

VICINITY MAP
SCALE: 1" = 2000'

BENCH MARKS NAD'83

HO. CO. #3168
3/4" REBAR 0.5' BELOW SURFACE
5' SOUTHWEST OF ILCHESTER ROAD PAVING
500' WEST OF WHARF LANE
N 57082.3717' E 1376700.6467'

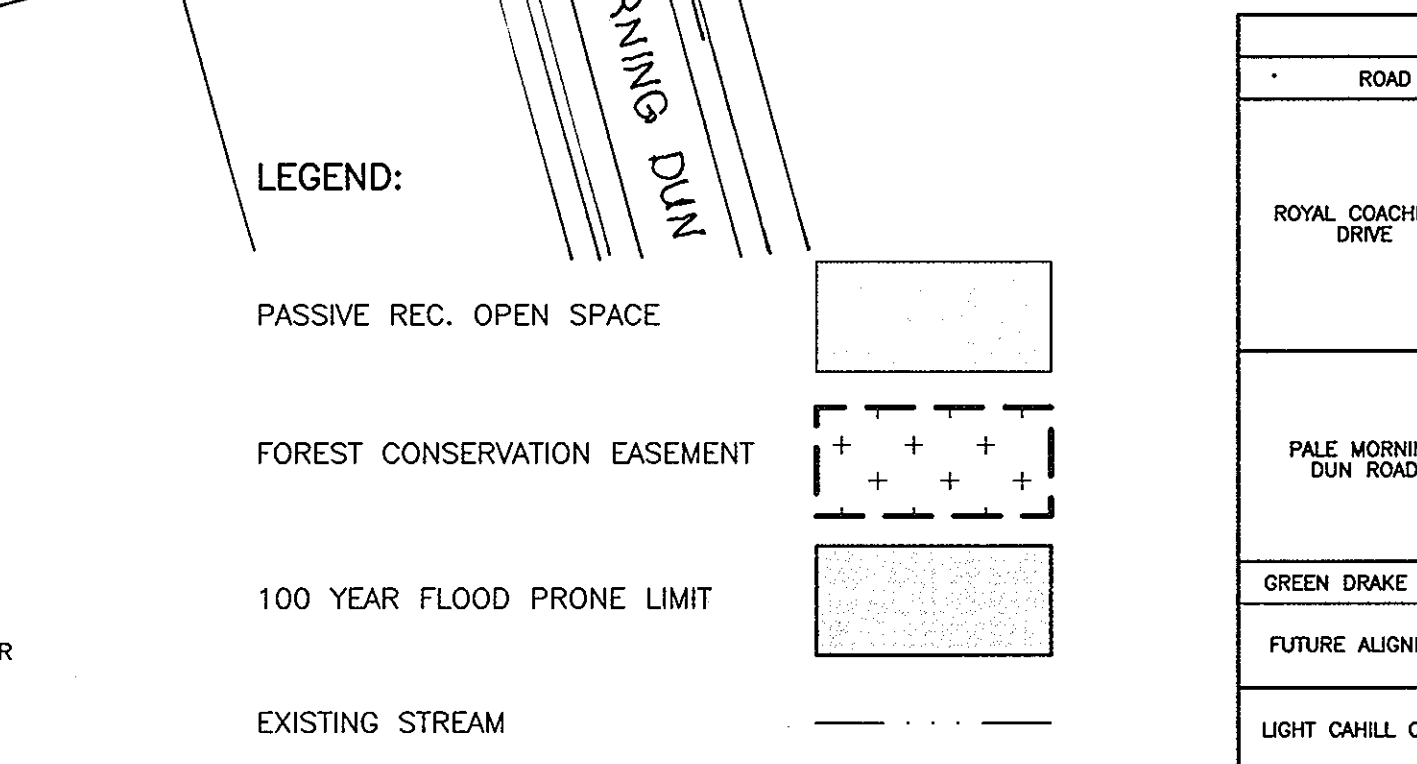
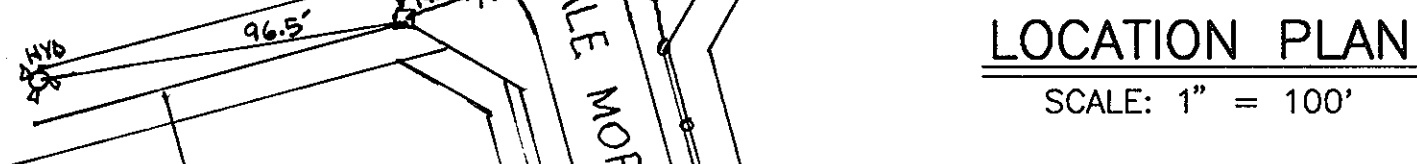
HO. CO. #3167
3/4" REBAR 0.5' BELOW SURFACE
9' SOUTHWEST OF ILCHESTER ROAD PAVING
280' WEST OF BEECHWOOD ROAD
N 572335.3503' E 1377504.0332'

HO. CO. BM#2745004
ELEV. 364.78'
USED FOR VERTICAL CONTROL.

SHEET INDEX

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- GENERAL NOTES:**
- PREVIOUS DEPARTMENT OF PLANNING AND ZONING REFERENCE NUMBERS INCLUDE: VP-86-130, F-88-20, S-01-04, PB-359, P-02-11.
 - ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARD AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS, IF APPLICABLE.
 - THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/CONSTRUCTION INSPECTION DIVISION AT 410-313-1880 AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE START OF WORK.
 - THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.
 - TRAFFIC CONTROL DEVICES, MARKINGS AND SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). ALL STREET AND REGULATORY SIGNS SHALL BE IN PLACE PRIOR TO THE PLACEMENT OF ANY ASPHALT.
 - STREET LIGHT PLACEMENT AND THE TYPE OF FIXTURE AND POLE SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL VOLUME II (1993) AND AS MODIFIED BY "GUIDELINES FOR STREET LIGHTS IN RESIDENTIAL DEVELOPMENTS (JUNE 1993)". A MINIMUM SPACING OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET AND ANY TREE.
 - THE EXISTING TOPOGRAPHY IS TAKEN FROM FIELD RUN SURVEY WITH 2' CONTOUR INTERVALS PREPARED BY BENCHMARK ENGINEERING, INC. ON OR ABOUT MAY, 2001.
 - THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NOS. 3168 AND 3167 WERE USED FOR THIS PROJECT.
 - WATER IS PUBLIC. CONTRACT NO. 14-4080-D
 - SEWER IS PUBLIC. CONTRACT NO. 14-4080-D AND IS LOCATED WITHIN THE PATAPSCO DRAINAGE AREA.
 - STORMWATER MANAGEMENT FOR THIS PROJECT IS PROVIDED BY TWO MICRO-POOL EXTENDED DETENTION FACILITIES AND TWO BIO-RETENTION FACILITIES AND ARE PRIVATELY OWNED AND MAINTAINED.
 - EXISTING UTILITIES ARE BASED ON FIELD LOCATION AND CONTRACT DRAWINGS.
 - THE FLOODPLAIN STUDY FOR THIS PROJECT WAS PREPARED BY BENCHMARK ENGINEERING INC., DATED JULY, 2000, AND WAS APPROVED ON 10/29/02.
 - THE WETLANDS DELINEATION FOR THIS PROJECT WAS PREPARED BY ECO-SCIENCE PROFESSIONALS AND WAS APPROVED ON 10/29/02.
 - NO TRAFFIC STUDY IS REQUIRED FOR THIS PROJECT.
 - SITE HAS BEEN INCORPORATED INTO THE METROPOLITAN DISTRICT, ON FEBRUARY 3, 2003, DECISION NO. 4-2003.
 - ALL LANDSCAPING REQUIREMENTS, AS SET FORTH IN THE LANDSCAPE MANUAL, SHALL BE FULFILLED.
 - TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO CEMETERY LOCATIONS ON-SITE.
 - SEDMIMENT CONTROL SHALL BE PROVIDED FOR THIS PROJECT.
 - ALL ROAD FILLS SHALL BE COMPACTED TO 95% AS DETERMINED BY ASHTO T-180.
 - THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN WORKING IN THE AREA OF ANY OVERHEAD POWERLINES.
 - THE PROPOSED STREAM CROSSING FOR THE PURPOSE OF CONSTRUCTING THE ENTRANCE ROAD HAS BEEN DETERMINED TO BE ESSENTIAL PER SECTION 16.116(c). THE DESIGN OF PROPOSED ENTRANCE ROAD MUST MINIMIZE ENVIRONMENTAL DISTURBANCE, PER SECTION 16.116(c)(1)(i).
 - A WAIVER FROM SECTION 2.4.1 OF THE DESIGN MANUAL WAS APPROVED ON FEBRUARY 28, 2002. THE WAIVER PROVIDES RELIEF FROM THE TYPICAL ROAD SECTION ALONG A PORTION OF ROYAL COACHMAN DRIVE.
 - LANDING ROAD IS A SCENIC ROADWAY.
 - FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING WILL BE POSTED AS PART OF THE DPW DEVELOPERS AGREEMENT IN THE AMOUNT OF \$49,650.00.
 - FINANCIAL SURETY FOR THE FOREST CONSERVATION PLANTINGS WILL BE POSTED AS PART OF THE DPW DEVELOPERS AGREEMENT. RETENTION \$0.20 X 10.6 ACRES = \$2,120.00 AND REFORESTED \$0.50 X 1.0 ACRES = 0.05 ACRES CREDIT FOR LANDSCAPING = \$20,650.00. TOTAL = \$22,770.00.
 - PROJECT IS SUBJECT TO THE 4th EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.
 - MARYLAND DEPARTMENT OF THE ENVIRONMENT, APPLICATION TRACKING NUMBER 03-NI-0297/200364843, FOR LETTER OF AUTHORIZATION FOR ROAD CROSSING AND UTILITY CROSSING OF EXISTING STREAM AND WETLANDS.



CENTERLINE CURVE DATA

ROAD	STATION	RADIUS	LENGTH	TANGENT	DELTA	CHORD
ROYAL COACHMAN DRIVE	2+35.27 TO 4+06.02	150.00'	170.74'	95.96'	65°13'06"	N84°42'16"E 161.67'
	4+06.02 TO 4+89.61	250.00'	283.59'	159.25'	64°59'38"	N84°49'01"E 268.63'
	10+03.94 TO 11+99.37	172.00'	188.42'	104.92'	62°46'00"	S85°51'14"E 48.56'
	11+99.37 TO 12+90.19	500.00'	97.82'	49.07'	11°12'35"	N89°28'54"E 97.67'
PALE MORNING DUN ROAD	15+01.72 TO 16+82.14	150.00'	180.42'	102.93'	68°54'55"	N49°25'09"E 169.74'
	17+50.03 TO 18+57.26	100.00'	107.24'	59.43'	61°26'31"	N45°40'57"E 102.17'
	2+63.08 TO 3+52.34	75.00'	89.28'	50.77'	68°11'29"	S19°03'28"W 84.09'
	5+09.88 TO 5+72.71	60.00'	62.83'	34.64'	60°00'00"	S23°09'10"W 60.00'
GREEN DRAKE ROAD	6+52.32 TO 6+66.74	100.00'	14.42'	7.22'	08°15'46"	S10°58'43"E 14.41'
	7+11.92 TO 8+16.64	100.00'	104.72'	57.74'	60°00'00"	S14°53'24"W 100.00'
	11+04.97 TO 11+36.39	300.00'	31.42'	15.72'	06°00'00"	S47°53'24"W 31.40'
FUTURE ALIGNMENT	0+47.78 TO 1+32.04	150.00'	84.26'	43.27'	32°11'02"	S41°44'52"E 83.15'
	2+82.00 TO 3+52.41	50.00'	70.41'	42.47'	80°41'06"	N81°49'04"E 64.74'
LIGHT CHAHILL COURT	7+47.79 TO 10+33.10	175.00'	285.32'	185.75'	93°24'53"	N88°10'57"E 254.75'
	0+91.46 TO 1+29.86	32.00'	38.39'	21.89'	68°44'40"	N70°48'03"W 36.13'
	1+29.86 TO 1+77.05	30.00'	47.19'	30.07'	90°08'05"	N60°08'21"W 42.48'

RIGHT OF WAY ELEVATION CHART NAD'83

R/W PT. NO.	DESCRIPTION	ELEVATION	R/W PT. NO.	DESCRIPTION	ELEVATION
216	REBAR & CAP	424.52'	335	REBAR & CAP	415.01'
300	REBAR & CAP	426.35'	336	REBAR & CAP	410.71'
301	REBAR & CAP	425.69'	337	REBAR & CAP	409.59'
302	REBAR & CAP	419.15'	338	X-CUT	400.62'
303	REBAR & CAP	417.02'	339	X-CUT	400.96'
304	CONC. MONUMENT	418.61'	340	X-CUT	409.97'
305	REBAR & CAP	417.44'	341	X-CUT	410.87'
306	REBAR & CAP	415.09'	342	REBAR & CAP	416.77'
307	MAGNAIL	414.67'	343	REBAR & CAP	415.26'
308	MAGNAIL	415.34'	344	REBAR & CAP	415.01'
309	X-CUT	415.66'	345	REBAR & CAP	415.06'
310	X-CUT	417.63'	346	REBAR & CAP	414.92'
311	REBAR & CAP	420.28'	347	REBAR & CAP	415.98'
312	REBAR & CAP	424.73'	348	X-CUT	415.62'
313	REBAR & CAP	440.89'	349	REBAR & CAP	414.87'
314	MAGNAIL	440.60'	350	REBAR & CAP	414.37'
315	REBAR & CAP	439.57'	351	REBAR & CAP	411.92'
316	REBAR & CAP	437.54'	352	REBAR & CAP	391.44'
317	REBAR & CAP	433.87'	353	REBAR & CAP	425.32'
318	REBAR & CAP	430.91'	354	CONC. MONUMENT	422.24'
319	REBAR & CAP	426.26'	355	REBAR & CAP	427.85'
321	CONC. MONUMENT	419.50'	356	REBAR & CAP	430.22'
322	REBAR & CAP	414.79'	357	REBAR & CAP	431.13'
323	MAGNAIL	415.32'	358	REBAR & CAP	439.82'
324	REBAR & CAP	416.15'	359	REBAR & CAP	437.50'
325	REBAR & CAP	416.22'	360	MAGNAIL	437.50'
326	REBAR & CAP	415.80'	361	REBAR & CAP	440.42'
327	REBAR & CAP	415.33'	362	REBAR & CAP	440.44'
328	REBAR & CAP	415.11'	363	REBAR & CAP	425.23'
329	REBAR & CAP	415.37'	364	REBAR & CAP	417.21'
330	REBAR & CAP	416.33'	365	REBAR & CAP	418.80'
331	CONC. MONUMENT	416.47'	366	CONC. MONUMENT	425.72'
332	REBAR & CAP	417.31'	210	REBAR & CAP	421.55'
333	REBAR & CAP	423.71'	225	SPIKE	406.44'
334	REBAR & CAP	417.35'	233	REBAR & CAP	397.36'

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

William J. M... 12-24-03
CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cindy ... 1/13/04
CHIEF, DIVISION OF LAND DEVELOPMENT

... 11/13/03
CHIEF, DEPARTMENT ENGINEERING DIVISION

AS-BUILT CERTIFICATION

I hereby certify that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.

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. 21443, Expiration Date: 12-21-12

Donald Mason
4-25-11

BENCHMARK ENGINEERING, INC.

8480 BALTIMORE NATIONAL PIKE & SUITE 418
ELLICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER
CASCADE OVERLOOK, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MD 21041
(410) 465-4244

OWNER
CRAIG R. AND KAREN C. MARTIN
4937 LANDING ROAD
ELK RIDGE, MD 21075

PROJECT: CASCADE OVERLOOK SECTION ONE
LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A'

LOCATION:
TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791
1st ELECTION DISTRICT - HOWARD COUNTY, MARYLAND

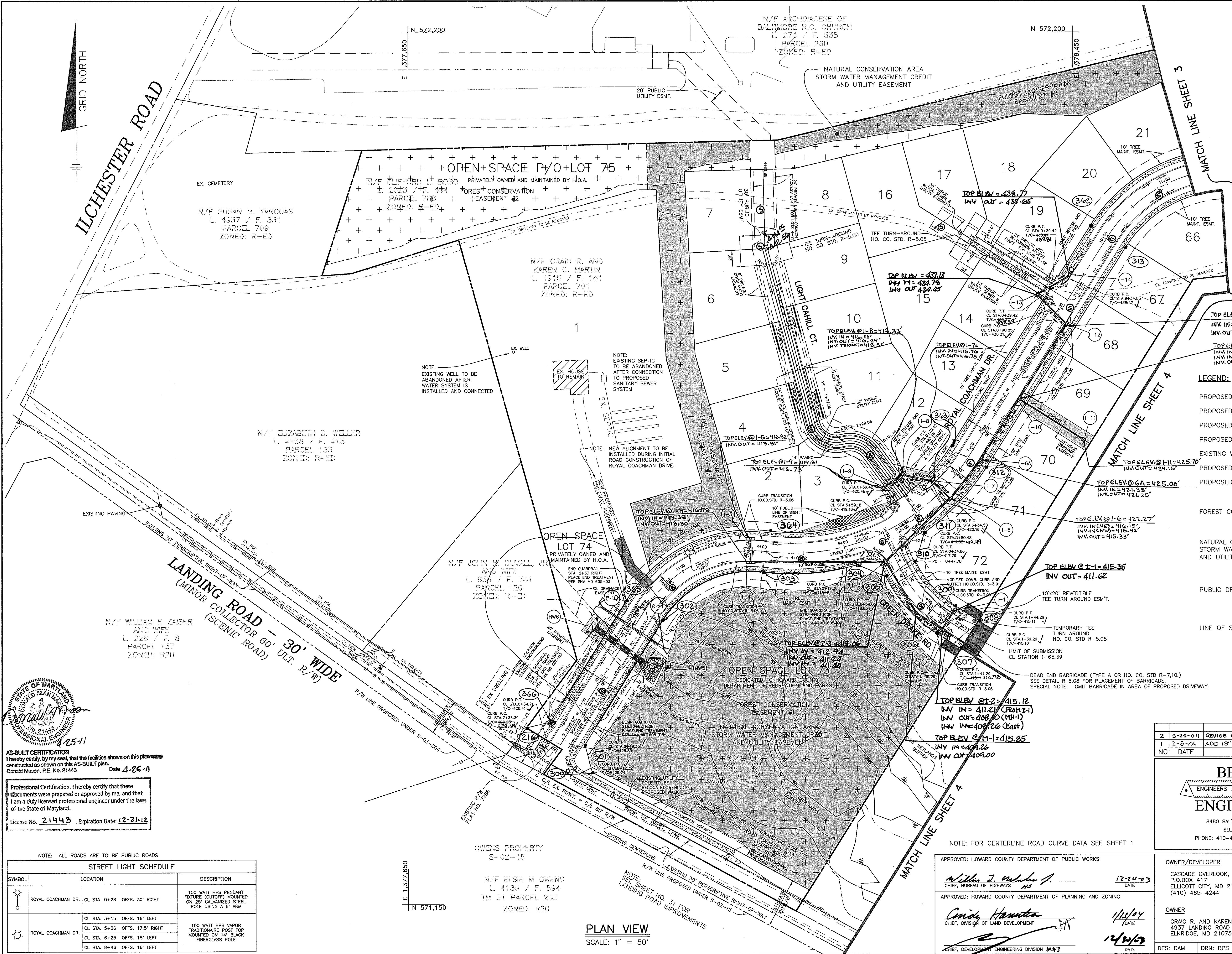
TITLE: TITLE SHEET

VP-86-130, F-88-20, S-01-04, PB-359, P-02-11

DATE: DECEMBER, 2003 PROJECT NO. 1383

DES: DAM DRN: RPS CHK: DAM SCALE: AS SHOWN DRAWING: 1 OF 33

AS-BUILT F-03-134



- BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS**
- 1) NO EXCESS FILL CONSTRUCTION MATERIAL OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
 - 2) PLACE MATERIALS IN A LOCATION AND MANNER THAT DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
 - 3) DO NOT USE THE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNDESIRABLE DEBRIS, TOXIC MATERIAL, OR ANY OTHER DEleterious SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIAL FREE OF WASTE METAL PRODUCTS, UNDESIRABLE DEBRIS, TOXIC MATERIAL, OR ANY OTHER DEleterious SUBSTANCE.
 - 4) PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
 - 5) REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORDINARY AUTHORIZED STRUCTURE OR FILL.
 - 6) IDENTIFY ANY NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, OR 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.
 - 7) ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES: ANNUAL REE - GRASS (COLEUM MULTIFLORUM), POLYCTES (STENO) BARLEY (HORDEUM ST.), ONTS (MULCASA) AND/OR REY (SICAL CECROIA). THESE SPECIES SHALL ALSO BE USED FOR THE STABILIZATION OF THE SITE WHILE ALSO ALLOWING FOR THE VOLUNTARY REGENERATION OF NATURAL WETLANDS. OTHER NON-PERSISTENT VEGETATION MAY BE USED IN WETLANDS DIVISION. REVEGETATION SHALL BE UTILIZED IN WETLANDS DIVISION. REVEGETATION SHALL BE UTILIZED IN WETLANDS DIVISION. REVEGETATION SHALL BE UTILIZED IN WETLANDS DIVISION.
 - 8) AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST-CONSTRUCTION MONITORING AND ELEVATIONS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.
 - 9) TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM. USE T. WATERFALLS IN STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH JUNE 15, INCLUSIVE, DURING ANY YEAR.
 - 10) STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.
 - 11) CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.

LEGEND:

PROPOSED GUARDRAIL =	
PROPOSED CONC. SIDEWALK =	
PROPOSED STORM DRAIN PIPE =	
PROPOSED CATCH BASIN =	
EXISTING WETLANDS =	
PROPOSED ROAD SIGN =	
PROPOSED STREET LIGHT =	
FOREST CONSERVATION EASEMENT =	
NATURAL CONSERVATION AREA =	
STORM WATER MANAGEMENT CREDIT AND UTILITY EASEMENT =	
PUBLIC DRAINAGE EASEMENT =	
LINE OF SIGHT EASEMENT =	

NO.	DATE	REVISION
2	6-26-04	REVISE HDPEP TO RCP CL IV
1	2-5-04	ADD 18" HDPE CULVERT AND MANAGEMENT PRACTICES NOTES
NO.	DATE	REVISION

BENCHMARK ENGINEERING, INC.

ENGINEERS • LAND SURVEYORS • PLANNERS

Donald Mason

8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

11/2/03

OWNER/DEVELOPER CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MD 21041 (410) 465-4244	PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 11
OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELKDRIDGE, MD 21075	LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160, 161, 788, & 791 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE: ROAD PLAN AND DETAILS VP-86-130, F-88-20, S-01-04, PB-359, P-02-11	DATE: OCTOBER, 2003 PROJECT NO. 1383
DES: DAM	DRN: RPS
CHK: DAM	SCALE: AS SHOWN
DATE: 12/24/03	DRAWING 2 OF 33

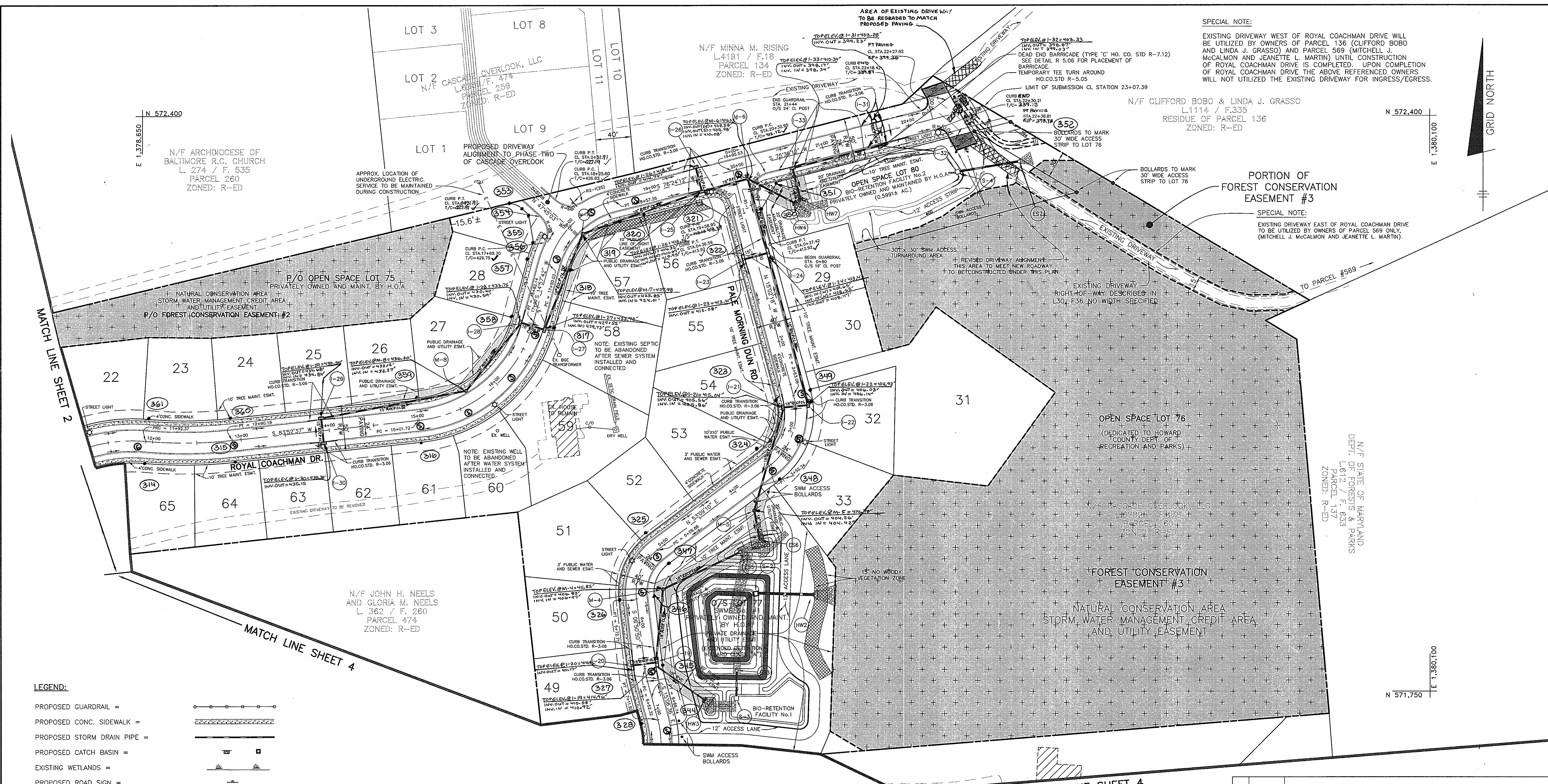
AS-BUILT CERTIFICATION
I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
Donald Mason, P.E. No. 21443 Date 4-25-11

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. 21443, Expiration Date: 12-21-12

NOTE: ALL ROADS ARE TO BE PUBLIC ROADS

STREET LIGHT SCHEDULE		
SYMBOL	LOCATION	DESCRIPTION
	ROYAL COACHMAN DR. CL STA. 0+28 OFFS. 30' RIGHT	150 WATT HPS PENDANT FIXTURE (CUTOFF) MOUNTED ON 20' GALVANIZED STEEL POLE USING A 6' ARM
	ROYAL COACHMAN DR. CL STA. 3+15 OFFS. 16' LEFT CL STA. 5+26 OFFS. 17.5' RIGHT CL STA. 6+25 OFFS. 18' LEFT CL STA. 9+46 OFFS. 16' LEFT	100 WATT HPS VAPOR FIXTURE (CUTOFF) MOUNTED ON 14' BLACK FIBERGLASS POLE

PLAN VIEW
SCALE: 1" = 50'



SPECIAL NOTE:
 EXISTING DRIVEWAY WEST OF ROYAL COACHMAN DRIVE WILL BE UTILIZED BY OWNERS OF PARCEL 136 (CLIFFORD BOBO AND LINDA J. GRASSO) AND PARCEL 569 (MITCHELL J. McCALMON AND JEANETTE L. MARTIN) UNTIL CONSTRUCTION OF ROYAL COACHMAN DRIVE IS COMPLETED. UPON COMPLETION OF ROYAL COACHMAN DRIVE THE ABOVE REFERENCED OWNERS WILL NOT UTILIZED THE EXISTING DRIVEWAY FOR INGRESS/EGRESS.

SPECIAL NOTE:
 EXISTING DRIVEWAY EAST OF ROYAL COACHMAN DRIVE TO BE UTILIZED BY OWNERS OF PARCEL 569 ONLY. (MITCHELL J. McCALMON AND JEANETTE L. MARTIN).

PLAN VIEW
 SCALE: 1" = 50'

- LEGEND:**
- PROPOSED GUARDRAIL = [Symbol]
 - PROPOSED CONC. SIDEWALK = [Symbol]
 - PROPOSED STORM DRAIN PIPE = [Symbol]
 - PROPOSED CATCH BASIN = [Symbol]
 - EXISTING WETLANDS = [Symbol]
 - PROPOSED ROAD SIGN = [Symbol]
 - PROPOSED STREET LIGHT = [Symbol]
 - FOREST CONSERVATION EASEMENT = [Symbol]
 - NATURAL CONSERVATION AREA = STORM WATER MANAGEMENT CREDIT AND UTILITY EASEMENT = [Symbol]
 - PUBLIC DRAINAGE EASEMENT = [Symbol]
 - LINE OF SIGHT EASEMENT = [Symbol]

N/F JOHN H. NEELS AND GLORIA M. NEELS
 L. 362 / F. 260
 PARCEL 474
 ZONED: R-ED

AS-BUILT CERTIFICATION
 I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
 Donald Mason, P.E. No. 21443 Date 4-25-11

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.
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NOTE: ALL ROADS ARE TO BE PUBLIC ROADS

STREET LIGHT SCHEDULE		
SYMBOL	LOCATION	DESCRIPTION
[Symbol]	ROYAL COACHMAN DR. CL STA. 11+33 OFFS. 16' LEFT CL STA. 15+84 OFFS. 16' RIGHT CL STA. 17+75 OFFS. 16' LEFT CL STA. 19+66 OFFS. 17.5' RIGHT CL STA. 22+30 OFFS. 16' RIGHT	100 WATT HPS VAPOR TRADITIONAL POST TOP MOUNTED ON 14" BLACK FIBERGLASS POLE
[Symbol]	PALE MORNING DUN RD. CL STA. 3+10 OFFS. 16.5' RIGHT CL STA. 5+35 OFFS. 14' RIGHT	100 WATT HPS VAPOR TRADITIONAL POST TOP MOUNTED ON 14" BLACK FIBERGLASS POLE

NOTE: FOR CENTERLINE ROAD CURVE DATA SEE SHEET 1

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
 [Signature] 12-24-03
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 [Signature] 1/13/04
 CHIEF, DIVISION OF LAND DEVELOPMENT

DATE: 11/30/03

NO.	DATE	REVISION
10-08-04		REVISED I-31 AND I-32, TOP OF CURB GRADIES AT T-TURN
5-25-04		REVISE HDPEP TO RECP CL IV

BENCHMARK ENGINEERING, INC.
 ENGINEERS • LAND SURVEYORS • PLANNERS
 8480 BALTIMORE NATIONAL PIKE • SUITE 418
 ELLICOTT CITY, MARYLAND 21043
 PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER: CASCADE OVERLOOK, L.L.C.
 P.O. BOX 417
 ELLICOTT CITY, MD 21041
 (410) 465-4244

OWNER: CRAIG R. AND KAREN C. MARTIN
 4937 LANDING ROAD
 ELK RIDGE, MD 21075

PROJECT: CASCADE OVERLOOK SECTION ONE
 LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCELS 'A'

LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791
 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND

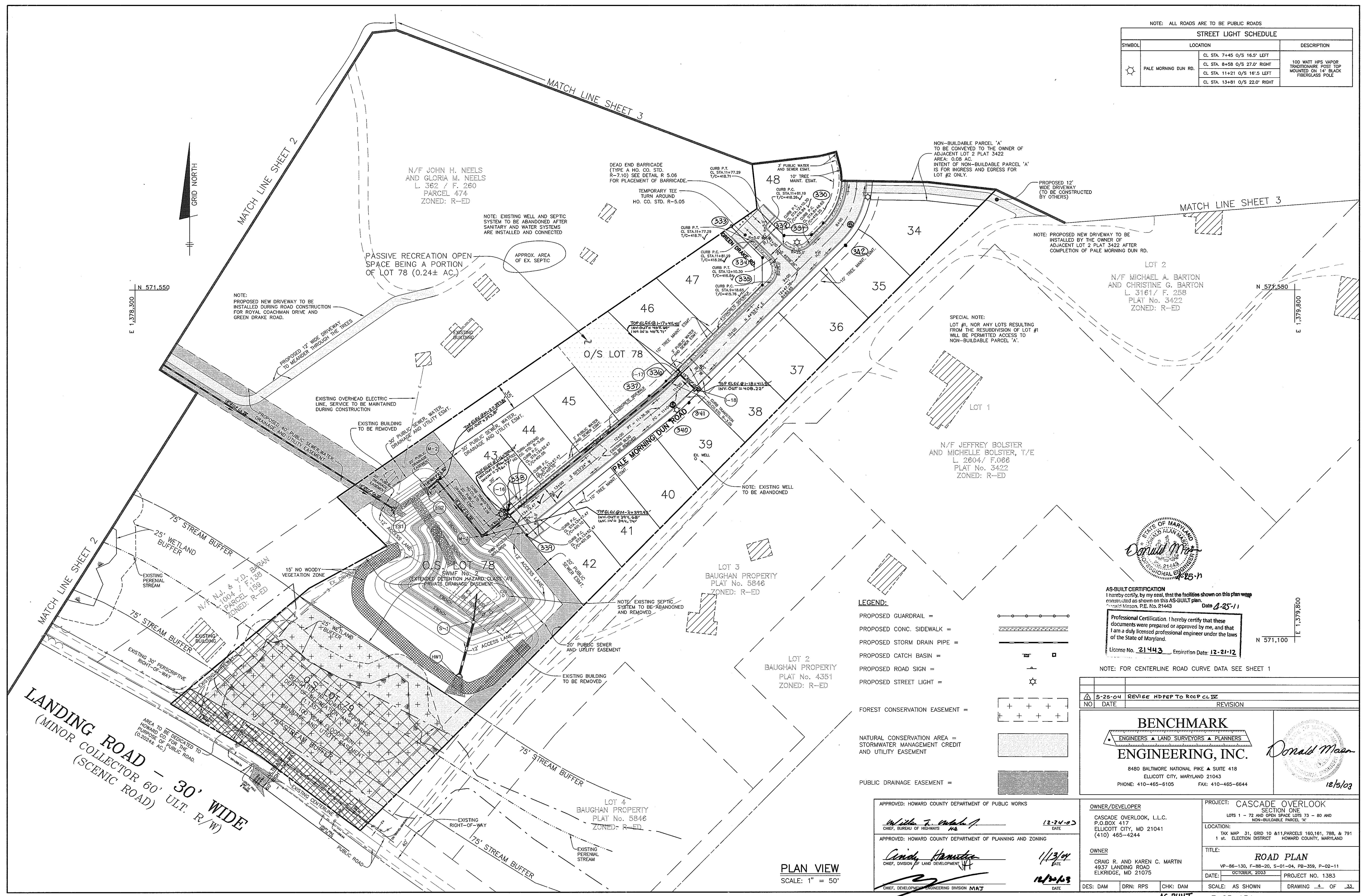
TITLE: ROAD PLAN AND DETAILS
 VP-86-130, F-88-20, S-01-04, PB-359, P-02-11

DATE: OCTOBER, 2003 **PROJECT NO.:** 1383

DES: DAM **DRN:** RPS **CHK:** DAM **SCALE:** AS SHOWN **DRAWING:** 3 OF 33

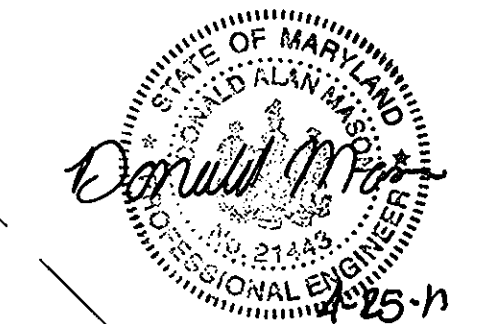
NOTE: ALL ROADS ARE TO BE PUBLIC ROADS

STREET LIGHT SCHEDULE		
SYMBOL	LOCATION	DESCRIPTION
☀	CL STA. 7+45 O/S 16.5' LEFT	100 WATT HPS VAPOR TRADITIONAL POST TOP MOUNTED ON 14' BLACK FIBERGLASS POLE
	CL STA. 8+58 O/S 27.0' RIGHT	
	CL STA. 11+21 O/S 16.5' LEFT	
	CL STA. 13+81 O/S 22.0' RIGHT	



LEGEND:

- PROPOSED GUARDRAIL = [Symbol]
- PROPOSED CONC. SIDEWALK = [Symbol]
- PROPOSED STORM DRAIN PIPE = [Symbol]
- PROPOSED CATCH BASIN = [Symbol]
- PROPOSED ROAD SIGN = [Symbol]
- PROPOSED STREET LIGHT = [Symbol]
- FOREST CONSERVATION EASEMENT = [Symbol]
- NATURAL CONSERVATION AREA = STORMWATER MANAGEMENT CREDIT AND UTILITY EASEMENT = [Symbol]
- PUBLIC DRAINAGE EASEMENT = [Symbol]



AS-BUILT CERTIFICATION
 I hereby certify by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
 Date: 4-25-11
 License No. 21443, Expiration Date: 12-21-12

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.

