

- 430 --- EX. CONTOUR
- SD --- SD EX. STORM DRAIN
- S --- S EX. SANITARY SEWER
- W --- W EX. WATER LINE
- G --- G EX. GAS LINE
- T --- T EX. OVERHEAD TELEPHONE
- WUS --- WUS EX. WATERS OF THE U.S.
- EX. WETLAND
- WB --- WB EX. 25' WETLAND BUFFER
- EX. WOODS LINE
- EX. TREE
- TREE TO BE REMOVED
- TREE TO BE SAVED
- EX. MANHOLE
- EX. UTILITY POLE
- EX. EASEMENT
- PROPERTY LINE
- EDGE OF WATER
- 100-YEAR FLOODPLAIN
- LOD --- LOD LIMIT OF DISTURBANCE
- PROPOSED STORM DRAIN
- PROPOSED CURB & GUTTER
- PROPOSED INLET
- RIPRAP OUTFALL PROTECTION
- FULL DEPTH PATCH
- OSF --- OSF ORANGE SAFETY FENCE
- SSF --- SSF SUPER SILT FENCE
- PST --- PST PORTABLE SEDIMENT TANK
- CIP --- CIP CURB INLET PROTECTION
- AGIP --- AGIP AT-GRADE INLET PROTECTION
- (B) --- (B) HYDROLOGIC SOIL GROUP

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
 SPARKS, MARYLAND 21152  
 TELEPHONE: (410) 316-7800  
 FAX: (410) 316-7818  
 WWW.KCI.COM

GREENWAY DRIVE AND GREENLOW COURT DRAINAGE IMPROVEMENTS  
 CAPITAL PROJECT D-1158  
 HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 STORMWATER MANAGEMENT DIVISION  
 6751 COLUMBIA GATEWAY DRIVE  
 COLUMBIA, MD 21046  
 PARCELS 389 445 TAX MAP 17  
 ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022

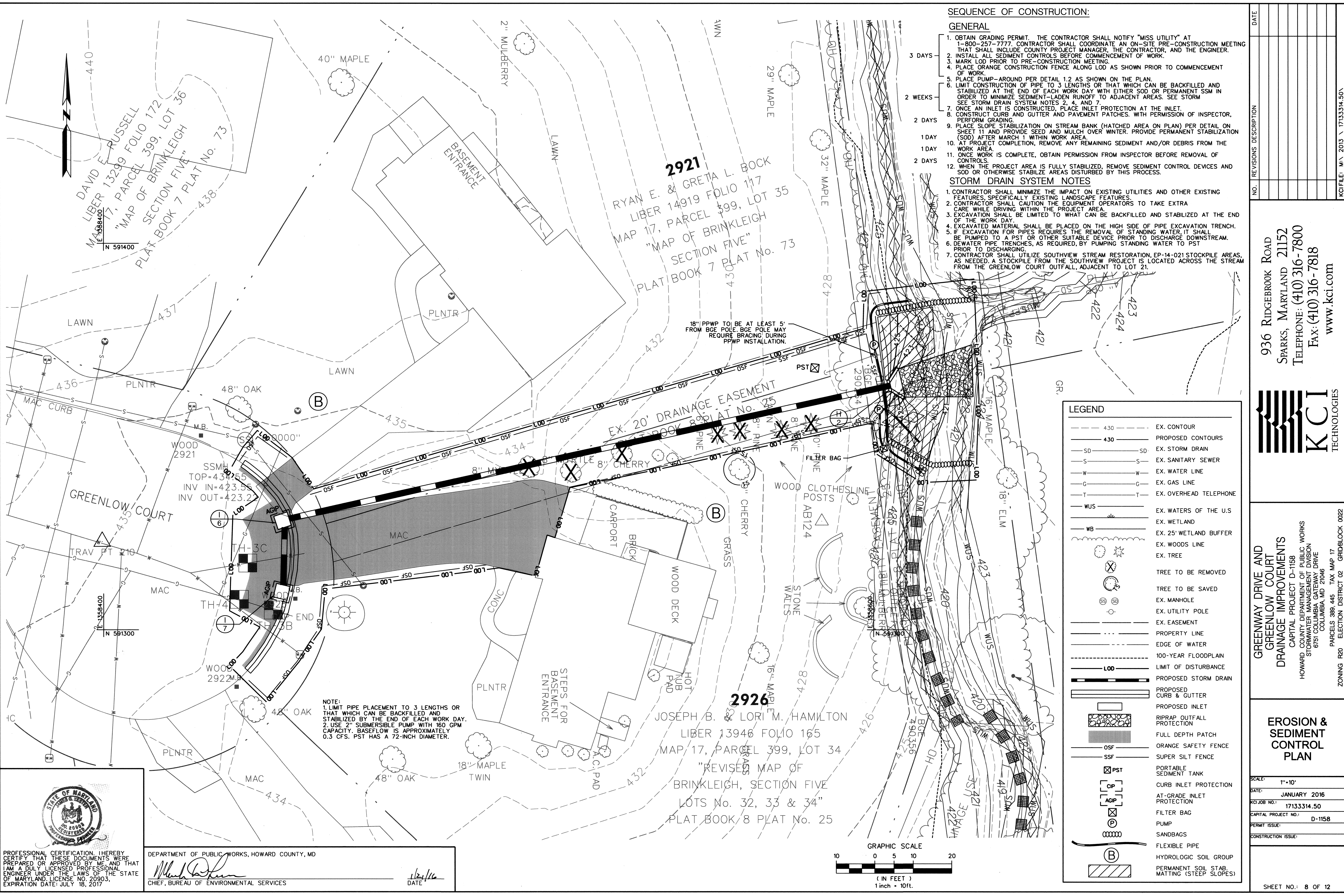
**EROSION & SEDIMENT CONTROL PLAN**

SCALE: 1"=10'  
 DATE: JANUARY 2016  
 KCI JOB NO.: 17133314.50  
 CAPITAL PROJECT NO.: D-1158  
 PERMIT ISSUE:  
 CONSTRUCTION ISSUE:



PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND AND LICENSE NO. 20903, EXPIRATION DATE: JULY 18, 2017.

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
 DATE: 1/21/16



SEQUENCE OF CONSTRUCTION:

GENERAL

- 1. OBTAIN GRADING PERMIT. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777. CONTRACTOR SHALL COORDINATE AN ON-SITE PRE-CONSTRUCTION MEETING THAT SHALL INCLUDE COUNTY PROJECT MANAGER, THE CONTRACTOR, AND THE ENGINEER.
- 2. INSTALL ALL SEDIMENT CONTROLS BEFORE COMMENCEMENT OF WORK.
- 3. MARK LOD PRIOR TO PRE-CONSTRUCTION MEETING.
- 4. PLACE ORANGE CONSTRUCTION FENCE ALONG LOD AS SHOWN PRIOR TO COMMENCEMENT OF WORK.
- 5. PLACE PUMP-AROUND PER DETAIL 1.2 AS SHOWN ON THE PLAN.
- 6. LIMIT CONSTRUCTION OF PIPE TO 3 LENGTHS OR THAT WHICH CAN BE BACKFILLED AND STABILIZED AT THE END OF EACH WORK DAY WITH EITHER SOD OR PERMANENT SSM IN ORDER TO MINIMIZE SEDIMENT-LADEN RUNOFF TO ADJACENT AREAS. SEE STORM SEE STORM DRAIN SYSTEM NOTES 2, 4, AND 7.
- 7. ONCE AN INLET IS CONSTRUCTED, PLACE INLET PROTECTION AT THE INLET.
- 8. CONSTRUCT CURB AND GUTTER AND PAVEMENT PATCHES. WITH PERMISSION OF INSPECTOR, PERFORM GRADING.
- 9. PLACE SLOPE STABILIZATION ON STREAM BANK (HATCHED AREA ON PLAN) PER DETAIL ON SHEET 11 AND PROVIDE SEED AND MULCH OVER WINTER. PROVIDE PERMANENT STABILIZATION (SOD) AFTER MARCH 1 WITHIN WORK AREA.
- 10. AT PROJECT COMPLETION, REMOVE ANY REMAINING SEDIMENT AND/OR DEBRIS FROM THE WORK AREA.
- 11. ONCE WORK IS COMPLETE, OBTAIN PERMISSION FROM INSPECTOR BEFORE REMOVAL OF CONTROLS.
- 12. WHEN THE PROJECT AREA IS FULLY STABILIZED, REMOVE SEDIMENT CONTROL DEVICES AND SOD OR OTHERWISE STABILIZE AREAS DISTURBED BY THIS PROCESS.

STORM DRAIN SYSTEM NOTES

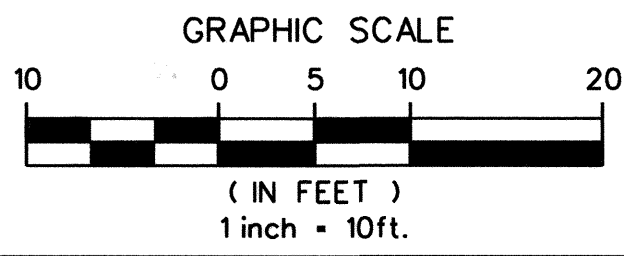
- 1. CONTRACTOR SHALL MINIMIZE THE IMPACT ON EXISTING UTILITIES AND OTHER EXISTING FEATURES, SPECIFICALLY EXISTING LANDSCAPE FEATURES.
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- 3. EXCAVATION SHALL BE LIMITED TO WHAT CAN BE BACKFILLED AND STABILIZED AT THE END OF THE WORK DAY.
- 4. EXCAVATED MATERIAL SHALL BE PLACED ON THE HIGH SIDE OF PIPE EXCAVATION TRENCH.
- 5. IF EXCAVATION FOR PIPES REQUIRES THE REMOVAL OF STANDING WATER, IT SHALL BE PUMPED TO A PST OR OTHER SUITABLE DEVICE PRIOR TO DISCHARGE DOWNSTREAM.
- 6. DEWATER PIPE TRENCHES, AS REQUIRED, BY PUMPING STANDING WATER TO PST PRIOR TO DISCHARGE.
- 7. CONTRACTOR SHALL UTILIZE SOUTHVIEW STREAM RESTORATION, EP-14-021 STOCKPILE AREAS, AS NEEDED. A STOCKPILE FROM THE SOUTHVIEW PROJECT IS LOCATED ACROSS THE STREAM FROM THE GREENLOW COURT OUTFALL, ADJACENT TO LOT 21.

LEGEND

--- 430 ---	EX. CONTOUR
--- 430 ---	PROPOSED CONTOURS
--- SD --- SD ---	EX. STORM DRAIN
--- S --- S ---	EX. SANITARY SEWER
--- W --- W ---	EX. WATER LINE
--- G --- G ---	EX. GAS LINE
--- T --- T ---	EX. OVERHEAD TELEPHONE
--- WUS ---	EX. WATERS OF THE U.S.
--- WB ---	EX. WETLAND
---	EX. 25' WETLAND BUFFER
---	EX. WOODS LINE
---	EX. TREE
---	TREE TO BE REMOVED
---	TREE TO BE SAVED
---	EX. MANHOLE
---	EX. UTILITY POLE
---	EX. EASEMENT
---	PROPERTY LINE
---	EDGE OF WATER
---	100-YEAR FLOODPLAIN
---	L.O.D.
---	PROPOSED STORM DRAIN
---	PROPOSED CURB & GUTTER
---	PROPOSED INLET
---	RIPRAP OUTFALL PROTECTION
---	FULL DEPTH PATCH
---	ORANGE SAFETY FENCE
---	SUPER SILT FENCE
---	PORTABLE SEDIMENT TANK
---	CIP
---	AGIP
---	FILTER BAG
---	SANDBAGS
---	FLEXIBLE PIPE
---	HYDROLOGIC SOIL GROUP
---	PERMANENT SOIL STAB. MATTING (STEEP SLOPES)

NOTE:  
 1. LIMIT PIPE PLACEMENT TO 3 LENGTHS OR THAT WHICH CAN BE BACKFILLED AND STABILIZED BY THE END OF EACH WORK DAY.  
 2. USE 2" SUBMERSIBLE PUMP WITH 160 GPM CAPACITY. BASEFLOW IS APPROXIMATELY 0.3 CFS. PST HAS A 72-INCH DIAMETER.