NO.	DATE	REVISION
1	5-25-04	REVISE HDPEP TO RCP CLIX

BENCHMARK ENGINEERING, INC.
 ENGINEERS • LAND SURVEYORS • PLANNERS
 8480 BALTIMORE NATIONAL PIKE A SUITE 418
 ELLICOTT CITY, MARYLAND 21043
 PHONE: 410-465-6105 FAX: 410-465-6644

Donald Mason
 12/5/03

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William T. ... 12-24-03
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Cindy ... 1/13/04
 CHIEF, DIVISION OF LAND DEVELOPMENT

APPROVED: *[Signature]* 12/20/03
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

OWNER/DEVELOPER
 CASCADE OVERLOOK, L.L.C.
 P.O. BOX 417
 ELLICOTT CITY, MD 21041
 (410) 465-4244

OWNER
 CRAIG R. AND KAREN C. MARTIN
 4937 LANDING ROAD
 ELKCRIDGE, MD 21075

PROJECT: CASCADE OVERLOOK SECTION ONE
 LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A'

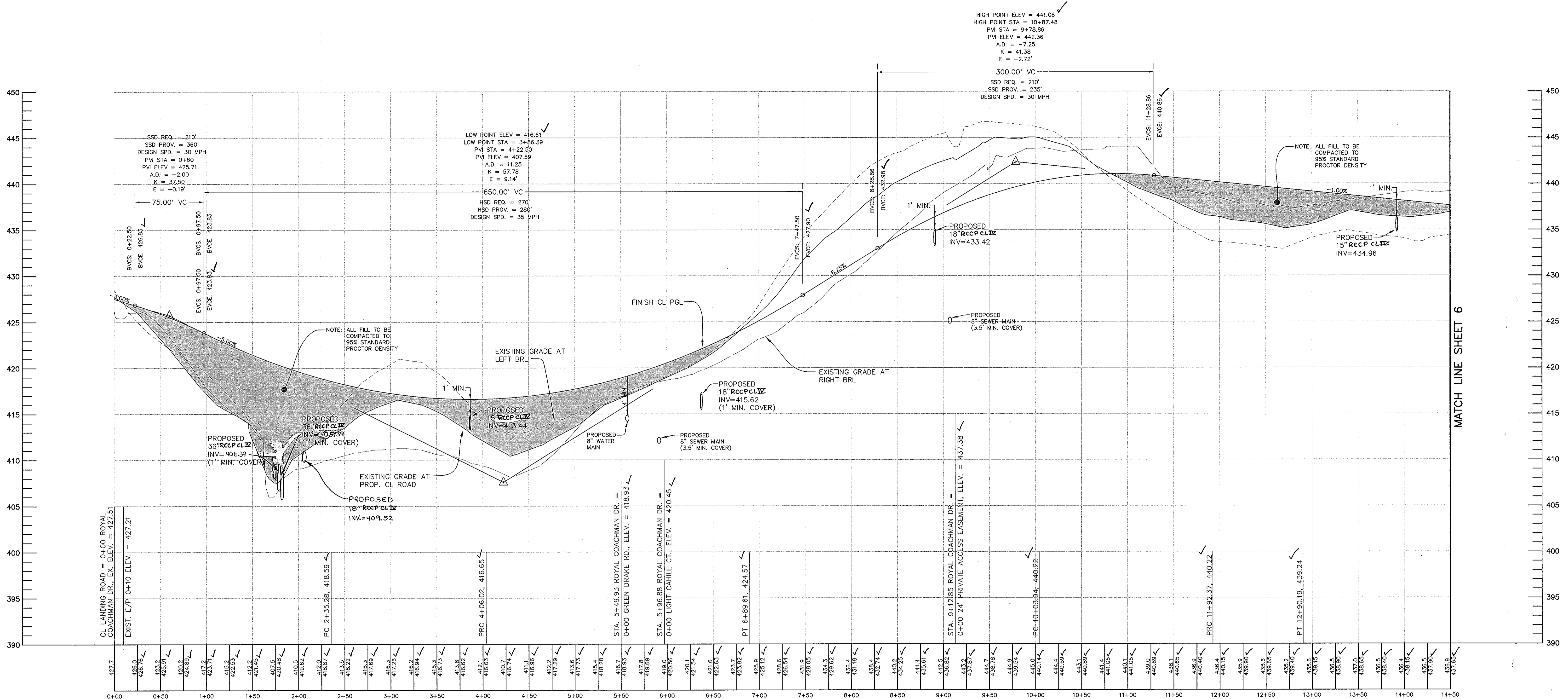
LOCATION:
 TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791
 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND

TITLE: ROAD PLAN
 VP-86-130, F-88-20, S-01-04, PB-359, P-02-11

DATE: OCTOBER, 2003
PROJECT NO.: 1383

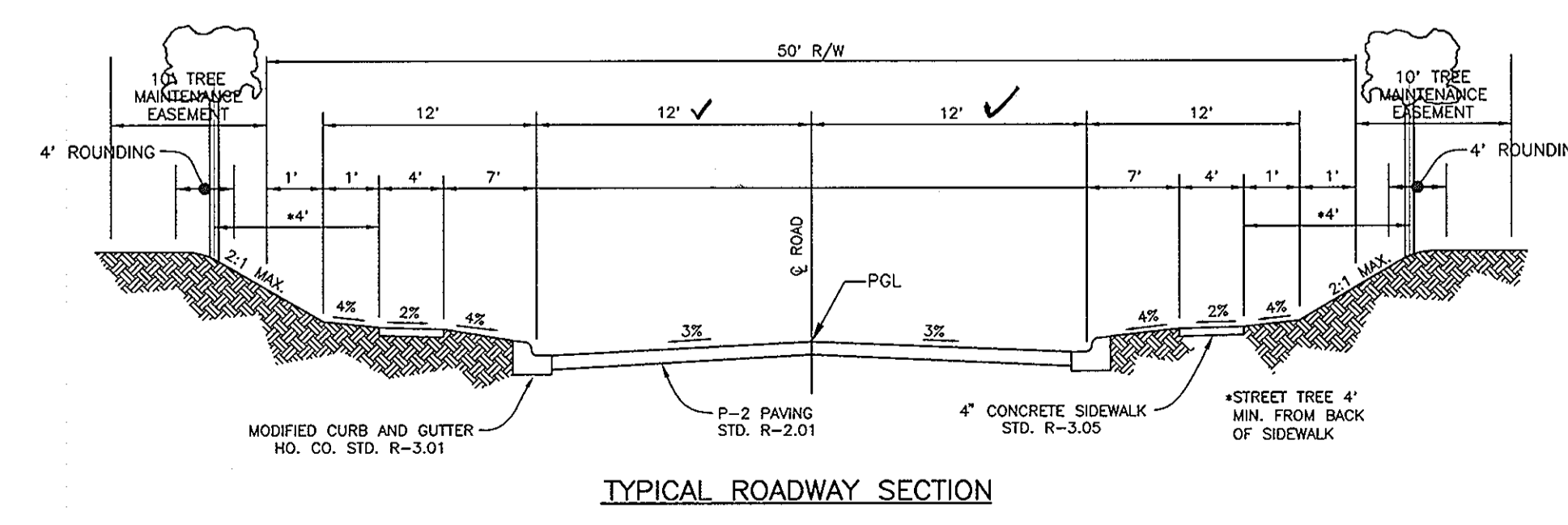
SCALE: AS SHOWN
DRAWING: 4 OF 33

PLAN VIEW
 SCALE: 1" = 50'



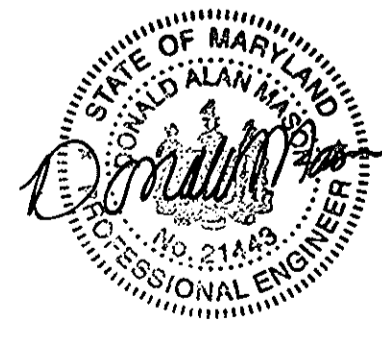
ROYAL COACHMAN DRIVE

HORIZ: 1" = 50'
VERT: 1" = 5'



TYPICAL ROADWAY SECTION

ROYAL COACHMAN DRIVE
 (PUBLIC ACCESS STREET - LESS THEN 1000 ADT)
 DESIGN SPEED: 30 MPH
 STA. 0+35 TO STA. 17+79
 NOT TO SCALE



AS-BUILT CERTIFICATION
 I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
 Donald Mason, P.E. No. 21443
 Date 4-25-11

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. 21443 Expiration Date: 12-21-12

2	5-25-04	REVISE HDPEP TO RCCP CL IV
1	2-5-04	ADD 18" HDPE AND REVISE (2) 36" HDPEP INVERTS
NO	DATE	REVISION

BENCHMARK ENGINEERING, INC.
 ENGINEERS • LAND SURVEYORS • PLANNERS
 8480 BALTIMORE NATIONAL PIKE SUITE 418
 ELLICOTT CITY, MARYLAND 21043
 PHONE: 410-465-6105 FAX: 410-465-6644

Donald Mason
 11/12/03

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
 [Signature] 12-24-03 DATE
 CHIEF, BUREAU OF HIGHWAYS HS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 [Signature] 11/2/04 DATE
 CHIEF, DIVISION OF LAND DEVELOPMENT JA

[Signature] 12/2/03 DATE
 CHIEF, DEVELOPMENT ENGINEERING DIVISION MAJ

OWNER/DEVELOPER
 CASCADE OVERLOOK, L.L.C.
 P.O. BOX 417
 ELLICOTT CITY, MD 21041
 (410) 465-4244

OWNER
 CRAIG R. AND KAREN C. MARTIN
 4937 LANDING ROAD
 ELKBRIDGE, MD 21075

PROJECT: **CASCADE OVERLOOK SECTION ONE**
 LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 14

LOCATION:
 TAX MAP 31, GRID 10 & 11, PARCELS 160, 161, 788, & 791
 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND

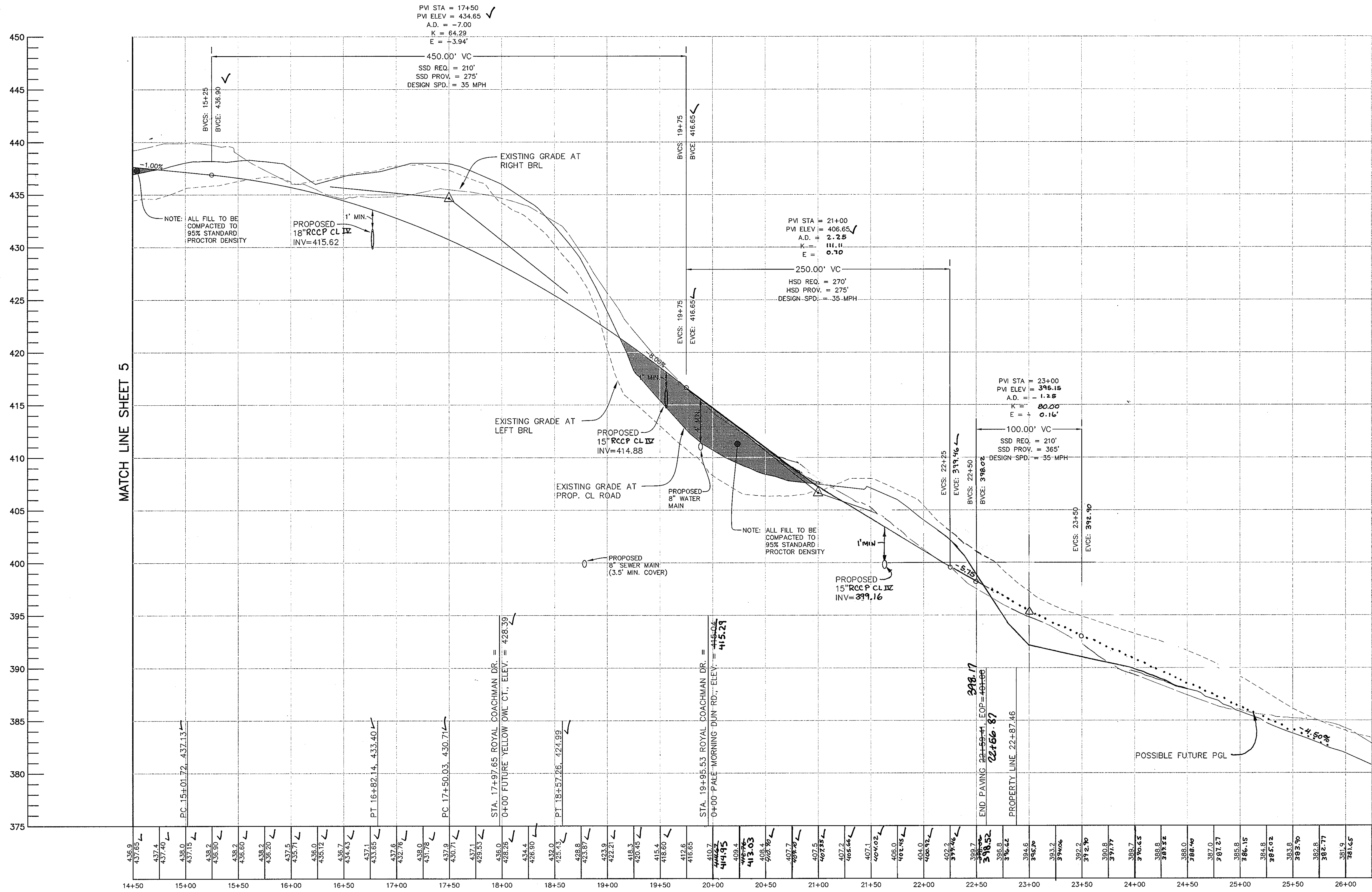
TITLE:
ROAD PROFILE AND DETAILS
 VP-88-130, F-88-20, S-01-04, PB-359, P-02-11

DATE: OCTOBER, 2003 PROJECT NO. 1383

DES: DAM DRN: RPS CHK: DAM SCALE: AS SHOWN DRAWING 5 OF 33

AS-BUILT

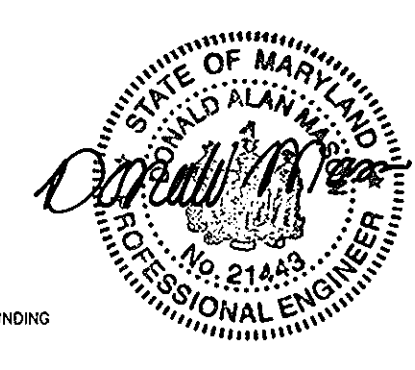
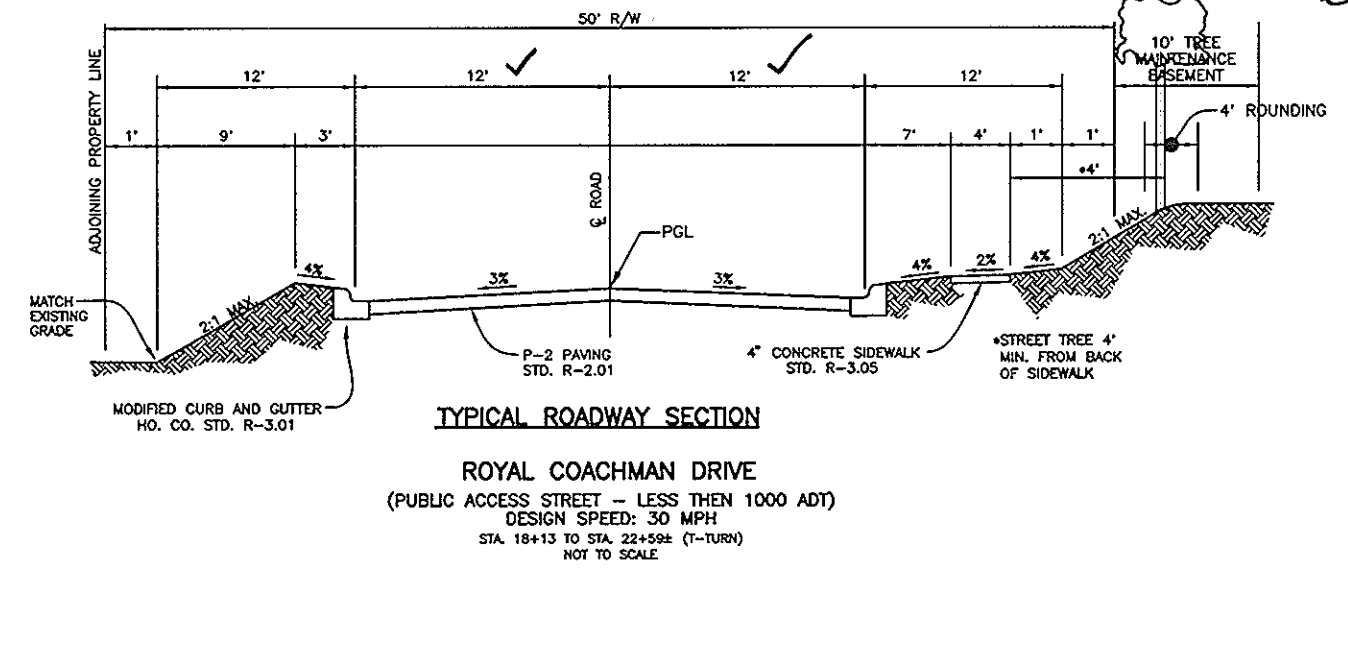
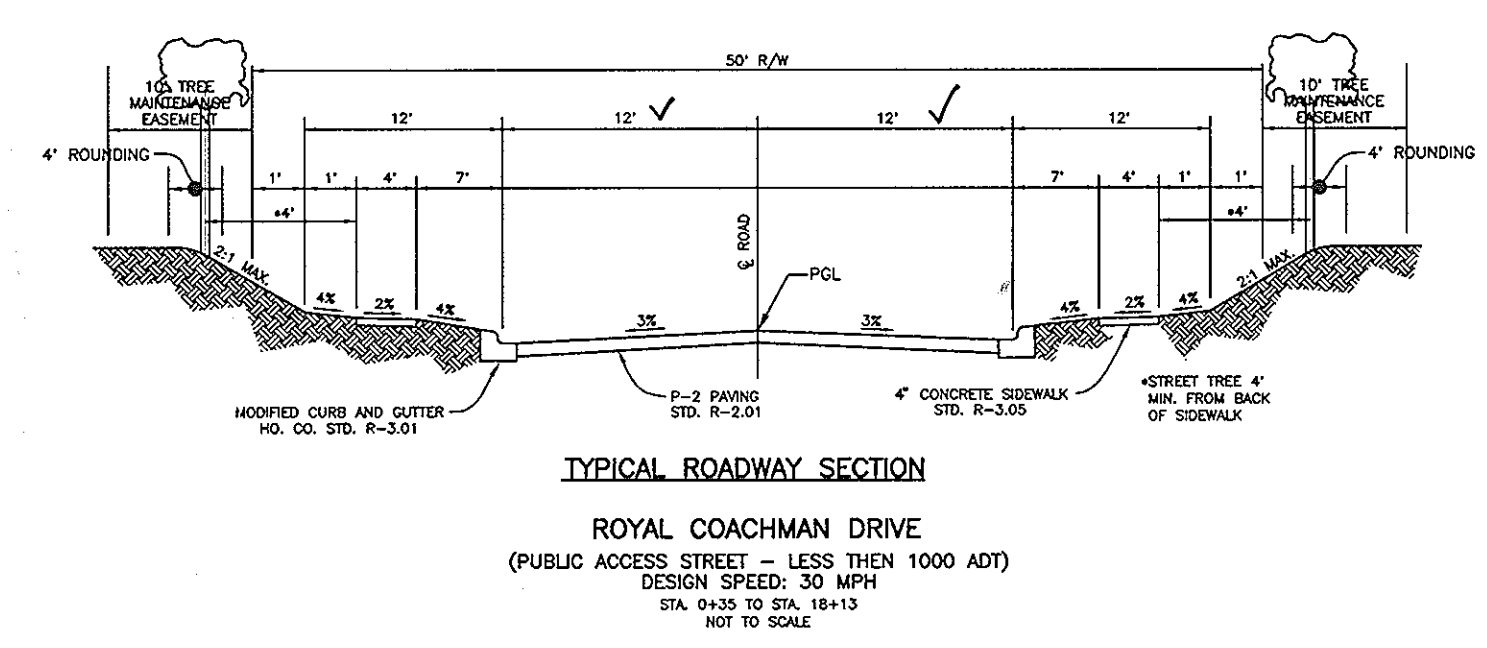
F-03-134



MATCH LINE SHEET 5

ROYAL COACHMAN DRIVE

HORIZ.: 1" = 50'
VERT.: 1" = 5'



AS-BUILT CERTIFICATION
I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
Donald Mason, P.E. No. 21443 Date 4-25-11

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. 21443 Expiration Date: 12-21-12

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
W. S. ... 12-24-03
CHIEF, BUREAU OF HIGHWAYS

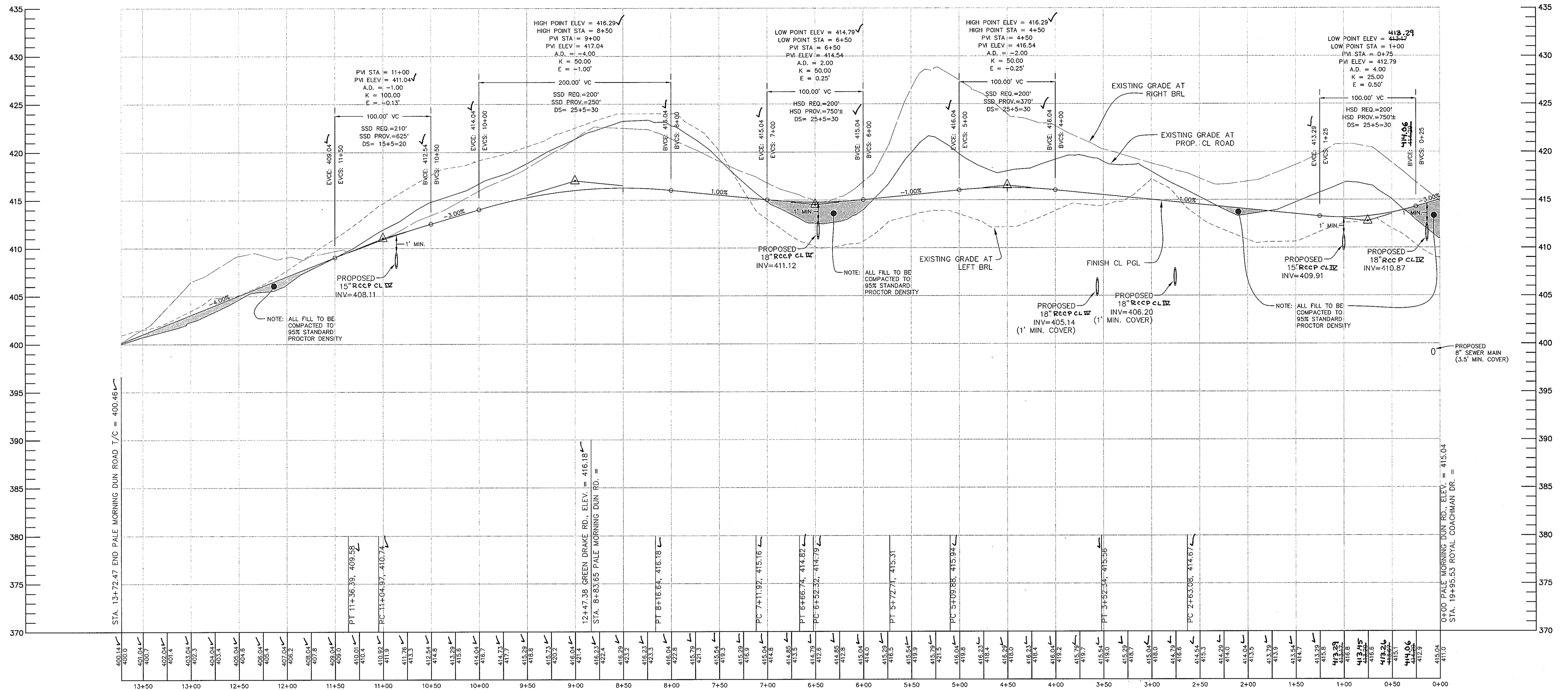
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
D. ... 11/20/04
CHIEF, DIVISION OF LAND DEVELOPMENT

[Signature] 12/24/03
CHIEF, DEVELOPMENT ENGINEERING DIVISION

10-11-04	REVISED CENTERLINE ROYAL COACHMAN DRIVE 17+75 TO 26+24.18
5-25-04	REVISE HDPEP TO RCCP CL IV
NO	DATE
	REVISION

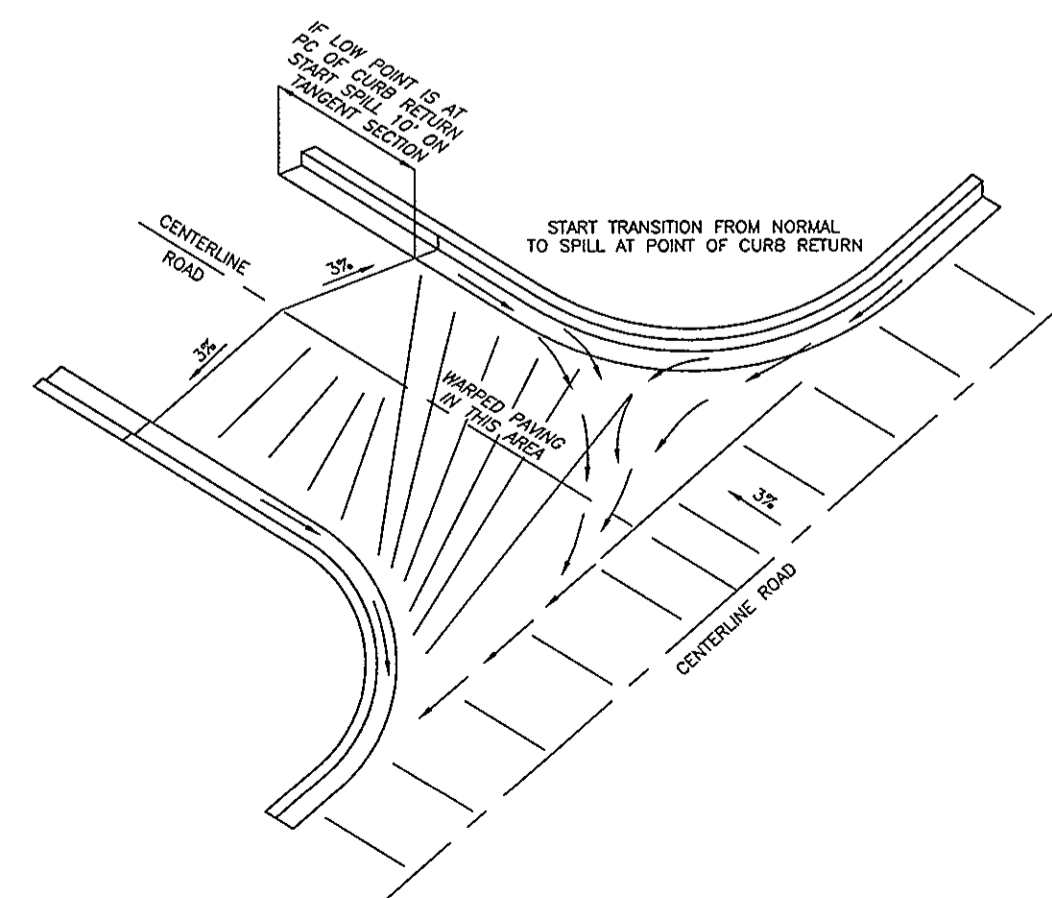
BENCHMARK	
ENGINEERS • LAND SURVEYORS • PLANNERS	
ENGINEERING, INC.	
8480 BALTIMORE NATIONAL PIKE • SUITE 418 ELLCOTT CITY, MARYLAND 21043 PHONE: 410-465-6105 FAX: 410-465-6644	

OWNER/DEVELOPER CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELLCOTT CITY, MD 21041 (410) 465-4244	PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A'
OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELKRIDGE, MD 21075	LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160, 161, 788, & 791 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND
DATE: OCTOBER, 2003	TITLE: ROAD PROFILE AND DETAILS VP-86-130, F-88-20, S-01-04, PB-359, P-02-11
DES: DAM	DRN: RPS
CHK: DAM	SCALE: AS SHOWN
DRAWING NO. 1383	
DRAWING 6 OF 33	

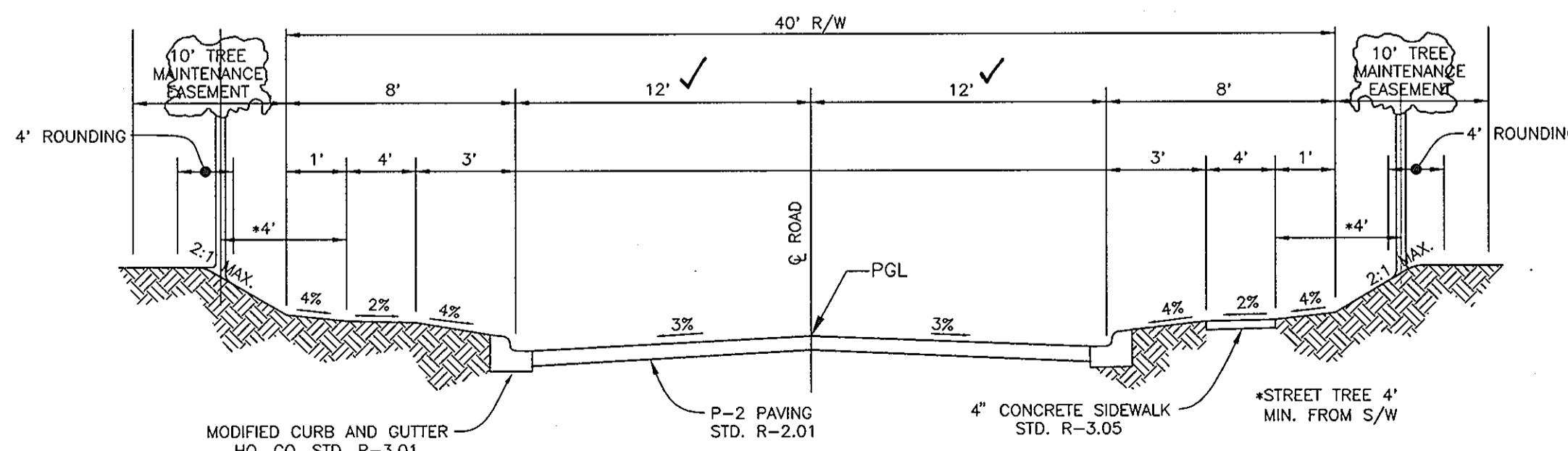


PALE MORNING DUN ROAD

HORIZ.: 1" = 50'
VERT.: 1" = 5'



INTERSECTION DRAINAGE DETAIL
SCALE: NOT TO SCALE



TYPICAL ROADWAY SECTION

PALE MORNING DUN ROAD
(PUBLIC ACCESS STREET - LESS THAN 500 ADT)
DESIGN SPEED: 30 MPH
STA. 0+35 TO STA. 13+88.57
NOT TO SCALE



AS-BUILT CERTIFICATION
I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
Donald Mason, P.E. No. 21443 Date 4-25-11

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. 21443, Expiration Date: 12-21-12

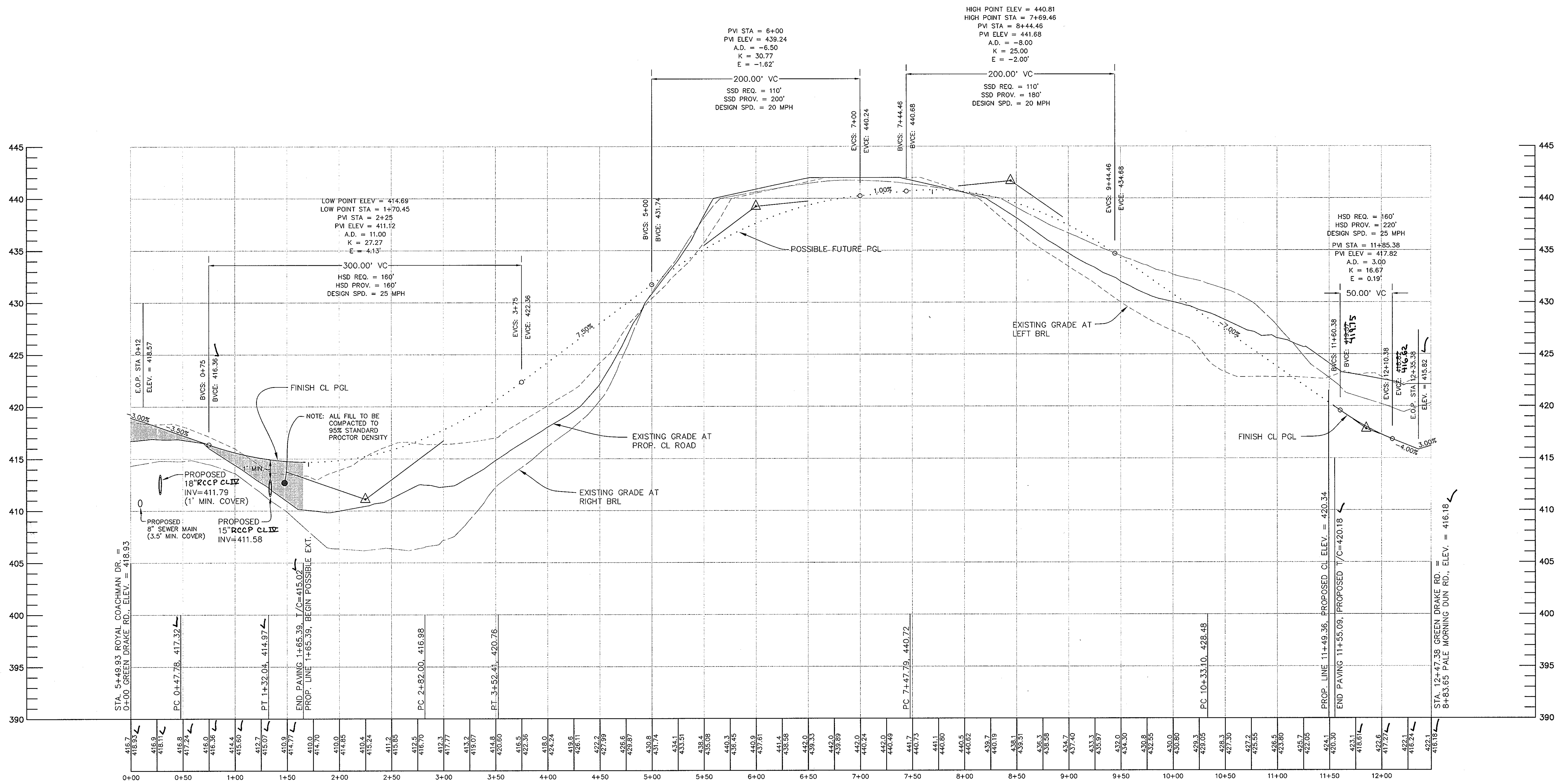
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

NO	DATE	REVISION
5-28-04		REVISE HDPEP TO RCCP CLIV

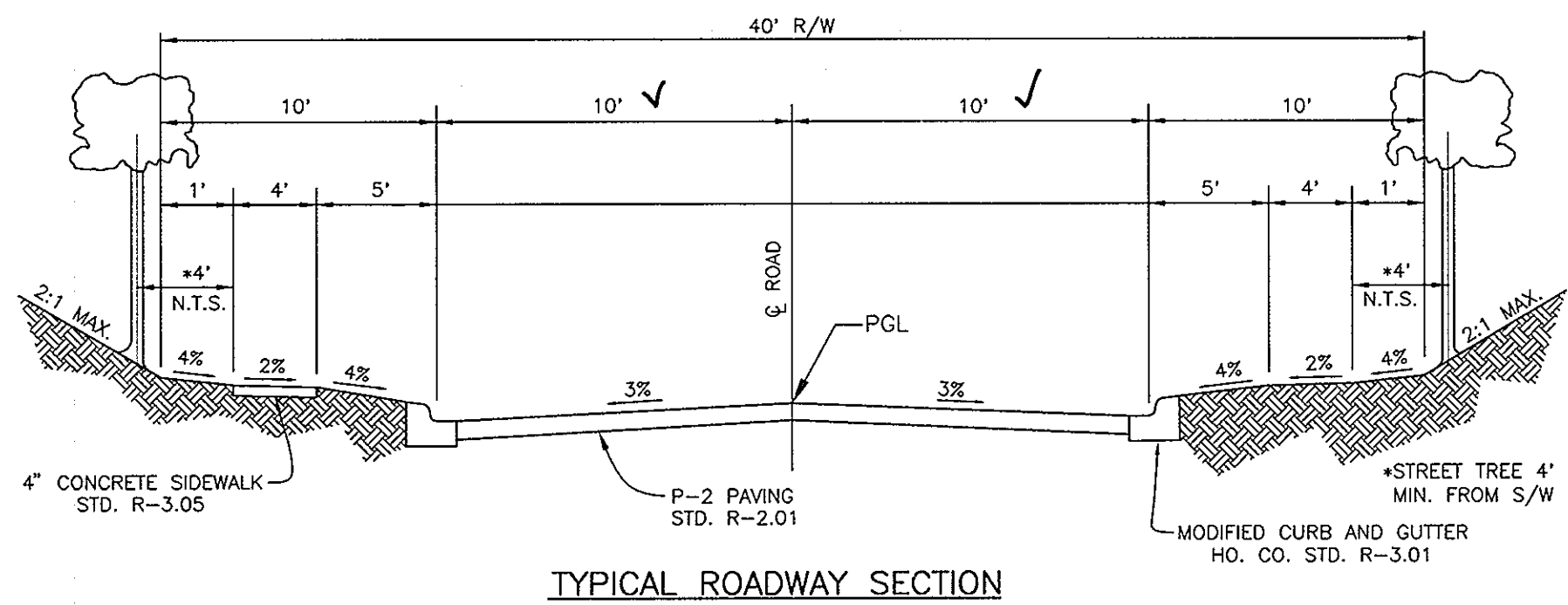
BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE & SUITE 418
ELLICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MD 21041 (410) 465-4244	PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A'
OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELKBRIDGE, MD 21075	LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND
DES: DAM DRN: RPS CHK: DAM	TITLE: ROAD PROFILE AND DETAILS VP-88-130, F-88-20, S-01-04, PB-359, P-02-11 OCTOBER, 2003 PROJECT NO. 1383



GREEN DRAKE ROAD WITH POSSIBLE FUTURE CONNECTION

HORIZ: 1" = 50'
 VERT: 1" = 5'



TYPICAL ROADWAY SECTION
 GREEN DRAKE ROAD
 (PUBLIC ACCESS STREET - LESS THAN 200 ADT)
 DESIGN SPEED: 20 MPH
 STA. 0+35 TO STA. 1+38.50 (T-TURN)
 STA. 11+28.20 TO 12+20.49 (T-TURN)
 NOT TO SCALE

NO	DATE	REVISION
5-25-04		REVISE HDPEP TO RCP CL IV
		REVISION

BENCHMARK ENGINEERING, INC.
 ENGINEERS • LAND SURVEYORS • PLANNERS
 8480 BALTIMORE NATIONAL PIKE • SUITE 418
 ELLICOTT CITY, MARYLAND 21043
 PHONE: 410-465-6105 FAX: 410-465-6644

OWNER: CASCADE OVERLOOK, L.L.C.
 P.O. BOX 417
 ELLICOTT CITY, MD 21041
 (410) 465-4244

PROJECT: **CASCADE OVERLOOK**
 SECTION ONE
 LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL "A"
 LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160, 161, 788, & 791
 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND

TITLE: **ROAD PROFILE AND DETAILS**
 VP-86-130, F-88-20, S-01-04, PB-359, P-02-11
 DATE: OCTOBER, 2003 PROJECT NO. 1383

DES: DAM DRN: RPS CHK: DAM
 SCALE: AS SHOWN DRAWING 8 OF 33



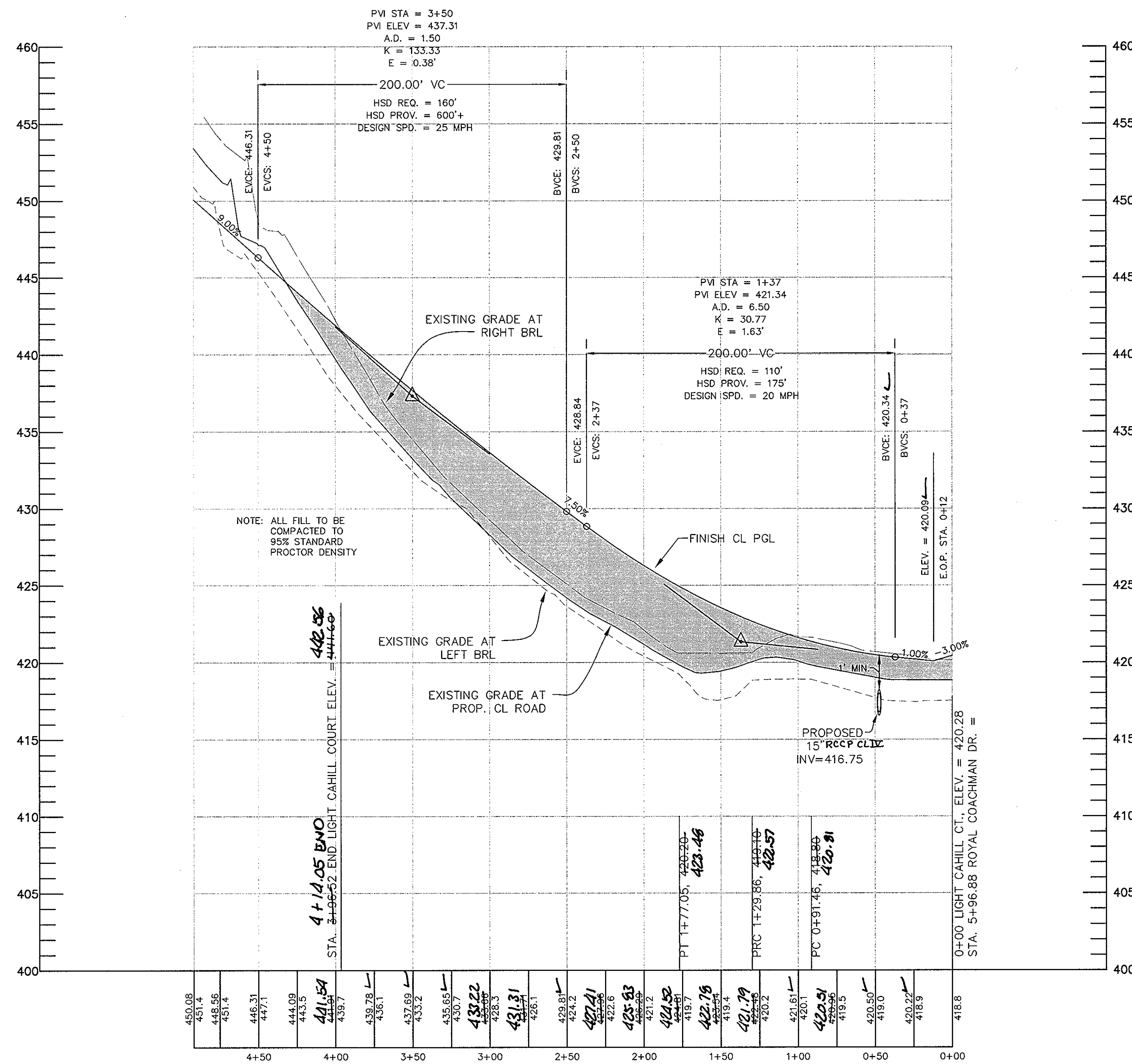
AS-BUILT CERTIFICATION
 I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
 Donald Mason, P.E. No. 21443 Date 4-25-11

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. 21443, Expiration Date: 12-21-12

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
 [Signature] 12-24-03
 CHIEF, BUREAU OF HIGHWAYS

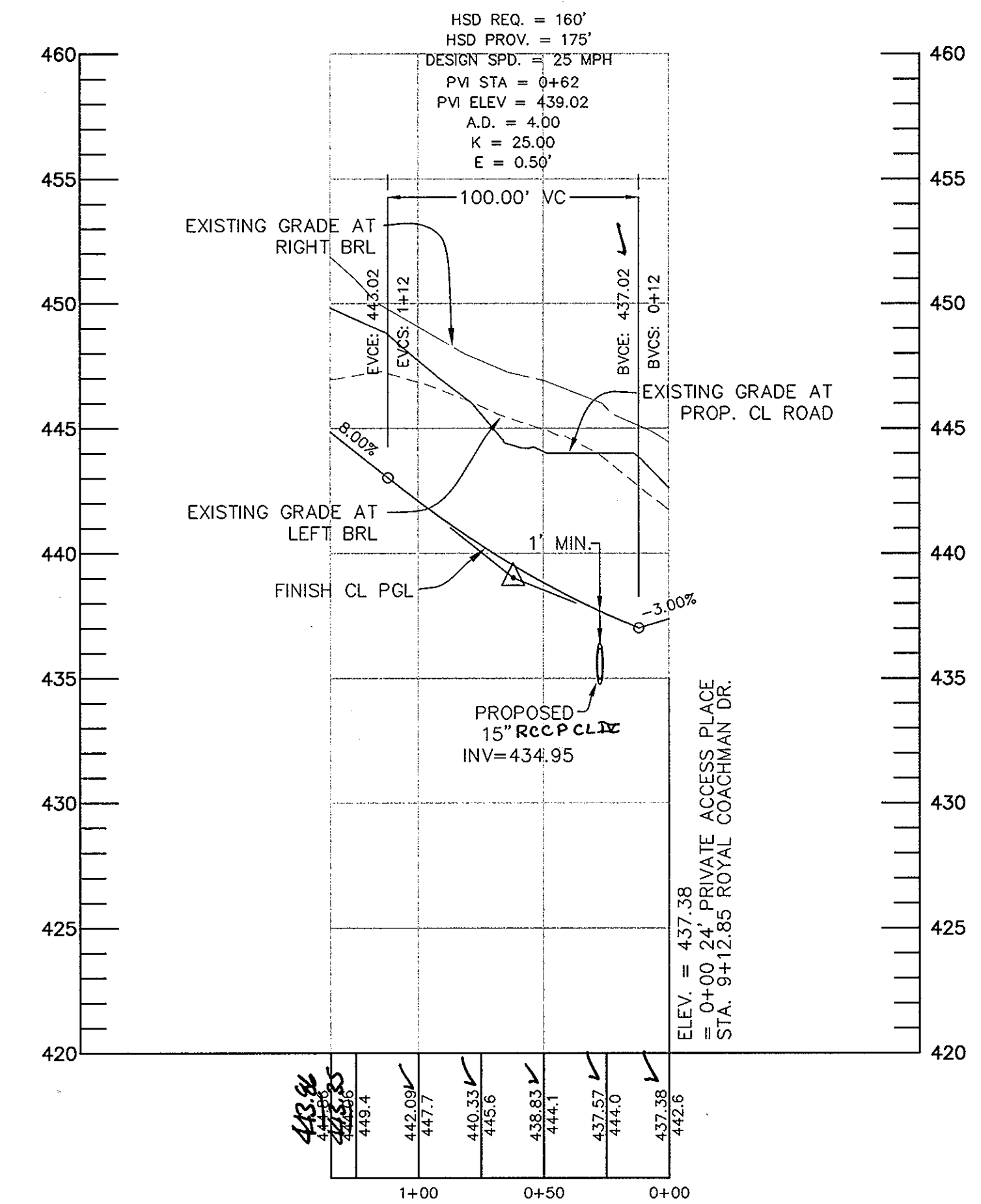
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 [Signature] 1/26/04
 CHIEF, DIVISION OF LAND DEVELOPMENT

APPROVED: [Signature] 11/21/03
 CHIEF, DEVELOPMENT ENGINEERING DIVISION



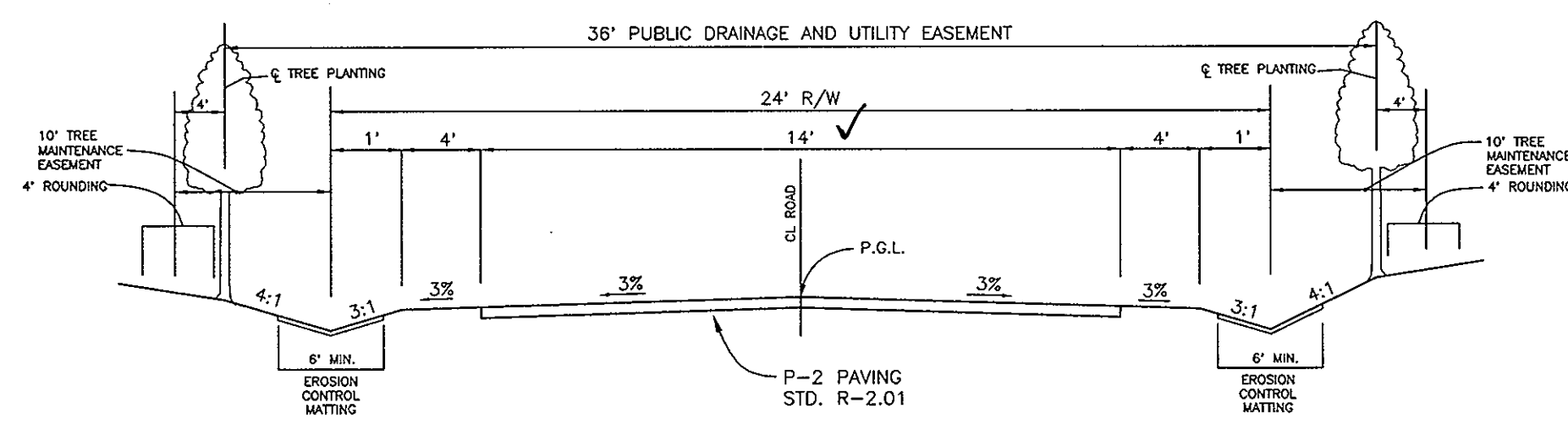
LIGHT CAHILL COURT

HORIZ.: 1" = 50'
 VERT.: 1" = 5'



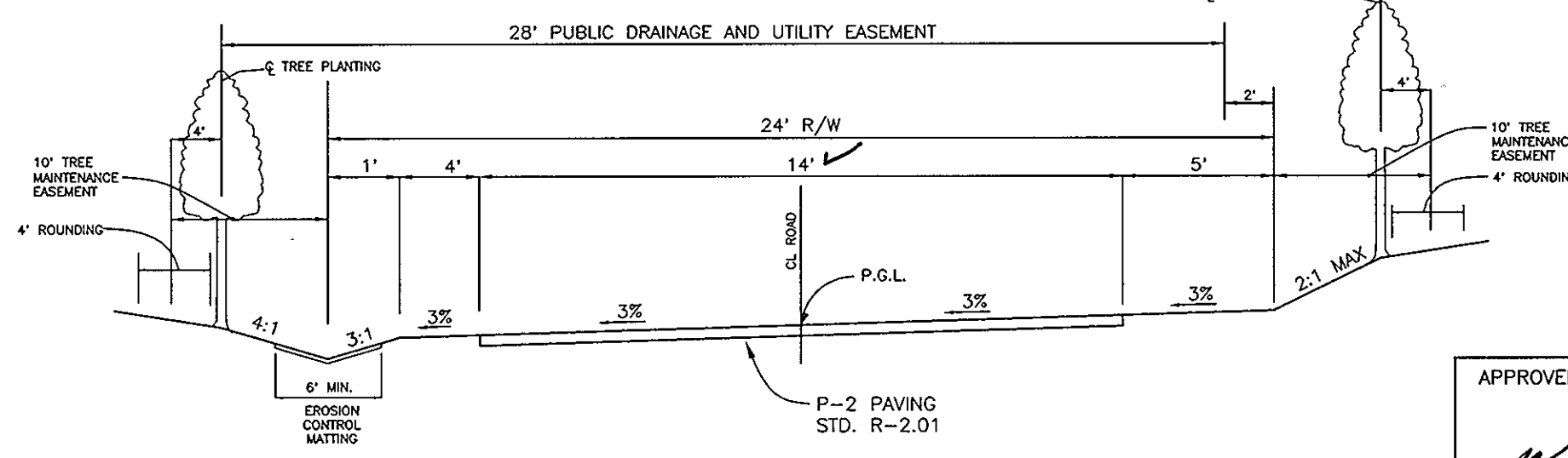
24' USE-IN-COMMON

HORIZ.: 1" = 50'
 VERT.: 1" = 5'



TYPICAL ROADWAY SECTION

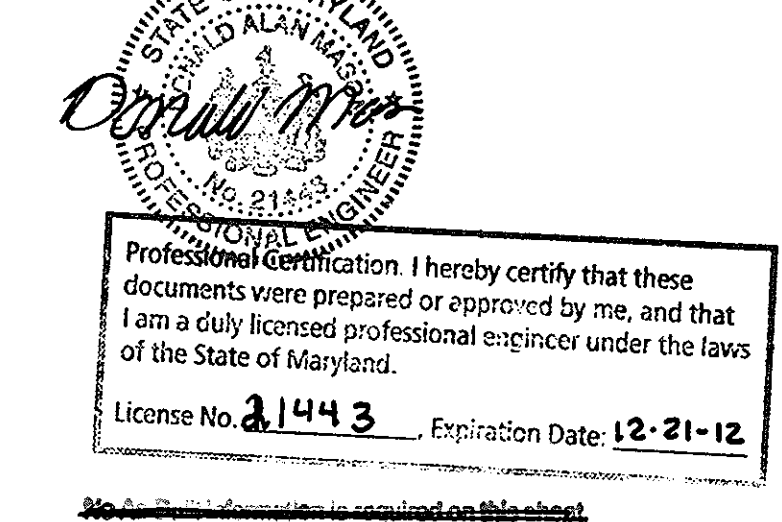
LIGHT CAHILL COURT
 (PRIVATE ACCESS PLACE - LESS THEN 100 ADT)
 DESIGN SPEED: 20 MPH
 STA. 0+27 TO STA. 3+96.37 (T-TURN)
 NOT TO SCALE



TYPICAL ROADWAY SECTION

24' USE-IN-COMMON
 (PRIVATE ACCESS PLACE - LESS THEN 100 ADT)
 DESIGN SPEED: 15 MPH
 STA. 0+27 TO STA. 1+35 (T-TURN)
 NOT TO SCALE

AS-BUILT CERTIFICATION
 I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
 Donald Mason, P.E. No. 21443 Date 12-25-11



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
 [Signature] 12-24-03
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 [Signature] 12/20/03
 CHIEF, DIVISION OF LAND DEVELOPMENT

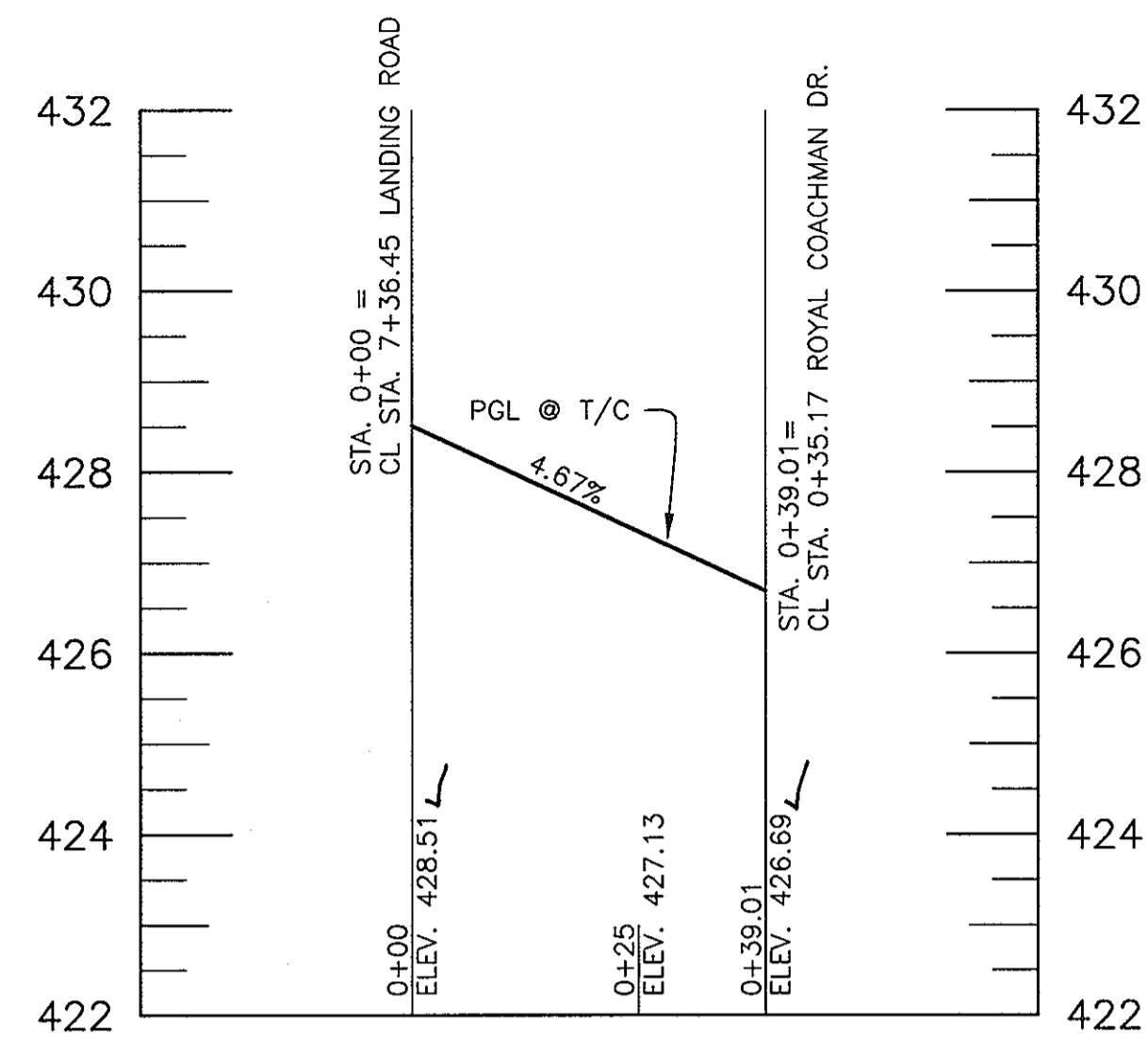
NO	DATE	REVISION
5-25-04		REVISE HDPEP TO RECP CL. DR.

BENCHMARK ENGINEERING, INC.
 ENGINEERS • LAND SURVEYORS • PLANNERS
 8480 BALTIMORE NATIONAL PIKE & SUITE 418
 ELLICOTT CITY, MARYLAND 21043
 PHONE: 410-465-6105 FAX: 410-465-6644

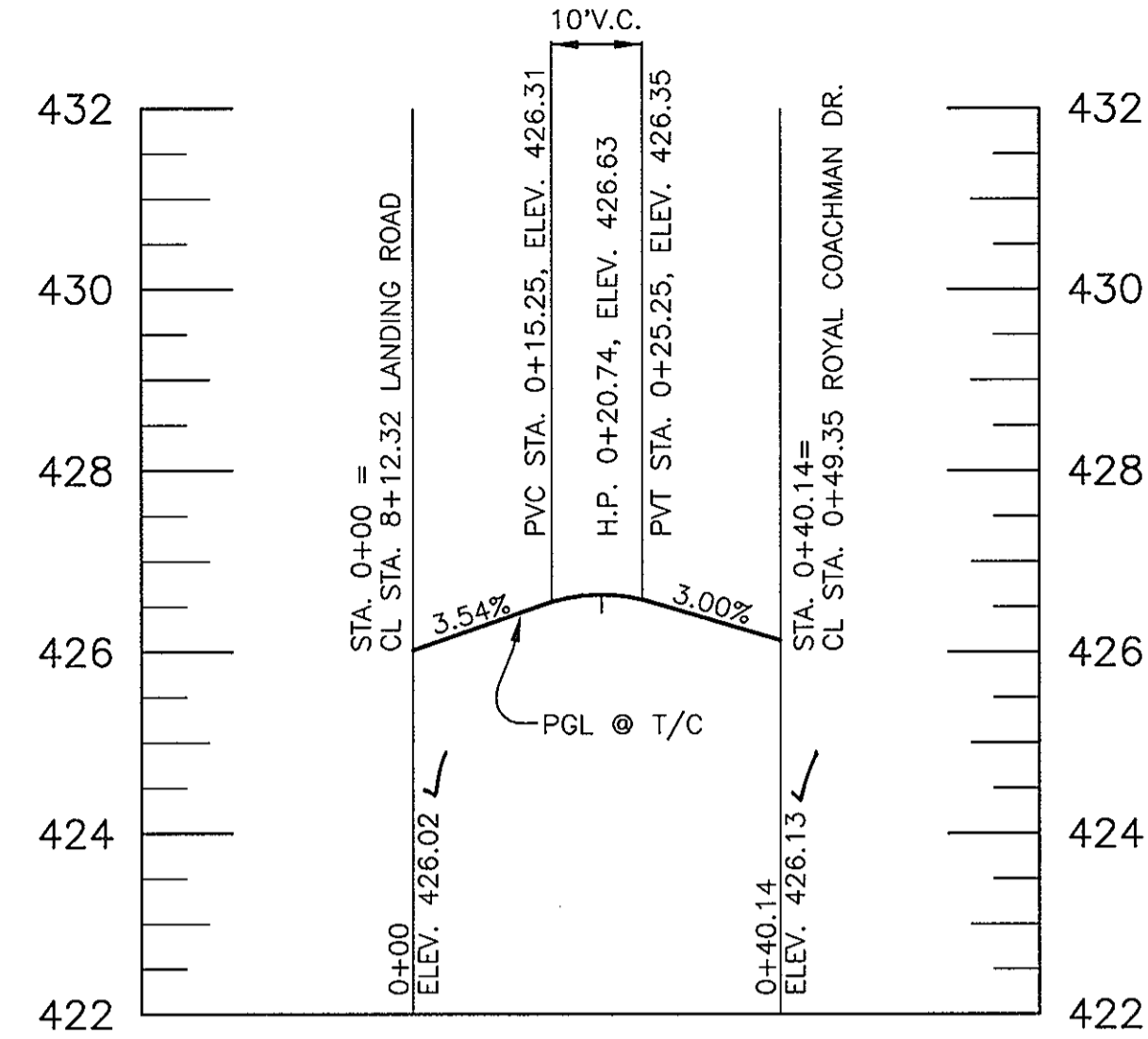
PROJECT: **CASCADE OVERLOOK SECTION ONE**
 LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'X'
 LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND
 TITLE: **ROAD PROFILE AND DETAILS**
 VP-86-130, F-88-20, S-01-04, PB-259, P-02-11
 DATE: OCTOBER, 2003 PROJECT NO. 1383

OWNER: CRAIG R. AND KAREN C. MARTIN
 4937 LANDING ROAD
 ELK RIDGE, MD 21075

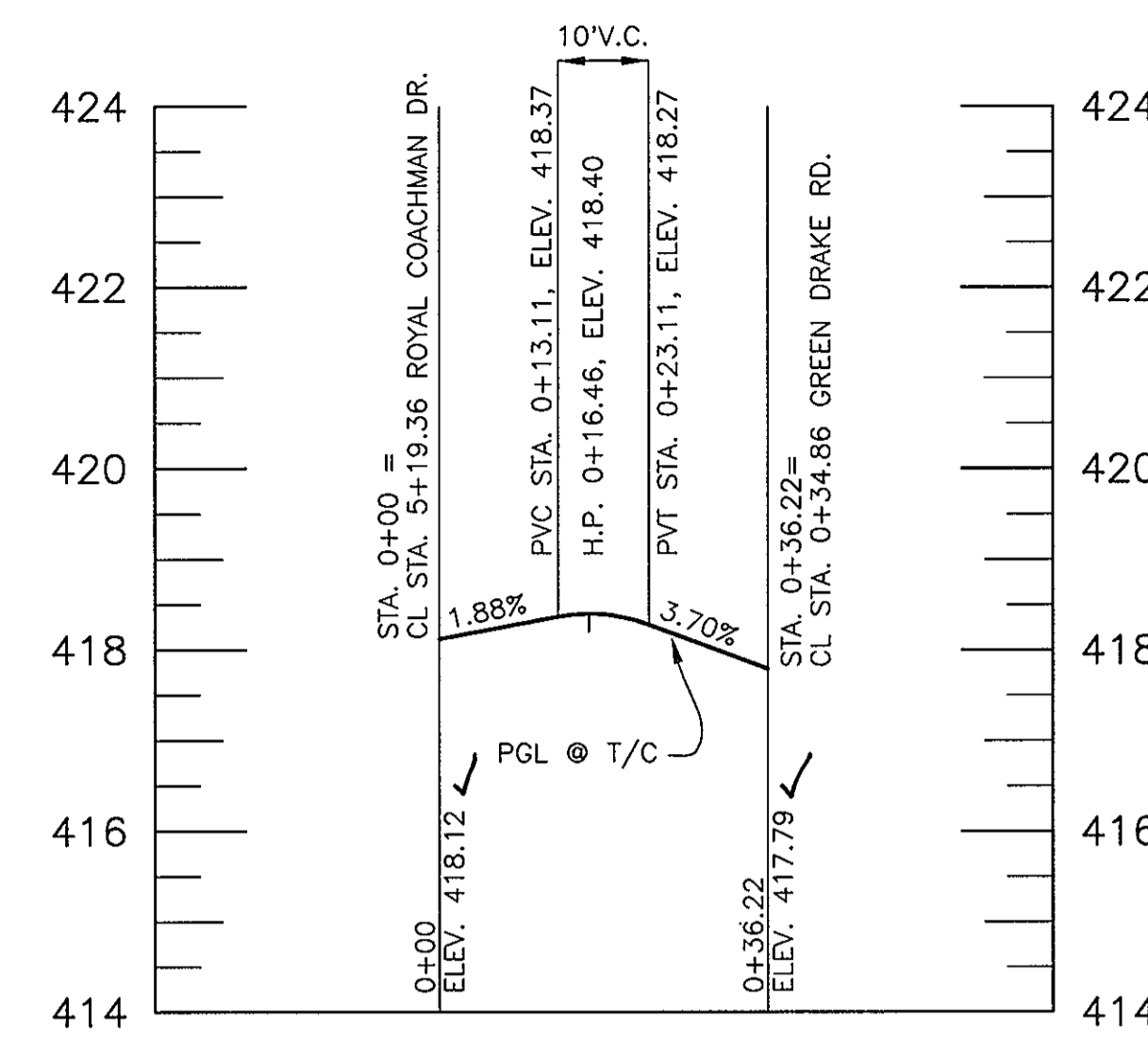
DES: DAM DRN: RPS CHK: DAM SCALE: AS SHOWN DRAWING: 9 OF 33



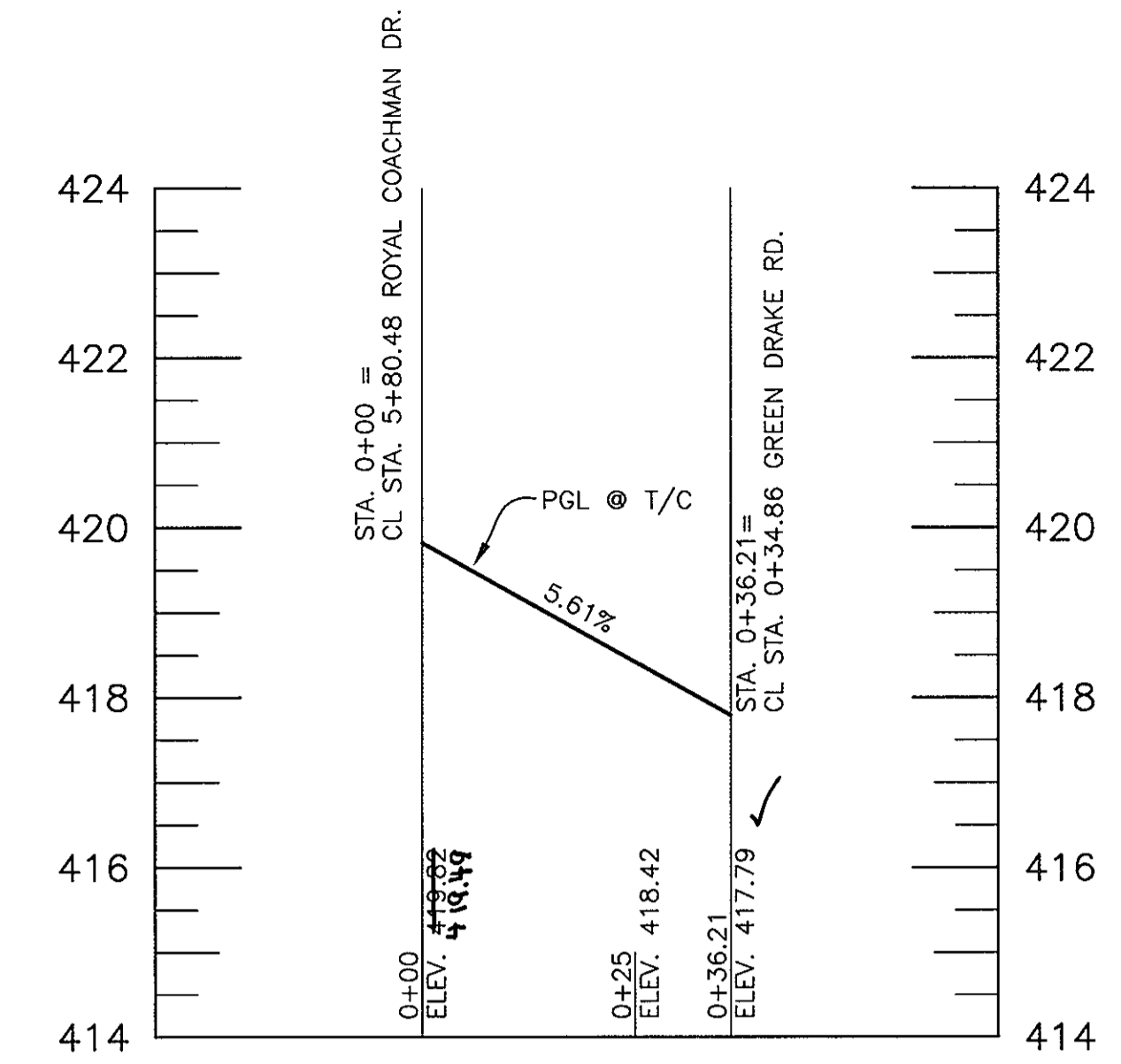
CURB RETURN
NORTHWEST SIDE OF
LANDING ROAD AND ROYAL COACHMAN DRIVE
SCALE: HORIZ: 1"=20' VERT: 1"=2'



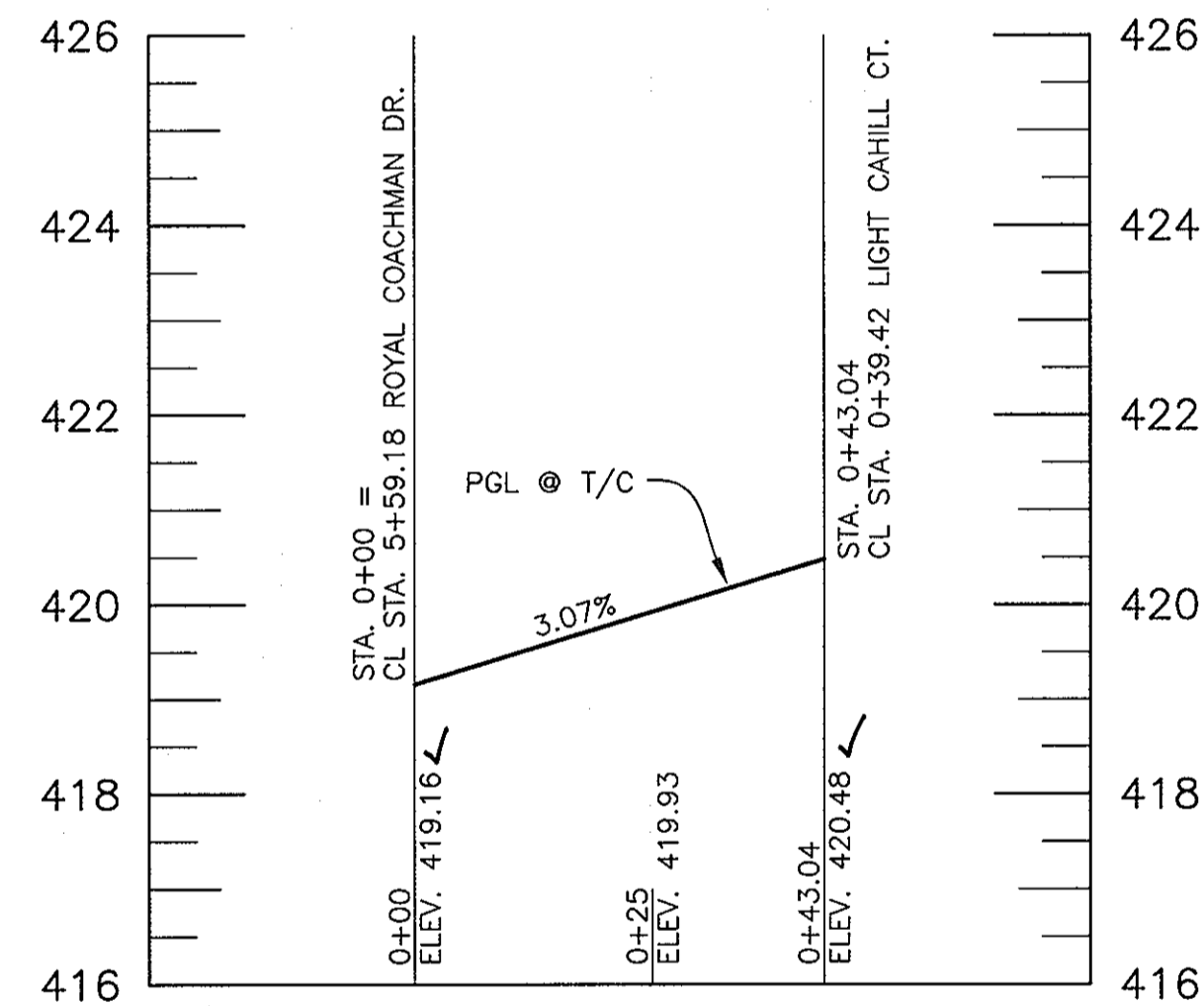
CURB RETURN
NORTHEAST SIDE OF
LANDING ROAD AND ROYAL COACHMAN DRIVE
SCALE: HORIZ: 1"=20' VERT: 1"=2'



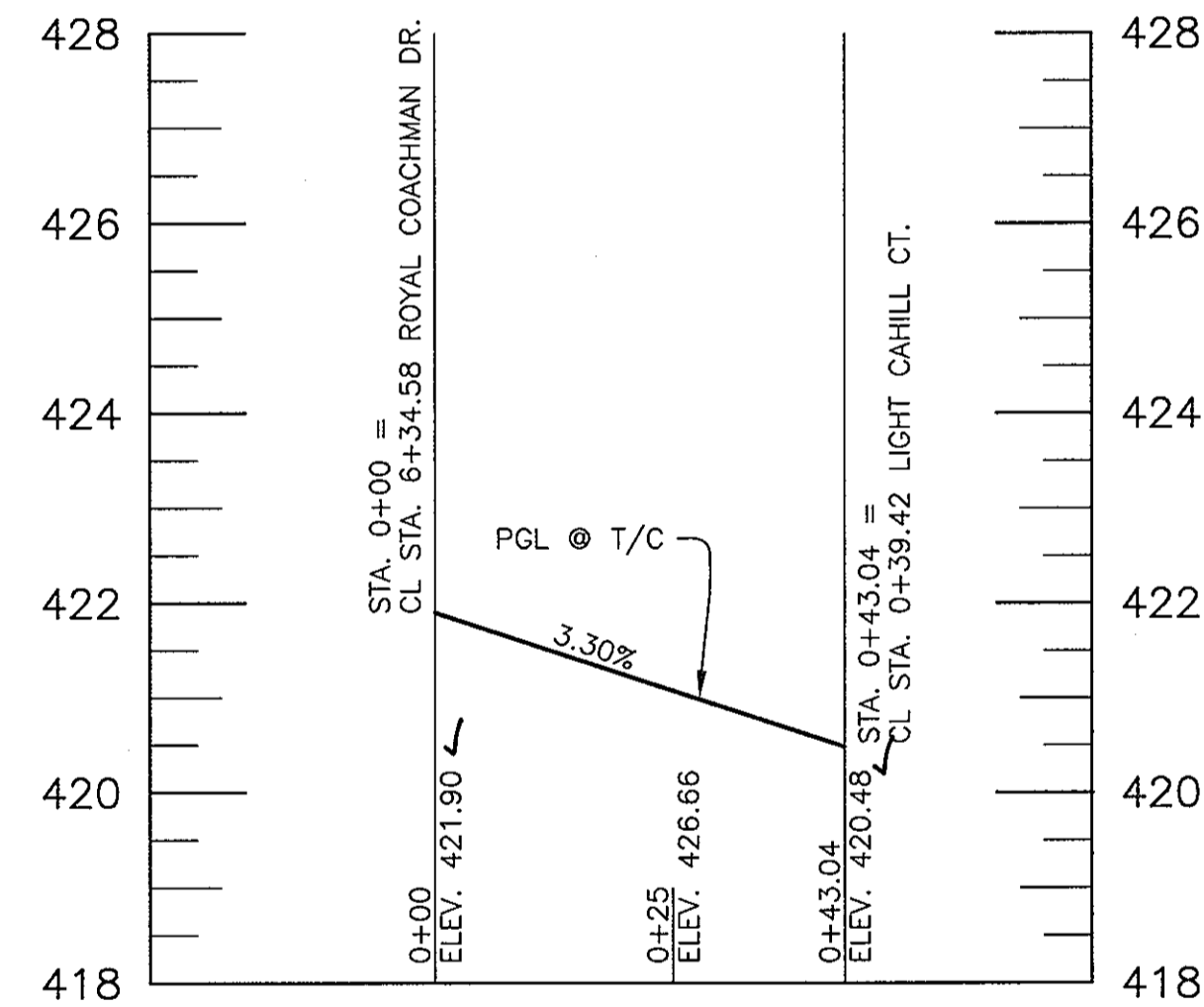
CURB RETURN
SOUTHWEST SIDE OF
ROYAL COACHMAN DR. AND GREEN DRAKE RD.
SCALE: HORIZ: 1"=20' VERT: 1"=2'



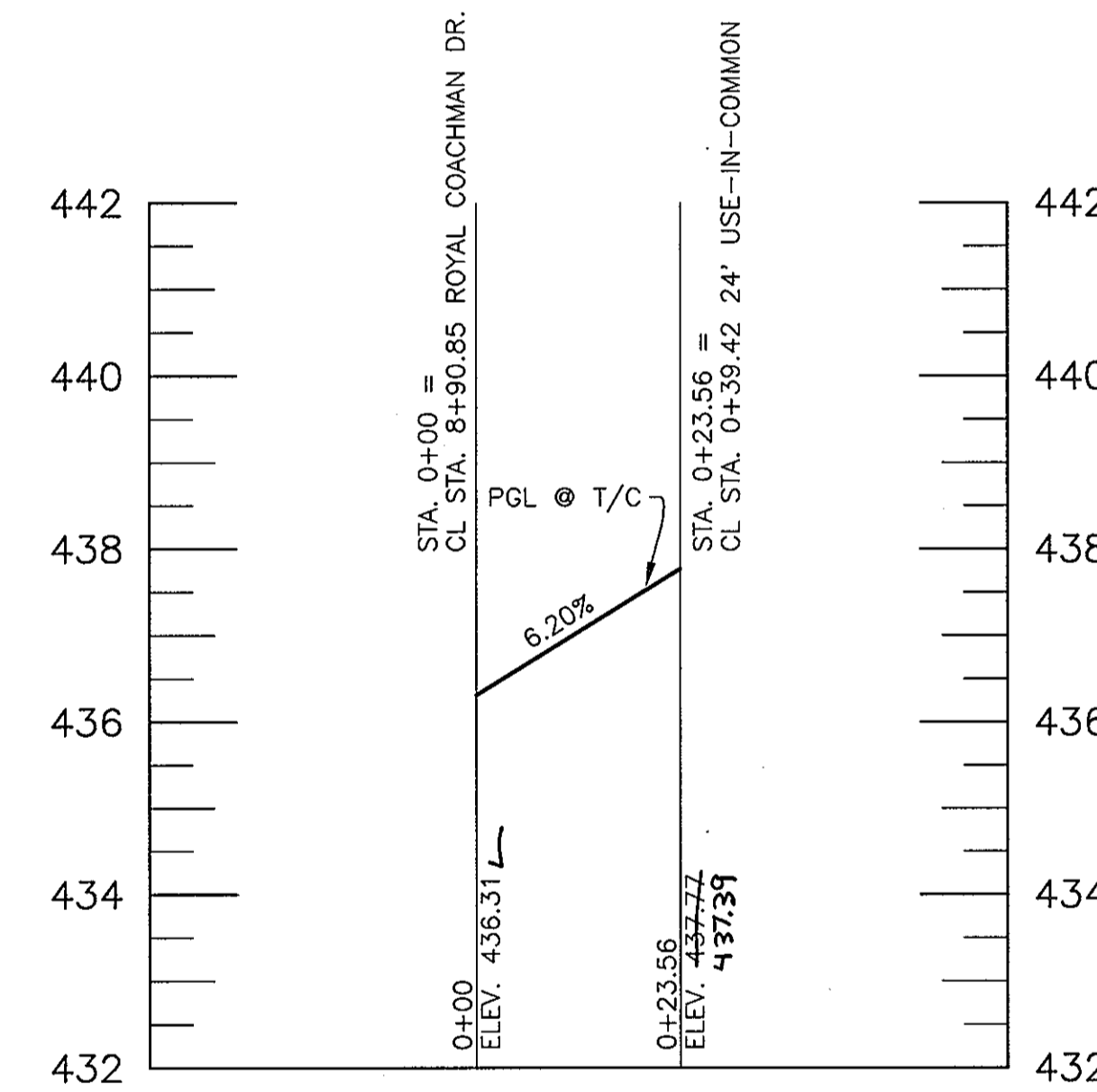
CURB RETURN
SOUTHEAST SIDE OF
ROYAL COACHMAN DR. AND GREEN DRAKE RD.
SCALE: HORIZ: 1"=20' VERT: 1"=2'



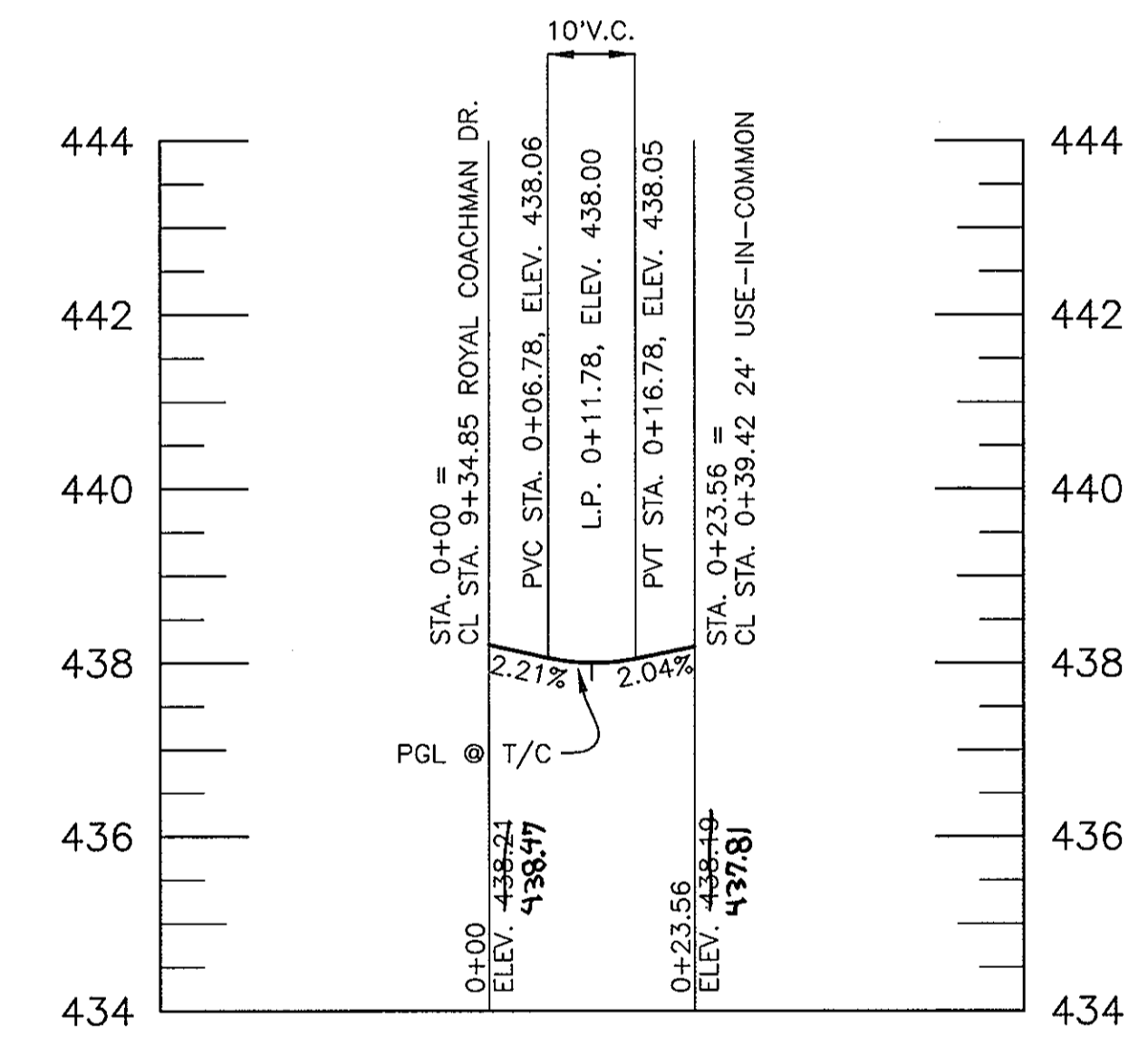
CURB RETURN
NORTHWEST SIDE OF
ROYAL COACHMAN DR. AND LIGHT CAHILL CT.
SCALE: HORIZ: 1"=20' VERT: 1"=2'



CURB RETURN
NORTHEAST SIDE OF
ROYAL COACHMAN DR. AND LIGHT CAHILL CT.
SCALE: HORIZ: 1"=20' VERT: 1"=2'



CURB RETURN
SOUTHWEST SIDE OF
ROYAL COACHMAN DR. AND 24' USE-IN-COMMON
SCALE: HORIZ: 1"=20' VERT: 1"=2'



CURB RETURN
NORTHWEST SIDE OF
ROYAL COACHMAN DR. AND 24' USE-IN-COMMON
SCALE: HORIZ: 1"=20' VERT: 1"=2'

GENERAL NOTES:

- PGL GRADE SHOWN IS REPRESENTATIVE OF THE NORMAL TOP OF CURB.
- MODIFICATIONS TO THE PGL GRADE SHOWN WILL BE NECESSARY FOR RETURNS WITH HANDICAP RAMPS PROPOSED.



AS-BUILT CERTIFICATION
I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on the AS-BUILT plan.
Donald Mason, P.E. No. 21443 Date 4-25-11

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. 21443, Expiration Date: 12-21-12

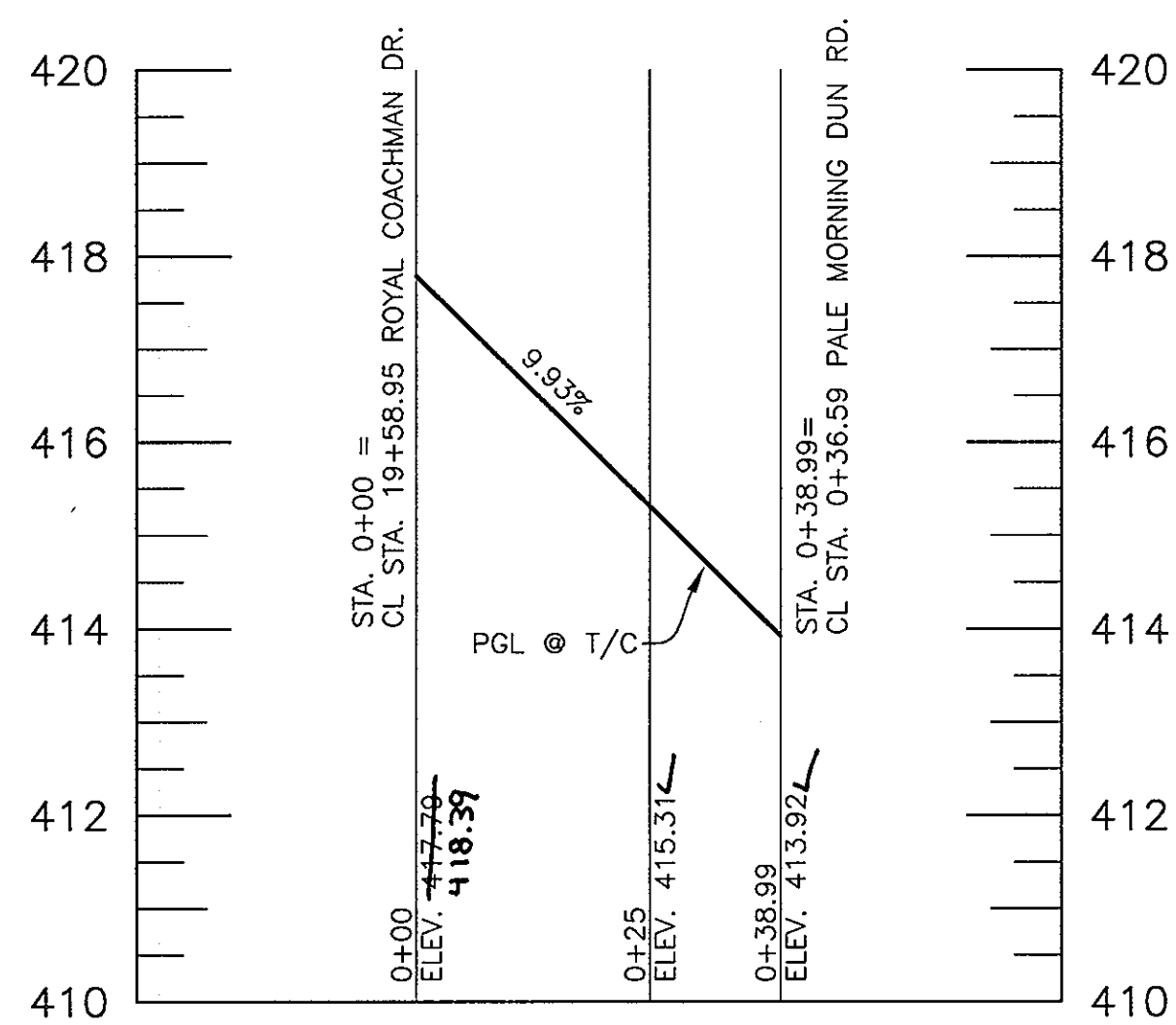
NO	DATE	REVISION

BENCHMARK
ENGINEERS • LAND SURVEYORS • PLANNERS
ENGINEERING, INC.