18" PPWP TO BE AT LEAST 5' FROM BGE POLE. BGE POLE MAY REQUIRE BRACING DURING PPWP INSTALLATION.

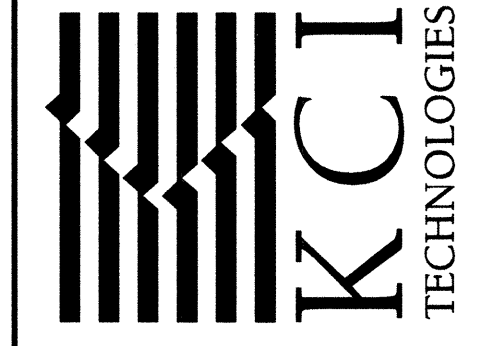


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DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 Chief, Bureau of Environmental Services  
 Date: 1/21/16

NO.	REVISIONS DESCRIPTION	DATE

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GREENWAY DRIVE AND GREENLOW COURT DRAINAGE IMPROVEMENTS  
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 PARCELS 389, 445 TAX MAP 17  
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EROSION & SEDIMENT CONTROL PLAN

SCALE: 1" = 10'  
 DATE: JANUARY 2016  
 KCI JOB NO.: 17133314.50  
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**HOWARD SOIL CONSERVATION DISTRICT (HSCD)  
STANDARD SEDIMENT CONTROL NOTES**

1. A pre-construction meeting must occur with the Howard County Department of Public Works, Construction Inspection Division (CID), 410-313-1855 after the future LOD and protected areas are marked clearly in the field. A minimum of 48 hour notice to CID must be given at the following stages:

- Prior to the start of earth disturbance,
- Upon completion of the installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading,
- Prior to the start of another phase of construction or opening of another grading unit,
- Prior to the removal or modification of sediment control practices.

Other building or grading inspection approvals may not be authorized until this initial approval by the inspection agency is made. Other related state and federal permits shall be referenced, to ensure coordination and to avoid conflicts with this plan.

2. All vegetative and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, and revisions thereto.

3. Following initial soil disturbance or re-disturbance, permanent or temporary stabilization is required within three (3) calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes steeper than 3 horizontal to 1 vertical (3:1); and seven (7) calendar days as to all other disturbed areas on the project site except for those areas under active grading.

4. All disturbed areas must be stabilized within the time period specified above in accordance with the 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for topsoil (Sec. B-4-2), permanent seeding (Sec. B-4-5), temporary seeding (Sec. B-4-4) and mulching (Sec. B-4-3). Temporary stabilization with mulch alone can only be applied between the fall and spring seeding dates if the ground is frozen. Incremental stabilization (Sec. B-4-1) specifications shall be enforced in areas with >15' of cut and/or fill. Stockpiles (Sec. B-4-8) in excess of 20 ft. must be benched with stable outlet. All concentrated flow, steep slope, and highly erodible areas shall receive soil stabilization matting (Sec. B-4-6).

5. All sediment control structures are to remain in place, and are to be maintained in operative condition until permission for their removal has been obtained from the CID.

6. Site Analysis:

Total Area of Site:	0.30	Acres
Area Disturbed:	0.30	Acres
Area to be roofed or paved:	0.13	Acres
Area to be vegetatively stabilized:	0.17	Acres
Total Cut:	280	Cu. Yds.
Total Fill:	280	Cu. Yds.

Offsite waste/borrow area location: SEE STORM DRAIN SYSTEM NOTE #7 ON SHEET 7. SOUTHVIEW STORM RESTORATION: EP-14-021

7. Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.

8. Additional sediment control must be provided, if deemed necessary by the CID. The site and all controls shall be inspected by the contractor weekly, and the next day after each rain event. A written report by the contractor, made available upon request, is part of every inspection and should include:

- Inspection date
- Inspection type (routine, pre-storm event, during rain event)
- Name and title of inspector
- Weather information (current conditions as well as time and amount of last recorded precipitation)
- Brief description of project's status (e.g., percent complete) and/or current activities
- Evidence of sediment discharges
- Identification of plan deficiencies
- Identification of sediment controls that require maintenance
- Identification of missing or improperly installed sediment controls
- Compliance status regarding the sequence of construction and stabilization requirements
- Photographs
- Monitoring/sampling
- Maintenance and/or corrective action performed
- Other inspection items as required by the General Permit for Stormwater Associated with Construction Activities (NPDES, MDE).

9. Trenches for the construction of utilities is limited to three pipe lengths or that which can and shall be back-filled and stabilized by the end of each workday, whichever is shorter.

10. Any major changes or revisions to the plan or sequence of construction must be reviewed and approved by the HSCD prior to proceeding with construction. Minor revisions may be allowed by the CID per the list of HSCD-approved field changes.

11. Disturbance shall not occur outside the L.O.D. A project is to be sequenced so that grading activities begin on one grading unit (maximum acreage of 20 ac. per grading unit) at a time. Work may proceed to a subsequent grading unit when at least 50 percent of the disturbed area in the preceding grading unit has been stabilized and approved by the CID. Unless otherwise specified and approved by the CID, no more than 30 acres cumulatively may be disturbed at a given time.

12. Wash water from any equipment, vehicles, wheels, pavement, and other sources must be treated in a sediment basin or other approved washout structure.

13. Topsoil shall be stockpiled and preserved on-site for redistribution onto final grade.

14. All Silt Fence and Super Silt Fence shall be placed on-the-contour, and be imbricated at 25' minimum intervals, with lower ends curled uphill by 2' in elevation.

15. Stream channels must not be disturbed during the following restricted time periods (inclusive):

- Use I and IP March 1 - June 15
- Use III and IIIP October 1 - April 30
- Use IV March 1 - May 31

16. A copy of this plan, the 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, and associated permits shall be on-site and available when the site is active.

**B-4-1 STANDARDS AND SPECIFICATIONS**

**FOR**

**INCREMENTAL STABILIZATION**

**Definition**

Establishment of vegetative cover on cut and fill slopes.

**Purpose**

To provide timely vegetative cover on cut and fill slopes as work progresses.

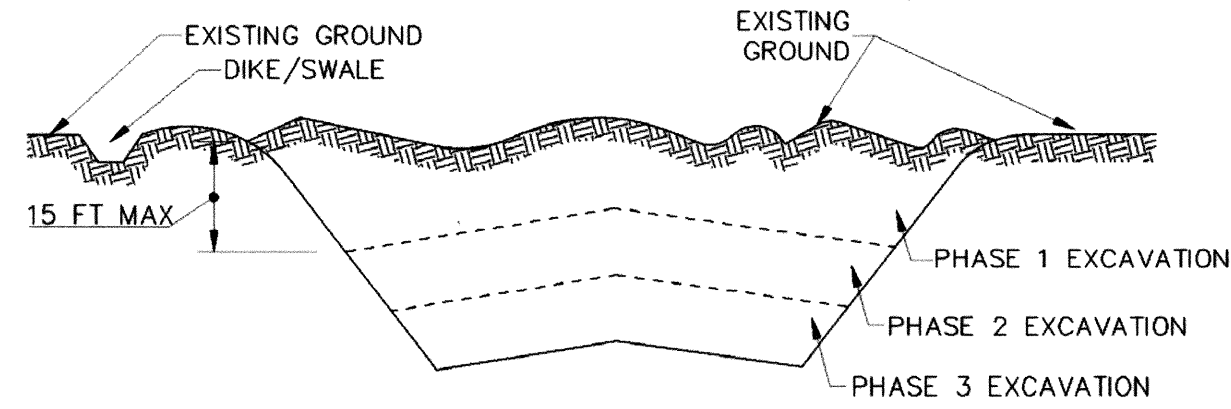
**Conditions Where Practice Applies**

Any cut or fill slope greater than 15 feet in height. This practice also applies to stockpiles.

**Criteria**

- A. Incremental Stabilization - Cut Slopes
- Excavate and stabilize cut slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all cut slopes as the work progresses.
  - Construction sequence example (Refer to Figure B.1):
    - Construct and stabilize all temporary swales or dikes that will be used to convey runoff around the excavation.
    - Perform Phase 1 excavation, prepare seedbed, and stabilize.
    - Perform Phase 2 excavation, prepare seedbed, and stabilize. Overseed Phase 1 areas as necessary.
    - Perform final phase excavation, prepare seedbed, 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 or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

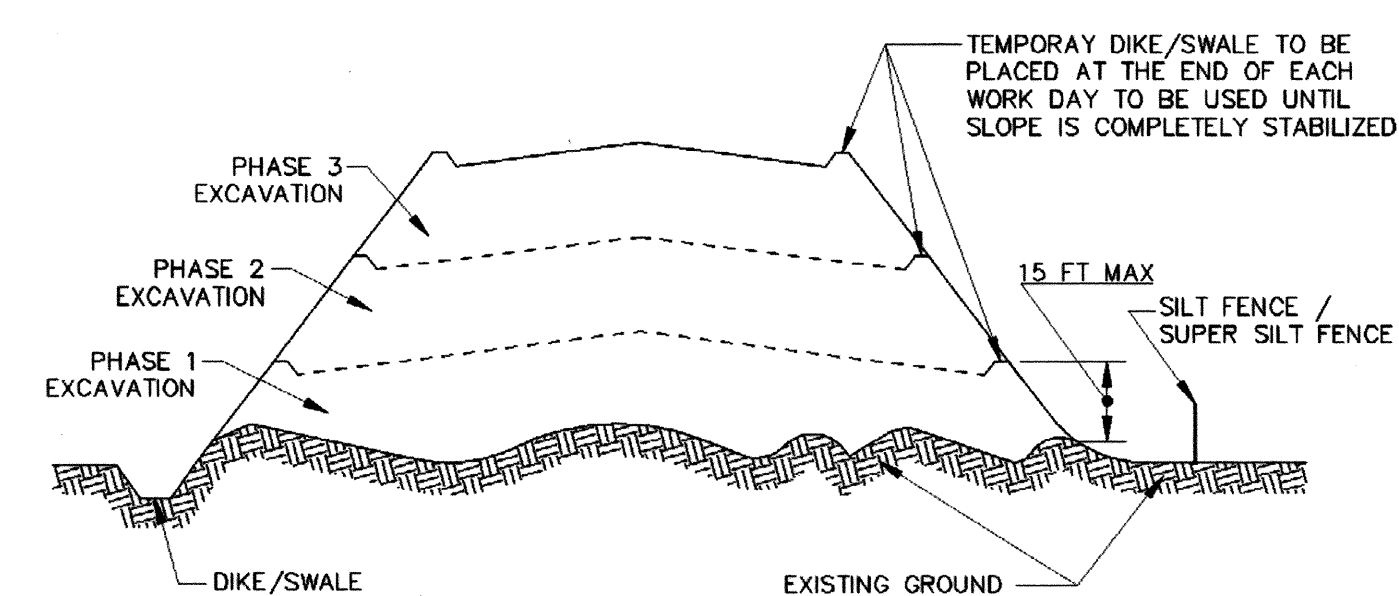


**Figure B.1: Incremental Stabilization - Cut**

B.10

- B. Incremental Stabilization - Fill Slopes
- Construct and stabilize fill slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all slopes as the work progresses.
  - Stabilize slopes immediately when the vertical height of a lift reaches 15 feet, or when the grading operation ceases as prescribed in the plans.
  - At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
  - Construction sequence example (Refer to Figure B.2):
    - Construct and stabilize all temporary swales or dikes that will be used to divert runoff around the fill. Construct silt fence on low side of fill unless other methods shown on the plans address this area.
    - At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
    - Place Phase 1 fill, prepare seedbed, and stabilize.
    - Place Phase 2 fill, prepare seedbed, and stabilize.
    - Place final phase fill, prepare seedbed, 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.



**Figure B.2: Incremental Stabilization - Fill**

**B-4-2 STANDARDS AND SPECIFICATIONS**

**FOR**

**SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS**

**Definition**

The process of preparing the soils to sustain adequate vegetative stabilization.

**Purpose**

To provide a suitable soil medium for vegetative growth.

**Conditions Where Practice Applies**

Where vegetative stabilization is to be established.

**Criteria**

- A. Soil Preparation
- Temporary Stabilization
    - Seedbed preparation consists of loosening soil to a depth of 3 to 5 inches by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened, it must not be rolled or dragged smooth but left in the roughened condition. Slopes 3:1 or flatter are to be tracked with ridges running parallel to the contour of the slope.
    - Apply fertilizer and lime as prescribed on the plans.
    - Incorporate lime and fertilizer into the top 3 to 5 inches of soil by disking or other suitable means.
  - Permanent Stabilization
    - A soil test is required for any earth disturbance of 5 acres or more. The minimum soil conditions required for permanent vegetative establishment are:
      - Soil pH between 6.0 and 7.0.
      - Soluble salts less than 500 parts per million (ppm).
      - Soil contains less than 40 percent clay but enough fine grained material (greater than 30 percent silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception: if lovegrass will be planted, then a sandy soil (less than 30 percent silt plus clay) would be acceptable.
      - Soil contains 1.5 percent minimum organic matter by weight.
      - Soil contains sufficient pore space to permit adequate root penetration.
    - Application of amendments or topsoil is required if on-site soils do not meet the above conditions.
    - Graded areas must be maintained in a true and even grade as specified on the approved plan, then scarified or otherwise loosened to a depth of 3 to 5 inches.
    - Apply soil amendments as specified on the approved plan or as indicated by the results of a soil test.
    - Mix soil amendments into the top 3 to 5 inches of soil by disking or other suitable means. Rake lawn areas to smooth the surface, remove large objects like stones and branches, and ready the area for seed application. Loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface where site conditions will not permit normal seedbed preparation. Track slopes 3:1 or flatter with tracked equipment leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. Leave the top 1 to 3 inches of soil loose and friable. Seedbed loosening may be unnecessary on newly disturbed areas.
- B. Topsoiling
- Topsoil is placed over prepared subsoil prior to establishment of permanent vegetation. The purpose is to provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.
  - Topsoil salvaged from an existing site may be used provided it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA-NRCS.
  - Topsoiling is limited to areas having 2:1 or flatter slopes where:
    - The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
    - The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
    - The original soil to be vegetated contains material toxic to plant growth.
    - The soil is so acidic that treatment with limestone is not feasible.
  - Areas having slopes steeper than 2:1 require special consideration and design.
  - Topsoil Specifications: Soil to be used as topsoil must meet the following criteria:
    - Topsoil must be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Topsoil must not be a mixture of contrasting textured subsoils and must contain less than 5 percent by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1 1/2 inches in diameter.
    - Topsoil must be free of noxious plants or plant parts such as Bermuda grass, quack grass, Johnson grass, nut sedge, poison ivy, thistle, or others as specified.
    - Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.
  - Topsoil Application
    - Erosion and sediment control practices must be maintained when applying topsoil.
    - Uniformly distribute topsoil in a 5 to 8 inch layer and lightly compact to a minimum thickness of 4 inches. Spreading is to be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations must be corrected in order to prevent the formation of depressions or water pockets.
    - Topsoil must not be placed if the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading

and seedbed preparation.

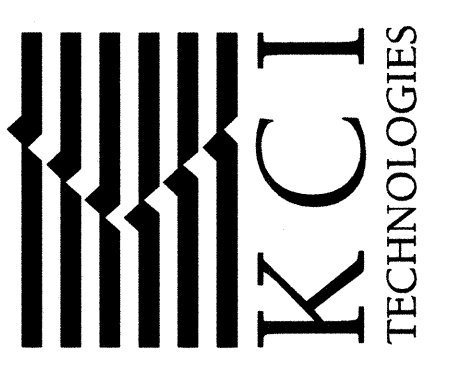
C. Soil Amendments (Fertilizer and Lime Specifications)

- Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas of 5 acres or more. Soil analysis may be performed by a recognized private or commercial laboratory. Soil samples taken for engineering purposes may also be used for chemical analyses.
- Fertilizers must be uniform in composition, free flowing and suitable for accurate application by appropriate equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers must all be delivered to the site fully labeled according to the applicable laws and must bear the name, trade name or trademark and warranty of the producer.
- Lime materials must be ground limestone (hydrated or burnt lime may be substituted except when hydroseeding) which contains at least 50 percent total oxides (calcium oxide plus magnesium oxide). Limestone must be ground to such fineness that at least 50 percent will pass through a #100 mesh sieve and 98 to 100 percent will pass through a #20 mesh sieve.
- Lime and fertilizer are to be evenly distributed and incorporated into the top 3 to 5 inches of soil by disking or other suitable means.
- Where the subsoil is either highly acidic or composed of heavy clays, spread ground limestone at the rate of 4 to 8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil.

SOIL TYPE			
SYMBOL	NAME	HSG	K
GhB	GLENELG-URBAN	B	N/A
GcB	GLENELG-URBAN-UODORTENTS	B	0.43

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
SPARKS, MARYLAND 21152  
TELEPHONE: (410) 316-7800  
FAX: (410) 316-7818  
WWW.KCI.COM



GREENWAY DRIVE AND GREENLOW COURT  
DRAINAGE IMPROVEMENTS  
CAPITAL PROJECT D-1158  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STORMWATER MANAGEMENT DIVISION  
6751 COLUMBIA GATEWAY DRIVE  
COLUMBIA, MD 21046  
PARCELS 389, 445 TAX MAP 17  
ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022

**EROSION & SEDIMENT CONTROL NOTES**

SCALE:	AS SHOWN
DATE:	JANUARY 2016
KCI JOB NO.:	17133314.50
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

TOTAL DISTURBED AREA: 0.30 AC.

BY: Division: 17133314.50 Drawings: VBP-pES-NOD1-Cremoney.dgn

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 20903, EXPIRATION DATE: JULY 18, 2017.

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

*Michael J. ...*  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

1/21/16  
DATE

**B-4-3 STANDARDS AND SPECIFICATIONS**

**FOR**

**SEEDING AND MULCHING**

**Definition**

The application of seed and mulch to establish vegetative cover.

**Purpose**

To protect disturbed soils from erosion during and at the end of construction.

**Conditions Where Practice Applies**

To the surface of all perimeter controls, slopes, and any disturbed area not under active grading.

**Criteria**

**A. Seeding**

**1. Specifications**

- a. All seed must meet the requirements of the Maryland State Seed Law. All seed must be subject to re-testing by a recognized seed laboratory. All seed used must have been tested within the 6 months immediately preceding the date of sowing such material on any project. Refer to Table B.4 regarding the quality of seed. Seed tags must be available upon request to the inspector to verify type of seed and seeding rate.
- b. Mulch alone may be applied between the fall and spring seeding dates only if the ground is frozen. The appropriate seeding mixture must be applied when the ground thaws.
- c. Inoculants: The inoculant for treating legume seed in the seed mixtures must be a pure culture of nitrogen fixing bacteria prepared specifically for the species. Inoculants must not be used later than the date indicated on the container. Add fresh inoculants as directed on the package. Use four times the recommended rate when hydroseeding. Note: It is very important to keep inoculant as cool as possible until used. Temperatures above 75 to 80 degrees Fahrenheit can weaken bacteria and make the inoculant less effective.
- d. Sod or seed must not be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phyto-toxic materials.

**2. Application**

- a. Dry Seeding: This includes use of conventional drop or broadcast spreaders.
  - i. Incorporate seed into the subsoil at the rates prescribed on Temporary Seeding Table B.1, Permanent Seeding Table B.3, or site-specific seeding summaries.
  - ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction. Roll the seeded area with a weighted roller to provide good seed to soil contact.
- b. Drill or Cultipacker Seeding: Mechanized seeders that apply and cover seed with soil.
  - i. Cultipacking 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 planing.
  - ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction.
- c. Hydroseeding: Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer).
  - i. If fertilizer is being applied at the time of seeding, the application rates should not exceed the following: nitrogen, 100 pounds per acre total of soluble nitrogen; P<sub>2</sub>O<sub>5</sub> (phosphorous), 200 pounds per acre; K<sub>2</sub>O (potassium), 200 pounds per acre.
  - ii. Lime: Use only ground agricultural limestone (up to 3 tons per acre may be applied by hydroseeding). Normally, not more than 2 tons are applied by hydroseeding at any one time. Do not use burnt or hydrated lime when hydroseeding.
  - iii. Mix seed and fertilizer on site and seed immediately and without interruption.
  - iv. When hydroseeding do not incorporate seed into the soil.

**B. Mulching**

**1. Mulch Materials (in order of preference)**

- a. Straw consisting of thoroughly threshed wheat, rye, oat, or barley and reasonably bright in color. Straw is to be free of noxious weed seeds as specified in the Maryland Seed Law and not musty, moldy, caked, decayed, or excessively dusty. **Note: Use only sterile straw mulch in areas where one species of grass is desired.**
- b. Wood Cellulose Fiber Mulch (WCFM) consisting of specially prepared wood cellulose processed into a uniform fibrous physical state.
  - i. WCFM is to 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.
  - ii. WCFM, including dye, must contain no germination or growth inhibiting factors.
  - iii. WCFM materials are to 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 must form a blotter-like ground cover, on application, having moisture absorption and percolation properties and must cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings.
  - iv. WCFM material must not contain elements or compounds at concentration levels that will be phyto-toxic.
  - v. WCFM must conform to the following physical requirements: fiber length of approximately 10 millimeters, diameter approximately 1 millimeter, pH range of 4.0 to 8.5, ash content of 1.6 percent maximum and water holding capacity of 90 percent minimum.

**2. Application**

- a. Apply mulch to all seeded areas immediately after seeding.
- b. When straw mulch is used, spread it over all seeded areas at the rate of 2 tons per acre to a uniform loose depth of 1 to 2 inches. Apply mulch to achieve a uniform distribution and depth so that the soil surface is not exposed. When using a mulch anchoring tool, increase the application rate to 2.5 tons per acre.
- c. Wood cellulose fiber used as mulch must be applied at a net dry weight of 1500 pounds per acre. Mix the wood cellulose fiber with water to attain a mixture with a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.

**3. Anchoring**

- a. Perform mulch anchoring immediately following application of mulch to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon the size of the area and erosion hazard:
  - i. A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of 2 inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. If used on sloping land, this practice should follow the contour.
  - ii. Wood cellulose fiber may be used for anchoring straw. Apply the fiber binder at a net dry weight of 750 pounds per acre. Mix the wood cellulose fiber with water at a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
  - iii. Synthetic binders such as Acrylic DLR (Agro-Tack), DCA-70, Petrosset, Terra Tax II, Terra Tack AR or other approved equal may be used. Follow application rates as specified by the manufacturer. Application of liquid binders needs to be heavier at the edges where wind catches mulch, such as in valleys and on crests of banks. **Use of asphalt binders is strictly prohibited.**
  - iv. Lightweight plastic netting may be stapled over the mulch according to manufacturer recommendations. Netting is usually available in rolls 4 to 15 feet wide and 300 to 3,000 feet long.