8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

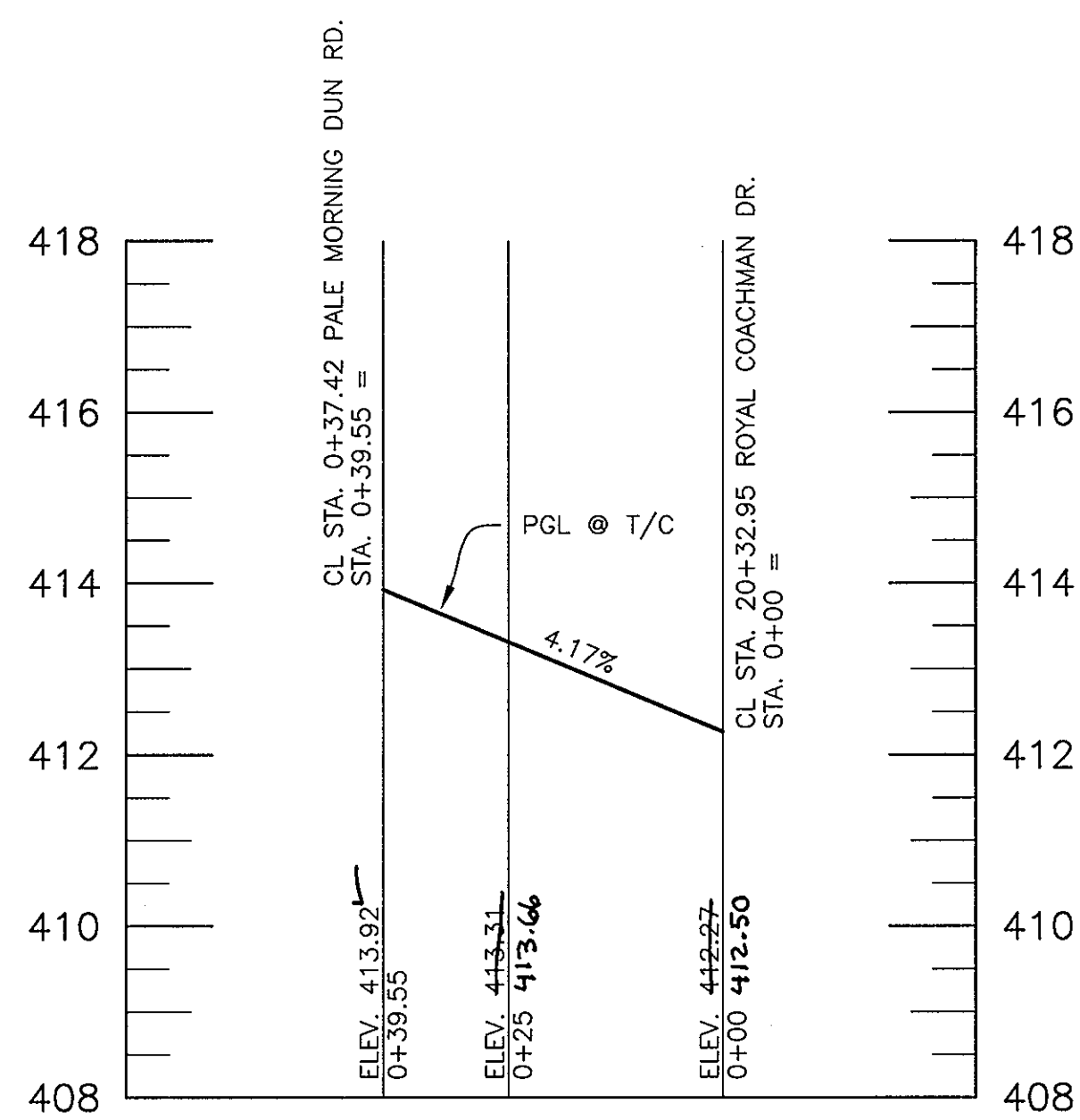
11/27/03

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS <i>William J. ...</i> 12-21-03 CHIEF, BUREAU OF HIGHWAYS	OWNER/DEVELOPER CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELLCOTT CITY, MD 21041 (410) 465-4244	PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL "X"
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING <i>Craig R. ...</i> 4/25/11 CHIEF, DIVISION OF LAND DEVELOPMENT	OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELKRIDGE, MD 21075	LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND
DATE: 10/27/03	DATE: 10/27/03	TITLE: ROAD PROFILE VP-86-130, F-88-20, S-01-04, PB-359, P-02-11
DES: DAM	DRN: RPS	DATE: 10/27/03
CHK: DAM	SCALE: AS SHOWN	PROJECT NO. 1383
AS-BUILT		DRAWING 10 OF 33



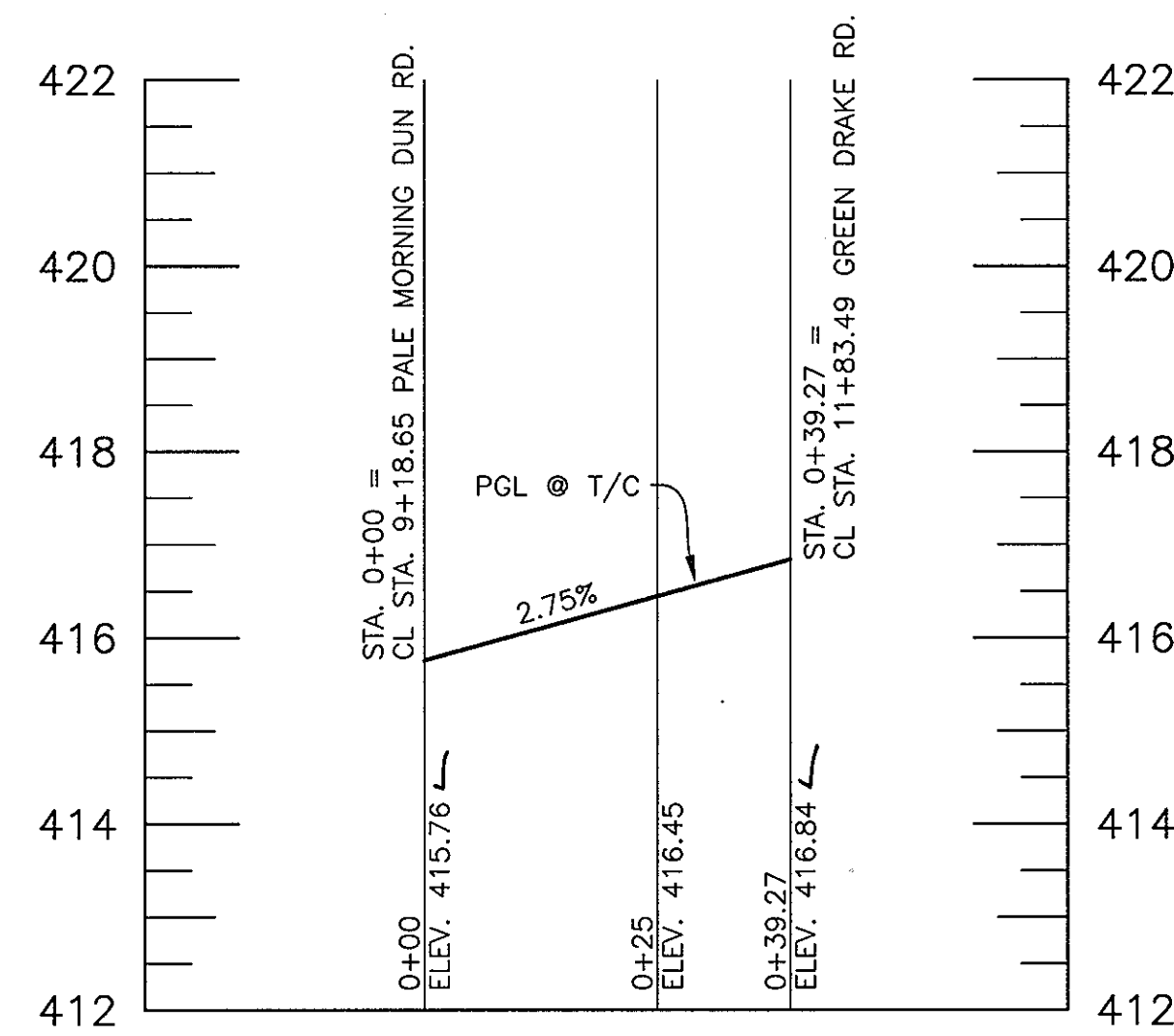
CURB RETURN
SOUTHWEST SIDE OF
ROYAL COACHMAN DR. AND PALE MORNING DUN RD.

SCALE: HORIZ: 1"=20' VERT: 1"=2'



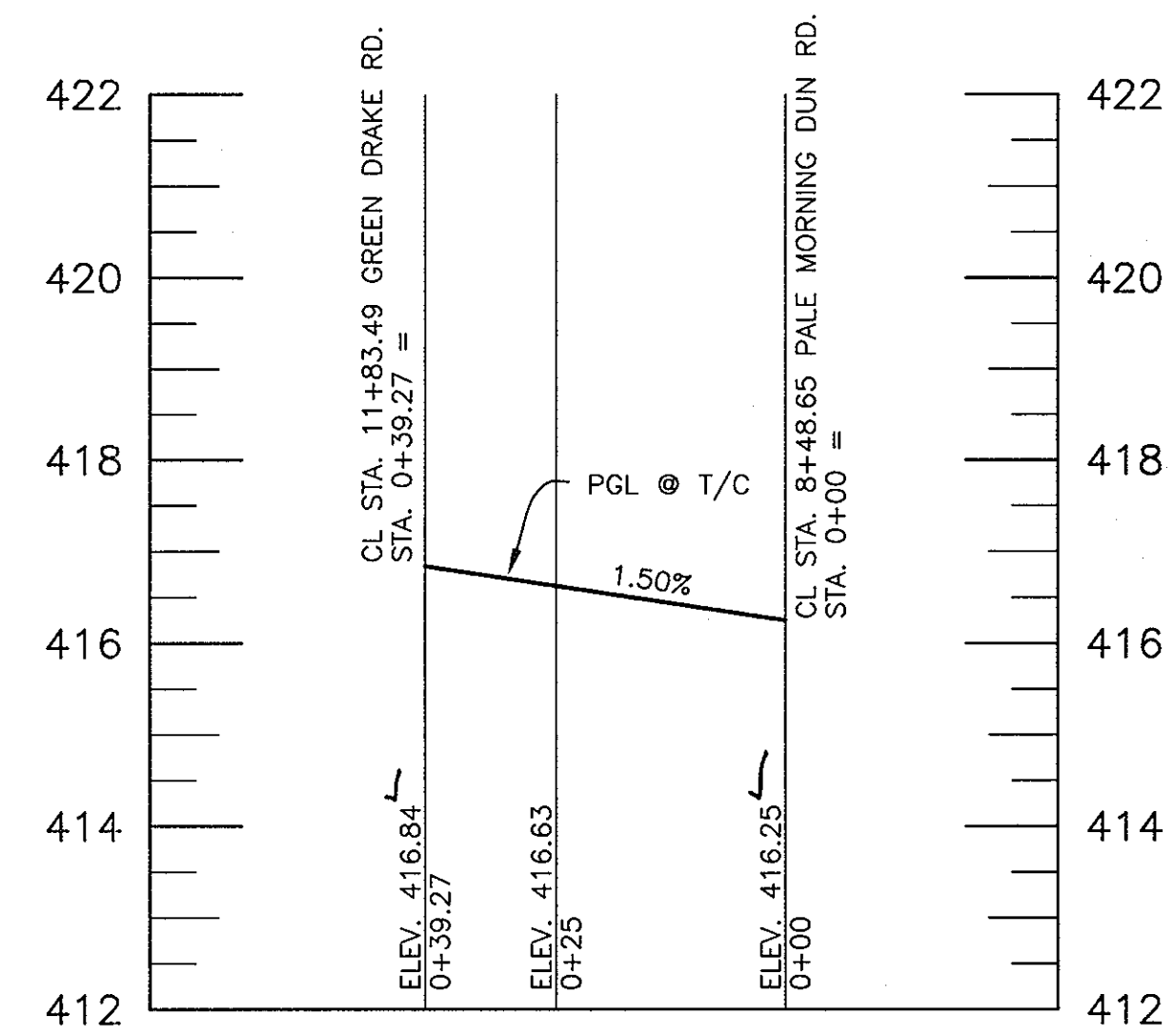
CURB RETURN
SOUTHEAST SIDE OF
ROYAL COACHMAN DR. AND PALE MORNING DUN RD.

SCALE: HORIZ: 1"=20' VERT: 1"=2'



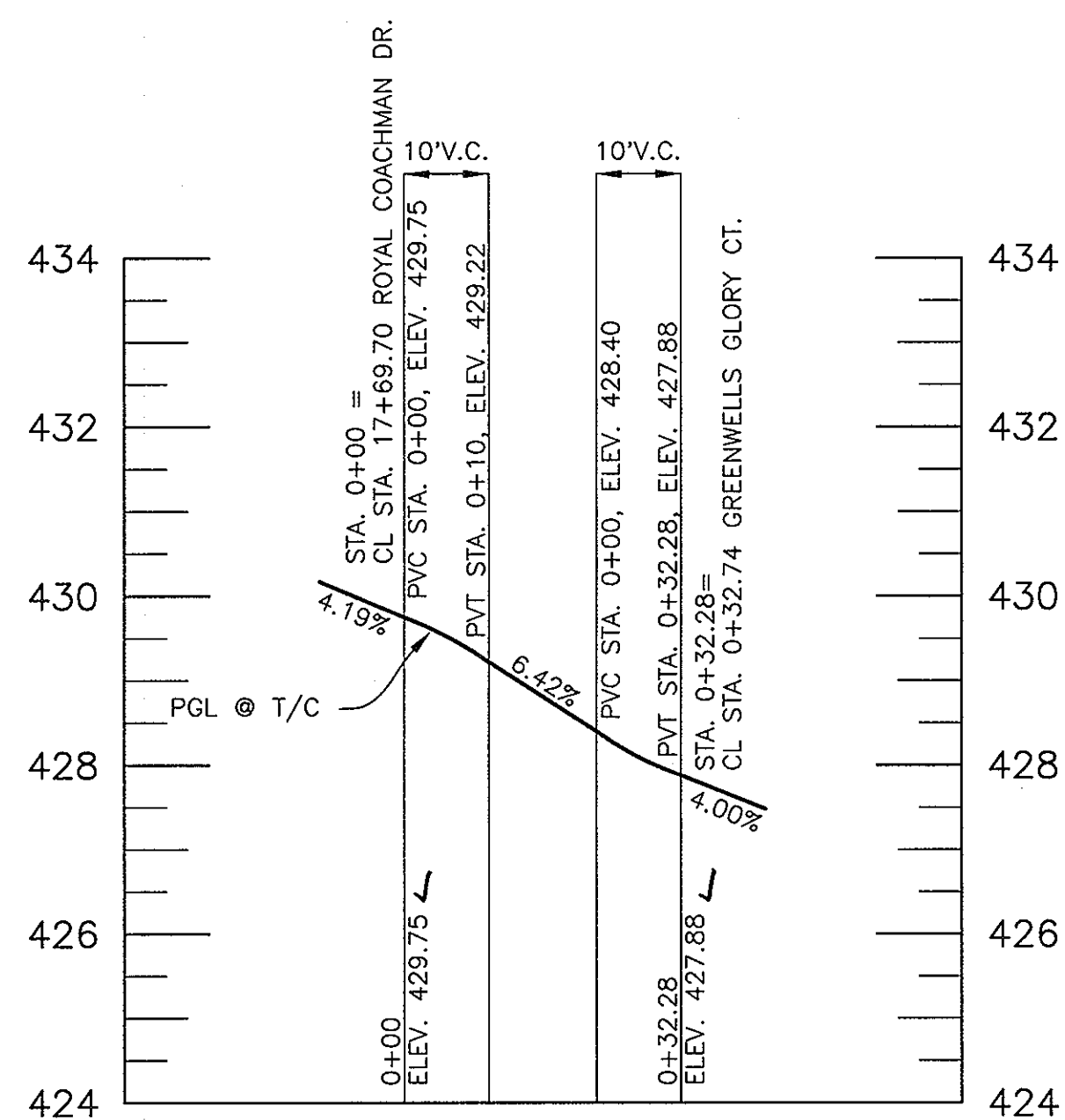
CURB RETURN
NORTHWEST SIDE OF
PALE MORNING DUN RD. AND GREEN DRAKE RD.

SCALE: HORIZ: 1"=20' VERT: 1"=2'



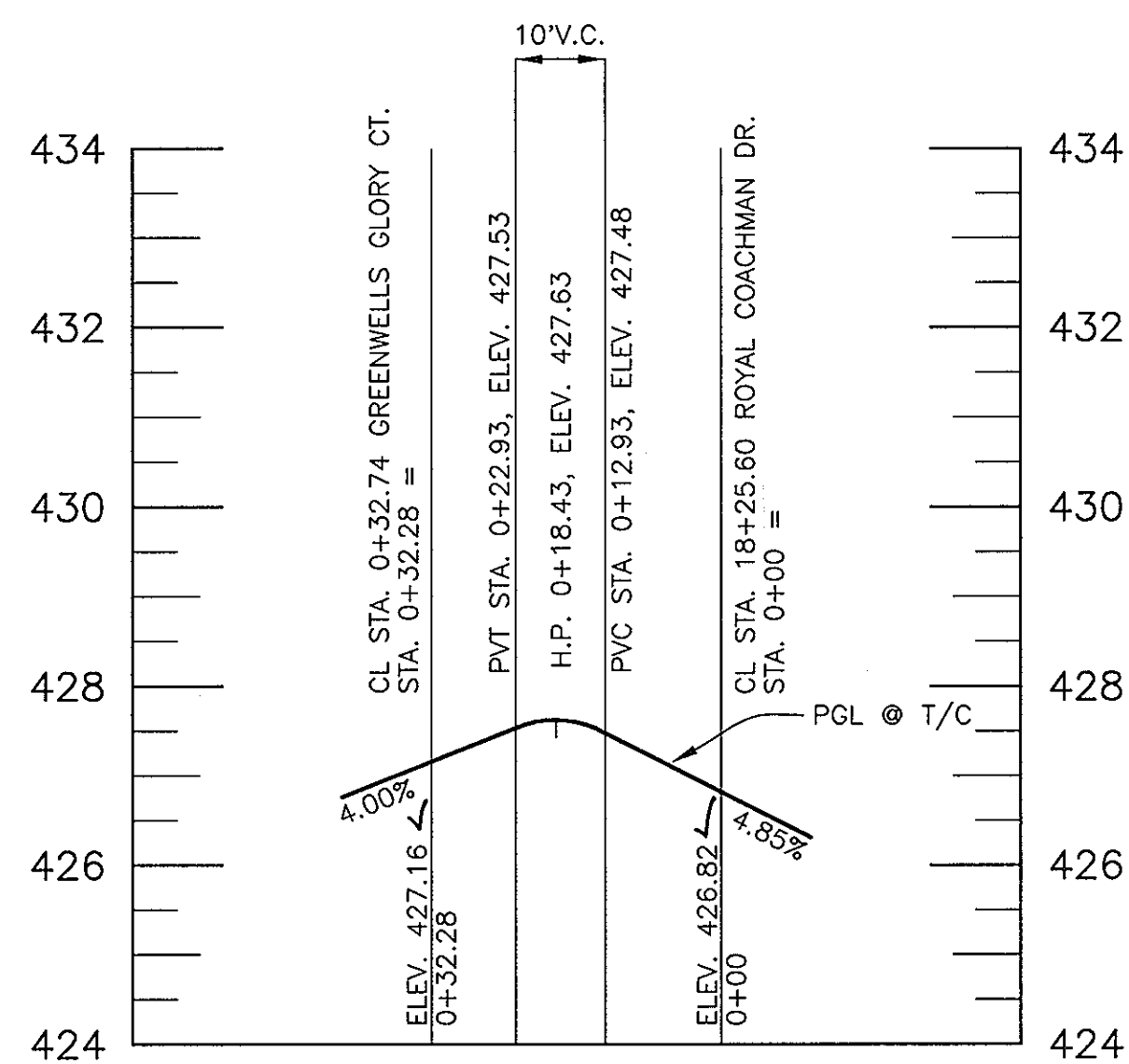
CURB RETURN
NORTHEAST SIDE OF
PALE MORNING DUN RD. AND GREEN DRAKE RD.

SCALE: HORIZ: 1"=20' VERT: 1"=2'



CURB RETURN
NORTHWEST SIDE OF MARCH BROWN RD.
ROYAL COACHMAN DR. AND GREENWELLS GLORY CT.

SCALE: HORIZ: 1"=20' VERT: 1"=2'



CURB RETURN
NORTHEAST SIDE OF MARCH BROWN RD.
ROYAL COACHMAN DR. AND GREENWELLS GLORY CT.

SCALE: HORIZ: 1"=20' VERT: 1"=2'

GENERAL NOTES:

- PGL GRADE SHOWN IS REPRESENTATIVE OF THE NORMAL TOP OF CURB.
- MODIFICATIONS TO THE PGL GRADE SHOWN WILL BE NECESSARY FOR RETURNS WITH HANDICAP RAMPS PROPOSED.



AS-BUILT CERTIFICATION
I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
Donald Mason, P.E. No. 21443 Date 4-25-11

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. 21443, Expiration Date: 12-21-12

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

William J. ... 12-24-03
CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cindy Hamilton 4/2/04
CHIEF, DIVISION OF LAND DEVELOPMENT

MAJ 4/2/03
CHIEF, DEVELOPMENT ENGINEERING DIVISION

NO	DATE	REVISION

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

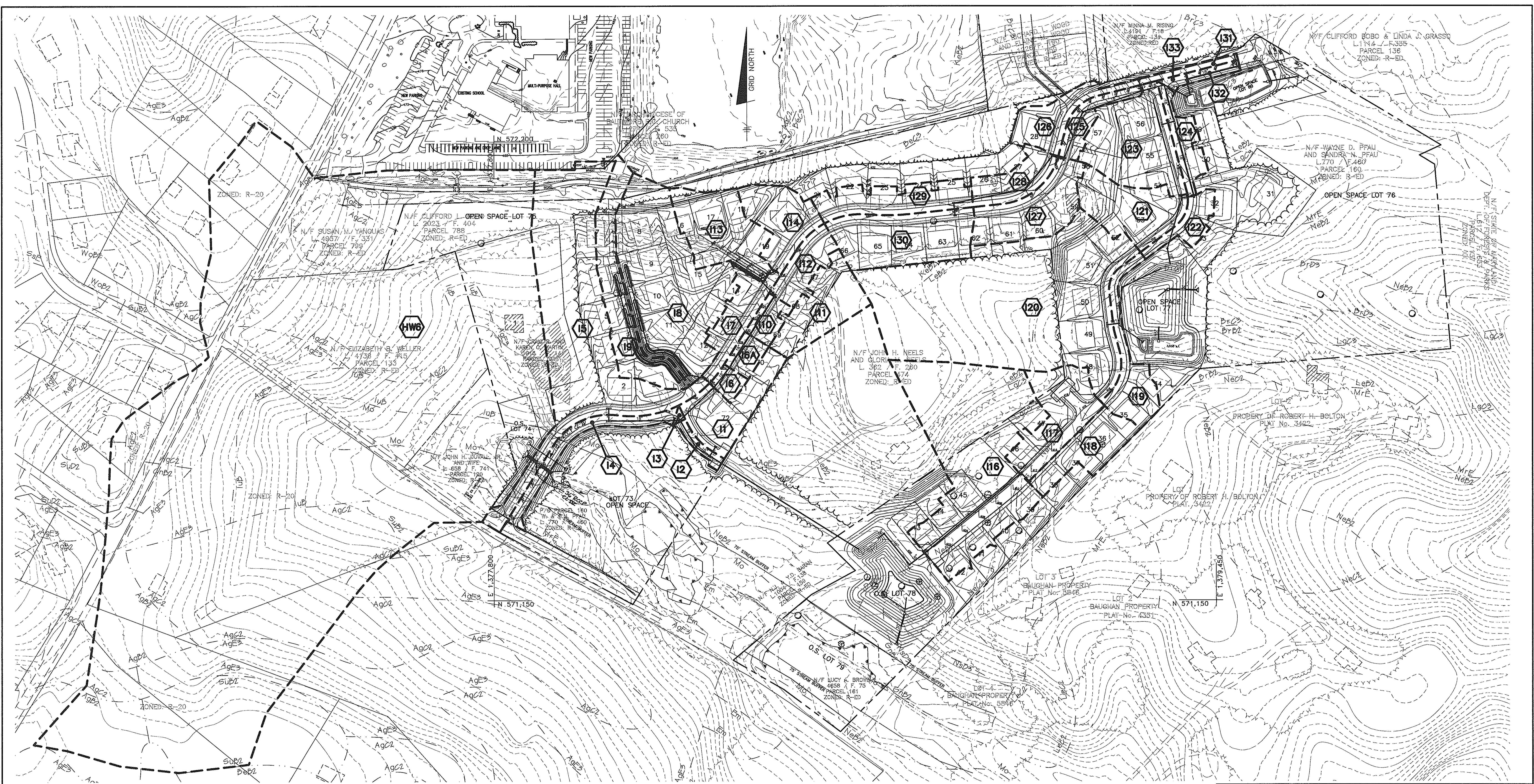
Donald Mason

OWNER/DEVELOPER
CASCADE OVERLOOK, L.L.C.
P.O. BOX 417
ELLCOTT CITY, MD 21041
(410) 465-4244

OWNER
CRAIG R. AND KAREN C. MARTIN
4937 LANDING ROAD
ELKRIDGE, MD 21075

DES: DAM DRN: RPS CHK: DAM

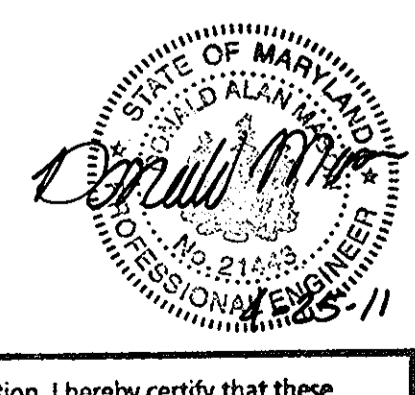
PROJECT: CASCADE OVERLOOK
SECTION ONE
LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL "A"
LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791
1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE: ROAD PROFILE AND DETAILS
VP-86-130, F-88-20, S-01-04, PB-359, P-02-11
DATE: OCTOBER, 2003 PROJECT NO. 1383



PLAN VIEW
SCALE: 1" = 100'

SYMBOL	DESCRIPTION	HYDROLOGIC GROUP
AgB2	ALDINO SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	C
AgB2	AURA GRAVELLY LOAM, 1 TO 5 PERCENT SLOPES, MODERATELY ERODED	C
AgC2	AURA GRAVELLY LOAM, 5 TO 10 PERCENT SLOPES, MODERATELY ERODED	C
AgE3	AURA GRAVELLY LOAM, 10 TO 30 PERCENT SLOPES, SEVERELY ERODED	C
BcC3	BELTSVILLE SILT LOAM, 5 TO 10 PERCENT SLOPES, SEVERELY ERODED	C
BcB2	BRANDYWINE LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	A
BcC3	BRANDYWINE LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED	A
BcD2	BRANDYWINE LOAM, 15 TO 25 PERCENT SLOPES, SEVERELY ERODED	A
ChB2	CHILLUM-FAIRFAX LOAMS, 1 TO 5 PERCENT SLOPES, MODERATELY ERODED	C
ChB2	DELANO SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	C
Em	ELKTON SILT LOAM	C/D
GhB2	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	C
IuB	IUKA LOAM, LOCAL ALLUVIUM, 1 TO 5 PERCENT SLOPES	C
KeB2	KELLY SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	D
LeB2	LEGORE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	B
LqC2	LEGORE SILT LOAM, 10 TO 15 PERCENT SLOPES, MODERATELY ERODED	B
LqC3	LEGORE SILT CLAY LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED	B
Mo	MIXED ALLUVIAL LAND	B
MrE	MONTALTO AND RELAY SOILS, 15 TO 45 PERCENT SLOPES	B
NcB2	NESHAMINY SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	B
NcC2	NESHAMINY SILT LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED	B
NcD3	NESHAMINY SILT LOAM, 15 TO 25 PERCENT SLOPES, SEVERELY ERODED	B
RnC2	RELAY SILT LOAM, 3 TO 15 PERCENT SLOPES, MODERATELY ERODED	B
Sub2	SUNNYSIDE FINE SANDY LOAM, 1 TO 5 PERCENT SLOPES, MODERATELY ERODED	B
Sub2	SUNNYSIDE FINE SANDY LOAM, 5 TO 15 PERCENT SLOPES, MODERATELY ERODED	B

STORM DRAIN RUNOFF					STORM DRAIN RUNOFF				
INLET	DA (Ac.)	C	%IMP	ZONE	INLET	DA (Ac.)	C	%IMP	ZONE
I-1	0.53	.42	68	R-ED	I-18	0.44	.41	66	R-ED
I-2	0.08	.65	66	R-ED	I-19	0.45	.43	49	R-ED
I-3	0.01	.80	78	R-ED	I-20	4.01	.42	66	R-ED
I-4	0.30	.64	67	R-ED	I-21	0.52	.36	67	R-ED
I-5	2.98	.26	23	R-ED	I-22	0.21	.42	50	R-ED
I-6	0.09	.53	66	R-ED	I-23	1.06	.38	68	R-ED
I-6A	0.13	.54	66	R-ED	I-24	0.25	.43	62	R-ED
I-7	0.37	.49	67	R-ED	I-25	0.22	.55	68	R-ED
I-8	1.69	.26	34	R-ED	I-26	0.32	.42	46	R-ED
I-9	0.59	.29	54	R-ED	I-27	0.46	.37	46	R-ED
I-10	0.15	.44	50	R-ED	I-28	0.33	.45	51	R-ED
I-11	0.73	.29	39	R-ED	I-29	0.48	.48	67	R-ED
I-12	0.30	.43	50	R-ED	I-30	0.43	.43	66	R-ED
I-13	0.71	.29	38	R-ED	I-31	0.08	.78	85	R-ED
I-14	0.50	.40	66	R-ED	I-32	0.07	.74	68	R-ED
I-16	2.39	.35	60	R-ED	I-33	0.04	.76	70	R-ED
I-17	0.65	.46	69	R-ED	HW-6	24.41	.35	86	R-ED/R-20



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.

21443 12-21-12

No As-Built information is required on this sheet

1	2-5-04	ADD 18" HDPE COLVERT	
NO	DATE	REVISION	
2	5-25-04	REVISE HDPEP TO REC'D CL V	
NO	DATE	REVISION	
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS			
William J. ...		12-20-03	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING			
Cindy ...		1/13/04	DATE
... M.J.		11/10/03	DATE

BENCHMARK ENGINEERING, INC.

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11/17/03

OWNER/DEVELOPER
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ELLCOTT CITY, MD 21041
(410) 465-4244

OWNER
CRAIG R. AND KAREN C. MARTIN
4937 LANDING ROAD
ELKRIDGE, MD 21075

PROJECT: CASCADE OVERLOOK SECTION ONE
LOTS 1 - 72 AND OPEN SPACE LOTS 75 - 80 AND NON-BUILDABLE PARCEL 74

LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791
1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND

TITLE: STORM DRAINAGE AREA MAP
VP-86-130, F-88-20, S-01-04, PB-359, P-02-11

DATE: OCTOBER, 2003 **PROJECT NO. 1383**

DES: DAM DRN: RPS CHK: DAM SCALE: AS SHOWN DRAWING 12 OF 33

AS-BUILT F-03-134

STRUCTURE SCHEDULE

STORM INLETS

NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
I-1	A-5	CL STA. 1+33.79 O/S 10.43' LEFT GREEN DRAKE RD.	411.21	411.69	415.21	SD - 4.01 OR 4.40
I-2	A-5	CL STA. 1+33.79 O/S 10.43' RIGHT GREEN DRAKE RD.	411.51	411.69	415.21	SD - 4.01 OR 4.40
I-3	A-5	CL STA. 0+31.85 O/S 10.43' RIGHT GREEN DRAKE RD.	412.98	413.13	416.83	SD - 4.01 OR 4.40
I-4	A-5	CL STA. 3+86.37 O/S 12.43' RIGHT ROYAL COACHMAN DR.	413.30	413.13	416.83	SD - 4.01 OR 4.40
I-5	A-5	CL STA. 3+86.37 O/S 12.43' LEFT ROYAL COACHMAN DR.	413.30	413.13	416.83	SD - 4.01 OR 4.40
I-6	A-5	CL STA. 6+37.44 O/S 12.43' RIGHT ROYAL COACHMAN DR.	415.28	415.28	422.29	SD - 4.01 OR 4.40
I-6A	A-5	CL STA. 6+95.11 O/S 12.43' RIGHT ROYAL COACHMAN DR.	415.28	415.28	422.29	SD - 4.01 OR 4.40
I-7	A-5	CL STA. 6+37.44 O/S 12.43' LEFT ROYAL COACHMAN DR.	415.76	415.76	422.29	SD - 4.01 OR 4.40
I-8	TYPE 'D' INLET	CL STA. 0+47.42 O/S 14.33' RIGHT LIGHT CAHILL CT.	416.60	416.35	419.34	SD - 4.11 OR 4.39
I-9	TYPE 'D' INLET	CL STA. 0+47.42 O/S 14.33' LEFT LIGHT CAHILL CT.	416.60	416.35	419.34	SD - 4.11 OR 4.39
I-10	A-5	CL STA. 7+80.75 O/S 12.43' RIGHT ROYAL COACHMAN DR.	423.10	422.90	430.20	SD - 4.01 OR 4.40
I-11	TYPE 'D' INLET	N 571709.01 E 1378463.16	424.04	424.04	425.70	SD - 4.11 OR 4.39
I-12	A-5	CL STA. 8+87.85 O/S 12.43' RIGHT ROYAL COACHMAN DR.	423.11	422.91	436.47	SD - 4.01 OR 4.40
I-13	TYPE 'D' INLET	CL STA. 0+34.33 O/S 14.33' RIGHT 24' USE-IN-COMMON	434.79	434.17	437.23	SD - 4.11 OR 4.39
I-14	A-5	CL STA. 9+37.85 O/S 12.43' LEFT ROYAL COACHMAN DR.	435.65	435.26	438.77	SD - 4.01 OR 4.40
I-16	A-5	CL STA. 13+72.90 O/S 17.00' RT PALE MORNING DUN RD.	413.97	396.80	400.36	SD - 4.01 OR 4.40
I-17	A-10	CL STA. 10+86.05 O/S 12.43' RT PALE MORNING DUN RD.	407.74	407.74	411.61	SD - 4.02 OR 4.41
I-18	A-5	CL STA. 10+86.05 O/S 12.43' LF PALE MORNING DUN RD.	407.74	407.74	411.61	SD - 4.01 OR 4.40
I-19	A-5	CL STA. 6+46.82 O/S 12.43' LF PALE MORNING DUN RD.	410.92	410.92	415.01	SD - 4.01 OR 4.40
I-20	A-10	CL STA. 6+46.82 O/S 12.43' RT PALE MORNING DUN RD.	411.31	411.31	415.01	SD - 4.02 OR 4.41
I-21	A-5	CL STA. 2+75.35 O/S 12.43' RT PALE MORNING DUN RD.	405.86	405.86	415.01	SD - 4.01 OR 4.40
I-22	A-5	CL STA. 2+75.35 O/S 12.43' LF PALE MORNING DUN RD.	406.54	406.54	415.01	SD - 4.01 OR 4.40
I-23	A-5	CL STA. 1+00.00 O/S 12.43' RT PALE MORNING DUN RD.	410.05	410.05	413.39	SD - 4.01 OR 4.40
I-24	A-5	CL STA. 1+00.00 O/S 12.43' LF PALE MORNING DUN RD.	410.05	410.05	413.39	SD - 4.01 OR 4.40
I-25	A-5	CL STA. 19+55.94 O/S 12.43' RT ROYAL COACHMAN DR.	414.24	414.24	418.36	SD - 4.01 OR 4.40
I-26	A-5	CL STA. 19+55.94 O/S 12.43' LF ROYAL COACHMAN DR.	414.24	414.24	418.36	SD - 4.01 OR 4.40
I-27	A-5	CL STA. 16+77.52 O/S 12.43' RT ROYAL COACHMAN DR.	429.63	429.63	433.78	SD - 4.01 OR 4.40
I-28	A-5	CL STA. 16+77.52 O/S 12.43' LF ROYAL COACHMAN DR.	429.63	429.63	433.78	SD - 4.01 OR 4.40
I-29	A-5	CL STA. 13+92.17 O/S 12.43' LF ROYAL COACHMAN DR.	434.82	434.54	438.44	SD - 4.01 OR 4.40
I-30	A-5	CL STA. 13+92.17 O/S 12.43' RT ROYAL COACHMAN DR.	434.82	434.54	438.44	SD - 4.01 OR 4.40
I-31	A-5	CL STA. 21+63.66 O/S 12.43' LF ROYAL COACHMAN DR.	399.09	399.23	403.38	SD - 4.01 OR 4.40
I-32	A-5	CL STA. 21+63.66 O/S 12.43' RT ROYAL COACHMAN DR.	399.09	399.23	403.38	SD - 4.01 OR 4.40
I-33	A-5	CL STA. 20+61.37 O/S 12.43' RT ROYAL COACHMAN DR.	398.38	398.18	400.29	SD - 4.01 OR 4.40

STORM MANHOLES

NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
M-1	4'-0" MANHOLE	N 571500.32 E 1378261.62	409.51	409.31	415.81	G - 5.12
M-2	4'-0" MANHOLE	N 571302.47 E 1378691.01	392.92	392.72	398.00	G - 5.12
M-3	4'-0" MANHOLE	N 571231.19 E 1378748.96	394.96	394.76	398.00	G - 5.12
M-4	4'-0" MANHOLE	N 571865.93 E 1379235.95	406.99	406.79	412.02	G - 5.12
M-5	4'-0" MANHOLE	N 571954.66 E 1379338.92	404.64	404.44	410.00	G - 5.12
M-6	4'-0" MANHOLE	CL STA. 0+13.34 O/S 13.75' LF PALE MORNING DUN RD.	409.07	408.87	414.23	G - 5.12
M-7	4'-0" MANHOLE	CL STA. 18+03.65 O/S 16.05' RT ROYAL COACHMAN DR.	423.93	423.73	428.15	G - 5.12
M-8	4'-0" MANHOLE	CL STA. 15+66.04 O/S 15.08' LF ROYAL COACHMAN DR.	422.08	421.88	426.30	G - 5.12

END SECTIONS

NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
ES-1	18" RCCP END SECTION	N 569443.35 E 1379749.09	392.11	392.00	-	SD - 5.52
ES-2	18" RCCP END SECTION	N 567715.80 E 1380757.70	392.11	392.00	-	SD - 5.52
ES-3	15" HDPE END SECTION	N 567726.38 E 1380744.93	402.56	402.50	-	SD - 5.52
ES-4	15" HDPE END SECTION	N 571450.74 E 1377956.56	409.32	409.29	-	SD - 5.52
ES-5	18" RCCP END SECTION	N 567493.17 E 1380327.01	404.08	404.00	-	SD - 5.52
ES-6	18" RCCP END SECTION	N 567367.22 E 1378836.10	404.03	404.00	-	SD - 5.52
ES-8	24" HDPE END SECTION	N 569227.78 E 1379532.71	394.23	394.20	-	SD - 5.52