**B-4-4 STANDARDS AND SPECIFICATIONS**

**FOR**

**TEMPORARY STABILIZATION**

**Definition**

To stabilize disturbed soils with vegetation for up to 6 months.

**Purpose**

To use fast growing vegetation that provides cover on disturbed soils.

**Conditions Where Practice Applies**

Exposed soils where ground cover is needed for a period of 6 months or less. For longer duration of time, permanent stabilization practices are required.

**Criteria**

- 1. Select one or more of the species or seed mixtures listed in Table B.1 for the appropriate Plant Hardiness Zone (from Figure B.3), and enter them in the Temporary Seeding Summary below along with application rates, seeding dates and seeding depths. If this Summary is not put on the plan and completed, then Table B.1 plus fertilizer and lime rates must be put on the plan.
- 2. For sites having soil tests performed, use and show the recommended rates by the testing agency. Soil tests are not required for Temporary Seeding.
- 3. When stabilization is required outside of a seeding season, apply seed and mulch or straw mulch alone as prescribed in Section B-4-3.A.1.b and maintain until the next seeding season.

**Temporary Seeding Summary**

SEED MIXTURE (HARDINESS ZONE 6B ) FROM TABLE 26				SEEDING DEPTHS	FERTILIZER RATE (10-10-10)	LIME RATE
NO.	SPECIES	APPLICATION RATE (LB/AC)	SEEDING DATES			
1	RYE	140	3/1-4/30 8/15-11/15	1-2 INCH	600 LB/AC (15 LB/1000 SF)	2 tons/oc (100 LB/1000 SF)
2	RYE PLUS FOXTAIL MILLET	150	3/1-4/30 5/1-8/14 8/15-11/15	1 INCH		

**NOTES:**

- 1/ Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. Adjustments are usually not needed for the cool-season grasses.
- Seeding rates listed above are for temporary seedings, when planted alone. When planted as a nurse crop with permanent seed mixes, use 1/3 of the seeding rate listed above for barley, oats, and wheat. For smaller-seeded grasses (annual ryegrass, pearl millet, foxtail millet), do not exceed more than 5% (by weight) of the overall permanent seeding mix. Cereal rye generally should not be used as a nurse crop, unless planting will occur in very late fall beyond the seeding dates for other temporary seedings. Cereal rye has allelopathic properties that inhibit the germination and growth of other plants. If it must be used as a nurse crop, seed at 1/3 of the rate listed above.
- Oats are the recommended nurse crop for warm-season grasses.
- 2/ For sandy soils, plant seeds at twice the depth listed above.
- 3/ The planting dates listed are averages for each Zone and may require adjustment to reflect local conditions, especially near the boundaries of the zone.

**B-4-5 STANDARDS AND SPECIFICATIONS**

**FOR**

**PERMANENT STABILIZATION**

**Definition**

To stabilize disturbed soils with permanent vegetation.

**Purpose**

To use long-lived perennial grasses and legumes to establish permanent ground cover on disturbed soils.

**Conditions Where Practice Applies**

Exposed soils where ground cover is needed for 6 months or more.

**Criteria**

**A. Seed Mixtures**

**1. General Use**

- a. Select one or more of the species or mixtures listed in Table B.3 for the appropriate Plant Hardiness Zone (from Figure B.3) and based on the site condition or purpose found on Table B.2. Enter selected mixture(s), application rates, and seeding dates in the Permanent Seeding Summary. The Summary is to be placed on the plan.
- b. Additional planting specifications for exceptional sites such as shorelines, stream banks, or dunes or for special purposes such as wildlife or aesthetic treatment may be found in USDA-NRCS Technical Field Office Guide, Section 342 - Critical Area Planting.
- c. For sites having disturbed area over 5 acres, use and show the rates recommended by the soil testing agency.
- d. For areas receiving low maintenance, apply urea form fertilizer (46-0-0) at 3 1/2 pounds per 1000 square feet (150 pounds per acre) at the time of seeding in addition to the soil amendments shown in the Permanent Seeding Summary.

**Turfgrass Mixtures**

- a. Areas where turfgrass may be desired include lawns, parks, playgrounds, and commercial sites which will receive a medium to high level of maintenance.
- b. Select one or more of the species or mixtures listed below based on the site conditions or purpose. Enter selected mixture(s), application rates, and seeding dates in the Permanent Seeding Summary. The summary is to be placed on the plan.

- i. Kentucky Bluegrass: Full Sun Mixture: For use in areas that receive intensive management. Irrigation required in the areas of central Maryland and Eastern Shore. Recommended Certified Kentucky Bluegrass Cultivars Seeding Rate: 1.5 to 2.0 pounds per 1000 square feet. Choose a minimum of three Kentucky bluegrass cultivars with each ranging from 10 to 35 percent of the total mixture by weight.
- ii. Kentucky Bluegrass/Perennial Rye: Full Sun Mixture: For use in full sun areas where rapid establishment is necessary and when turf will receive medium to intensive management. Certified Perennial Ryegrass Cultivars/Certified Kentucky Bluegrass Seeding Rate: 2 pounds mixture per 1000 square feet. Choose a minimum of three Kentucky bluegrass cultivars with each ranging from 10 to 35 percent of the total mixture by weight.
- iii. Tall Fescue/Kentucky Bluegrass: Full Sun Mixture: For use in drought prone areas and/or for areas receiving low to medium management in full sun to medium shade. Recommended mixture includes: Certified Tall Fescue Cultivars 95 to 100 percent, Certified Kentucky Bluegrass Cultivars 0 to 5 percent. Seeding Rate: 5 to 8 pounds per 1000 square feet. One or more cultivars may be blended.
- iv. Kentucky Bluegrass/Fine Fescue: Shade Mixture: For use in areas with shade in Bluegrass lawns. For establishment in high quality, intensively managed turf area. Mixture includes: Certified Kentucky Bluegrass Cultivars 30 to 40 percent and Certified Fine Fescue and 60 to 70 percent. Seeding Rate: 1 1/2 to 3 pounds per 1000 square feet.

**Notes:**

Select turfgrass varieties from those listed in the most current University of Maryland Publication, Agronomy Memo #77, "Turfgrass Cultivar Recommendations for Maryland"

Choose certified material. Certified material is the best guarantee of cultivar purity. The certification program of the Maryland Department of Agriculture, Turf and Seed Section, provides a reliable means of consumer protection and assures a pure genetic line

**c. Ideal Times of Seeding for Turf Grass Mixtures**

- Western MD:** March 15 to June 1, August 1 to October 1 (Hardiness Zones: 5b, 6a)
- Central MD:** March 1 to May 15, August 15 to October 15 (Hardiness Zone: 6b)
- Southern MD, Eastern Shore:** March 1 to May 15, August 15 to October 15 (Hardiness Zones: 7a, 7b)

- d. Till areas to receive seed by disking or other approved methods to a depth of 2 to 4 inches, level and rake the areas to prepare a proper seedbed. Remove stones and debris over 1 1/2 inches in diameter. The resulting seedbed must be in such condition that future mowing of grasses will pose no difficulty.
- e. If soil moisture is deficient, supply new seedlings with adequate water for plant growth (1/2 to 1 inch every 3 to 4 days depending on soil texture) until they are firmly established. This is especially true when seedlings are made late in the planting season, in abnormally dry or hot seasons, or on adverse sites.

**Permanent Seeding Summary**

SEED MIXTURE (HARDINESS ZONE 6B ) FROM TABLE 25				FERTILIZER RATE (10-20-20)			LIME	
NO.	SPECIES	APPLICATION RATE (LB/AC)	SEEDING DATES	SEEDING DEPTHS	N	P205		K20
1	TALL FESCUE (85%) PERENNIAL RYEGRASS (10%) KENTUCKY BLUEGRASS (5%)	125 15 10	3/1-5/15 8/15-10/15	1-2 INCH	90 LB/AC (2.0 LB/1000 SF)	175 lb/oc (4.0 LB/1000 SF)	175 lb/oc (4.0 LB/1000 SF)	2 tons/oc (100 LB/1000 SF)
2	KENTUCKY BLUEGRASS (50%) HARD FESCUE (40%) RED TOP (10%)	150	3/1-5/15 8/15-10/15	1-2 INCH				

**B. Sod: To provide quick cover on disturbed areas (2:1 grade or flatter).**

**1. General Specifications**

- a. Class of turfgrass sod must be Maryland State Certified. Sod labels must be made available to the job foreman and inspector.
- b. Sod must be machine cut at a uniform soil thickness of 3/4 inch, plus or minus 1/8 inch, at the time of cutting. Measurement for thickness must exclude top growth and thatch. Broken pads and torn or uneven ends will not be acceptable.
- c. Standard size sections of sod must be strong enough to support their own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10 percent of the section.
- d. Sod must not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.
- e. Sod must be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period must be approved by an agronomist or soil scientist prior to its installation.

**2. Sod Installation**

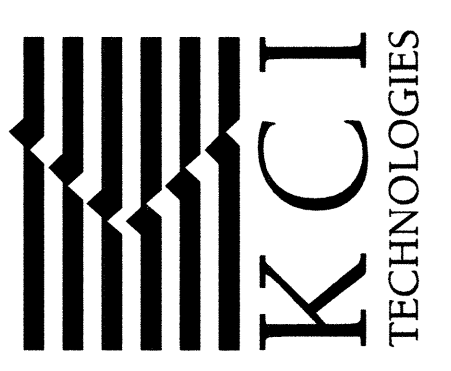
- a. During periods of excessively high temperature or in areas having dry subsoil, lightly irrigate the subsoil immediately prior to laying the sod.
- b. Lay the first row of sod in a straight line with subsequent rows placed parallel to it and tightly wedged against each other. Stagger lateral joints to promote more uniform growth and strength. Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause air drying of the roots.
- c. Wherever possible, lay sod with the long edges parallel to the contour and with staggering joints. Roll and tamp, peg or otherwise secure the sod to prevent slippage on slopes. Ensure solid contact exists between sod roots and the underlying soil surface.
- d. Water the sod immediately following rolling and tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. Complete the operations of laying, tamping and irrigating for any piece of sod within eight hours.

**3. Sod Maintenance**

- a. In the absence of adequate rainfall, water daily during the first week or as often and sufficiently as necessary to maintain moist soil to a depth of 4 inches. Water sod during the heat of the day to prevent wilting.
- b. After the first week, sod watering is required as necessary to maintain adequate moisture content.
- c. Do not mow until the sod is firmly rooted. No more than 1/2 of the grass leaf must be removed by the initial cutting or subsequent cuttings. Maintain a grass height of at least 3 inches unless otherwise specified.