HEADWALLS

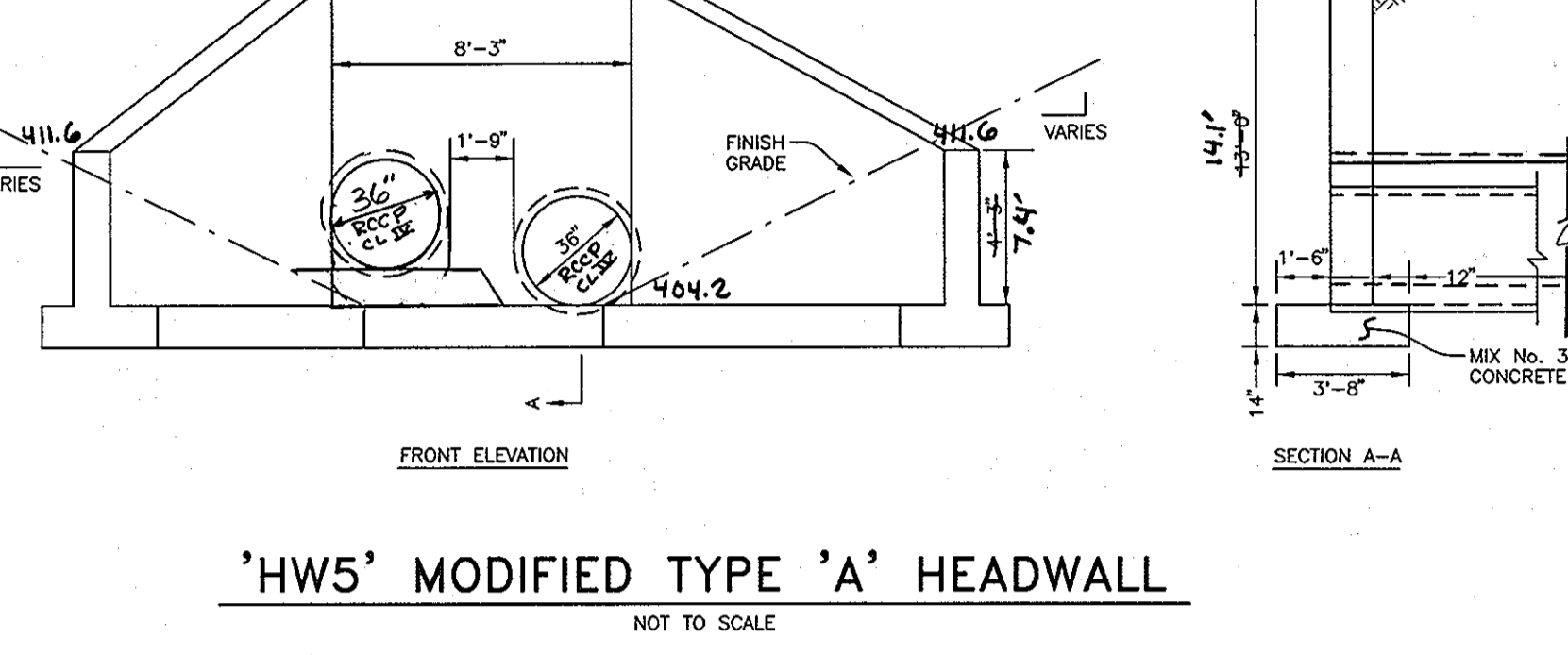
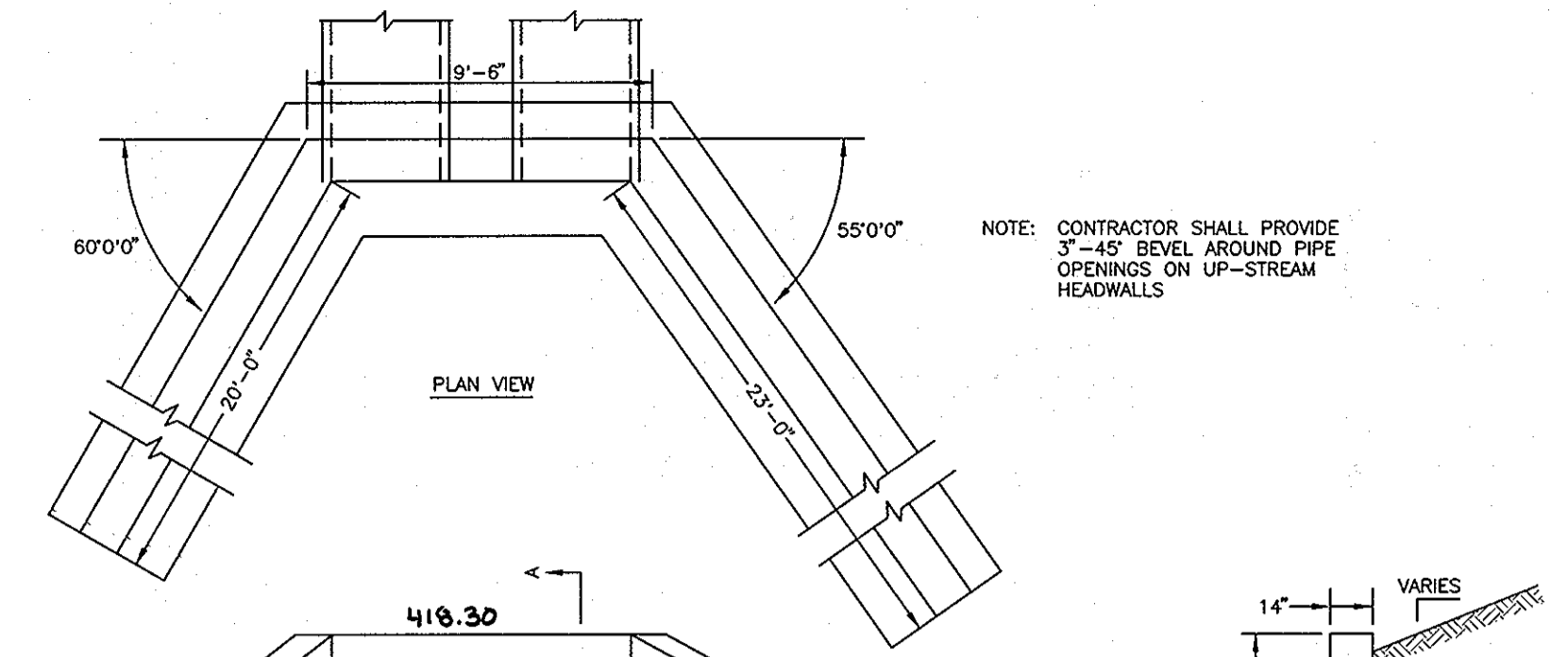
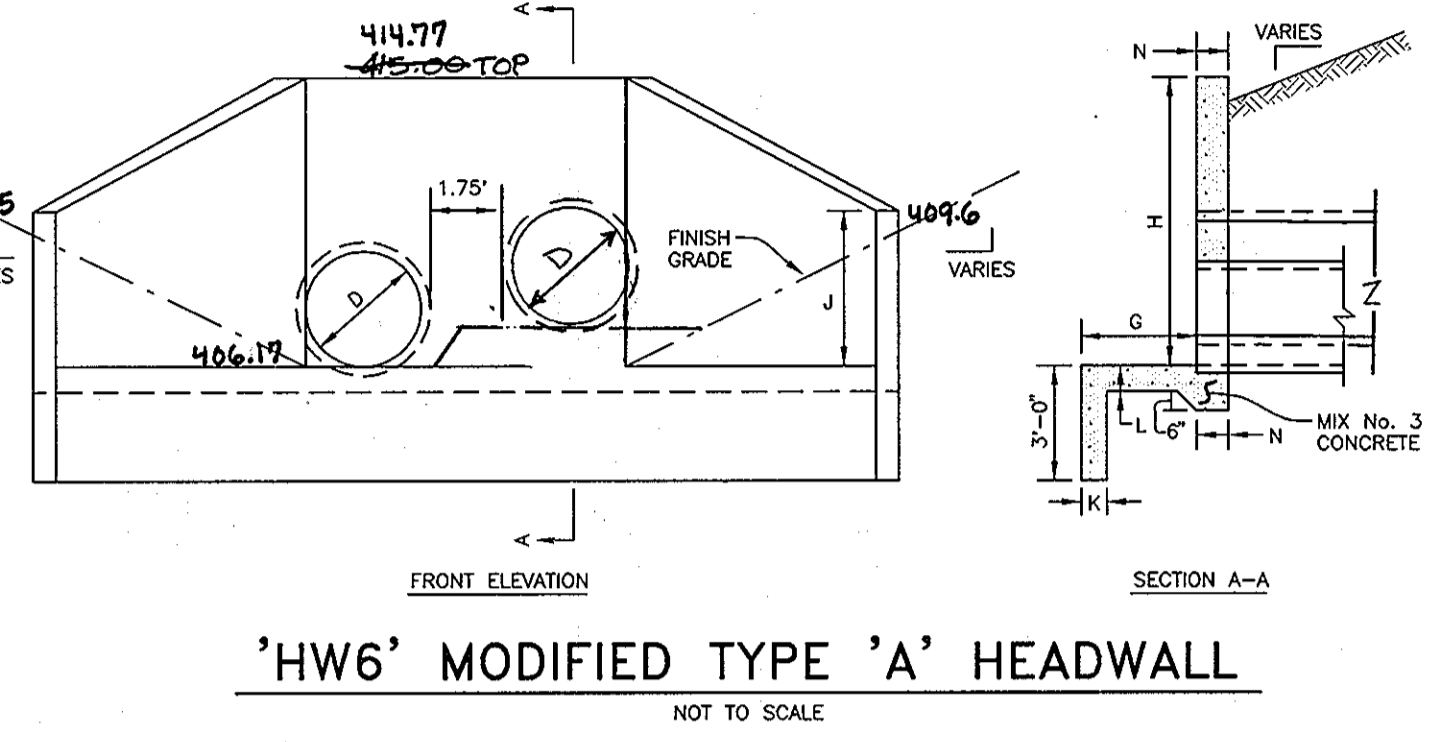
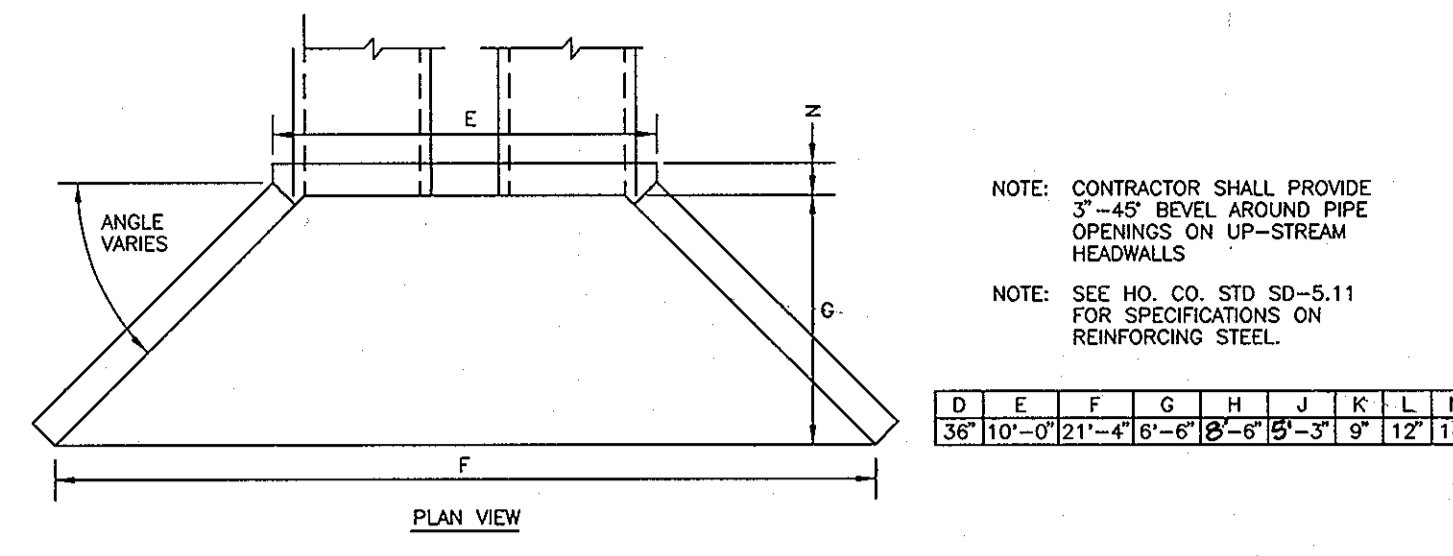
NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
HW1	TYPE 'A' HEADWALL	N 571053.01 E 1378719.91	384.62	-	388.62	SD - 5.11(30" PIPE)
HW2	TYPE 'A' HEADWALL	N 571860.35 E 1379404.67	398.00	-	402.00	SD - 5.11(30" PIPE)
HW3	TYPE 'C' ENDWALL	N 571747.38 E 1379274.67	405.00	-	406.75	SD - 5.21(12" PIPE)
HW4	TYPE 'C' ENDWALL	N 572306.53 E 1379375.53	398.00	-	398.75	SD - 5.21(12" PIPE)
HW5	SEE DETAIL THIS SHEET	N 571441.69 E 1377931.66	-	-	-	SEE DETAIL THIS SHEET
HW6	SEE DETAIL THIS SHEET	N 571482.95 E 1377875.32	407.10	406.50	406.50	SEE DETAIL THIS SHEET
HW7	TYPE 'C' ENDWALL	N 572308.59 E 1379390.67	398.00	-	400.25	SD - 5.21(18" PIPE)

OUTFALL STRUCTURES

NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
S-1	SEE DETAIL	N 571121.25 E 1378735.73	385.00	385.00	397.00	-
S-2	SEE DETAIL	N 571854.42 E 1379332.93	398.50	398.50	400.00	-
S-3	SEE DETAIL	N 571744.02 E 1379313.36	403.58	403.58	408.83	-
S-4	SEE DETAIL	N 572335.75 E 1379568.82	394.98	394.98	401.83	-

- STRUCTURE ELEVATION AND LOCATION FOR MANHOLES IS AT THE TOP AND CENTER OF RIM.
- STRUCTURE ELEVATION AND LOCATION FOR CURB INLETS IS AT THE TOP OF CURB AT MIDPOINT OF THE INLET AT THE FACE.
- STRUCTURE ELEVATION AND LOCATION FOR ENDSECTIONS IS AT THE CONNECTION OF PIPE AND END SECTION.
- PRECAST STRUCTURES MEETING HS-20 LOADING MAY BE USED.
- ALL STORM DRAINS SHALL BE RCCP UNLESS OTHERWISE NOTED.
- TOP OF SLAB ELEVATION SHOWN FOR 'D' TYPE INLETS.
- STRUCTURE ELEVATION AND LOCATION FOR TYPE 'D' INLETS IS AT THE TOP CENTER OF THE SLAB.
- STRUCTURE ELEVATION AND LOCATION FOR HEADWALL IS AT THE TOP CENTER FACE OF WALL.

ES-10	18" RCCP END SECTION	N 571506.56 E 1377800.32	409.80	409.77	-	SD - 5.52
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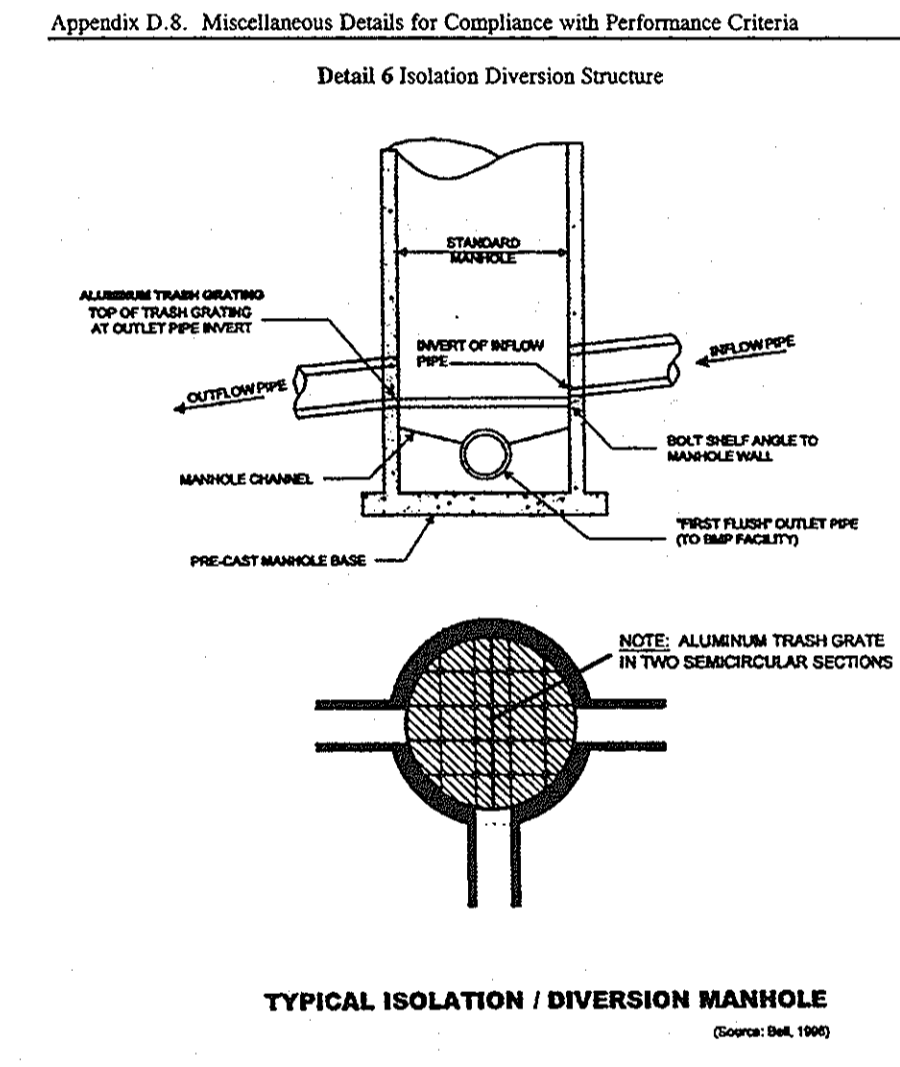
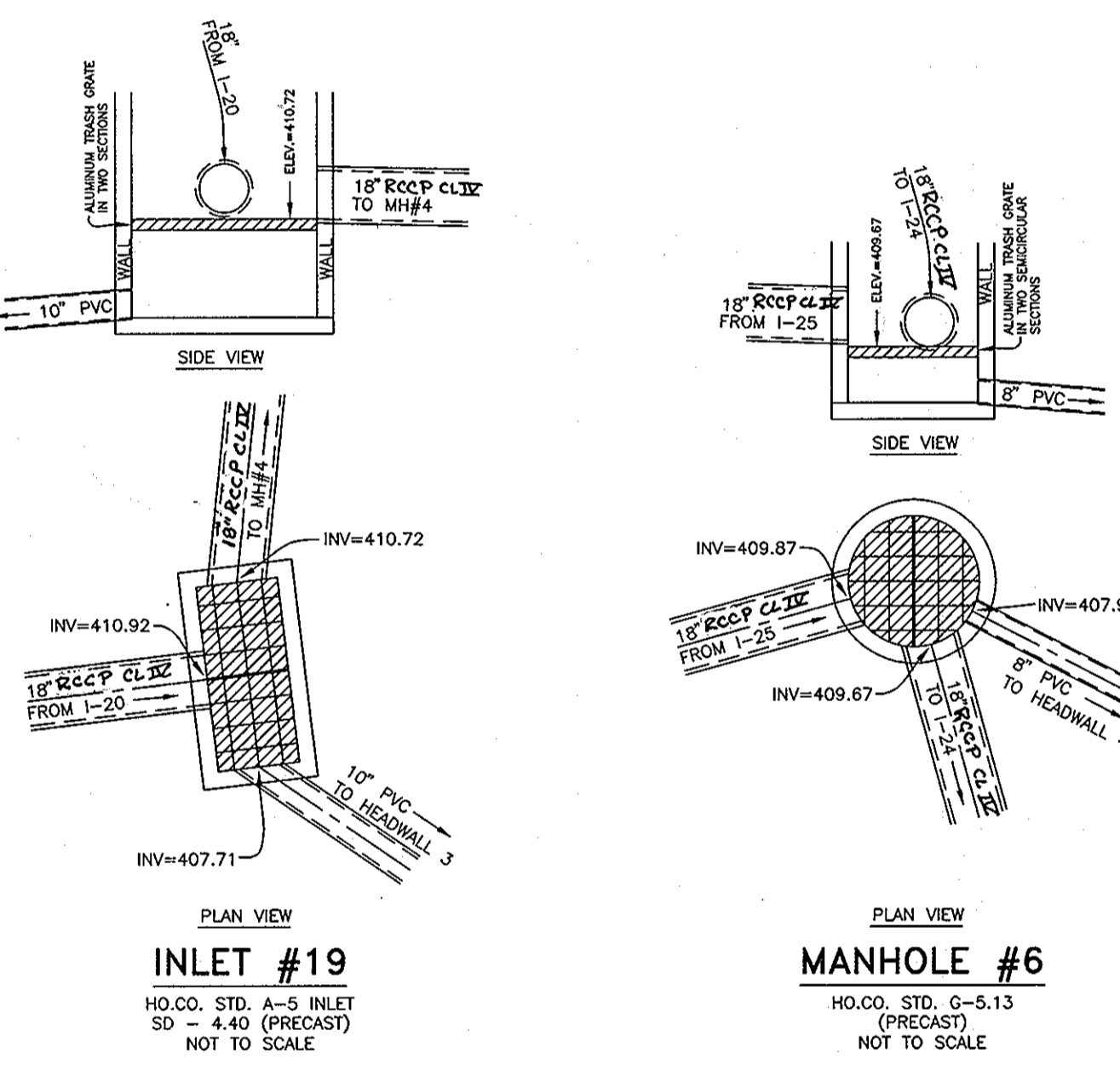


PIPE SCHEDULE

RUN	SIZE	LENGTH	SLOPE	TYPE & CLASS
HW-1 TO S-1	30"	75'	0.50%	RCCP IV
ES-1 TO I-2	18"	404'	4.03%	RCCP IV
I-2 TO M-1	18"	37'	2.30%	RCCP IV
M-1 TO I-3	18"	72'	2.42%	RCCP IV
I-3 TO I-4	18"	182'	1.00%	RCCP IV
I-4 TO I-5	15"	28'	1.00%	RCCP IV
I-2 TO I-1	15"	28'	1.00%	RCCP IV
I-3 TO I-6	18"	109'	2.14%	RCCP IV
I-6 TO I-6A	18"	61'	7.93%	RCCP IV
I-6A TO I-10	18"	86'	1.89%	RCCP IV
I-10 TO I-12	18"	107'	9.16%	RCCP IV
I-12 TO I-13	18"	50'	2.13%	RCCP IV
I-13 TO I-14	15"	47'	1.00%	RCCP IV
I-10 TO I-11	15"	94'	1.00%	RCCP IV
I-6 TO I-7	18"	28'	1.00%	RCCP IV
I-7 TO I-8	18"	39'	1.00%	RCCP IV
I-8 TO I-9	15"	29'	1.00%	RCCP IV
ES-2 TO M-2	18"	15'	4.00%	RCCP IV
M-2 TO M-3	18"	92'	2.00%	RCCP IV
M-3 TO I-16	18"	43'	4.28%	RCCP IV
I-16 TO I-17	18"	285'	3.77%	RCCP IV
I-17 TO I-18	15"	26'	1.00%	RCCP IV

PIPE SCHEDULE

RUN	SIZE	LENGTH	SLOPE	TYPE & CLASS
HW2 TO S-2	36"	64'	0.78%	RCCP IV
ES-3 TO S-3	15"	36'	3.03%	RCCP IV
HW3 TO I-19	10"	70'	4.70%	PVC SCH 40
ES-5 TO M-4	18"	96'	2.84%	RCCP IV
M-4 TO I-19	18"	83'	4.45%	RCCP IV
I-19 TO I-20	18"	28'	1.38%	RCCP IV
ES-6 TO M-5	18"	34'	1.20%	RCCP IV
M-5 TO I-21	18"	122'	1.00%	RCCP IV
I-21 TO I-22	18"	28'	1.00%	RCCP IV
I-22 TO I-24	18"	178'	0.93%	RCCP IV
I-24 TO M-6	18"	87'	1.42%	RCCP IV
M-6 TO I-25	18"	54'	7.27%	RCCP IV
I-25 TO M-7	18"	143'	6.13%	RCCP IV
M-7 TO I-27	18"	117'	4.89%	RCCP IV
I-27 TO I-28	18"	28'	1.38%	RCCP IV
I-28 TO M-8	18"	98'	1.48%	RCCP IV
M-8 TO I-29	18"	166'	1.48%	RCCP IV
I-29 TO I-30	15"	28'	1.00%	RCCP IV
I-24 TO I-23	15"	28'	1.00%	RCCP IV
I-25 TO I-26	15"	28'	0.90%	RCCP IV
HW4 TO M-6	8"	60'	12.47%	PVC SCH 40
ES-8 TO S-4	24"	69'	1.00%	HDPE
HW7 TO I-33	18"	37'	0.5%	RCCP IV
I-33 TO I-32	18"	102'	0.5%	RCCP IV
I-32 TO I-31	15"	28'	0.50%	RCCP IV
HW5 TO HW6	2-36"	70'	2.86%	RCCP IV
ES-9 TO ES-10	18"	40'	0.50%	RCCP IV



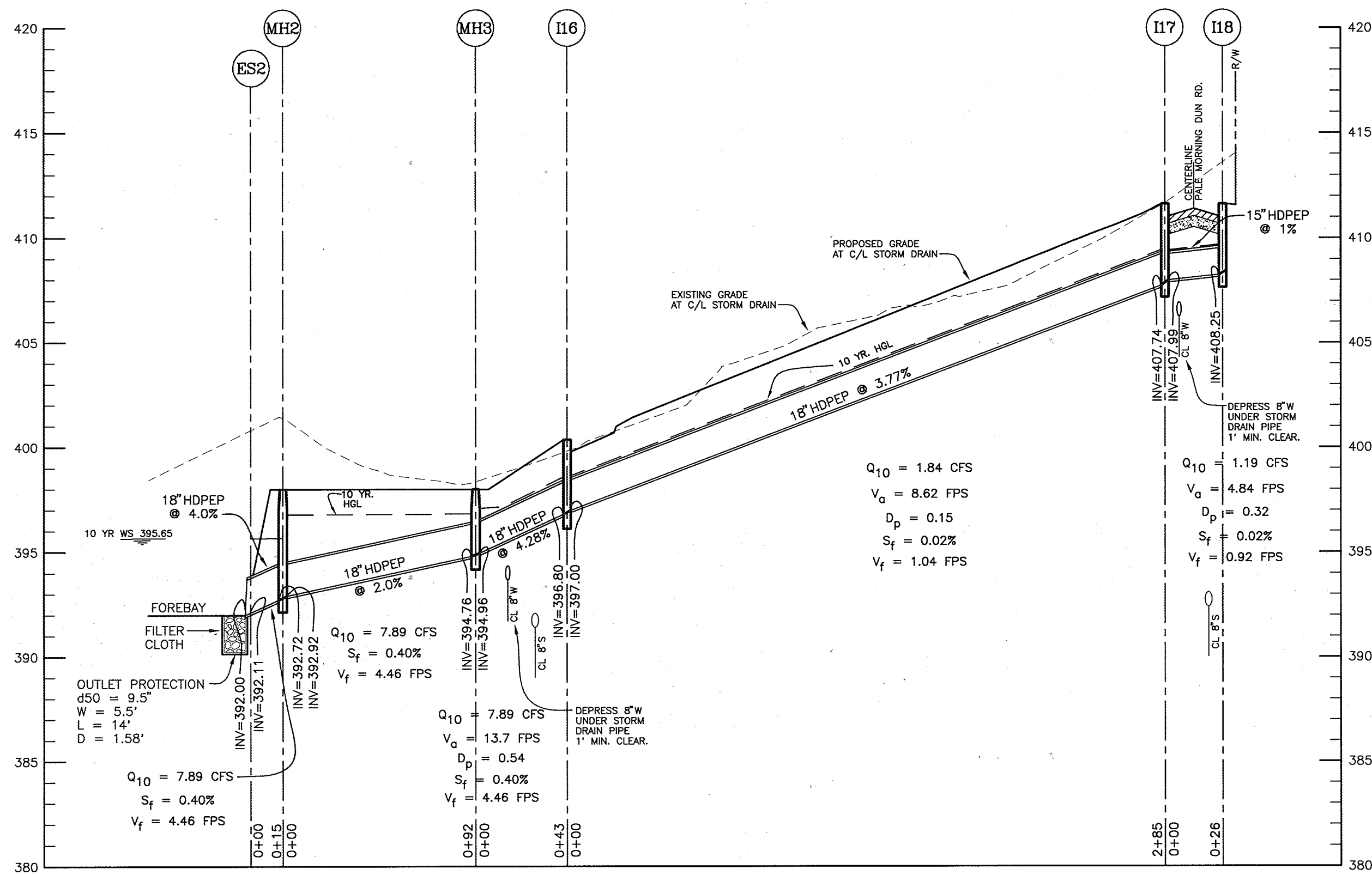
DIVERSION STRUCTURE DETAILS

AS-BUILT CERTIFICATION
I hereby certify, for record, that the facilities shown on this plan were constructed as shown on the attached plan.
Date: 12/21/11
Professional Certification: I hereby certify that these documents were prepared by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 21443, Expiration Date: 12-21-12

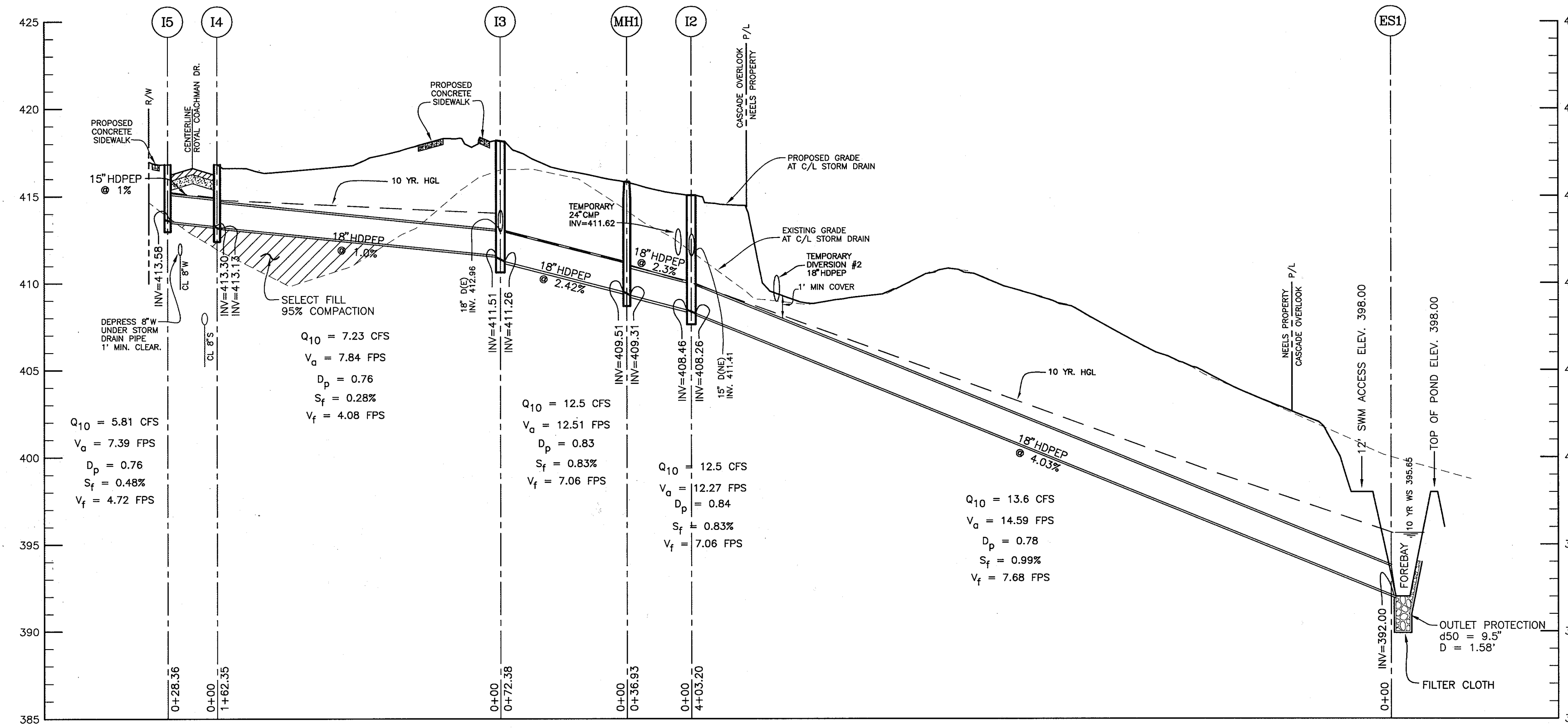
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Michael J. White, Jr., Chief, Bureau of Highways, 12-21-03
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Cindy Hamstra, Chief, Division of Land Development, 1/1/04

BENCHMARK ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE SUITE 418
ELLICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

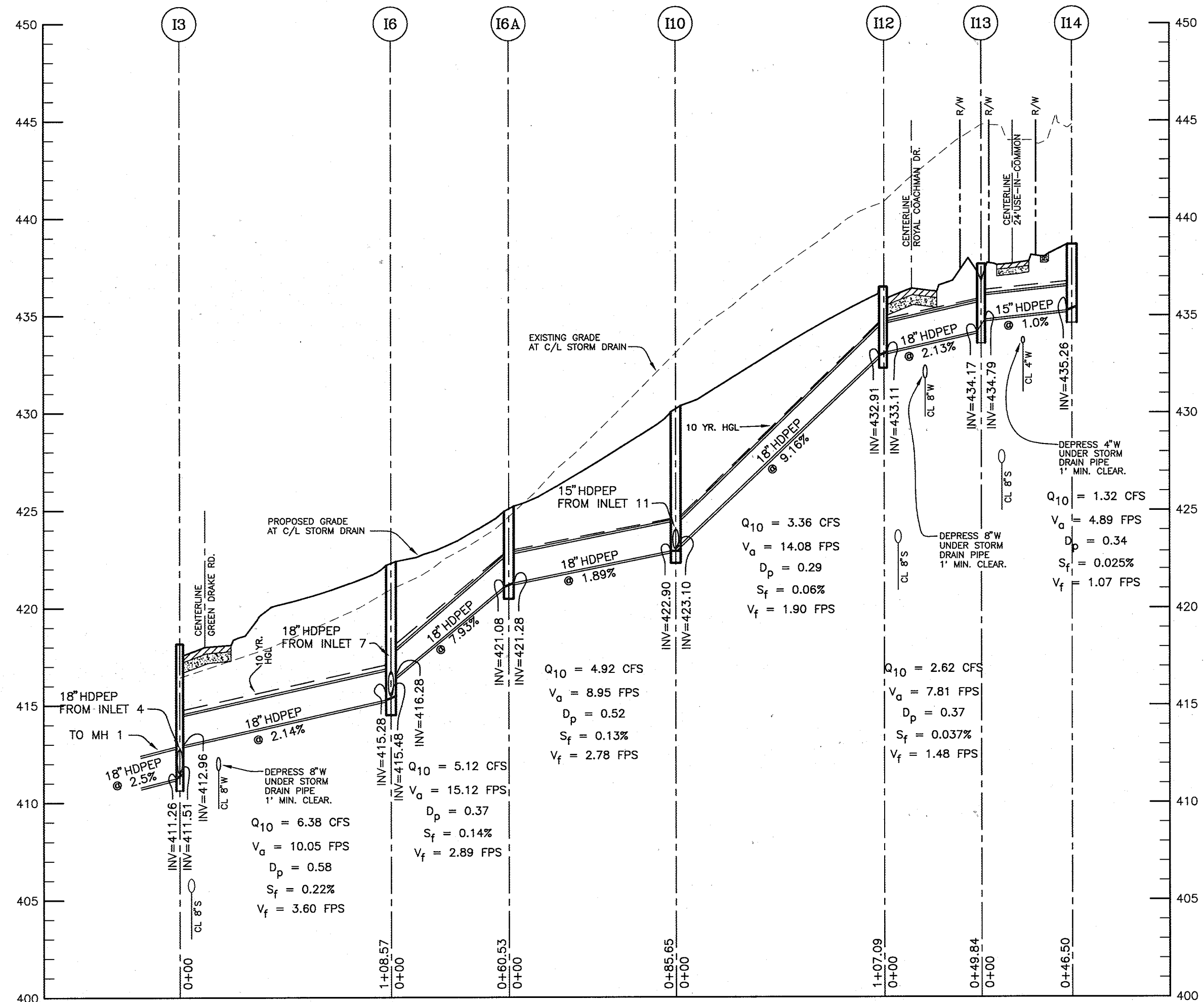
PROJECT: CASCADE OVERLOOK SECTION ONE
LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A'
LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791 1st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE: STRUCTURE AND PIPE SCHEDULE & STORMWATER MANAGEMENT DETAILS
DATE: OCTOBER, 2003 PROJECT NO. 1383
DES: DAM DRN: RPTS CHK: DAM SCALE: AS SHOWN DRAWING 13 OF 33



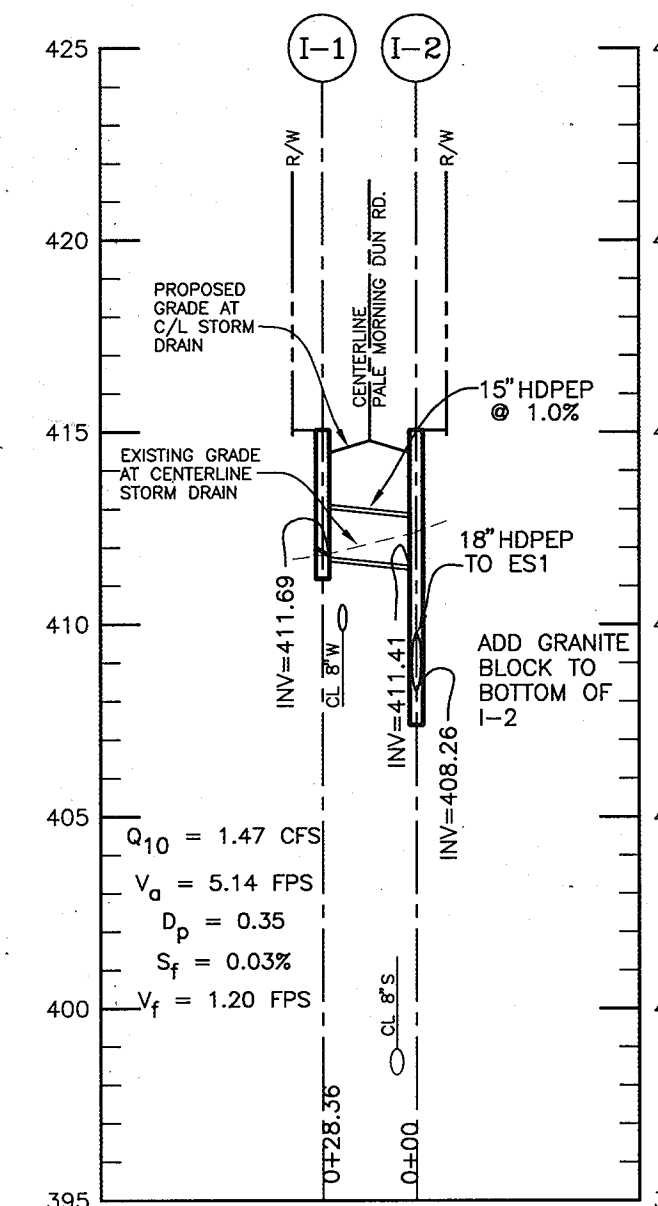
SCALE: HORIZ: 1" = 50', VERT: 1" = 5'



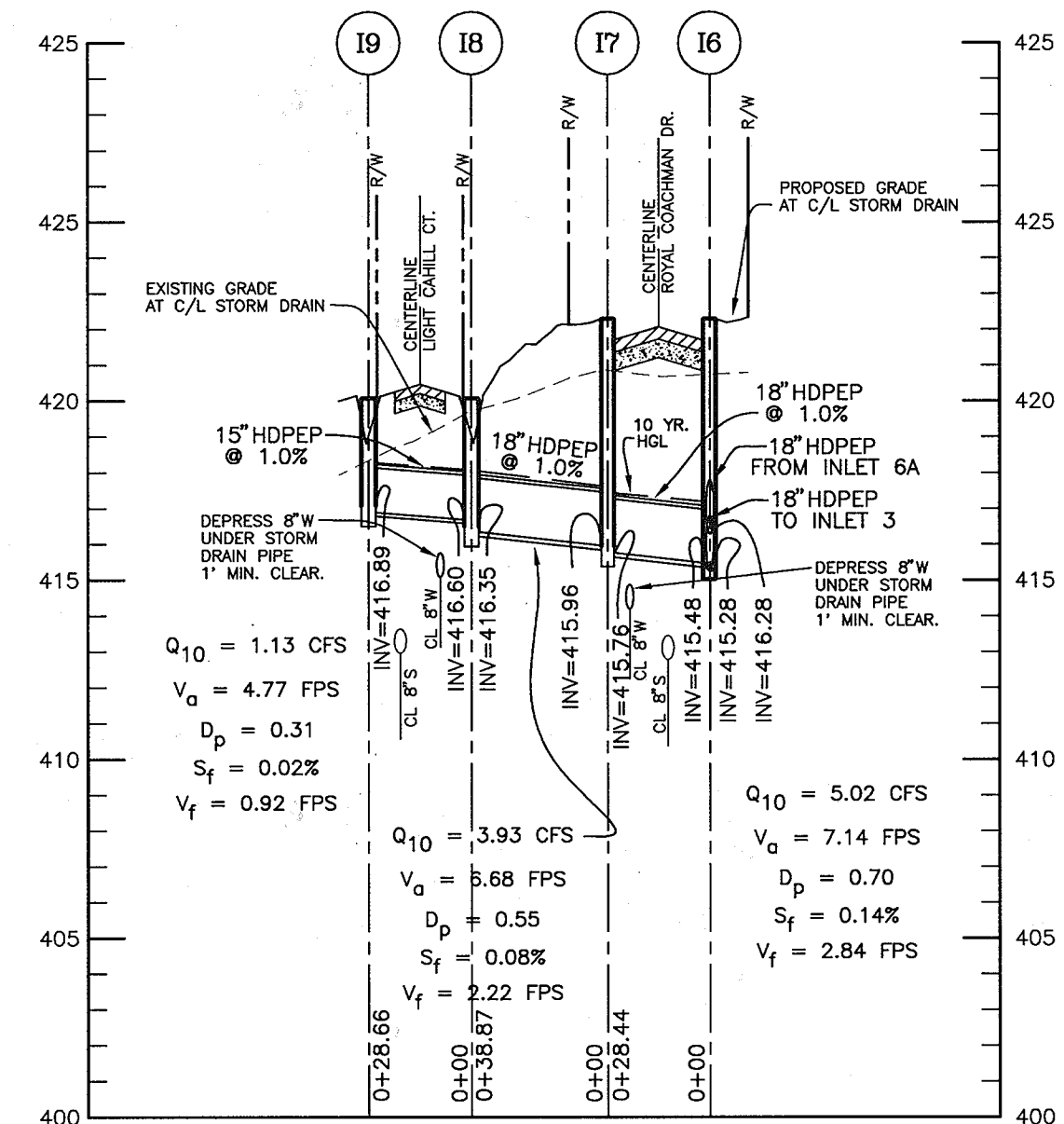
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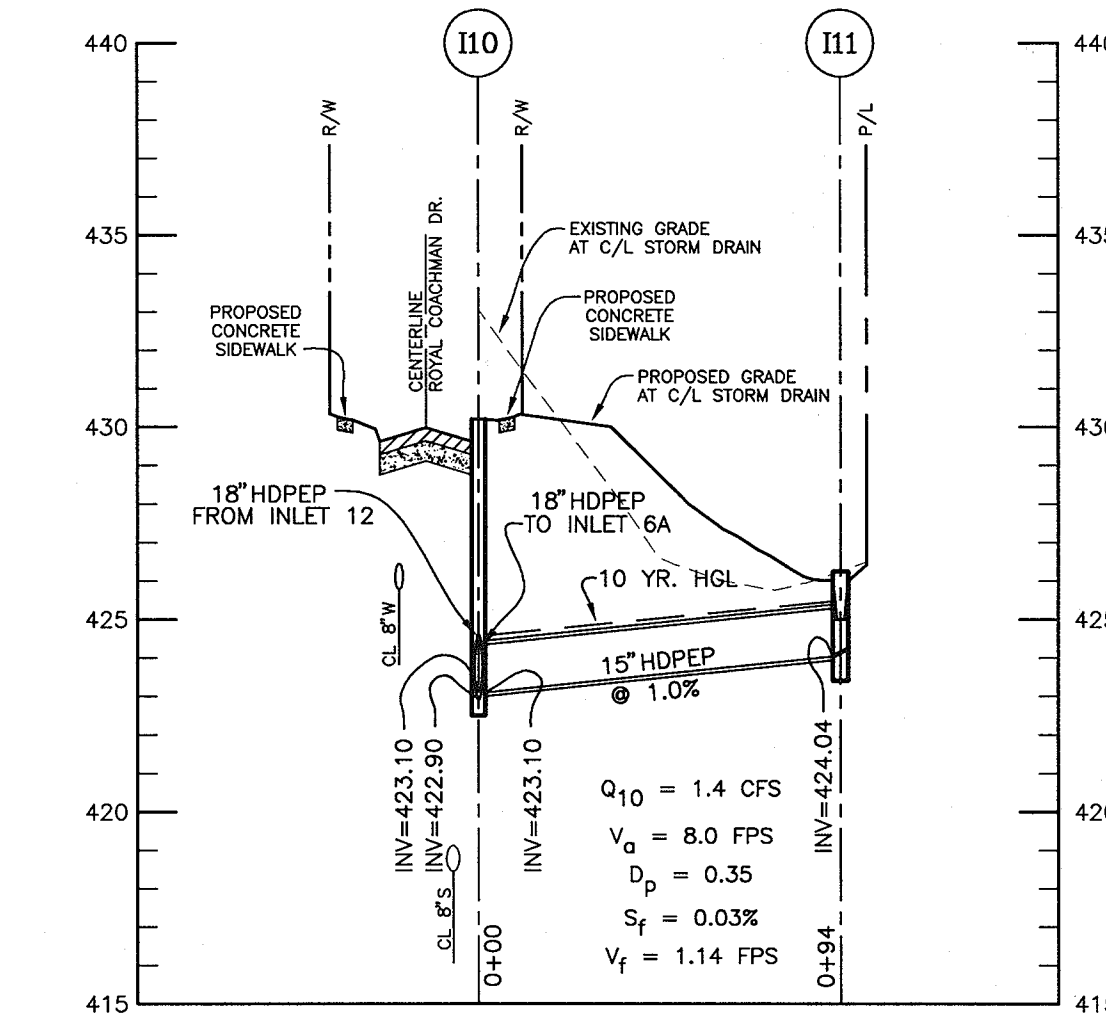
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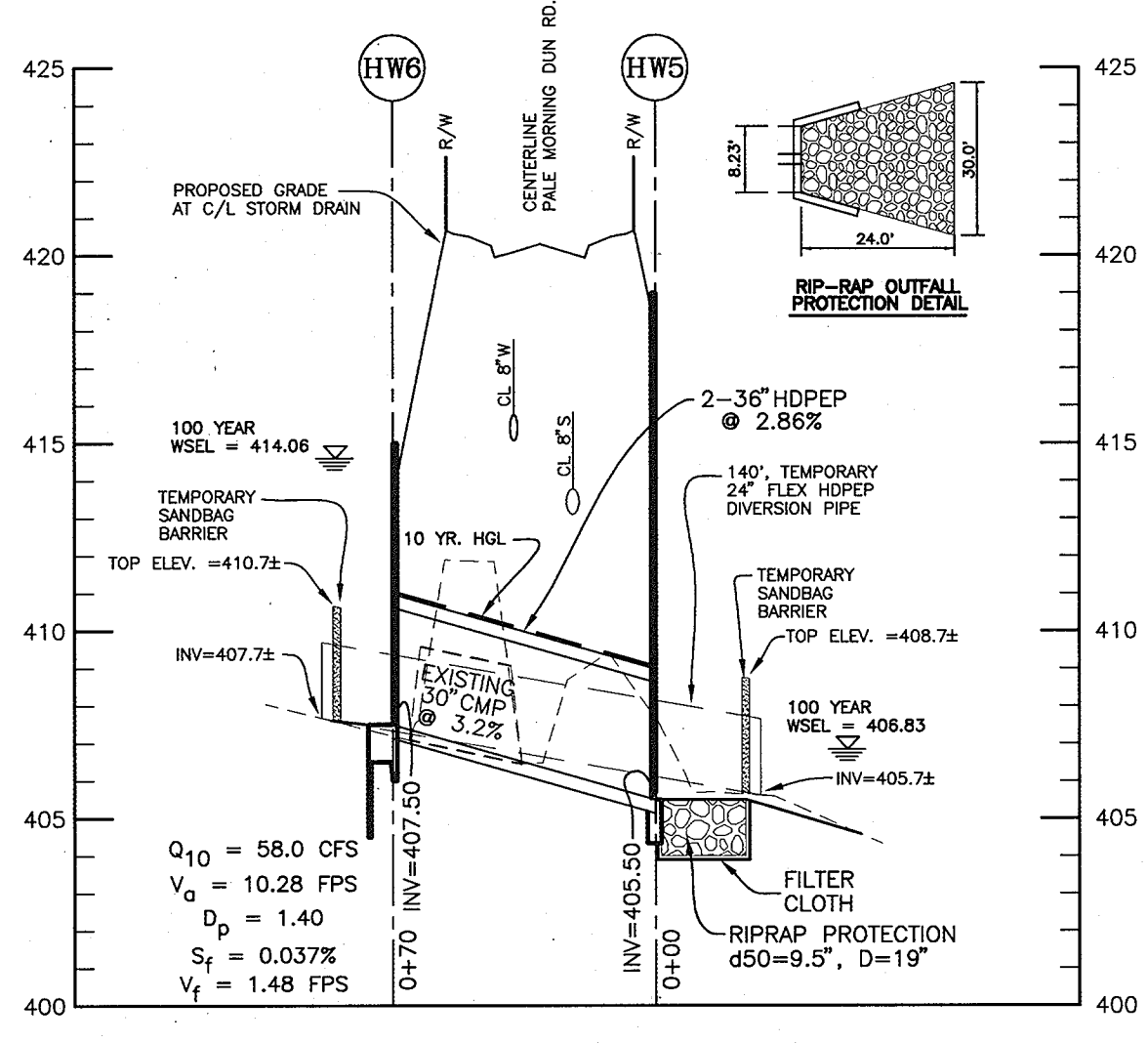
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SCALE: HORIZ: 1" = 50', VERT: 1" = 5'

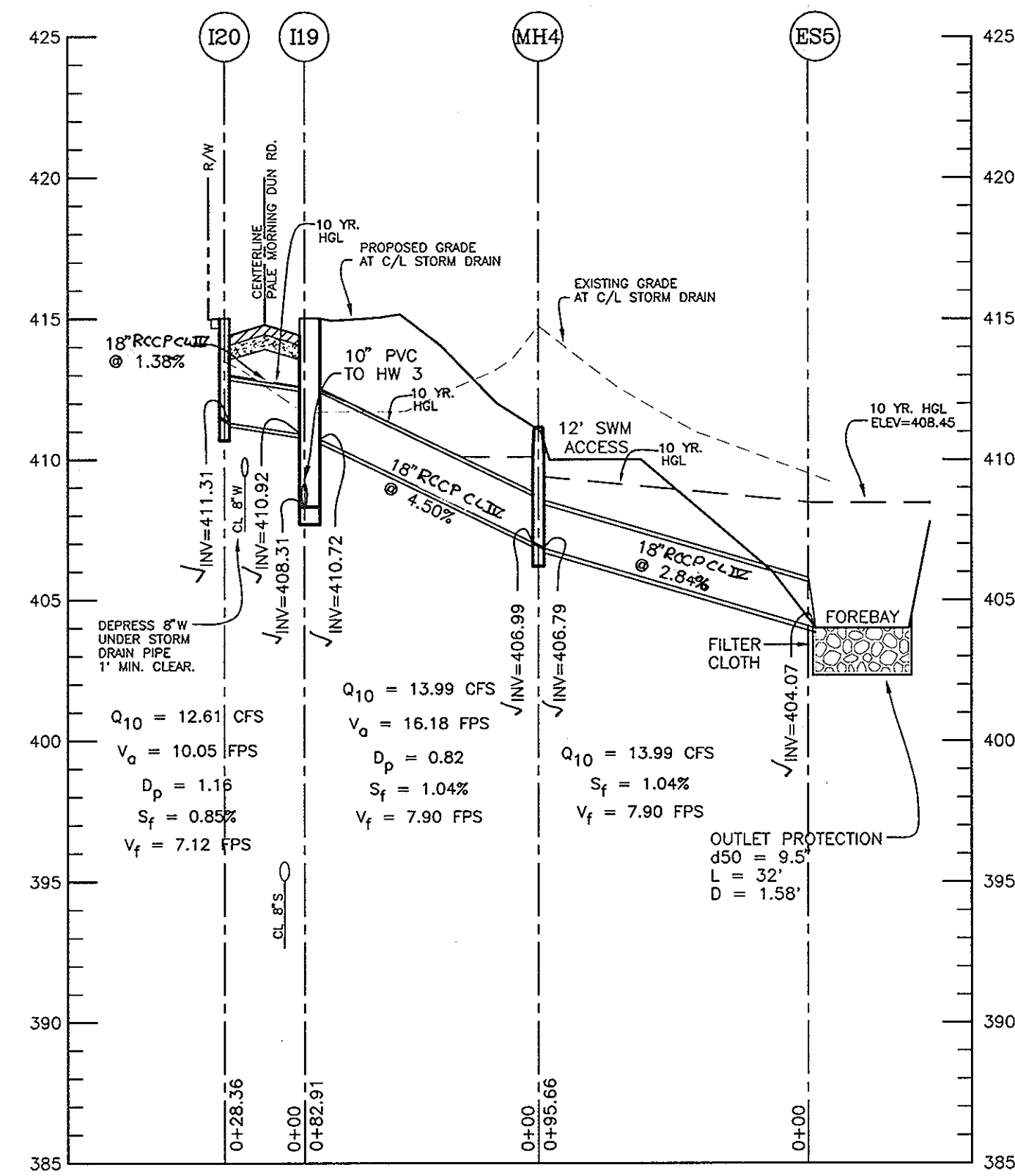


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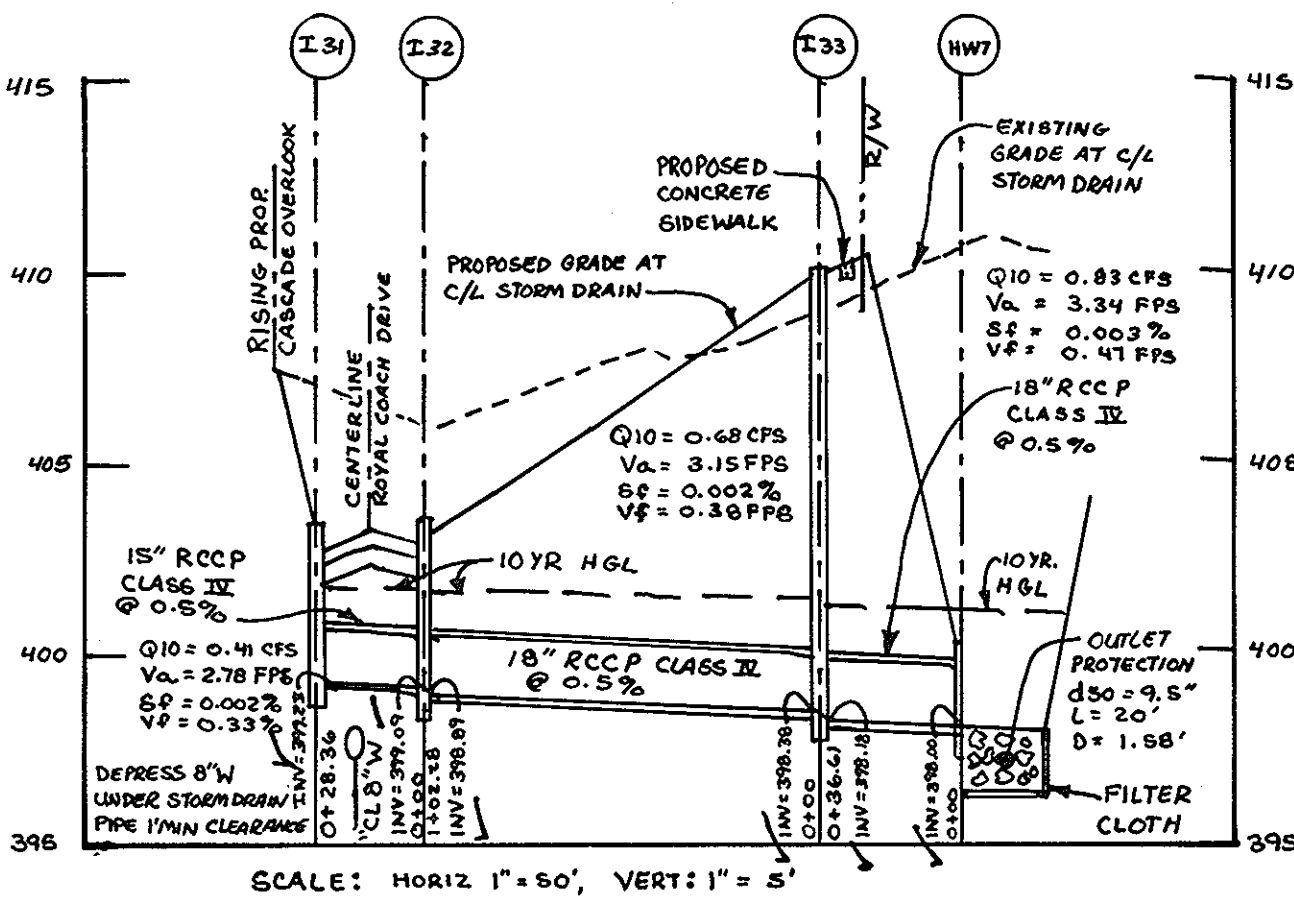


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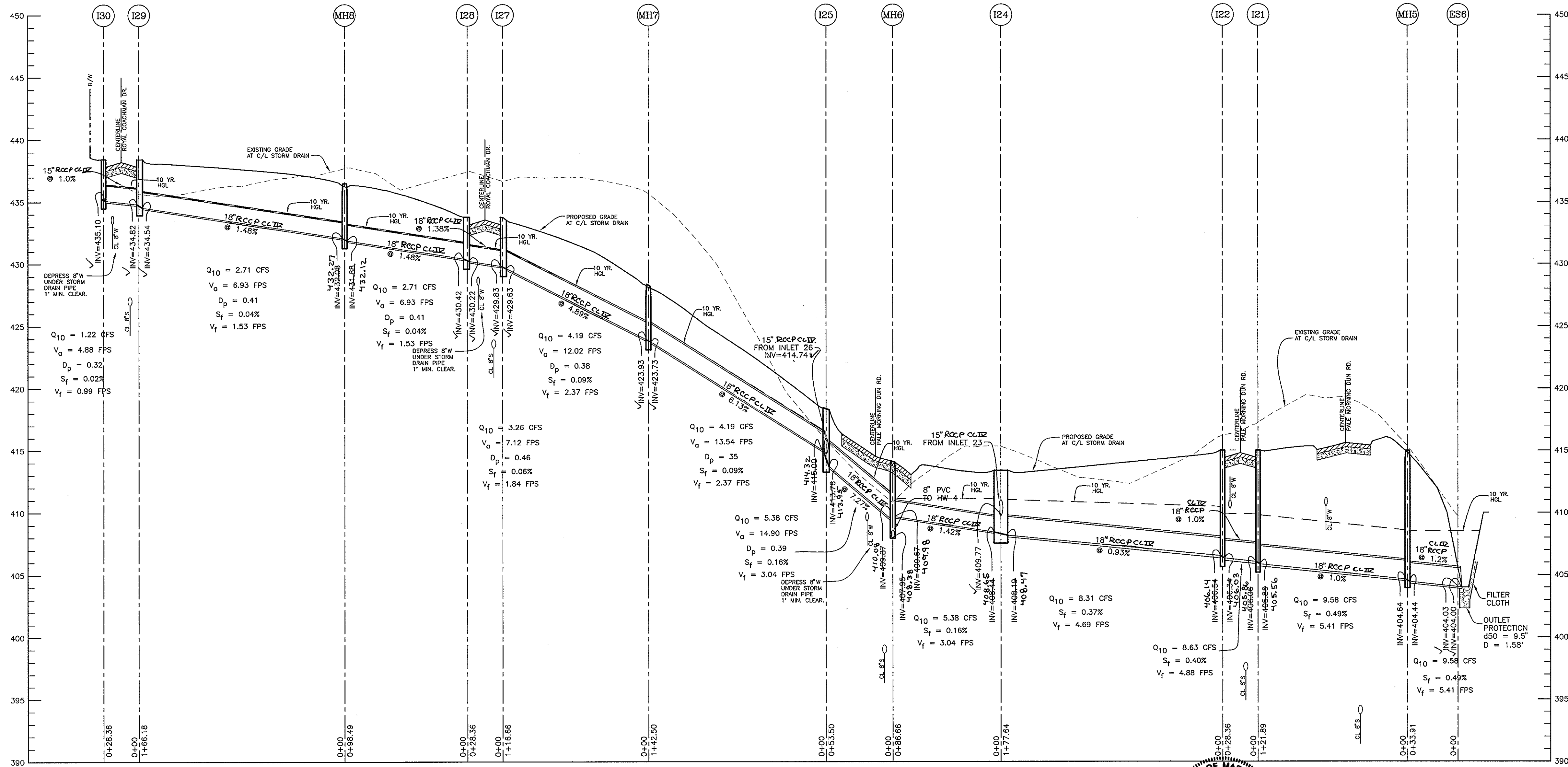
NO	DATE	REVISION
BENCHMARK ENGINEERS • LAND SURVEYORS • PLANNERS ENGINEERING, INC. 8480 BALTIMORE NATIONAL PIKE • SUITE 418 ELLICOTT CITY, MARYLAND 21043 PHONE: 410-465-6105 FAX: 410-465-6644		
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS <i>William Z. ...</i> CHIEF, BUREAU OF HIGHWAYS		DATE: 12-24-03
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING <i>...</i> CHIEF, DIVISION OF LAND DEVELOPMENT		DATE: 1/23/04
OWNER/DEVELOPER CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MD 21041 (410) 465-4244		PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL "X"
OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELK RIDGE, MD 21075		LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791 1st ELECTION DISTRICT - HOWARD COUNTY, MARYLAND
DES: DAM DRN: RPS CHK: DAM		TITLE: STORM DRAIN PROFILE VP-86-130, F-88-20, S-01-04, PB-359, P-02-11 DATE: OCTOBER, 2003 PROJECT NO. 1383
SCALE: AS SHOWN		DRAWING 14 OF 33



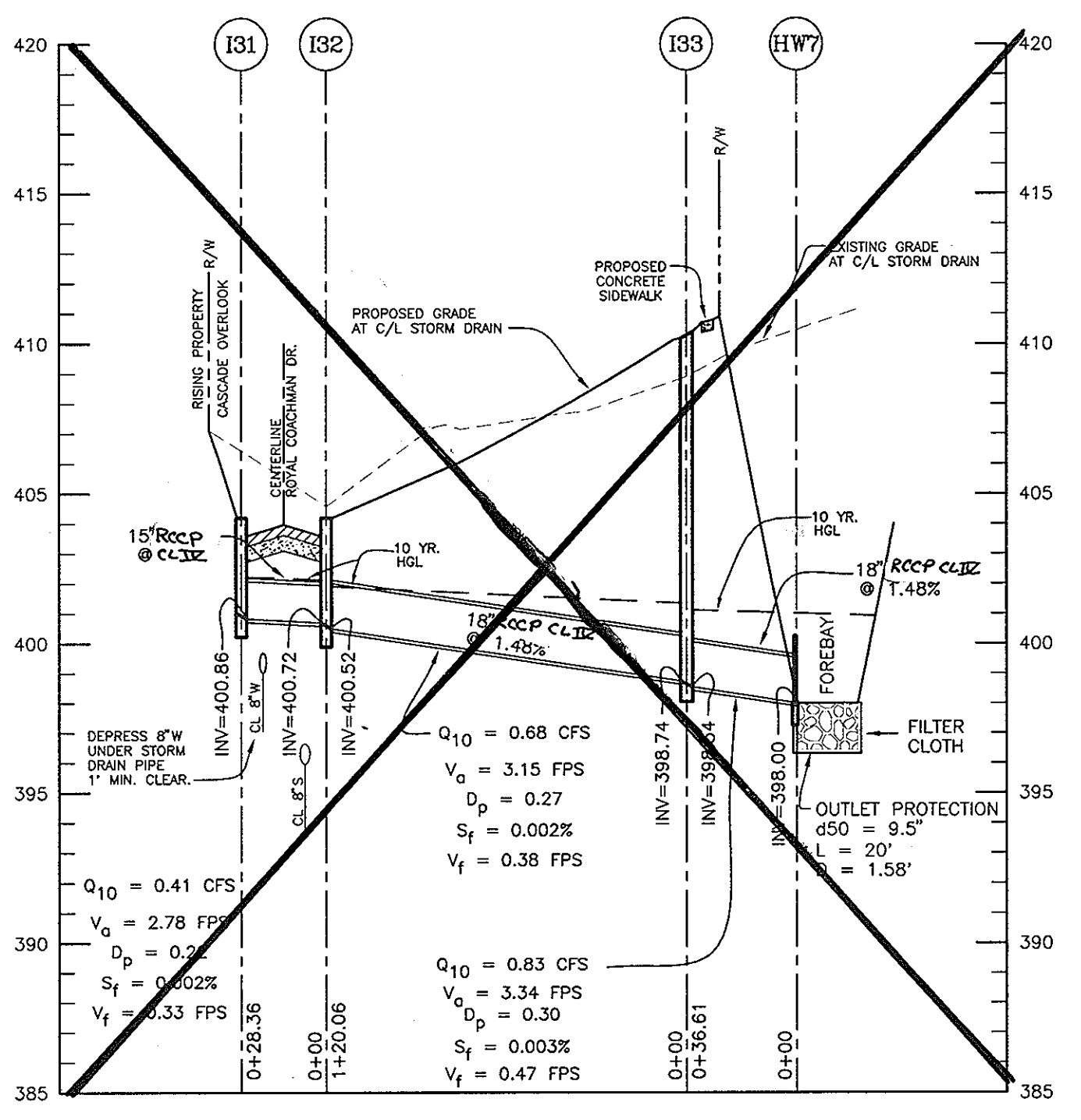
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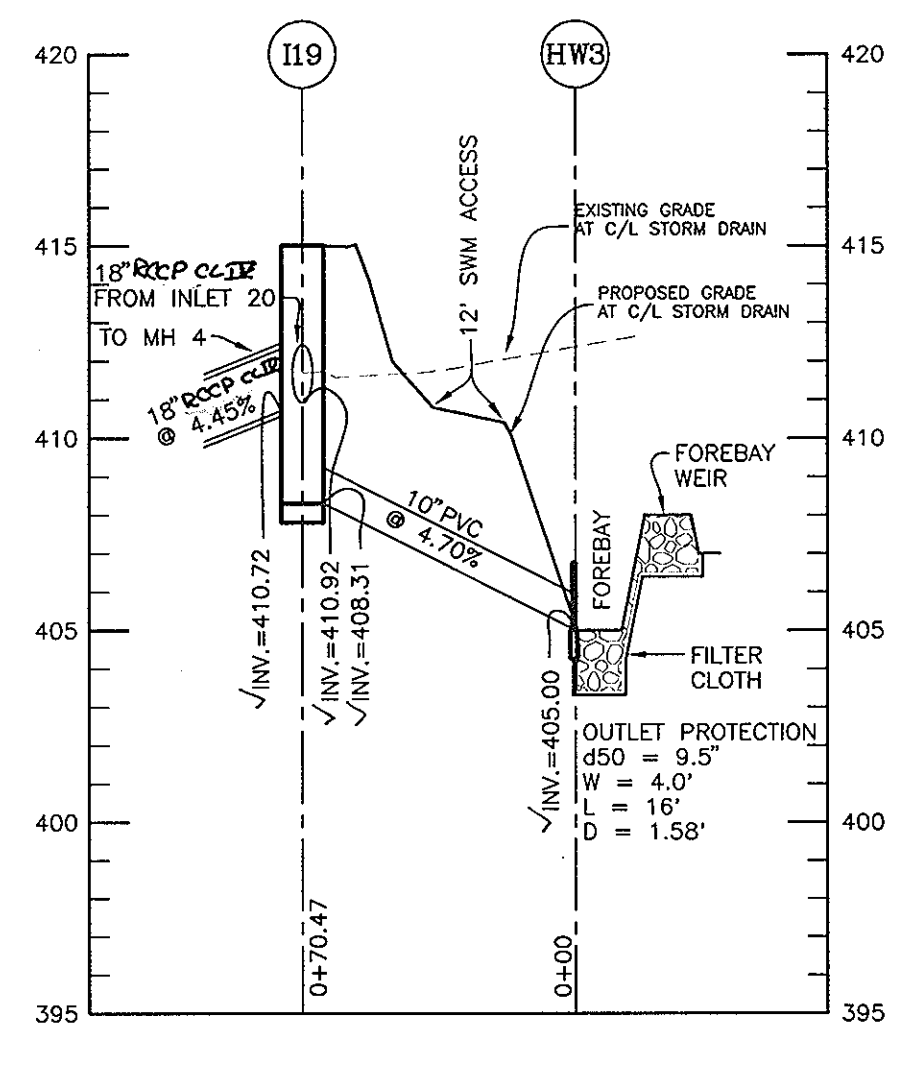
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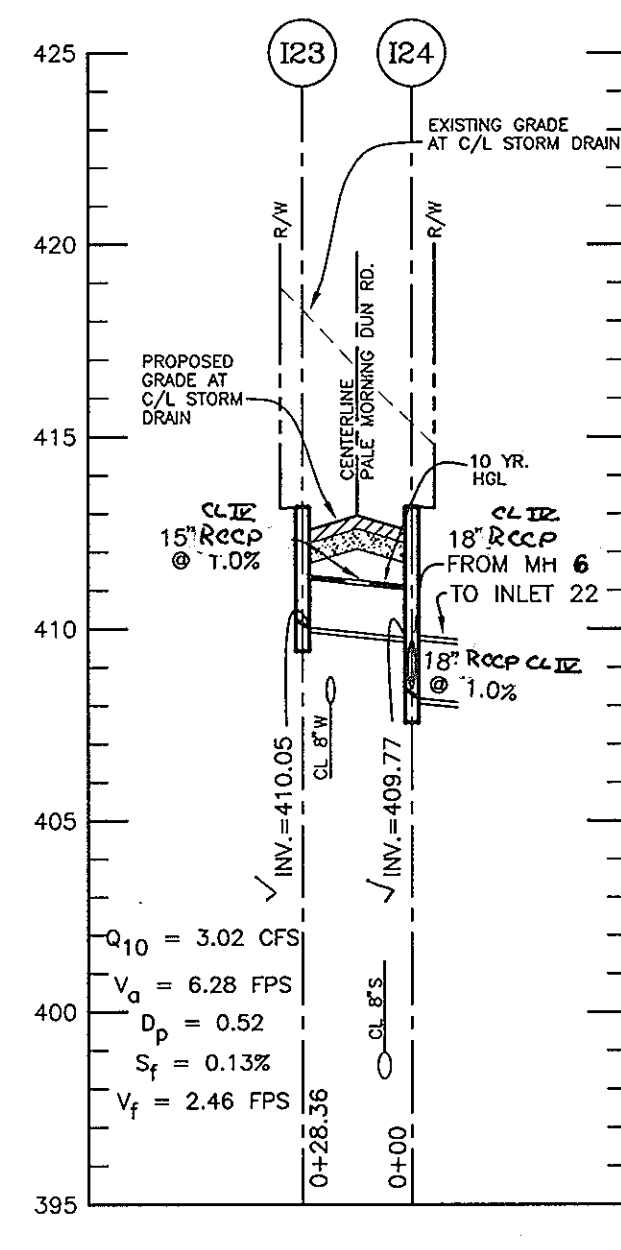
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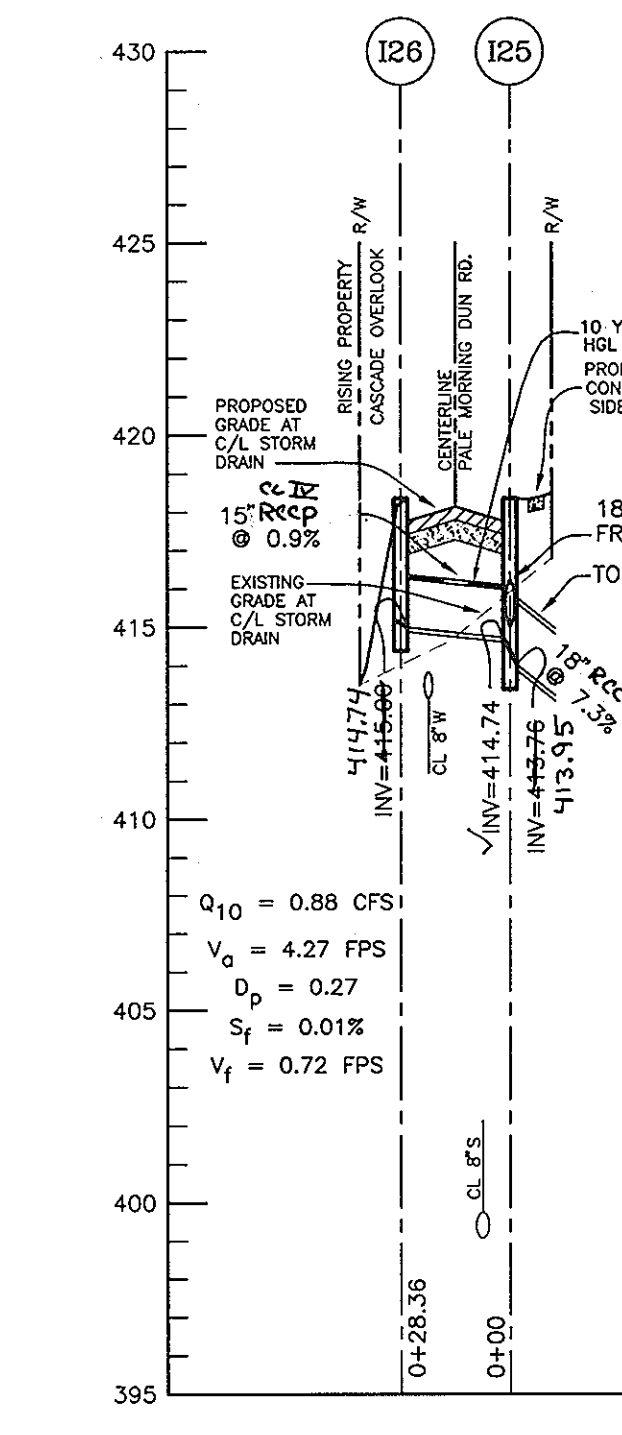
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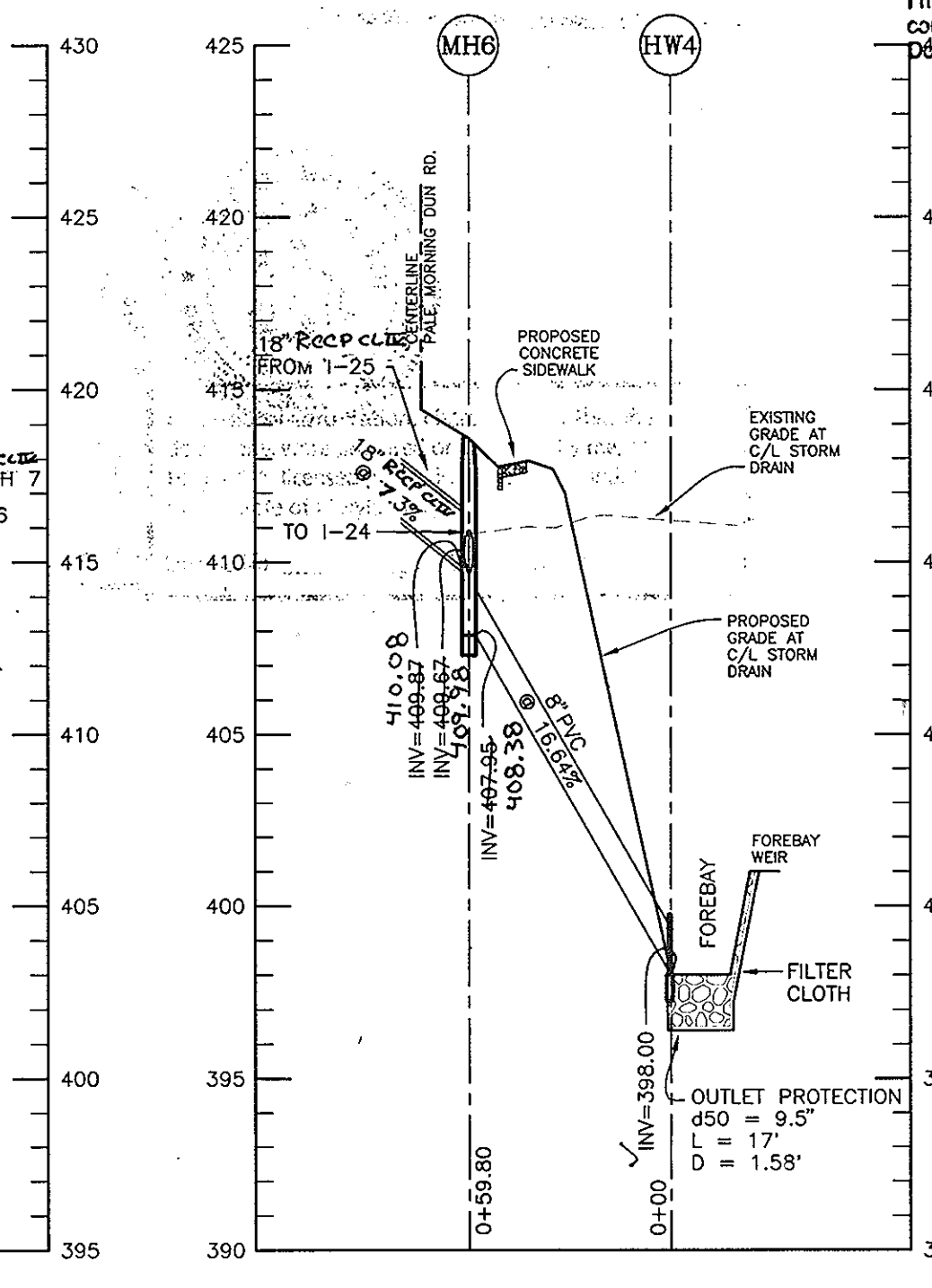
SCALE: HORIZ 1" = 50', VERT 1" = 5'



SCALE: HORIZ 1" = 50', VERT 1" = 5'



SCALE: HORIZ 1" = 50', VERT 1" = 5'



SCALE: HORIZ 1" = 50', VERT 1" = 5'

AS-BUILT CERTIFICATION
I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
Donald M. Mason, P.E. No. 21443 Date 0-25-11

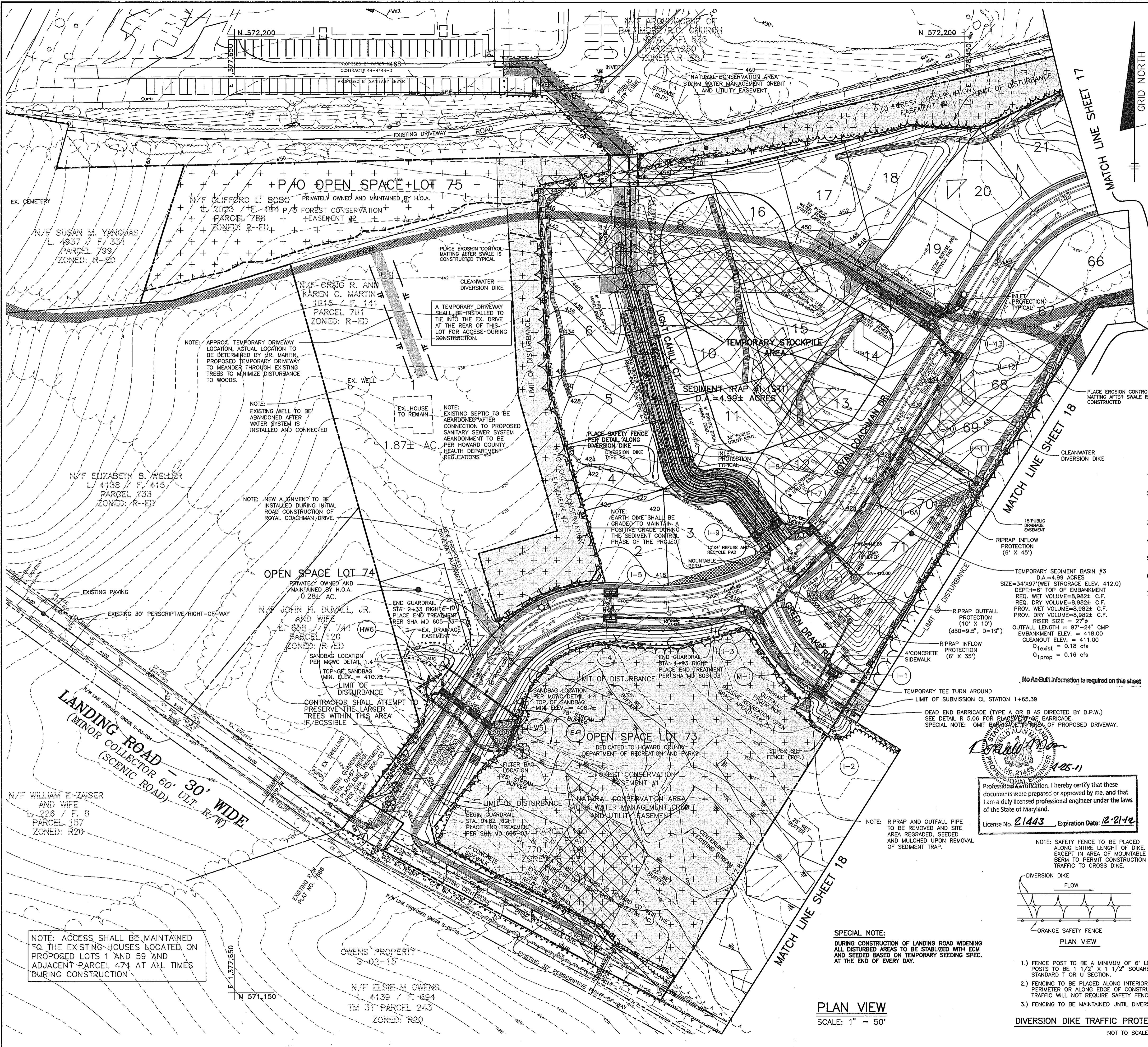
Professional Certification I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 21443, Expiration Date: 12-21-12

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Walter Z. ... 12-20-03
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Cinda Hamilton 11/3/04
11/3/03

NO	DATE	REVISION
10-08-04		REVISED PROFILE HW7 TO I-31
5-25-04		REVISE HDPE TO RCP CLIP

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELLCOTT CITY, MD 21041 (410) 465-4244	PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 75 - 80 AND NON-BUILDABLE PARCEL 1A
OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELKRIDGE, MD 21075	LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791 1ST ELECTION DISTRICT - HOWARD COUNTY, MARYLAND
TITLE: STORM DRAIN PROFILE	DATE: OCTOBER, 2003
DES: DAM	DRN: RPS
CHK: DAM	SCALE: AS SHOWN
DRAWING 15 OF 33	PROJECT NO. 1383



LEGEND:

EXISTING CONTOUR	---
PROPOSED CONTOUR	---
LIMIT OF DRAINAGE AREA	---
EARTH DIKE	---
EXISTING WETLANDS	---
EXISTING TREELINE	---
PROPOSED TREELINE	---
LIMIT OF DISTURBANCE	---
TREE PROTECTION FENCE	TF
DRAINAGE FLOW ARROW	---
SILT FENCE	SF
SUPER SILT FENCE	SSF
SLOPES BETWEEN 15% AND 24.9%	---
RIPRAP PROTECTION	---
NATURAL CONSERVATION AREA	---
STORM WATER MANAGEMENT CREDIT AND UTILITY EASEMENT	---
INLET PROTECTION	---
GUARDRAIL	---
REMOVABLE PUMPING STA.	---
EROSION CONTROL MATTING	---
FILTER BAG	---
SANDBAG DIVERSION	---

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. 21443, Expiration Date: 12-21-12
 No As-Built information is required on this sheet

CULVERT INSTALLATION GUIDELINES

- INSTALL DIVERSION PIPE PER MGWC 1.4 DETAIL. SEE DETAIL SHEET 20.
- ACQUIRE PERMISSION TO PROCEED FROM INSPECTOR PRIOR TO CONSTRUCTION OF HW5. CONSTRUCT HW5 AND INSTALL TWIN 30" RCP CULVERTS TO DOWNSTREAM SIDE OF EXISTING STREAM CROSSING.
- BACKFILL NEWLY INSTALLED TWIN 30" RCP CULVERTS PER MANUFACTURER'S RECOMMENDED SPECIFICATIONS.
- REMOVE EXISTING CMP CULVERT PIPES AND DRIVEWAY CROSSING.
- CONSTRUCT HW6 AND INSTALL REMAINING SECTIONS OF TWIN 30" RCP CULVERT PIPES.
- BACKFILL REMAINING PORTIONS OF TWIN 30" RCP CULVERTS PER MANUFACTURER'S RECOMMENDED SPECIFICATIONS.
- REMOVE DIVERSION PIPE AND STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES.

SPECIAL NOTES

- WHILE TEMPORARY SEDIMENT BASIN #3 IS IN USE, PIPE LEADING TO 1-3 FROM 1-6 TO BE BLOCKED TO DIVERT FLOW INTO BASIN 3. UPON REMOVAL OF BASIN 3, PIPE BLOCKING TO BE REMOVED.
- CURL ENDS OF SILT FENCE AND SUPER SILT FENCE UPHILL A MINIMUM OF TWO (2) FEET IN ELEVATION.
- SSF IS TO CLOSE OVER ENDWALLS.