NO.	REVISIONS DESCRIPTION	DATE

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GREENWAY DRIVE AND  
GREENLOW COURT  
DRAINAGE IMPROVEMENTS  
CAPITAL PROJECT D-1158  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STORMWATER MANAGEMENT DIVISION  
6751 COLUMBIA GATEWAY DRIVE  
COLUMBIA, MD 21046  
PARCELS 389, 445 TAX MAP 17  
ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022

**EROSION & SEDIMENT CONTROL NOTES**

SCALE:	AS SHOWN
DATE:	JANUARY 2016
NO. JOB NO.:	17133314.50
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

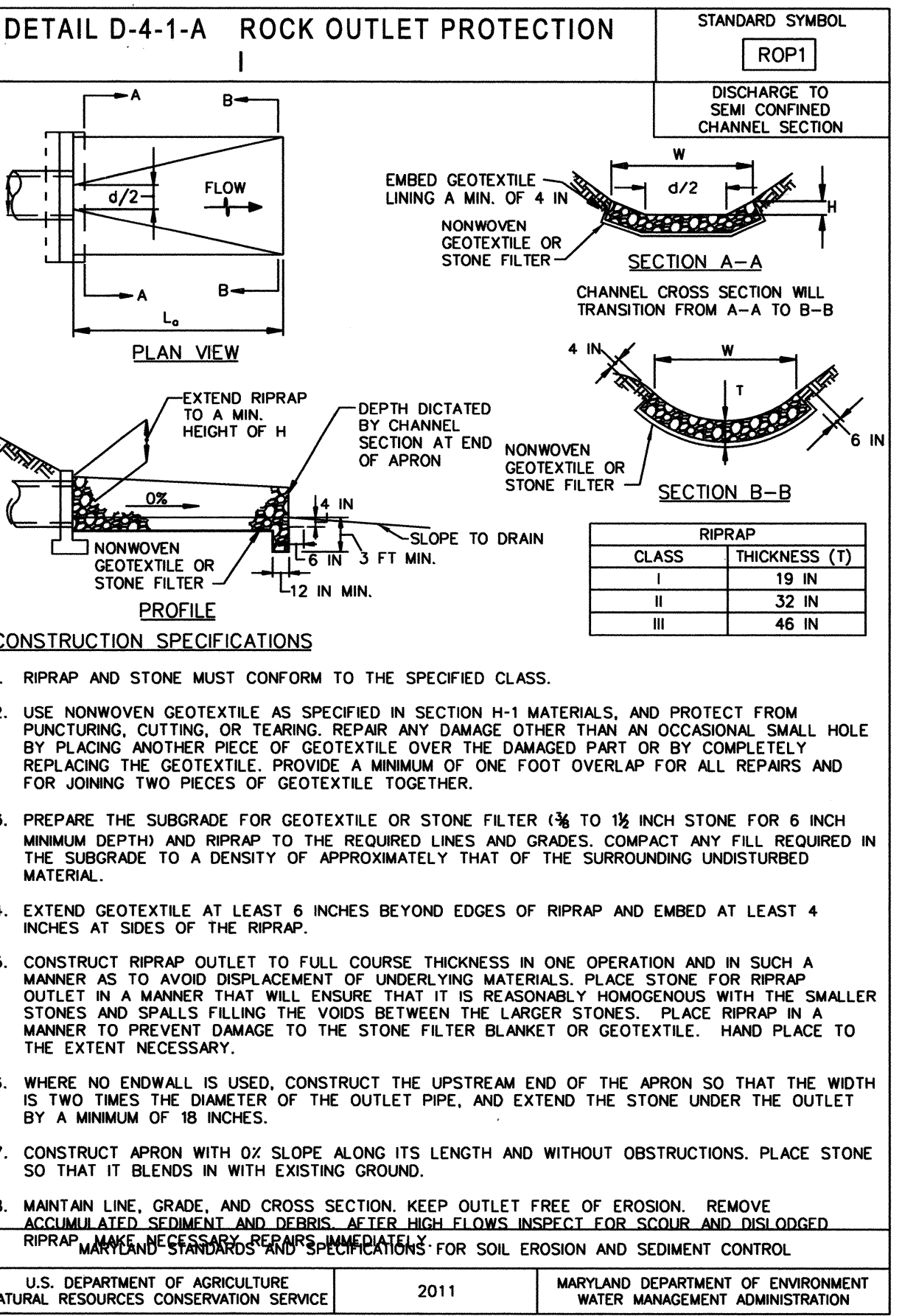
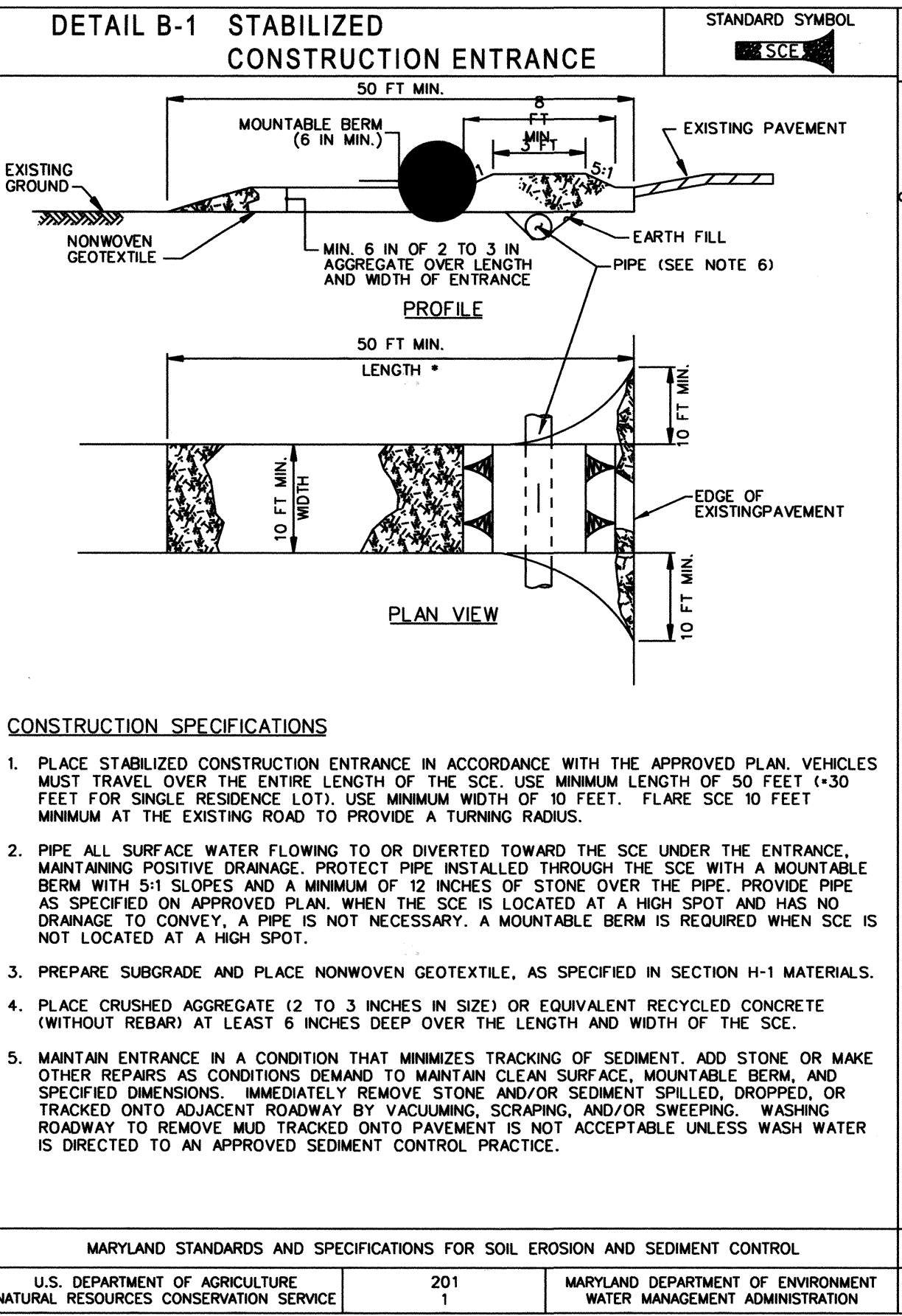
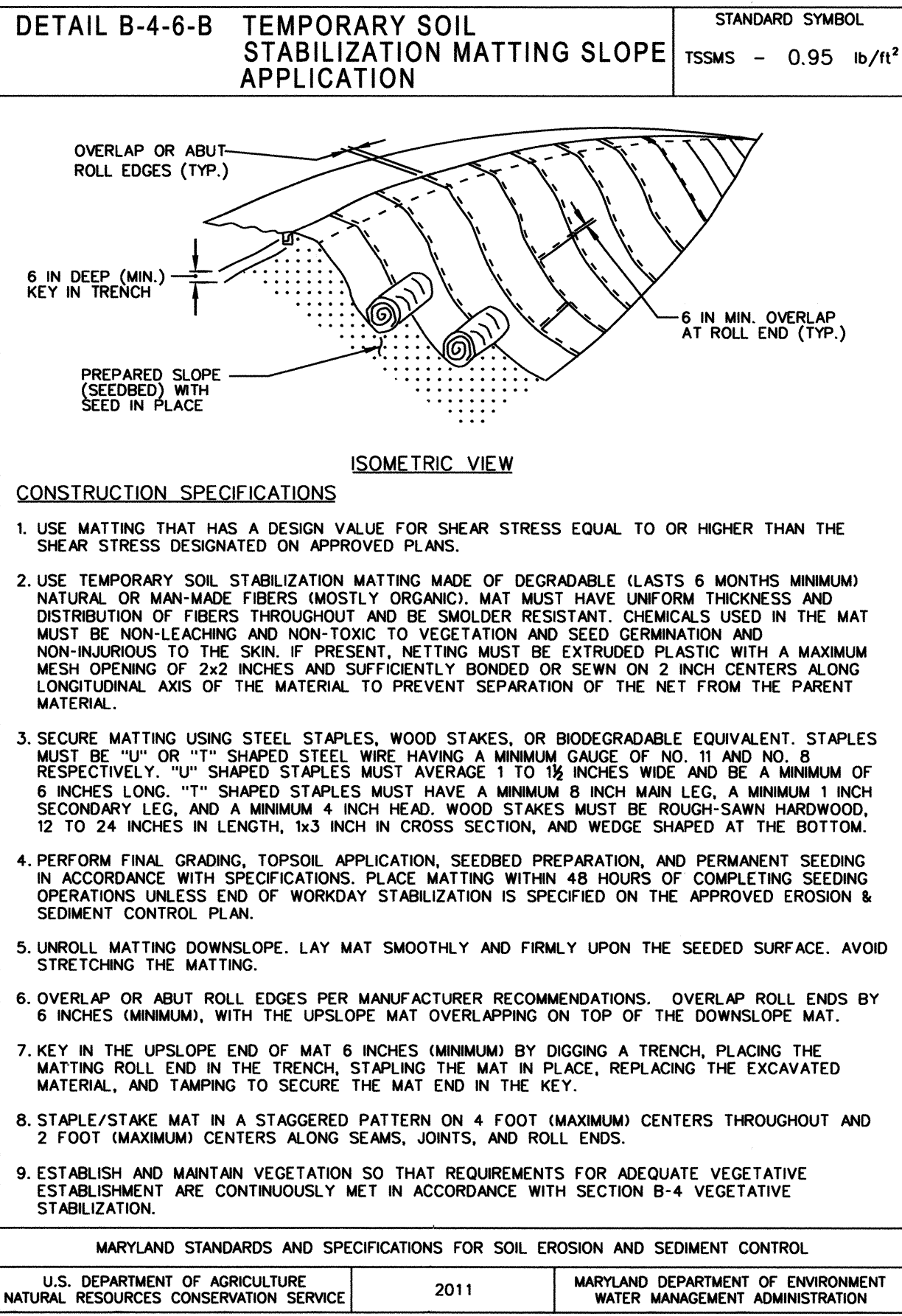
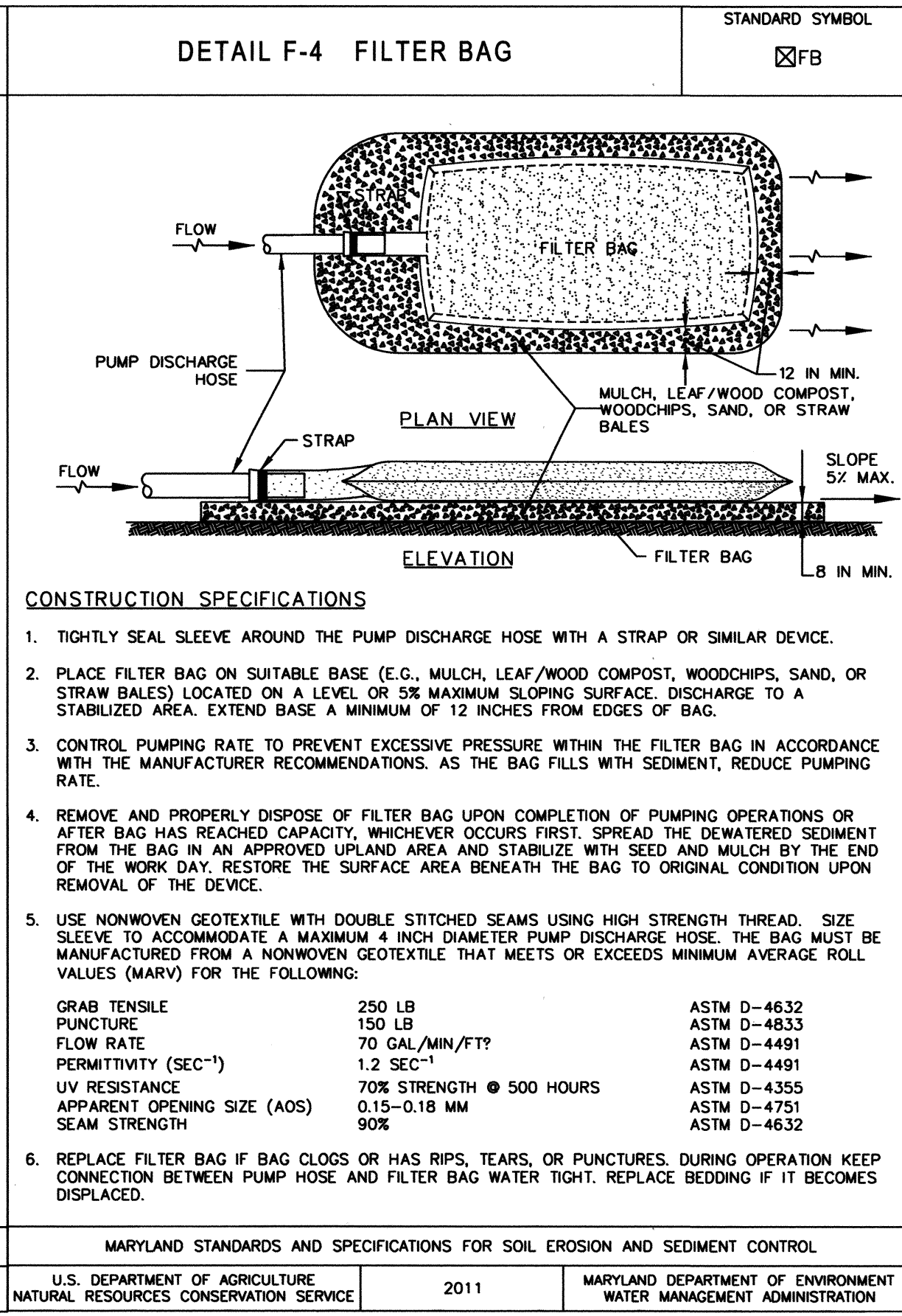
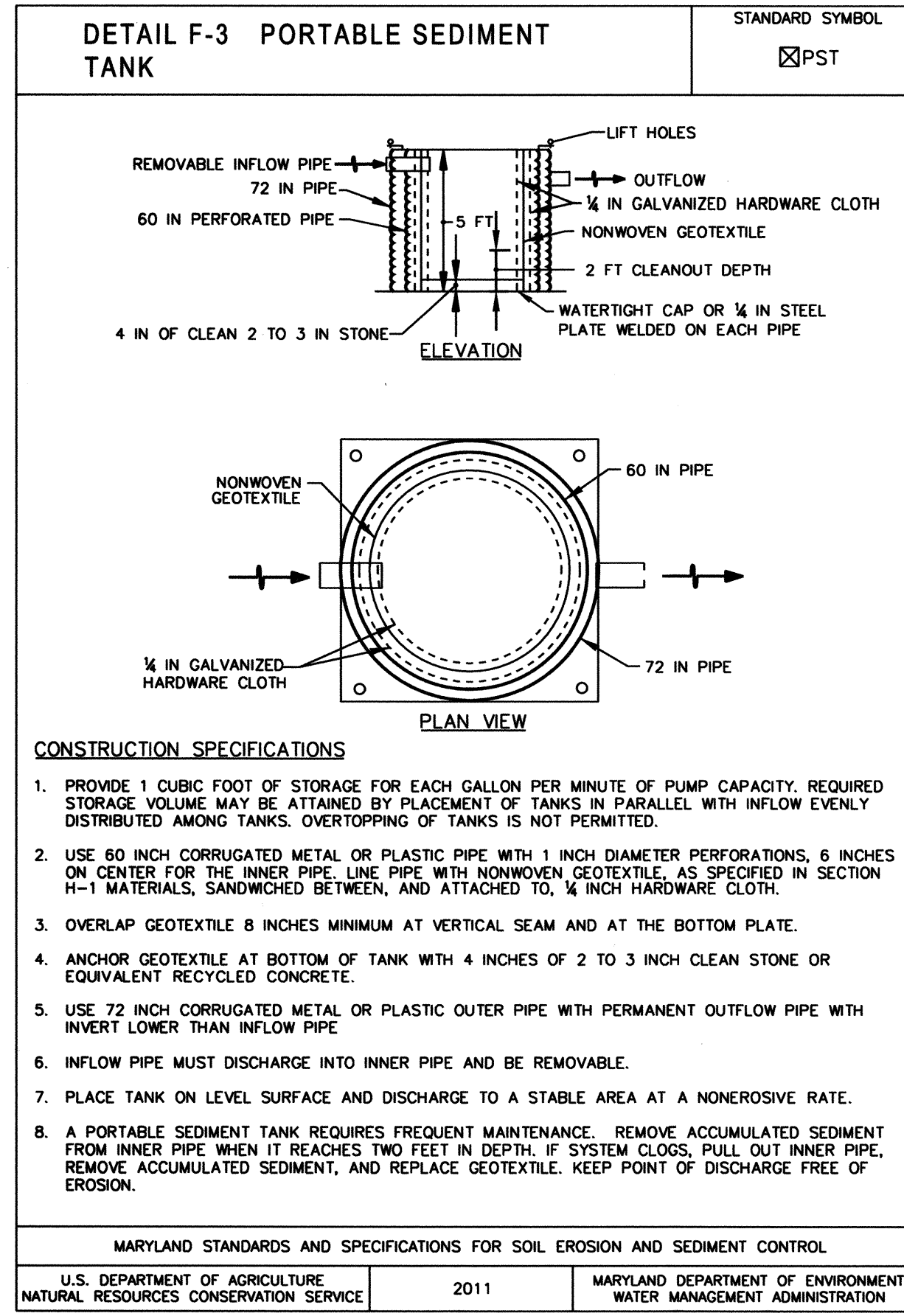
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PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 20903, EXPIRATION DATE: JULY 18, 2017.