OPERATION, MAINTENANCE AND INSPECTION NOTE

INSPECTION OF THE POND(S) SHOWN HEREON SHALL BE PERFORMED AT LEAST ANNUALLY, IN ACCORDANCE WITH THE OPERATIONAL AND MAINTENANCE REQUIREMENTS CONTAINED WITHIN USDA 505 "STANDARDS AND SPECIFICATIONS FOR PONDS" (MD-378). THE POND OWNER(S) AND ANY HEIRS, SUCCESSORS, OR ASSIGNS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE POND AND THE CONTINUED OPERATION, SURVEILLANCE, INSPECTION AND MAINTENANCE THEREOF. THE POND OWNER(S) SHALL PROMPTLY NOTIFY THE SOIL CONSERVATION DISTRICT OF ANY UNUSUAL OBSERVATIONS THAT MAY BE INDICATORS OF DISTRESS SUCH AS EXCESSIVE SEEPAGE, TURBID SEEPAGE, SLIDING OR SLUMPING.

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.

FE NO. _____ DATE _____
 DONALD A. MASON

BY THE DEVELOPER:
 I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS AND THAT ANY RESPONSIBLE PERSONS 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 BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT.

CASCADE OVERLOOK LLC
 DEVELOPER
 BY: *Steve K. Breeden* MEMBER 11/20/03 DATE
 STEVEN K. BREEDEN

BY THE ENGINEER:
 I/WE CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND REMOVABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

Donald Mason
 ENGINEER - DONALD A. MASON, P.E. # 21443 11/20/03 DATE

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL.

Jan Myer Las 12/14/03 DATE
 NATURAL RESOURCES CONSERVATION SERVICE

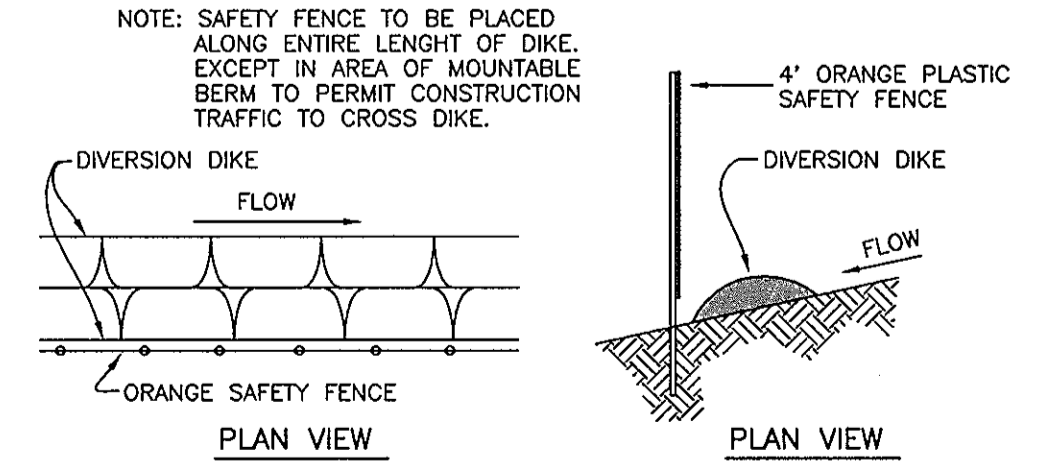
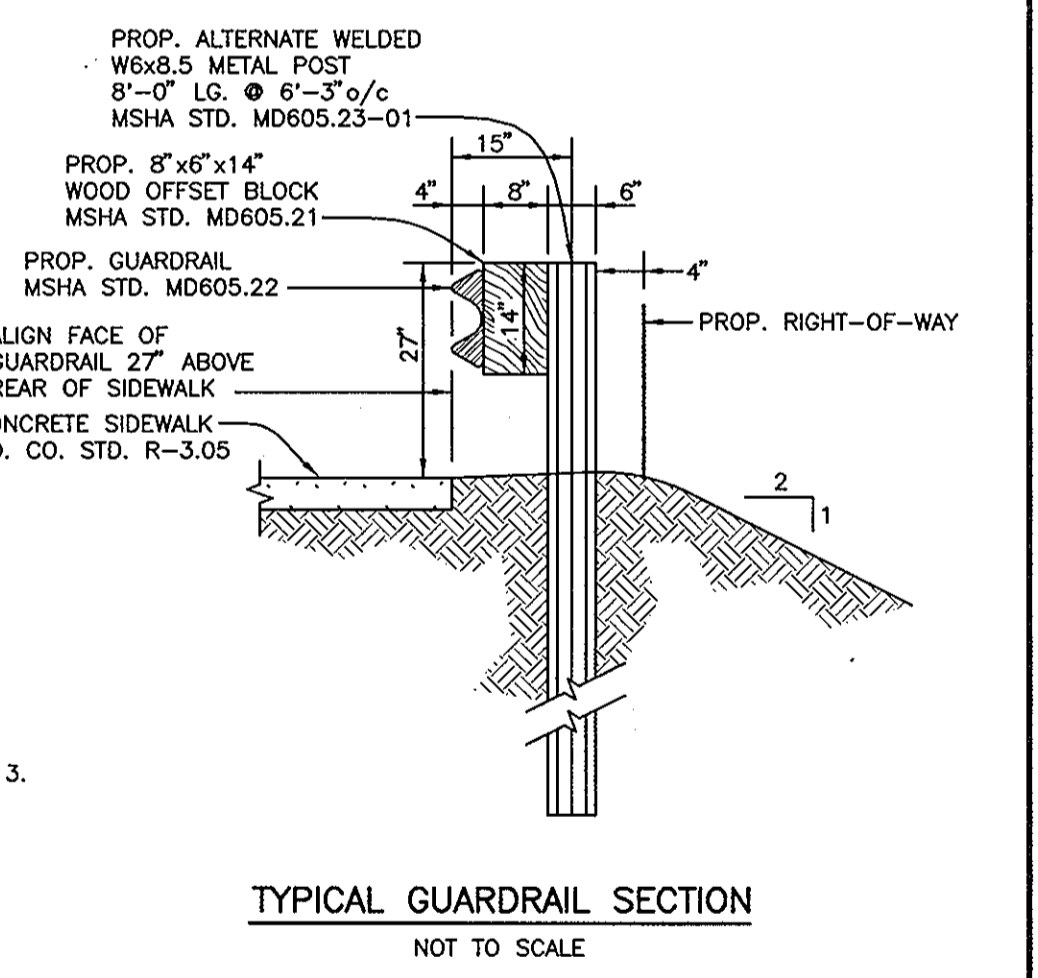
THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

Sharon Alley 12/16/03 DATE
 HOWARD SOIL CONSERVATION DISTRICT

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William F. ... 12-24-03 DATE
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Linda Hamilton 11/13/04 DATE
 CHIEF, DIVISION OF LAND DEVELOPMENT

... 12/20/03 DATE
 CHIEF, DEVELOPMENT ENGINEERING DIVISION



- FENCE POST TO BE A MINIMUM OF 6" LONG DRIVEN 16" INTO THE GROUND. POSTS TO BE 1 1/2" X 1 1/2" SQUARE (MINIMUM). STEEL POSTS WILL BE STANDARD T OR U SECTION.
- FENCING TO BE PLACED ALONG INTERIOR DIVERSION DIKES. DIKES ALONG PERIMETER OR ALONG EDGE OF CONSTRUCTION AREA AWAY FROM DIRECT TRAFFIC WILL NOT REQUIRE SAFETY FENCING.
- FENCING TO BE MAINTAINED UNTIL DIVERSION DIKES ARE REMOVED.

PLAN VIEW
 SCALE: 1" = 50'

NOTE: ACCESS SHALL BE MAINTAINED TO THE EXISTING HOUSES LOCATED ON PROPOSED LOTS 1 AND 59 AND ADJACENT PARCEL 474 AT ALL TIMES DURING CONSTRUCTION

NOTE: RIPRAP AND OUTFALL PIPE TO BE REMOVED AND SITE AREA REGRADED, SEEDED AND MULCHED UPON REMOVAL OF SEDIMENT TRAP.

NOTE: SAFETY FENCE TO BE PLACED ALONG ENTIRE LENGTH OF DIKE, EXCEPT IN AREA OF MOUNTABLE BERM TO PERMIT CONSTRUCTION TRAFFIC TO CROSS DIKE.

NOTE: EARTH DIKE SHALL BE GRADED TO MAINTAIN A POSITIVE GRADE THROUGH THE SEDIMENT CONTROL PHASE OF THE PROJECT

NOTE: APPROX. TEMPORARY DRIVEWAY LOCATION, ACTUAL LOCATION TO BE DETERMINED BY MR. MARTIN. PROPOSED TEMPORARY DRIVEWAY TO MEANDER THROUGH EXISTING TREES TO MINIMIZE DISTURBANCE TO WOODS.

NOTE: EXISTING WELL TO BE ABANDONED AFTER WATER SYSTEM IS INSTALLED AND CONNECTED

NOTE: EXISTING SEPTIC TO BE ABANDONED AFTER CONNECTION TO PROPOSED SANITARY SEWER SYSTEM ABANDONMENT TO BE PER HOWARD COUNTY HEALTH DEPARTMENT REGULATIONS

NOTE: ACCESS SHALL BE MAINTAINED TO THE EXISTING HOUSES LOCATED ON PROPOSED LOTS 1 AND 59 AND ADJACENT PARCEL 474 AT ALL TIMES DURING CONSTRUCTION

SPECIAL NOTES LOT 59:

PLACE 4' HIGH ORANGE SAFETY FENCE AROUND EXISTING WELL AND SEPTIC SYSTEM, TO ELIMINATE POSSIBLE LAND DISTURBANCE DURING CONSTRUCTION. AFTER PROPOSED WATER AND SEWER SYSTEMS ARE INSTALLED AND SERVICE PROVIDED TO EXISTING DWELLING SAFETY FENCE CAN BE REMOVED.

EXISTING WELL TO BE ABANDONED ONLY AFTER THE PROPOSED WATER SYSTEM IS IN AND SERVICE PROVIDED TO THE EXISTING DWELLING.

EXISTING SEPTIC SYSTEM TO BE ABANDONED ONLY AFTER PROPOSED SANITARY SEWER SYSTEM IS INSTALLED AND CONNECTED TO EXISTING DWELLING. AT THAT TIME THE EXISTING SEPTIC SYSTEM TO BE ABANDONED PER HOWARD COUNTY HEALTH DEPARTMENT REGULATIONS.

LEGEND:

- EXISTING CONTOUR ----- 44.2
- PROPOSED CONTOUR ----- 44.0
- LIMIT OF DRAINAGE AREA -----
- EARTH DIKE -----
- EXISTING WETLANDS -----
- EXISTING TREELINE -----
- PROPOSED TREELINE -----
- LIMIT OF DISTURBANCE -----
- TREE PROTECTION FENCE ----- TF -----
- DRAINAGE FLOW ARROW -----
- SILT FENCE ----- SF -----
- SUPER SILT FENCE ----- SSF -----
- SLOPES BETWEEN 15% AND 24.5% -----
- RIPRAP PROTECTION -----
- NATURAL CONSERVATION AREA -----
- STORM WATER MANAGEMENT CREDIT AND UTILITY EASEMENT -----
- 15' NO WOODY VEGETATION ZONE -----
- INLET PROTECTION -----
- GUARDRAIL -----
- REMOVEABLE PUMPING STA. -----
- EROSION CONTROL MATTING -----

OPERATION, MAINTENANCE AND INSPECTION NOTE

INSPECTION OF THE POND SHALL BE PERFORMED AT LEAST ANNUALLY, IN ACCORDANCE WITH THE CHECKLIST AND REQUIREMENTS CONTAINED WITHIN USDA, SCS STANDARDS AND SPECIFICATIONS FOR PONDS (MD-578), THE POND OWNERS AND ANY HEIRS, SUCCESSORS, OR ASSIGNEES SHALL BE RESPONSIBLE FOR THE SAFETY OF THE POND AND THE CONTINUED OPERATIONAL SURVEILLANCE, INSPECTION, AND MAINTENANCE THEREOF. THE POND OWNERS SHALL PROMPTLY NOTIFY THE SOIL CONSERVATION DISTRICT OF ANY UNUSUAL OBSERVATIONS THAT MAY BE INDICATORS OF DISTRESS SUCH AS EXCESSIVE SEEPAGE, TURBID SEEPAGE, SLIDING OR SLUMPING.

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 AS-BUILT PLANS AND MEETS THE APPROVED AS-BUILT PLANS.

Donald A. Mason 12/14/03
DONALD A. MASON 1/26/11

CERTIFY MEANS TO STATE OR DECLARE A PROFESSIONAL ENGINEER UPON ON-SITE INSPECTIONS AND MATERIAL TESTS WHICH ARE CONDUCTED DURING CONSTRUCTION. THE ON-SITE INSPECTIONS AND MATERIAL TESTS ARE THOSE INSPECTIONS AND TESTS DEEMED SUFFICIENT AND APPROPRIATE BY COMMONLY ACCEPTED ENGINEERING STANDARDS. CERTIFY DOES NOT MEAN OR IMPLY A GUARANTEE BY THE ENGINEER NOR DOES AN ENGINEER'S CERTIFICATION RELIEVE ANY OTHER PARTY FROM MEETING REQUIREMENTS IMPOSED BY CONTRACT, EMPLOYMENT, OR OTHER MEANS, INCLUDING MEETING COMMONLY ACCEPTED INDUSTRY PRACTICES.

BY THE DEVELOPER:

"I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY 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 BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN AS-BUILT PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT."

DEVELOPER: CASCADE OVERLOOK, LLC. *Stevan Becker* DATE: 12-5-03

BY THE ENGINEER:

"I/WE CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN AS-BUILT PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

Donald A. Mason 12/5/03
ENGINEER - DONALD A. MASON, P.E. # 21443 DATE

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL.

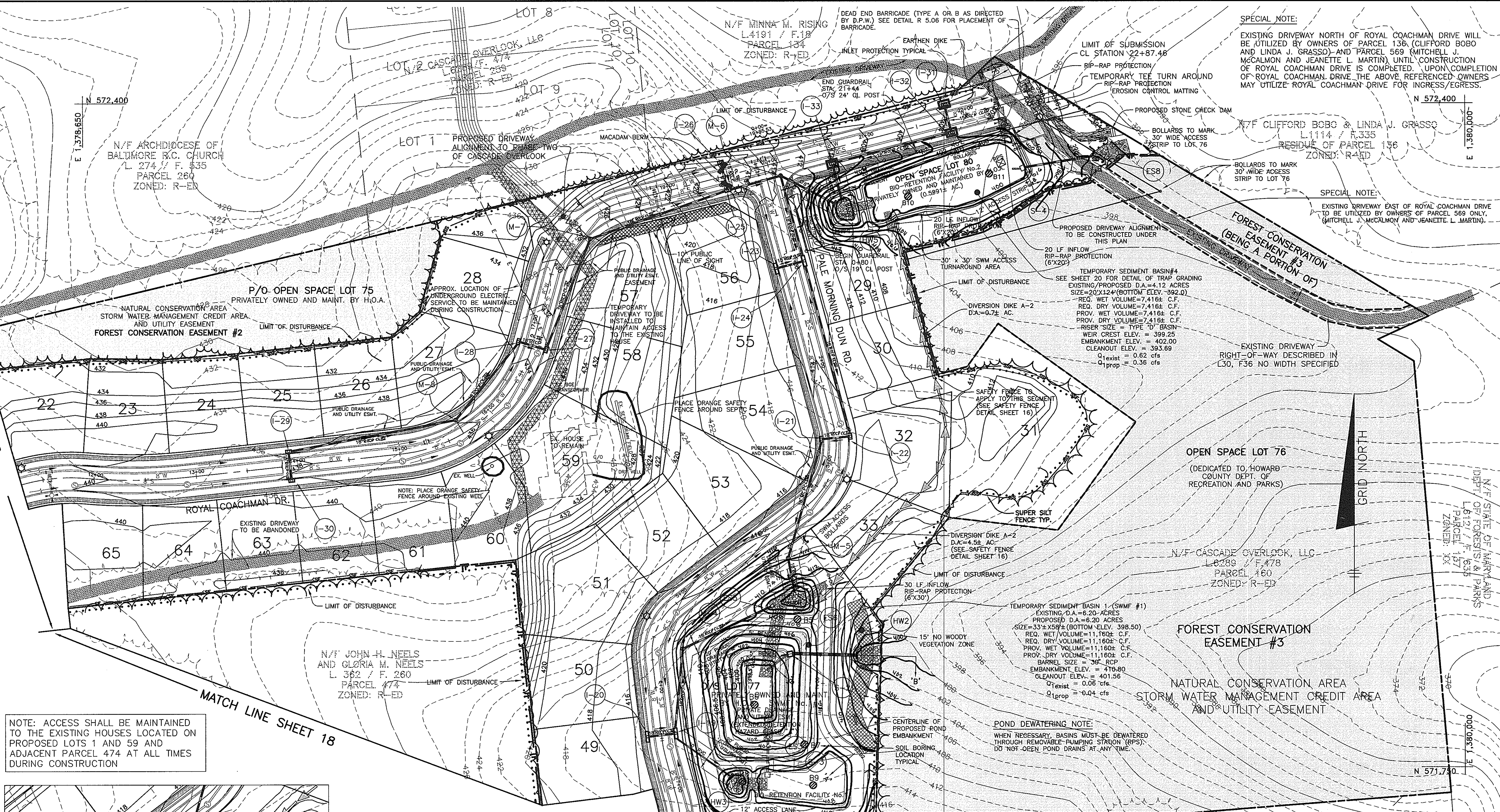
NATURAL RESOURCES CONSERVATION SERVICE *Jim Myers* 12/16/03 DATE

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

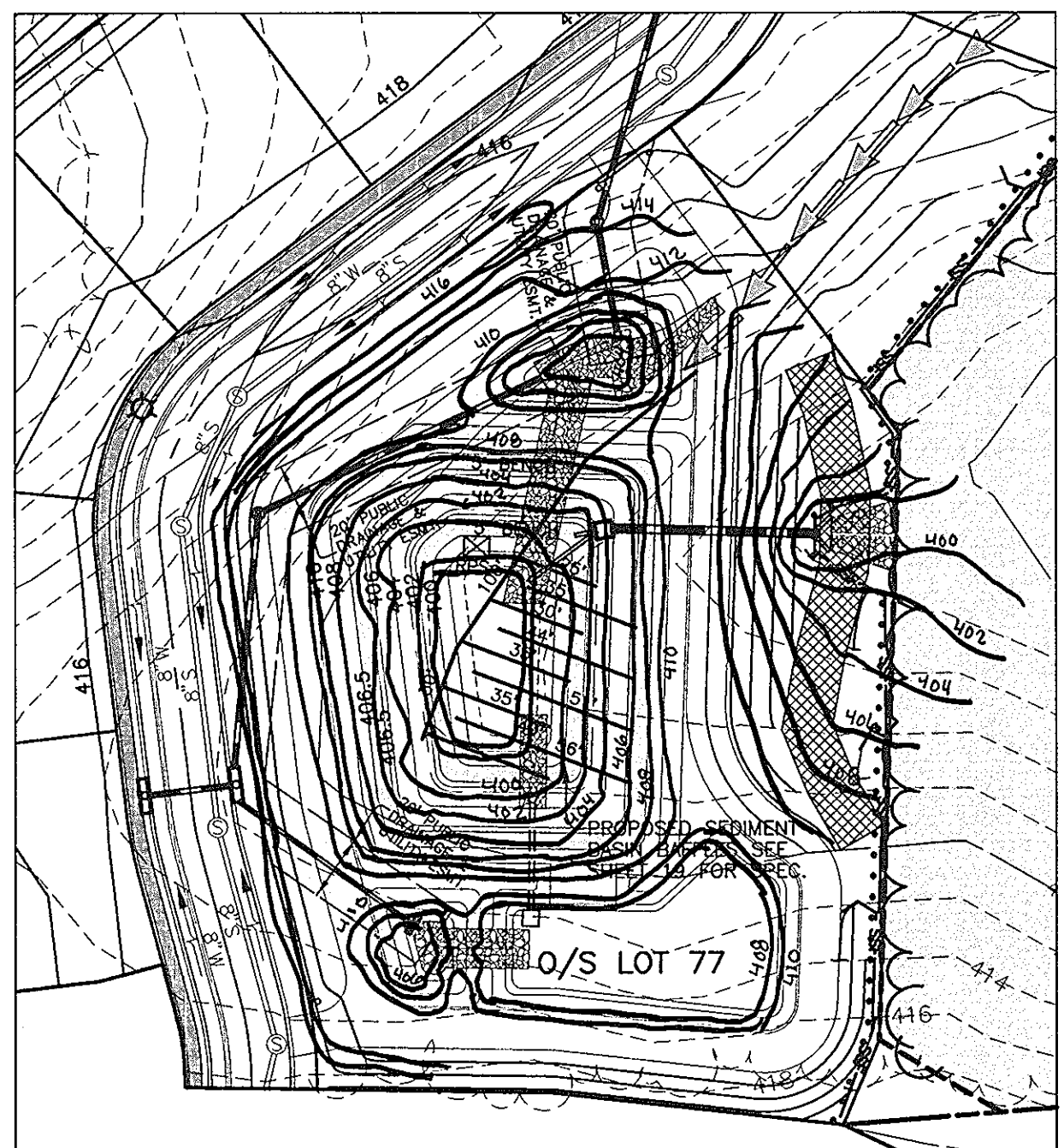
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS *William Z. Mahan* 12-24-03 DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING *Conrad Hamilton* 1/13/04 DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION *MAJ* 12/30/03 DATE



NOTE: ACCESS SHALL BE MAINTAINED TO THE EXISTING HOUSES LOCATED ON PROPOSED LOTS 1 AND 59 AND ADJACENT PARCEL 474 AT ALL TIMES DURING CONSTRUCTION



SEDIMENT BASIN#1 BAFFLE DETAIL

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED EXTENDED DETENTION POND

ROUTINE MAINTENANCE:

- FACILITY SHALL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHALL BE PERFORMED DURING WET WEATHER TO DETERMINE IF THE POND IS FUNCTIONING PROPERLY.
- TOP AND SIDE SLOPES OF THE EMBANKMENT SHALL BE MOWED A MINIMUM OF TWO (2) TIMES PER YEAR, ONCE IN JUNE AND ONCE IN SEPTEMBER. OTHER SIDE SLOPES AND MAINTENANCE ACCESS SHALL BE MOWED AS NEEDED.
- DEBRIS AND LITTER SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
- VISIBLE SIGNS OF EROSION IN THE POND AS WELL AS THE RIP-RAP OR GABION OUTLET AREA SHALL BE REPAIRED AS SOON AS IT IS NOTICED.

NON-ROUTINE MAINTENANCE:

- STRUCTURAL COMPONENTS OF THE POND SUCH AS THE DAM, THE RISER, AND THE PIPES SHALL BE REPAIRED UPON THE DETECTION OF ANY DAMAGE. THE COMPONENTS SHALL BE INSPECTED DURING ROUTINE MAINTENANCE OPERATIONS.
- SEDIMENTS SHALL BE REMOVED FROM THE POND AND FOREBAY, NO LATER THAN WHEN THE CAPACITY OF THE POND, OR FOREBAY, IS HALF FULL OF SEDIMENT, OR, WHEN DEEMED NECESSARY FOR AESTHETIC REASONS, UPON APPROVAL FROM THE DEPARTMENT OF PUBLIC WORKS.

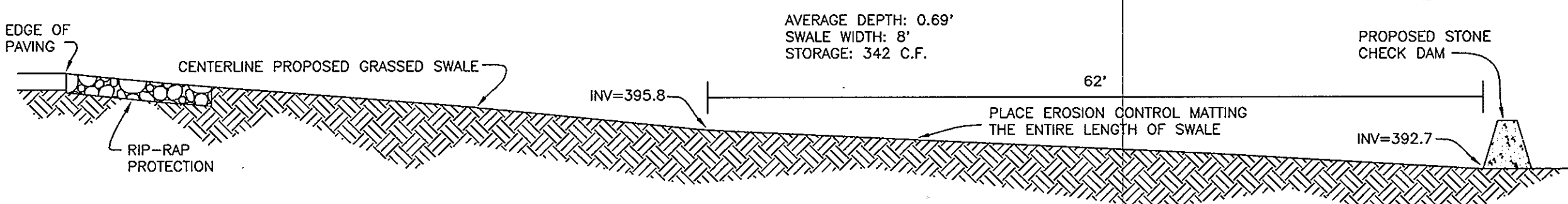
SPECIAL NOTE:
CURL ENDS OF SILT FENCE AND SUPER SILT FENCE UP HILL A MINIMUM OF 2 FEET IN ELEVATION.

PLAN VIEW

SCALE: 1" = 50'

SWMF #1 STORM DATA	
STORM EVENT	ELEVATION
Wpv	402.40
Cpv	407.65
Qp10	408.45
Qp100	408.80

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. 21449, Expiration Date: 12-21-12



GRASSED SWALE PROFILE DETAIL N.T.S.

NO	DATE	REVISION
1	5-25-04	REVISE HDPER TO RECIP CLV

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER CASCADE OVERLOOK, LLC. P.O. BOX 417 ELICOTT CITY, MD 21041 (410) 465-4244	PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A'
OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELK RIDGE, MD 21075	TITLE: GRADING, SEDIMENT AND EROSION CONTROL PLAN VP-86-130, F-88-20, S-01-04, PB-359, P-02-11 DATE: DECEMBER, 2003 PROJECT NO. 1383
DES: DAM DRN: RPS CHK: DAM	SCALE: AS SHOWN DRAWING 12 OF 33

OPERATION, MAINTENANCE AND INSPECTION NOTE

INSPECTION OF THE POND(S) SHOWN HEREON SHALL BE PERFORMED AT LEAST ANNUALLY, IN ACCORDANCE WITH THE CHECKLIST AND REQUIREMENTS CONTAINED WITHIN USIA SCS "STANDARDS AND SPECIFICATIONS FOR PONDS (40-27)", THE POND OWNERS) AND ANY HEIRS, SUCCESSORS, OR ASSIGNS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE POND AND THE CONTINUED OPERATION, SURVEILLANCE, INSPECTION, AND MAINTENANCE THEREOF. THE POND OWNERS) SHALL PROMPTLY NOTIFY THE SOIL CONSERVATION DISTRICT OF ANY UNUSUAL OBSERVATIONS THAT MAY BE INDICATIONS OF DISTRESS SUCH AS EXCESSIVE SEDIMENT, TURBID SEEPAGE, SLIDING OR SLUMPING.

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.

Donald Maon
DONALD A. MAON
PE NO. 21443
DATE 4/26/14

CERTIFY MEANS TO STATE OR DECLARE A PROFESSIONAL OPINION BASED UPON ON-SITE INSPECTIONS AND MATERIAL TESTS WHICH ARE CONDUCTED DURING CONSTRUCTION. THE ON-SITE INSPECTIONS AND MATERIAL TESTS ARE THOSE INSPECTIONS AND TESTS DEEMED SUFFICIENT AND APPROPRIATE BY COMMONLY ACCEPTED ENGINEERING STANDARDS. CERTIFY DOES NOT MEAN OR IMPLY A GUARANTEE BY THE ENGINEER NOR DOES AN ENGINEER'S CERTIFICATION RELIEVE ANY OTHER PARTY FROM MEETING REQUIREMENTS IMPOSED BY CONTRACT, EMPLOYMENT, OR OTHER MEANS, INCLUDING MEETING COMMONLY ACCEPTED INDUSTRY PRACTICES.

BY THE DEVELOPER:

"I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS AND THAT ANY 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 BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT."

Stavros Mamas
DEVELOPER CASCADE OVERLOOK, LLC
DATE 12-3-03
Stavros Mamas

BY THE ENGINEER:

"I/WE CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

Donald Maon
ENGINEER - DONALD A. MAON, P.E. # 21443
DATE 12/5/03

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL.

Jim Mynas
NATURAL RESOURCES CONSERVATION SERVICE
DATE 12/16/03

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

William Sch
HOWARD SOIL CONSERVATION DISTRICT
DATE 12/16/03

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

William Sch
CHIEF, BUREAU OF HIGHWAYS
DATE 12-24-03

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cindy Hamstra
CHIEF, DIVISION OF LAND DEVELOPMENT
DATE 1/23/04

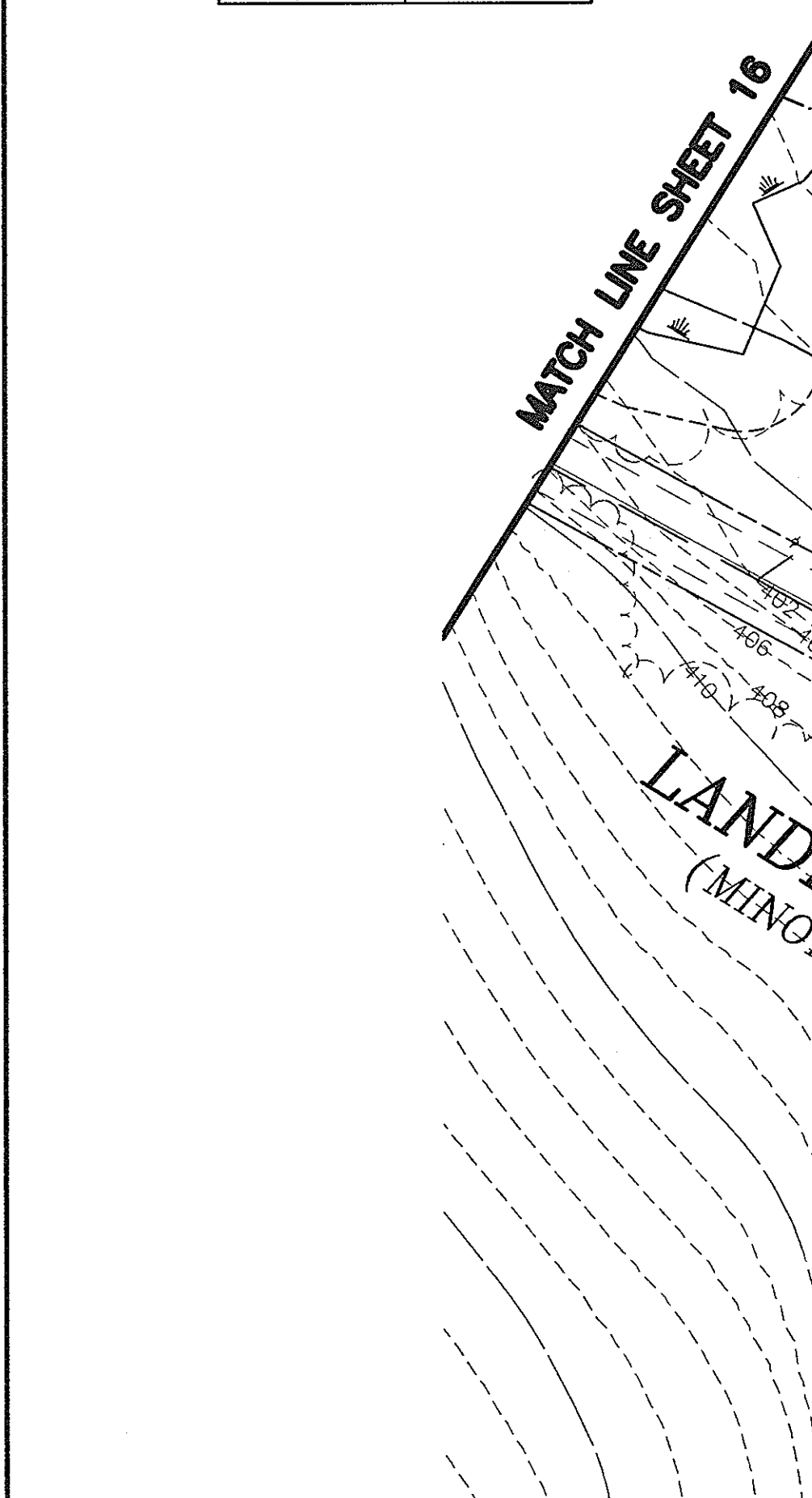
MA3
CHIEF, DEVELOPMENT ENGINEERING DIVISION
DATE 11/30/03

NOTE: ACCESS SHALL BE MAINTAINED TO THE EXISTING HOUSES LOCATED ON PROPOSED LOTS 1 AND 59 AND ADJACENT PARCEL 474 AT ALL TIMES DURING CONSTRUCTION

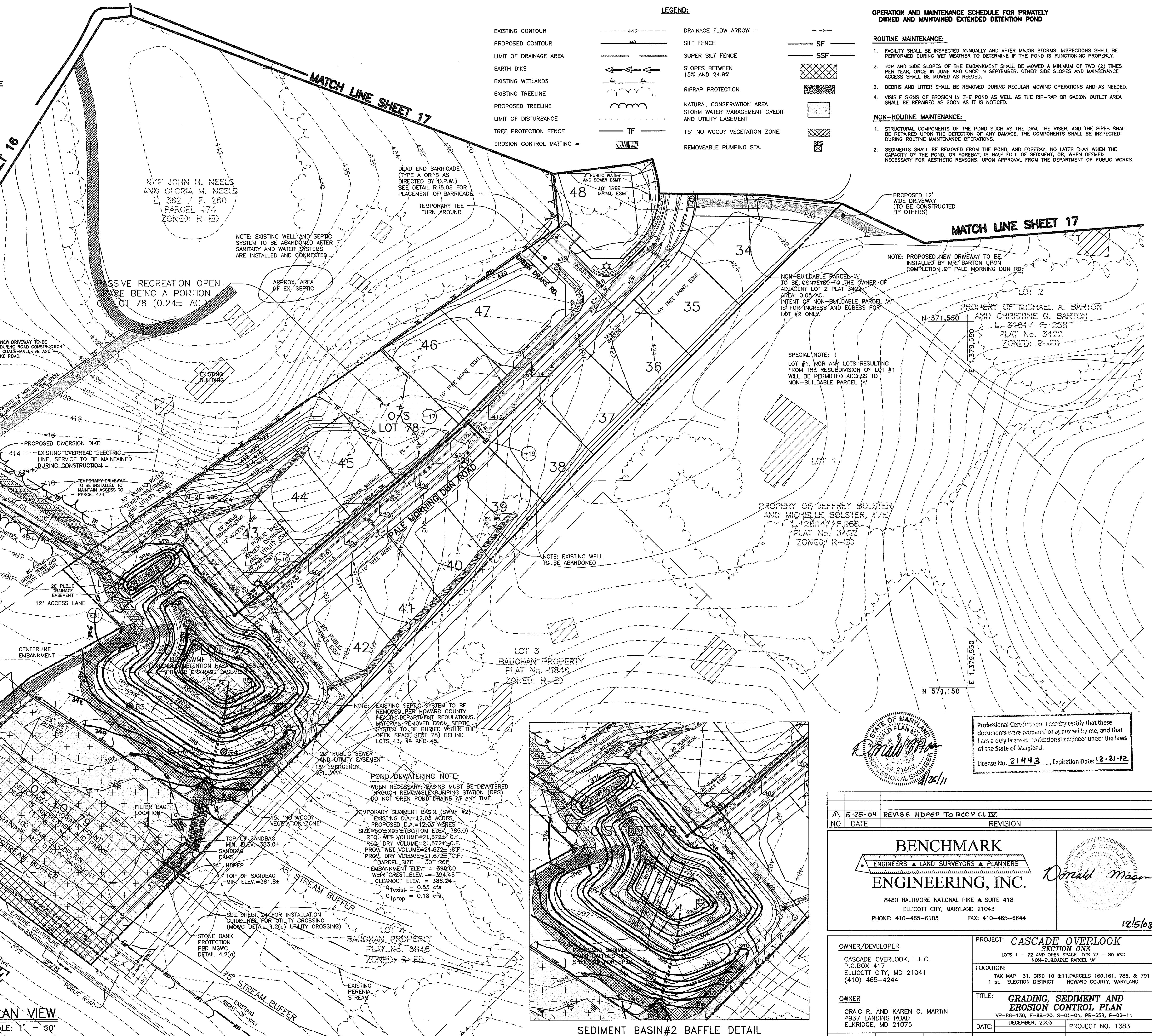
SPECIAL NOTE:
CURL ENDS OF SILT FENCE AND SUPER SILT FENCE UPHILL A MINIMUM OF 2 FEET IN ELEVATION.

SWMF #2 STORM DATA

STORM EVENT	ELEVATION
Wp	389.10
Cp	394.46
Qp10	395.85
Qp100	396.20



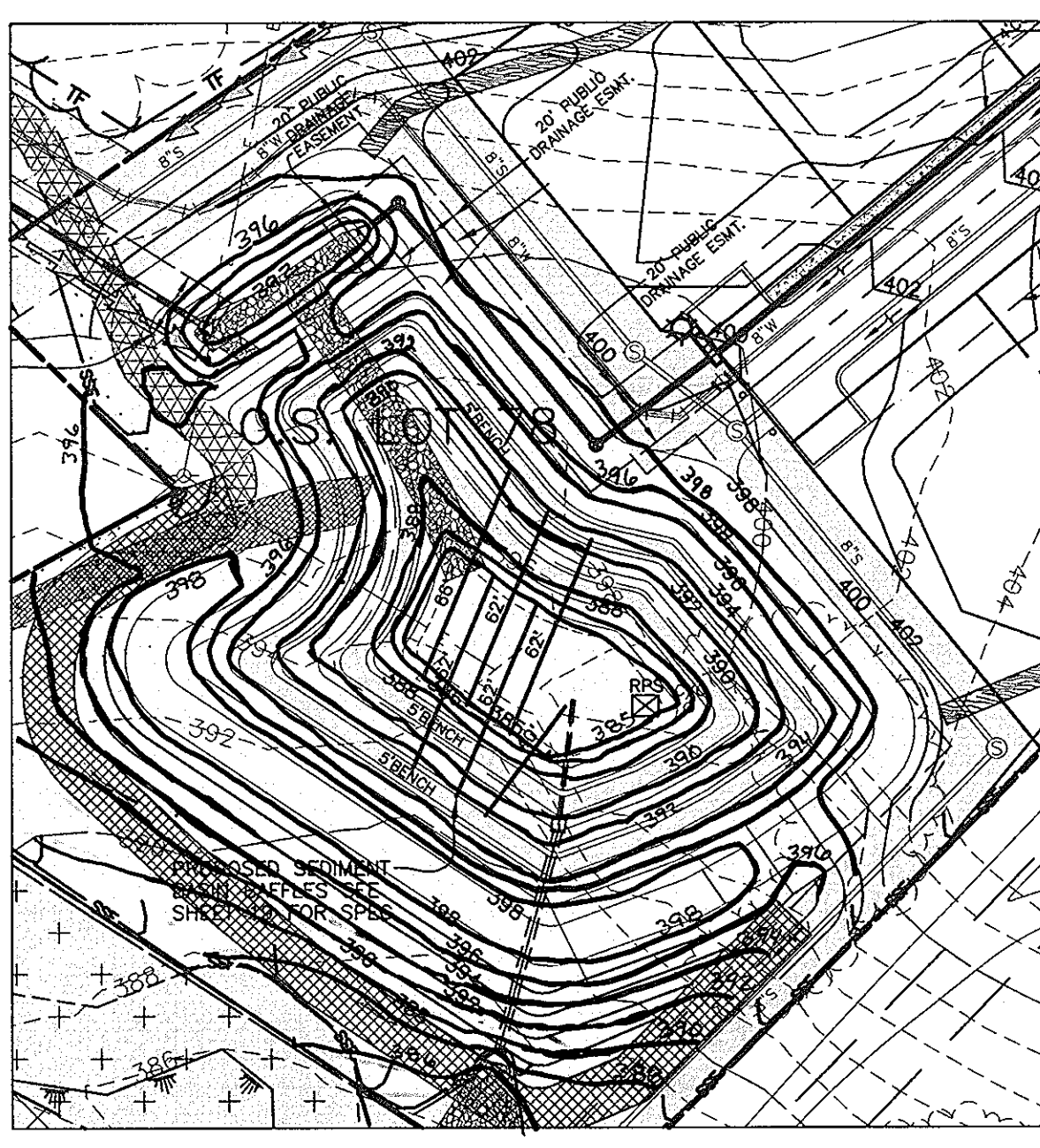
PLAN VIEW
SCALE: 1" = 50'



LEGEND:

EXISTING CONTOUR	--- 442 ---	DRAINAGE FLOW ARROW	→
PROPOSED CONTOUR	--- 446 ---	SILT FENCE	--- SF ---
LIMIT OF DRAINAGE AREA	--- ---	SUPER SILT FENCE	--- SSF ---
EARTH DIKE	--- ---	SLOPES BETWEEN 15% AND 24.9%	--- ---
EXISTING WETLANDS	--- ---	RIPRAP PROTECTION	--- ---
PROPOSED TREELINE	--- ---	NATURAL CONSERVATION AREA	--- ---
EXISTING TREELINE	--- ---	STORM WATER MANAGEMENT CREDIT AND UTILITY EASEMENT	--- ---
LIMIT OF DISTURBANCE	--- ---	15' NO WOODY VEGETATION ZONE	--- ---
TREE PROTECTION FENCE	--- TF ---	REMOVEABLE PUMPING STA.	--- ---
EROSION CONTROL MATTING	--- ---		

- OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED EXTENDED DETENTION POND**
- ROUTINE MAINTENANCE:**
- FACILITY SHALL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHALL BE PERFORMED DURING WET WEATHER TO DETERMINE IF THE POND IS FUNCTIONING PROPERLY.
 - TOP AND SIDE SLOPES OF THE EMBANKMENT SHALL BE MOWED A MINIMUM OF TWO (2) TIMES PER YEAR, ONCE IN JUNE AND ONCE IN SEPTEMBER. OTHER SIDE SLOPES AND MAINTENANCE ACCESS SHALL BE MOWED AS NEEDED.
 - DEBRIS AND LITTER SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
 - VISIBLE SIGNS OF EROSION IN THE POND AS WELL AS THE RIP-RAP OR GABION OUTLET AREA SHALL BE REPAIRED AS SOON AS IT IS NOTICED.
- NON-ROUTINE MAINTENANCE:**
- STRUCTURAL COMPONENTS OF THE POND SUCH AS THE DAM, THE RISER, AND THE PIPES SHALL BE REPAIRED UPON THE DETECTION OF ANY DAMAGE. THE COMPONENTS SHALL BE INSPECTED DURING ROUTINE MAINTENANCE OPERATIONS.
 - SEDIMENTS SHALL BE REMOVED FROM THE POND, AND FOREBAY, NO LATER THAN WHEN THE CAPACITY OF THE POND, OR FOREBAY, IS HALF FULL OF SEDIMENT, OR, WHEN DEEMED NECESSARY FOR AESTHETIC REASONS, UPON APPROVAL FROM THE DEPARTMENT OF PUBLIC WORKS.