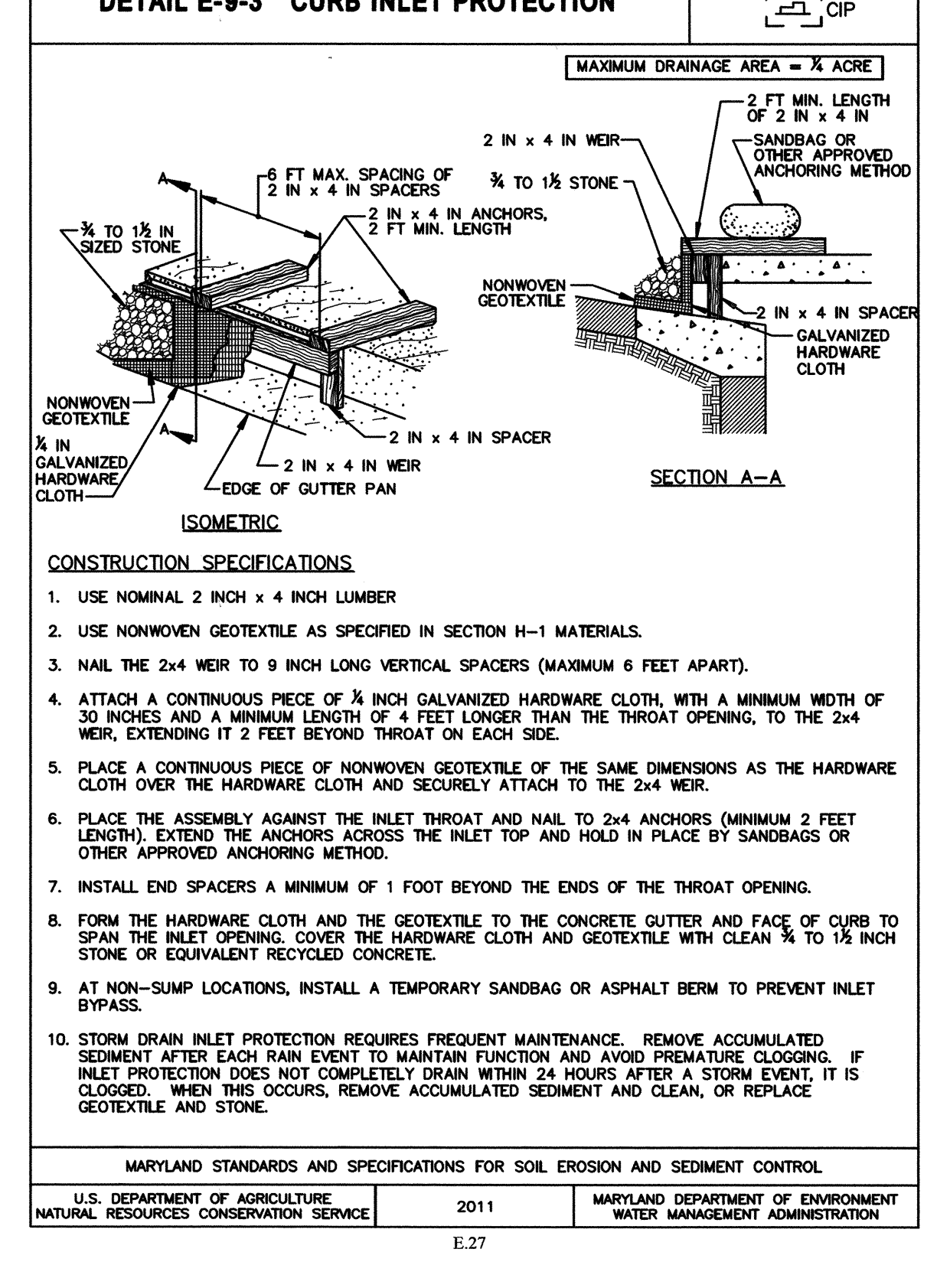
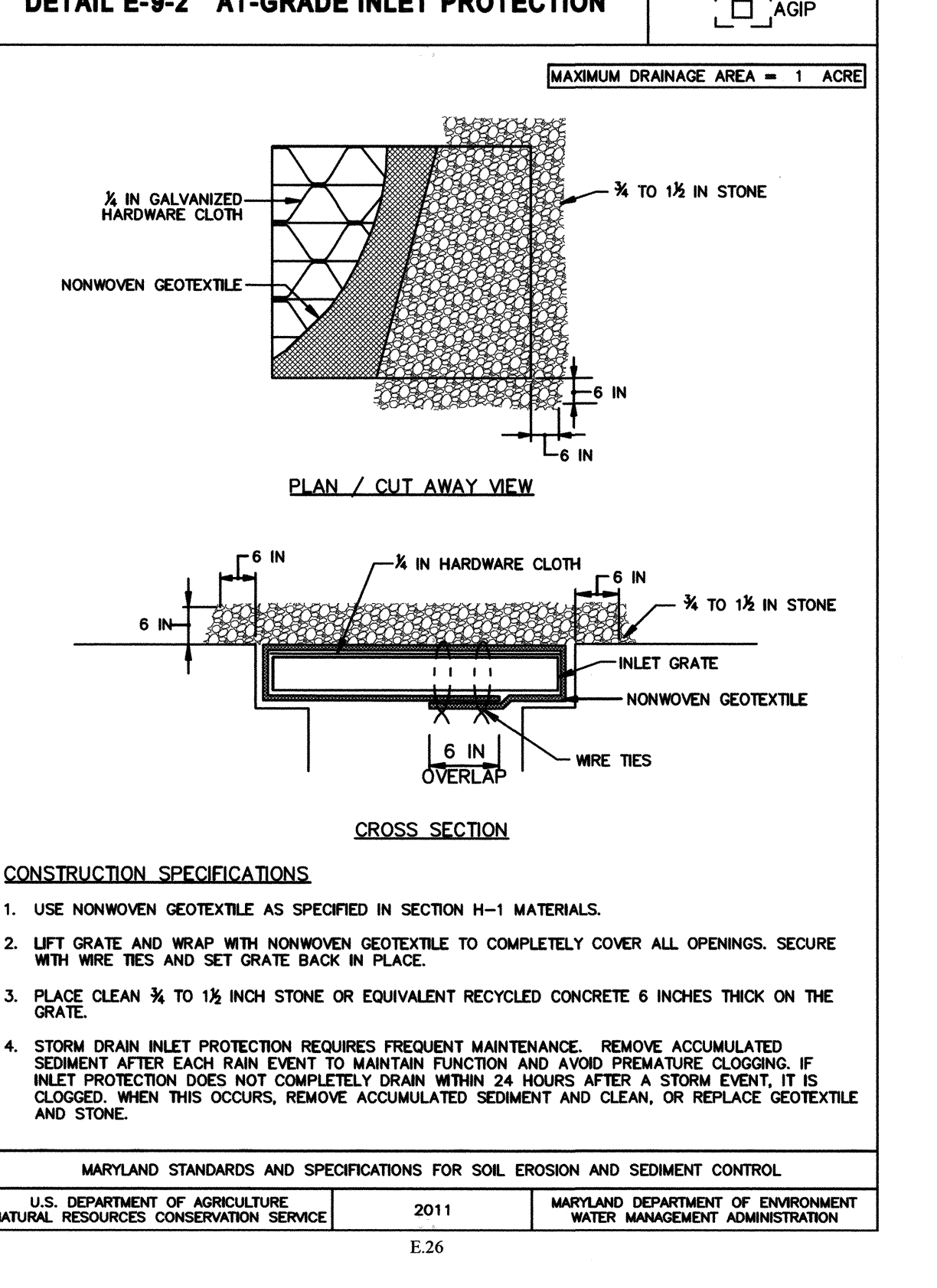
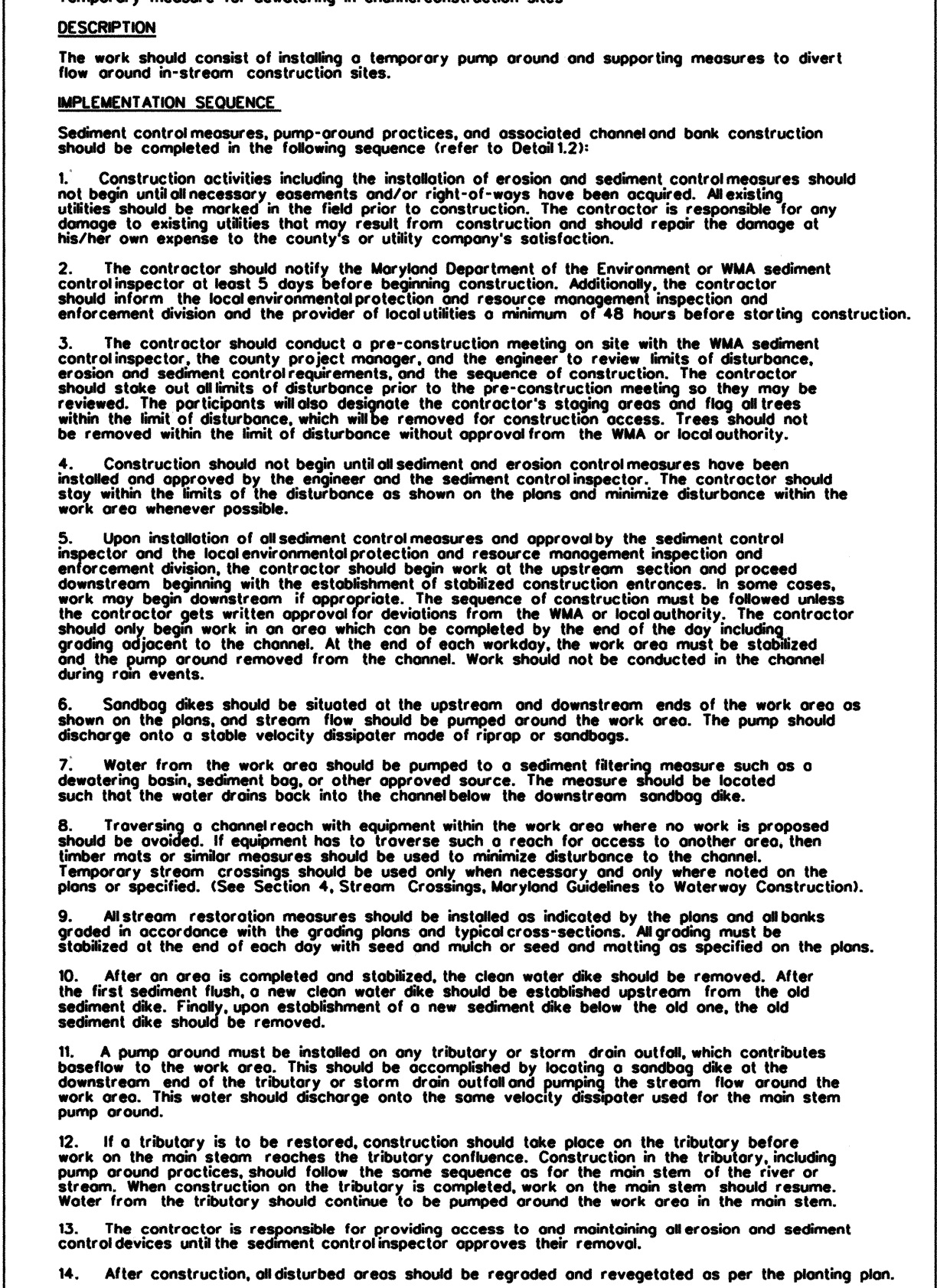
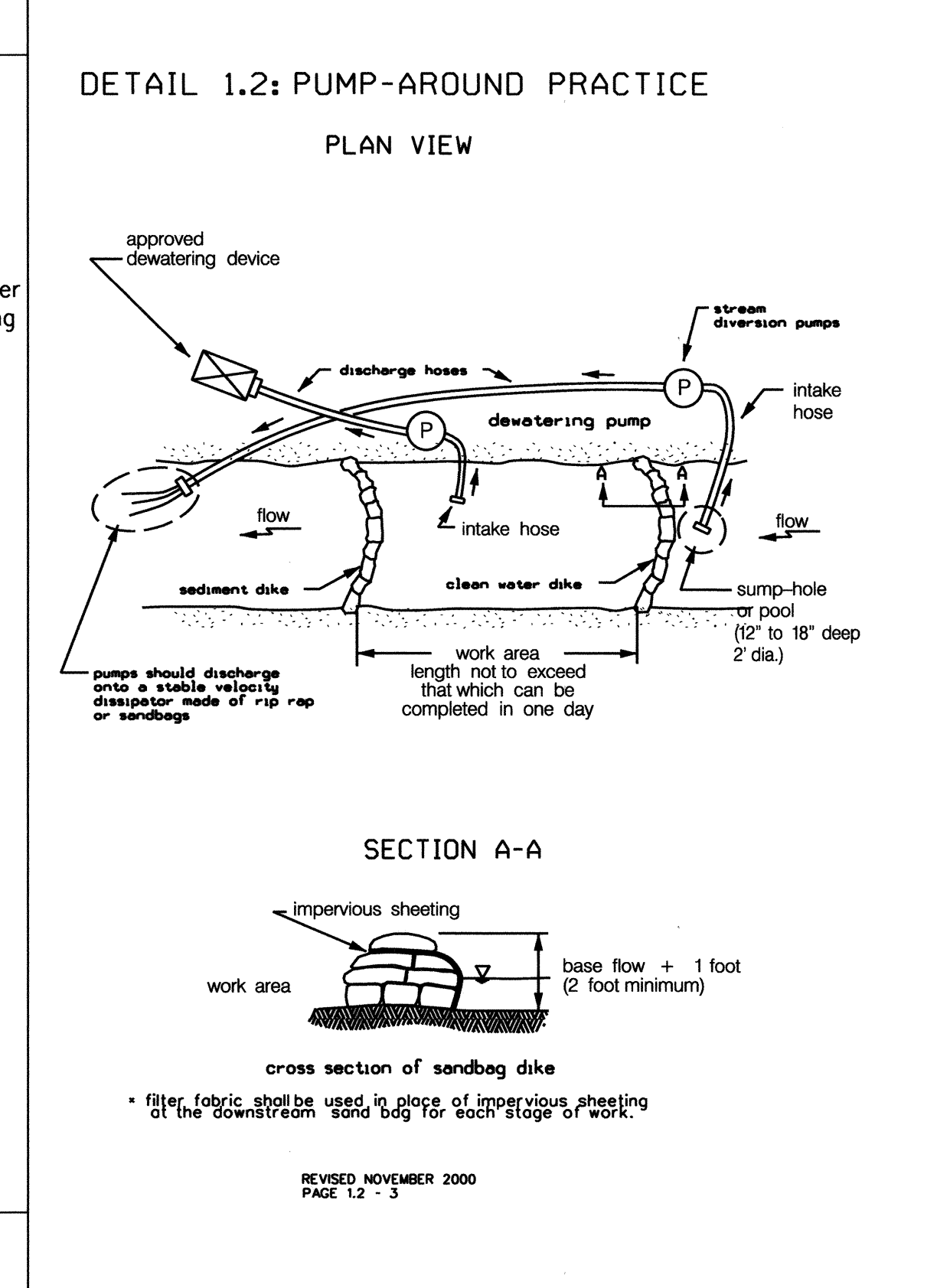
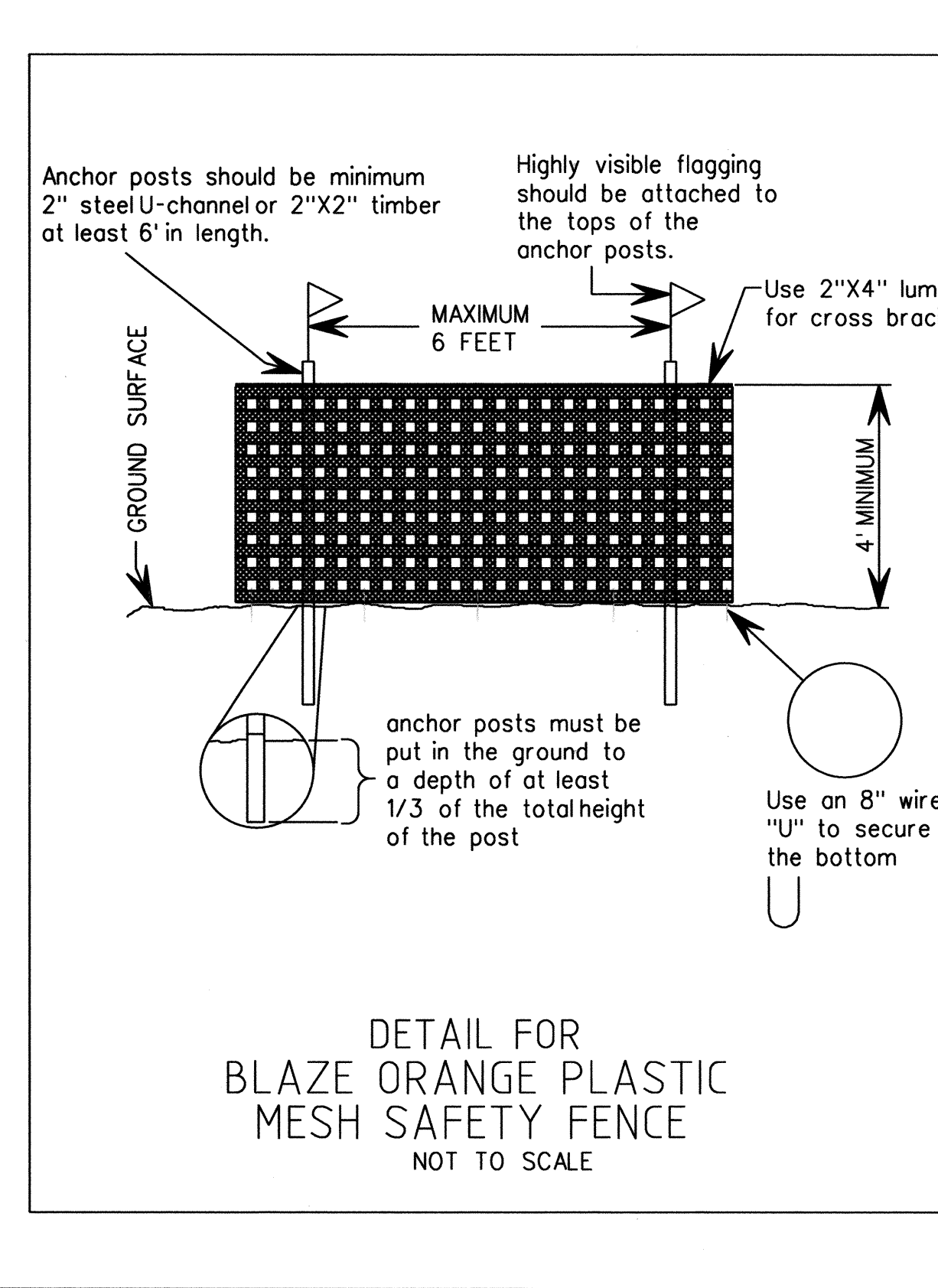
DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD

*(Signature)*  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

1/21/16  
DATE



NOTE: USE 2" SUBMERSIBLE PUMP WITH 160 GPM CAPACITY. BASEFLOW IS APPROXIMATELY 0.3 CFS. PST HAS A 72-INCH DIAMETER.



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*[Signature]*  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

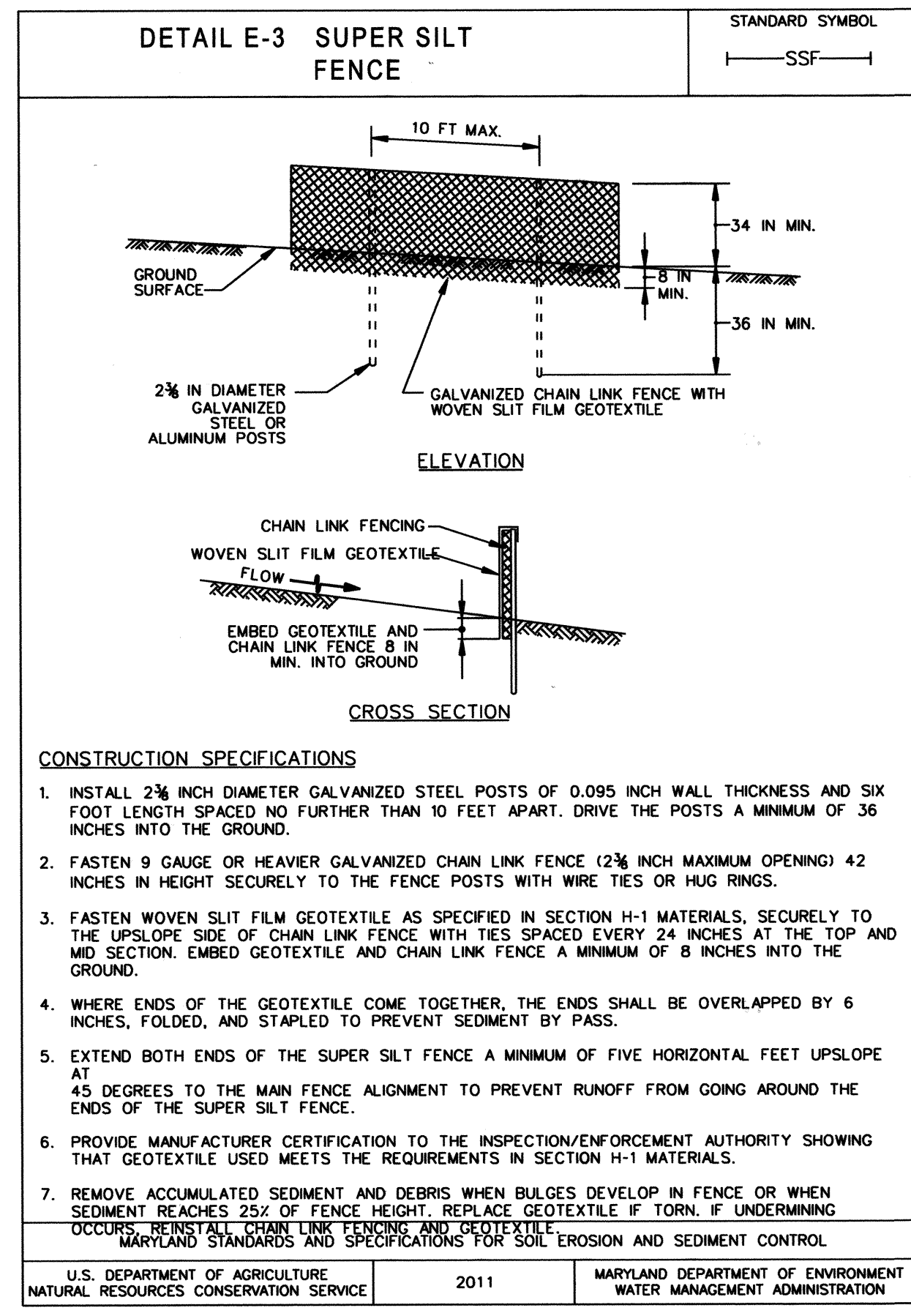
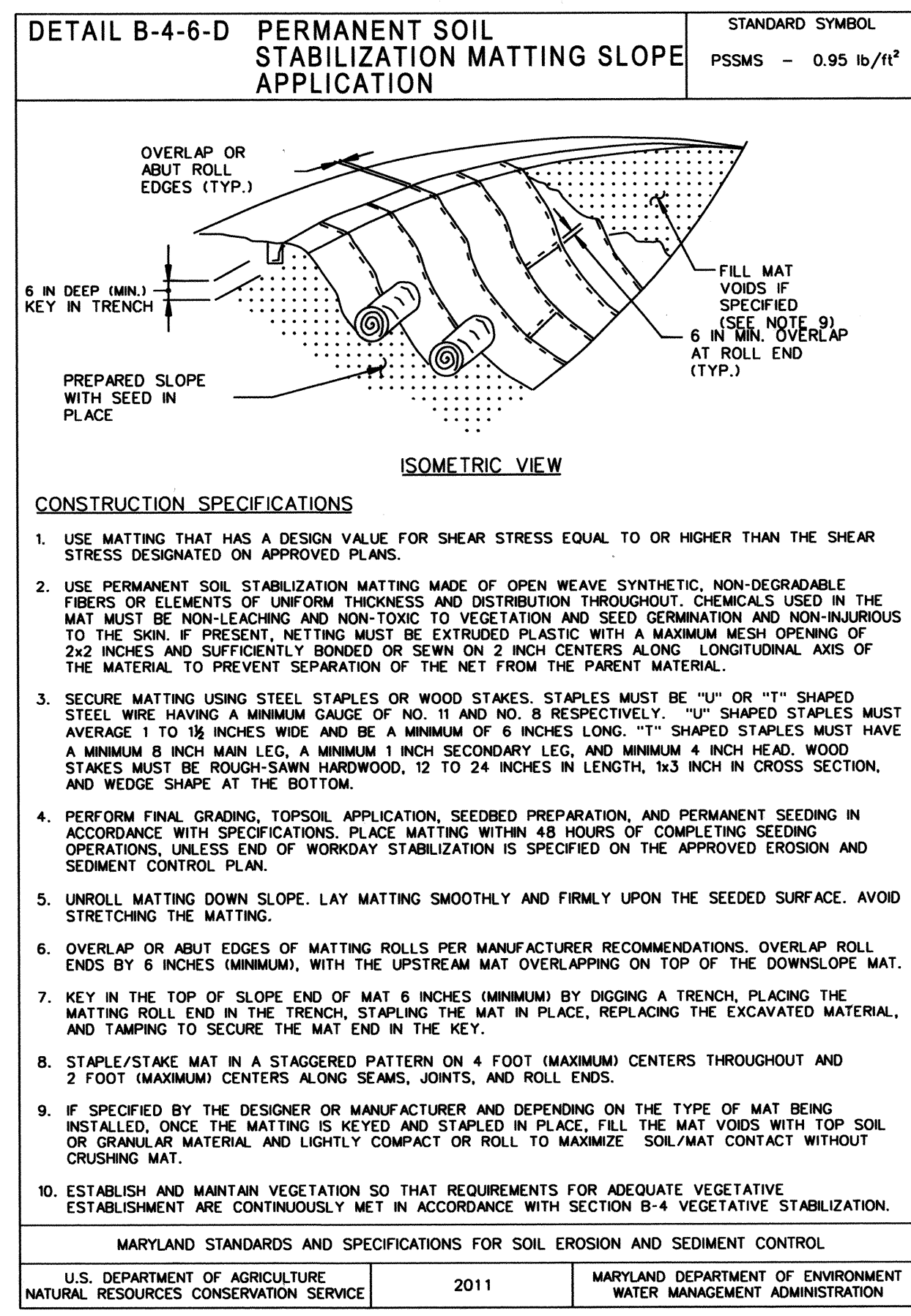
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GREENWAY DRIVE AND GREENLOW COURT DRAINAGE IMPROVEMENTS  
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HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
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6751 COLUMBIA GATEWAY DRIVE  
COLUMBIA, MD 21046  
PARCELS 389, 445 TAX MAP 17  
ZONING R20 ELECTION DISTRICT 02 GRIDBLOCK 0022

SCALE:	AS SHOWN
DATE:	JANUARY 2016
KCI JOB NO.:	17133314.50
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	
SHEET NO.:	11 OF 12



NO.	REVISIONS DESCRIPTION	DATE

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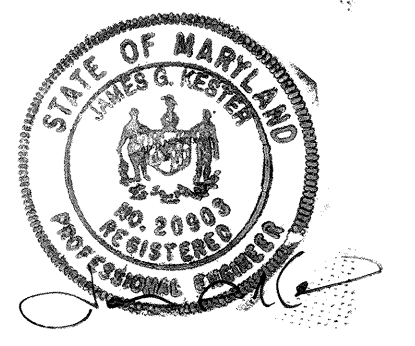
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**EROSION & SEDIMENT CONTROL DETAILS**

SCALE: AS SHOWN  
DATE: JANUARY 2016  
KCI JOB NO.: 17133314.50  
CAPITAL PROJECT NO.: D-1158  
PERMIT ISSUE:  
CONSTRUCTION ISSUE:

SHEET NO.: 12 OF 12

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DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 Chief, Bureau of Environmental Services  
 DATE: 12/16