SEDIMENT BASIN#2 BAFFLE DETAIL



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. 21443 Expiration Date: 12-21-12

6-25-04	REVISE HDPEP TO RCP CL IV	REVISION
NO	DATE	REVISION

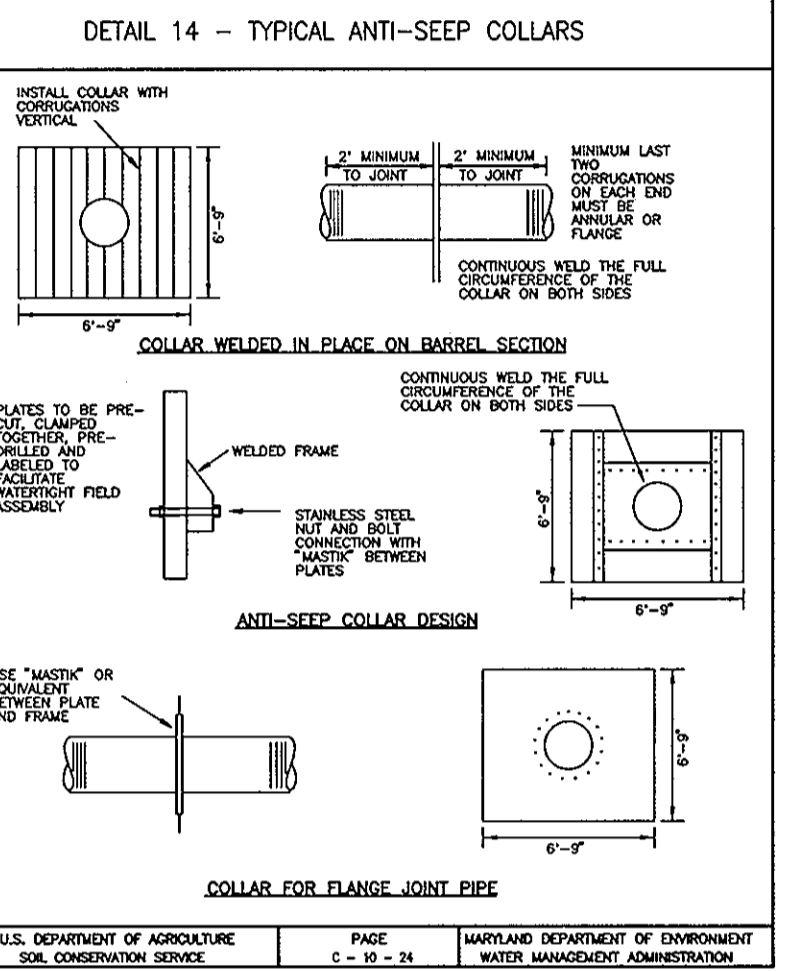
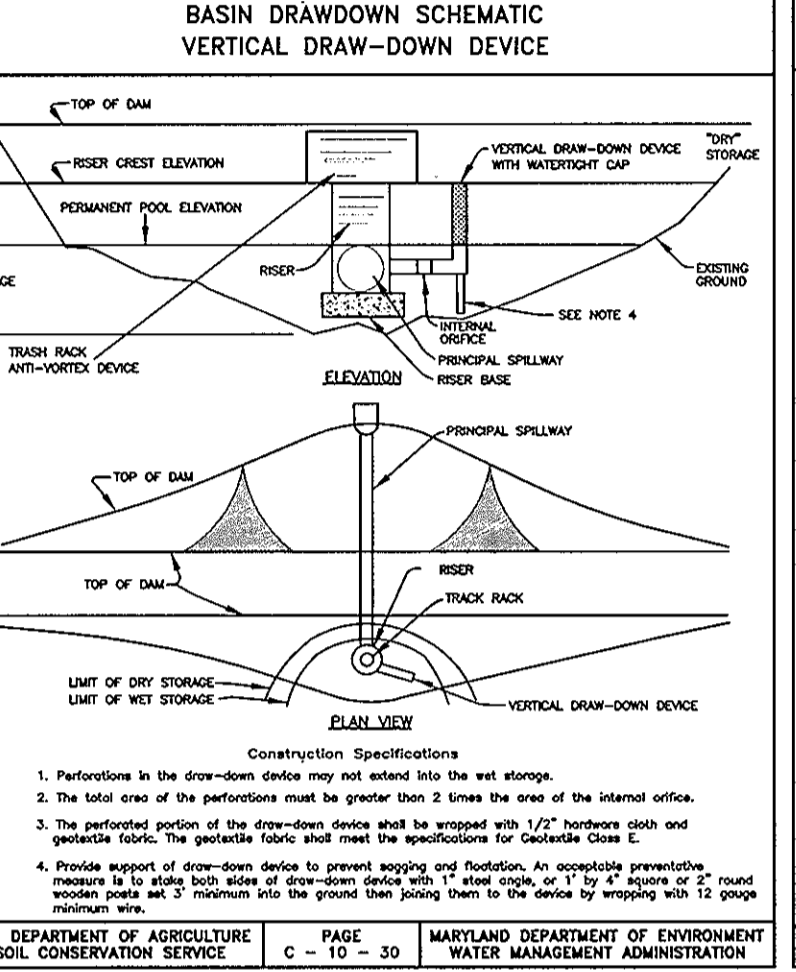
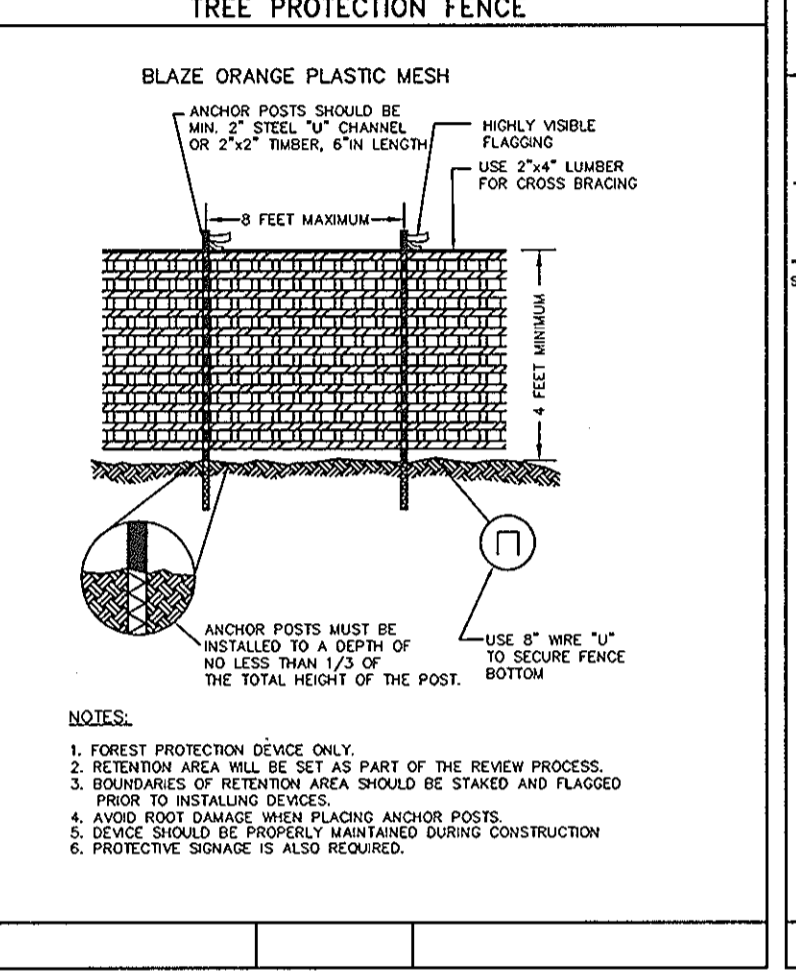
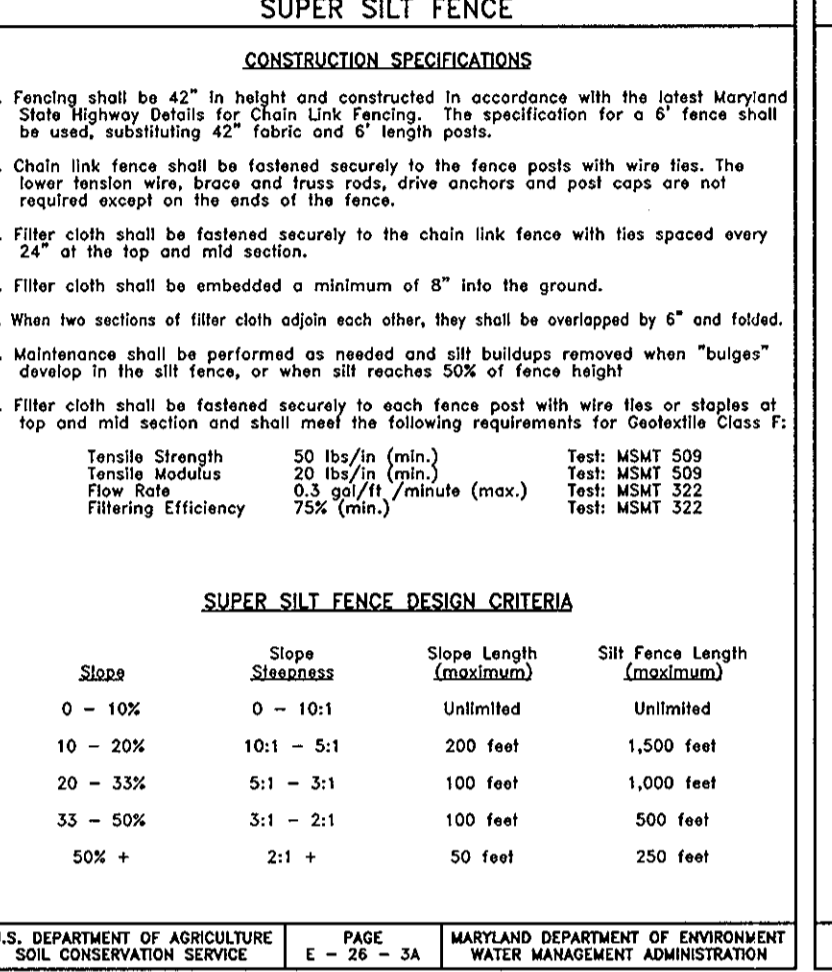
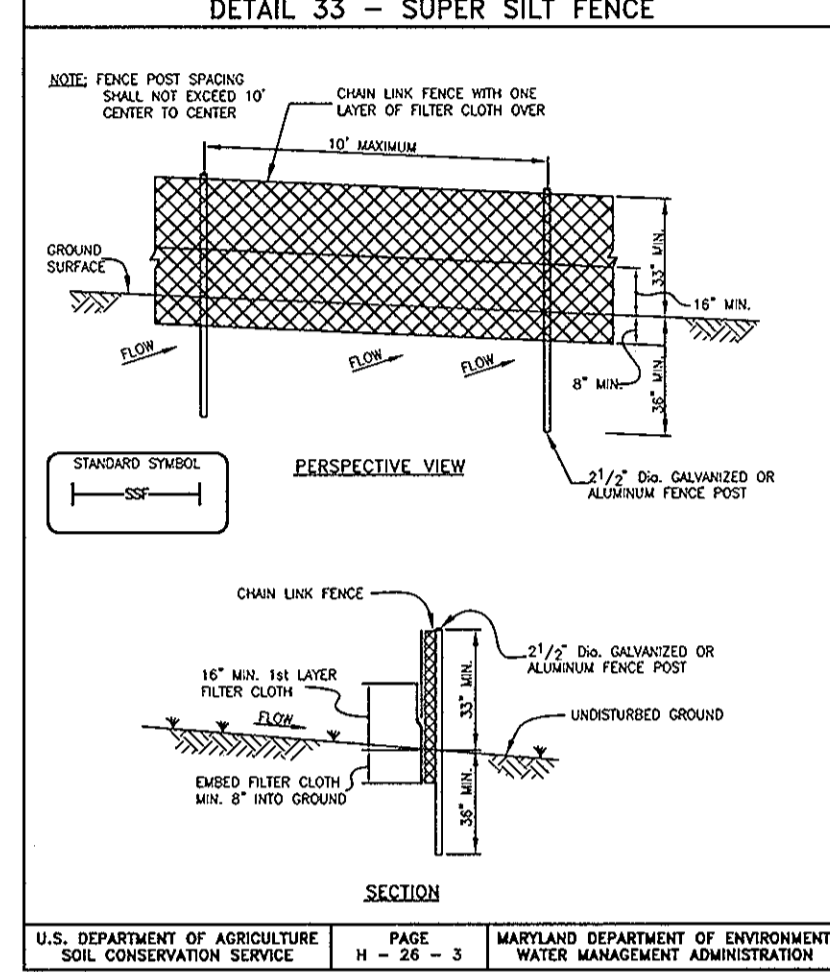
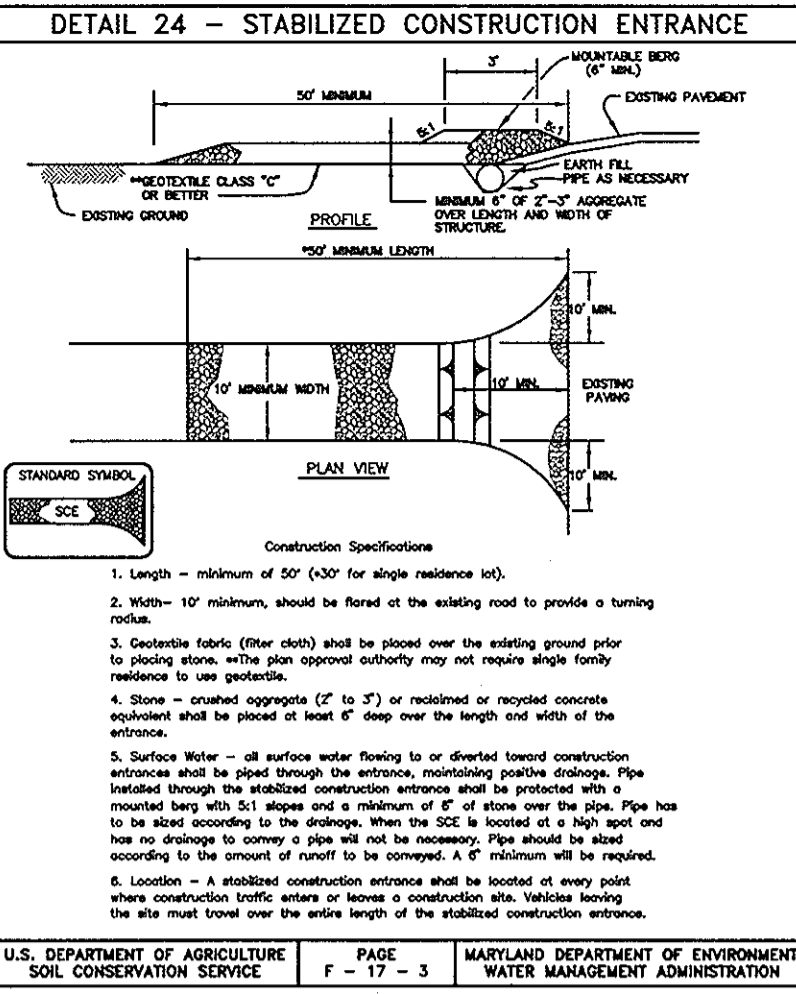
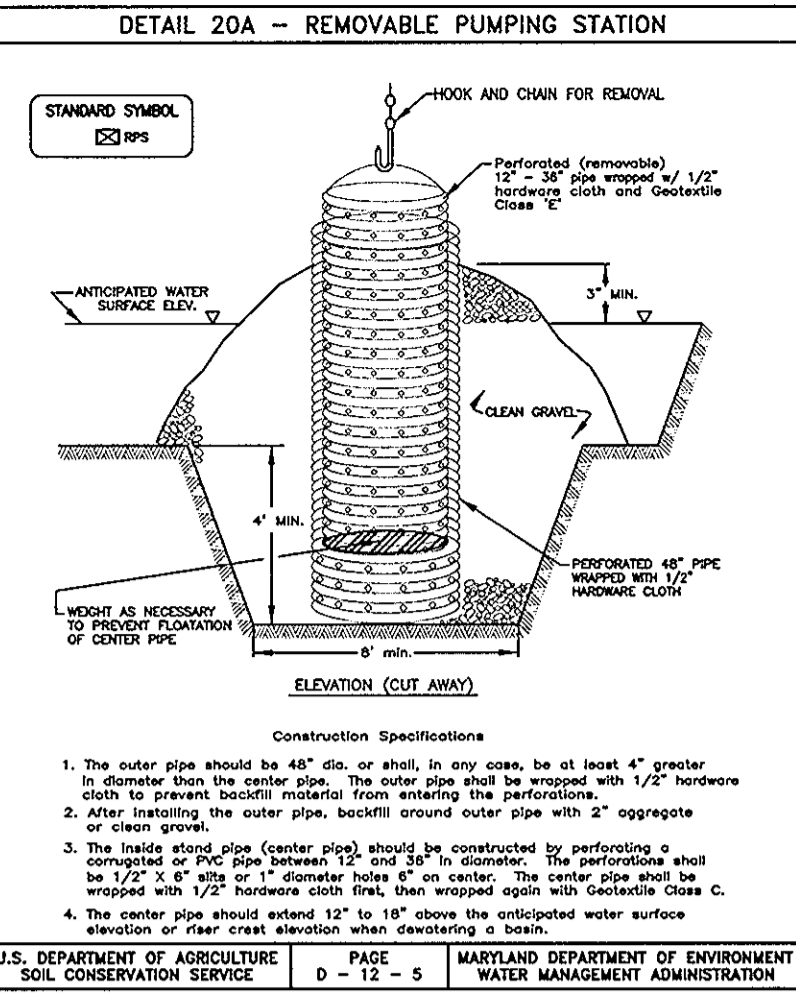
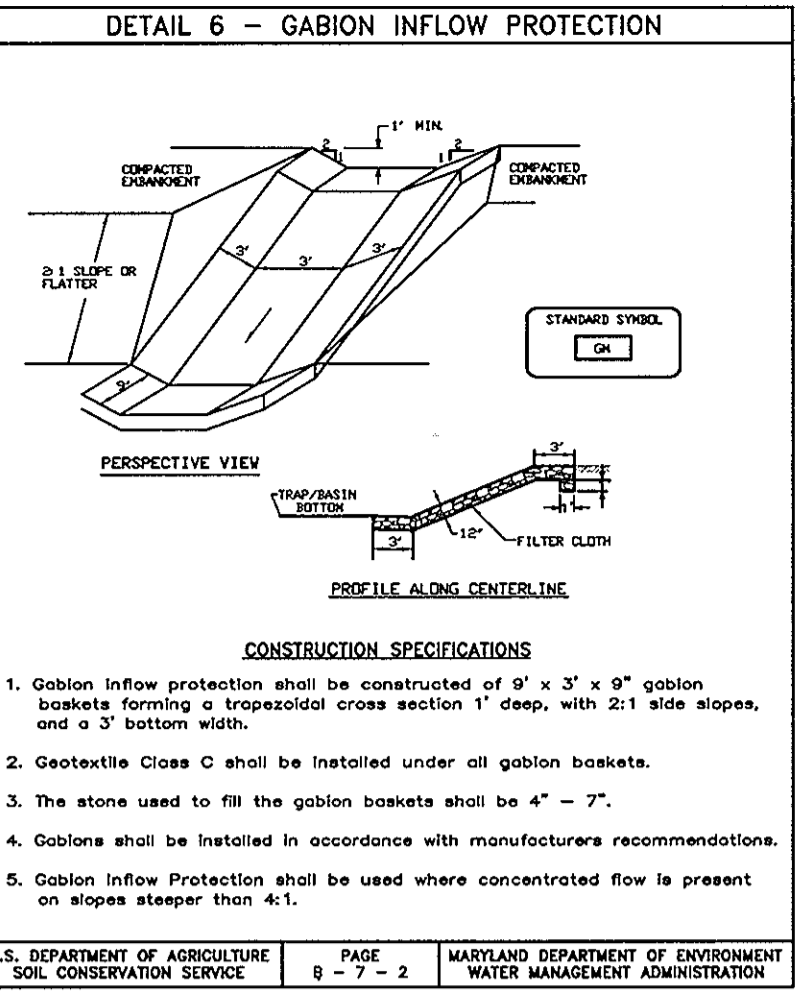
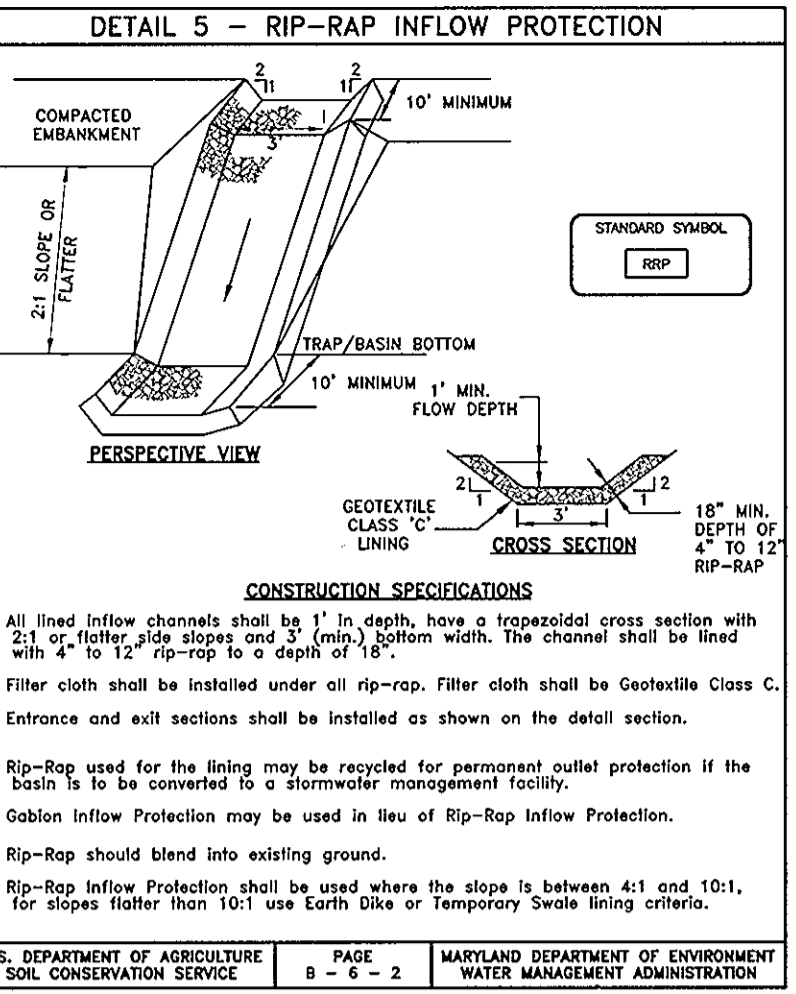
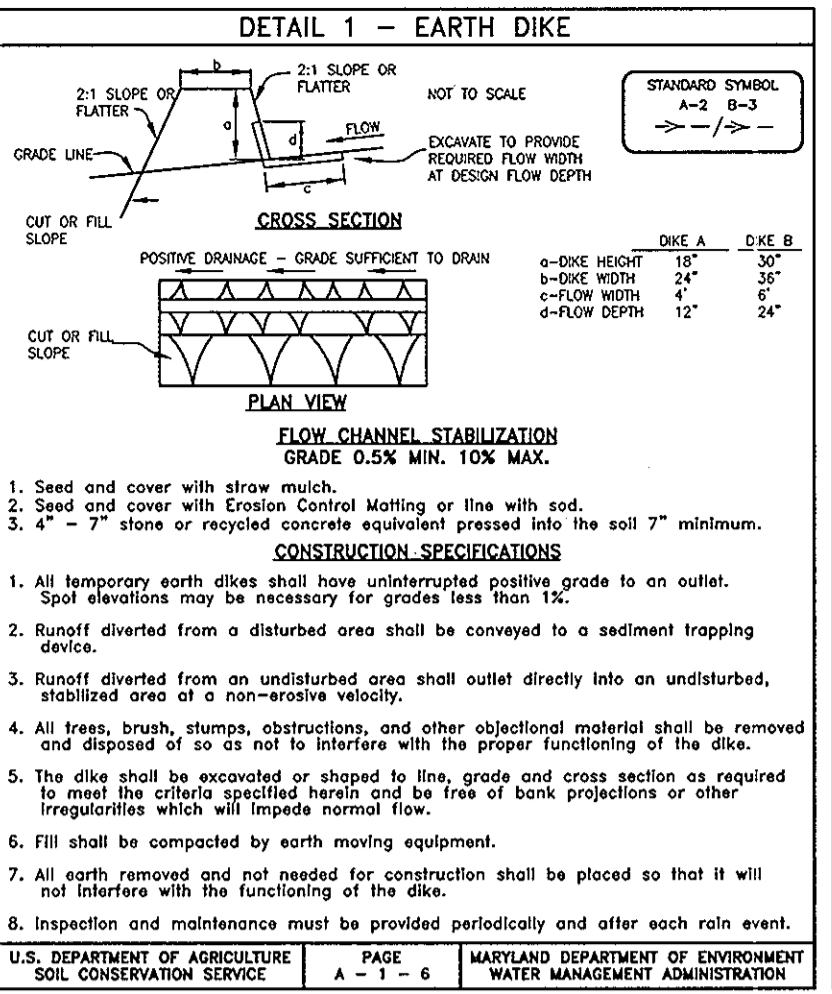
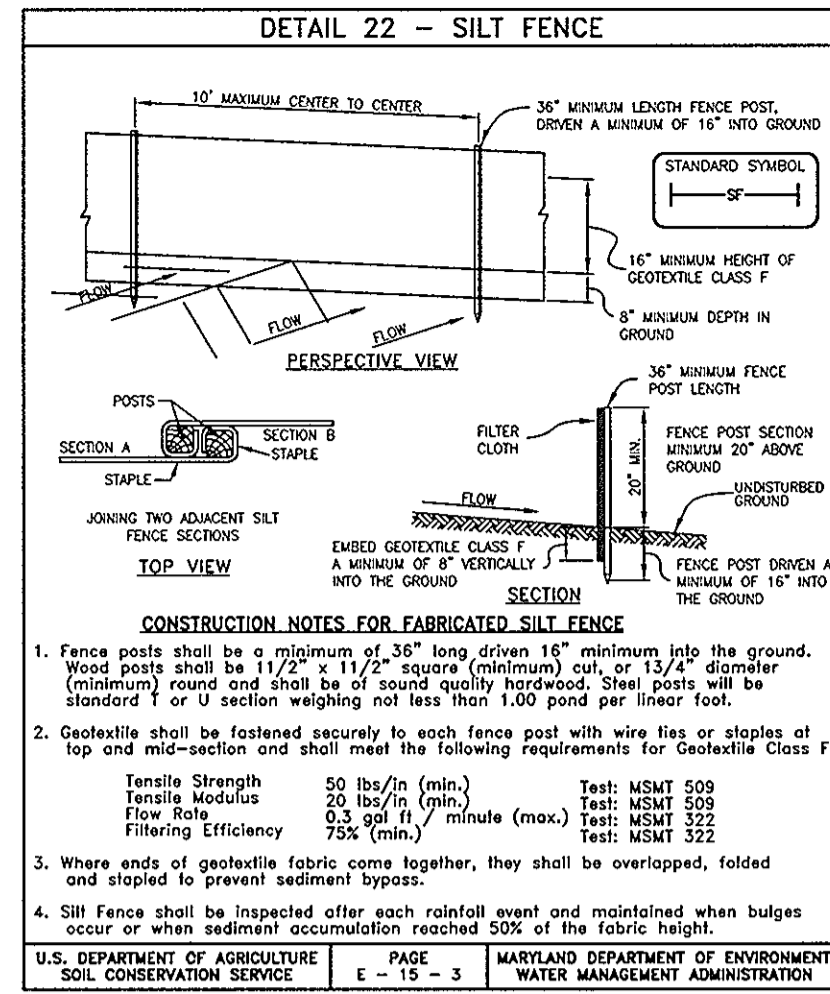
BENCHMARK ENGINEERING, INC.
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8480 BALTIMORE NATIONAL PIKE • SUITE 418
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PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELICOTT CITY, MD 21041 (410) 465-4244	PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A'
OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELK RIDGE, MD 21075	LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND
DES: DAM	TITLE: GRADING, SEDIMENT AND EROSION CONTROL PLAN
DRN: RPS	VP-86-130, F-88-20, S-01-04, PB-359, P-02-11
CHK: DAM	DATE: DECEMBER, 2003
SCALE: AS SHOWN	PROJECT NO. 1383
AS-BUILT	DRAWING 18 OF 33

SEDIMENT CONTROL NOTES

- 1. A MINIMUM OF 24 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTION, LICENSES AND PERMITS, SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION, (313-1850).

Table with 2 columns: Item, Value. Includes TOTAL AREA OF SITE (36.78 ACRES), AREA DISTURBED (21.74 ACRES), AREA TO BE ROOFED OR PAVED (11.51 ACRES), etc.



Professional Certification stamp for Donald Mason, Engineer, License No. 21443, Expiration Date: 12-21-12.

TEMPORARY SEEDBED PREPARATIONS

- APPLY TO GRADED OR CLEARED AREAS LIKELY TO BE REDISTURBED WHERE A SHORT-TERM VEGETATIVE COVER IS NEEDED.

TOPSOIL SPECIFICATIONS

- 1. Topsoil salvaged from the existing site may be used provided that it meets that standards as set forth in these specifications.

PERMANENT SEEDBED PREPARATIONS

- SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY LOOSENED.

SEQUENCE OF CONSTRUCTION

- DAY 1 OBTAIN GRADING PERMITS AND LETTER OF AUTHORIZATION FROM MDE. APPLICATION TRACKING NO. 03-NR-0297/2006BEN-10-01 MUST BE OBTAINED PRIOR TO DISTURBANCE OF THE STREAM OR WETLANDS FOR THE ROAD AND/OR UTILITY CROSSING.

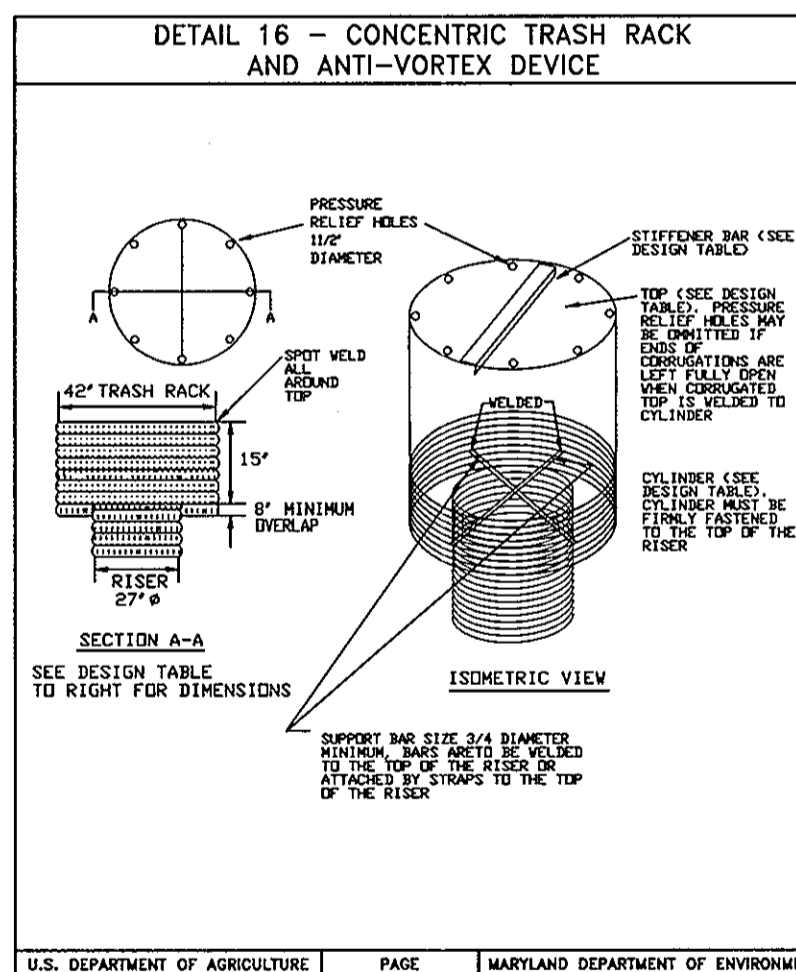
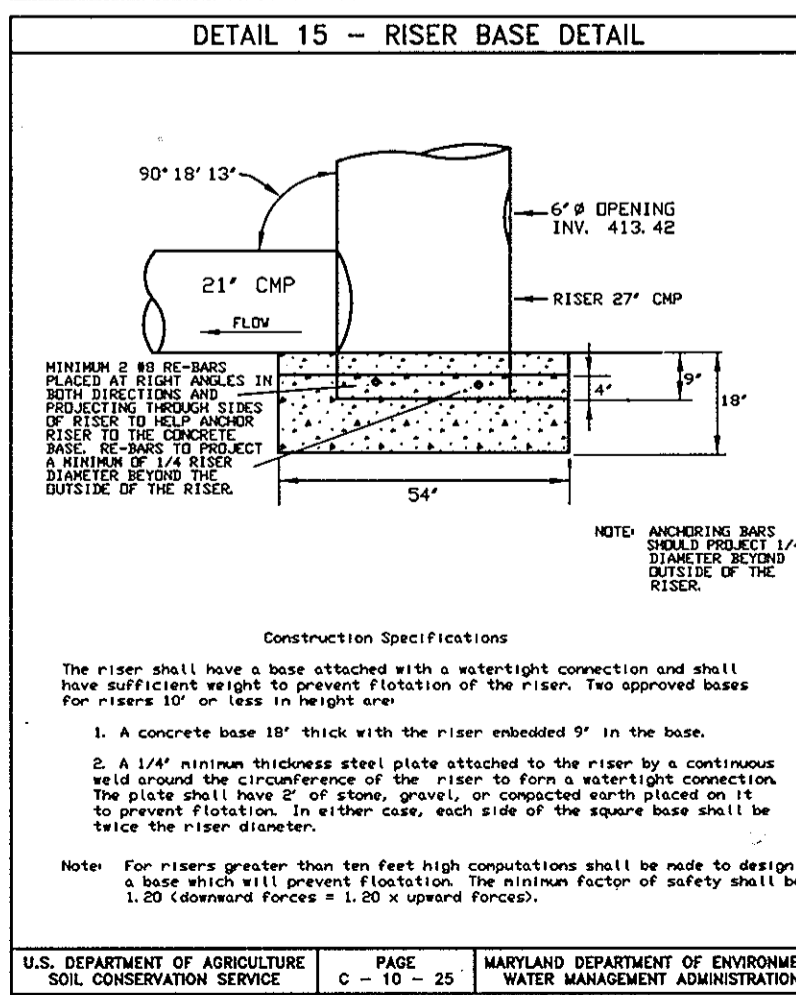
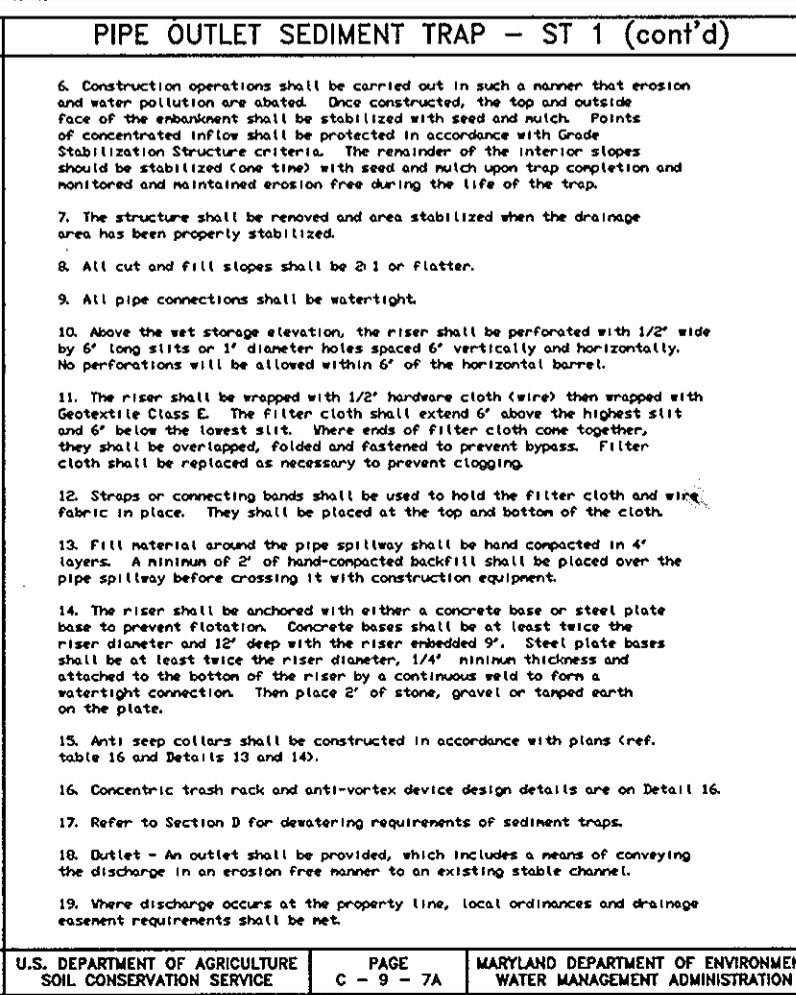
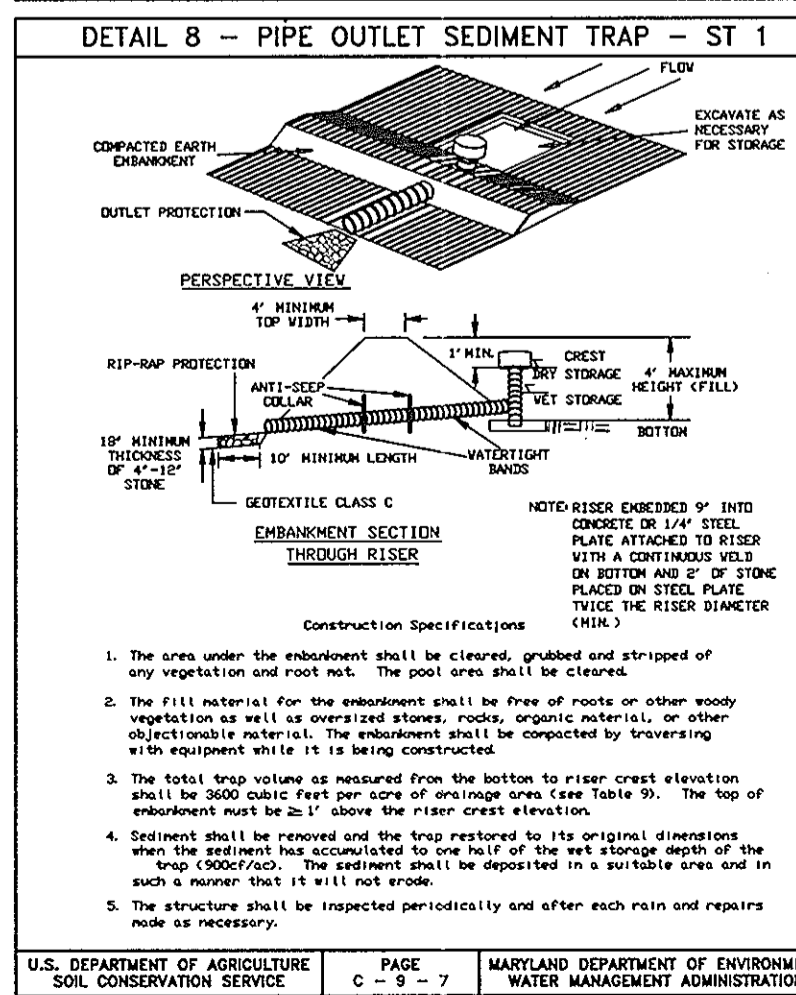
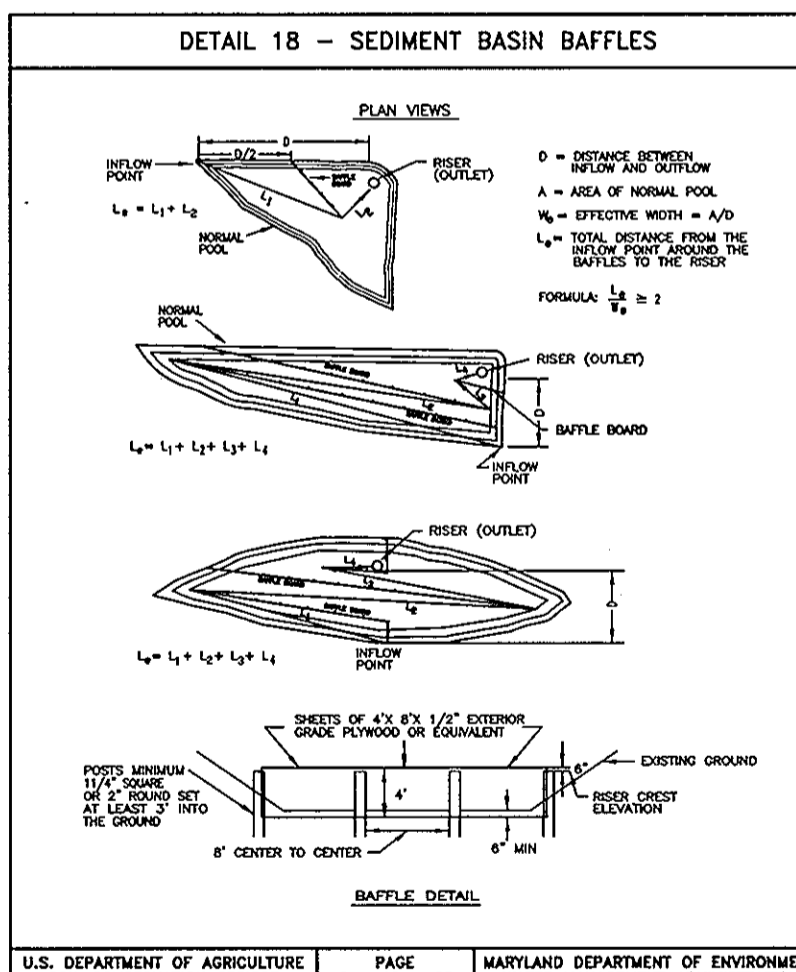
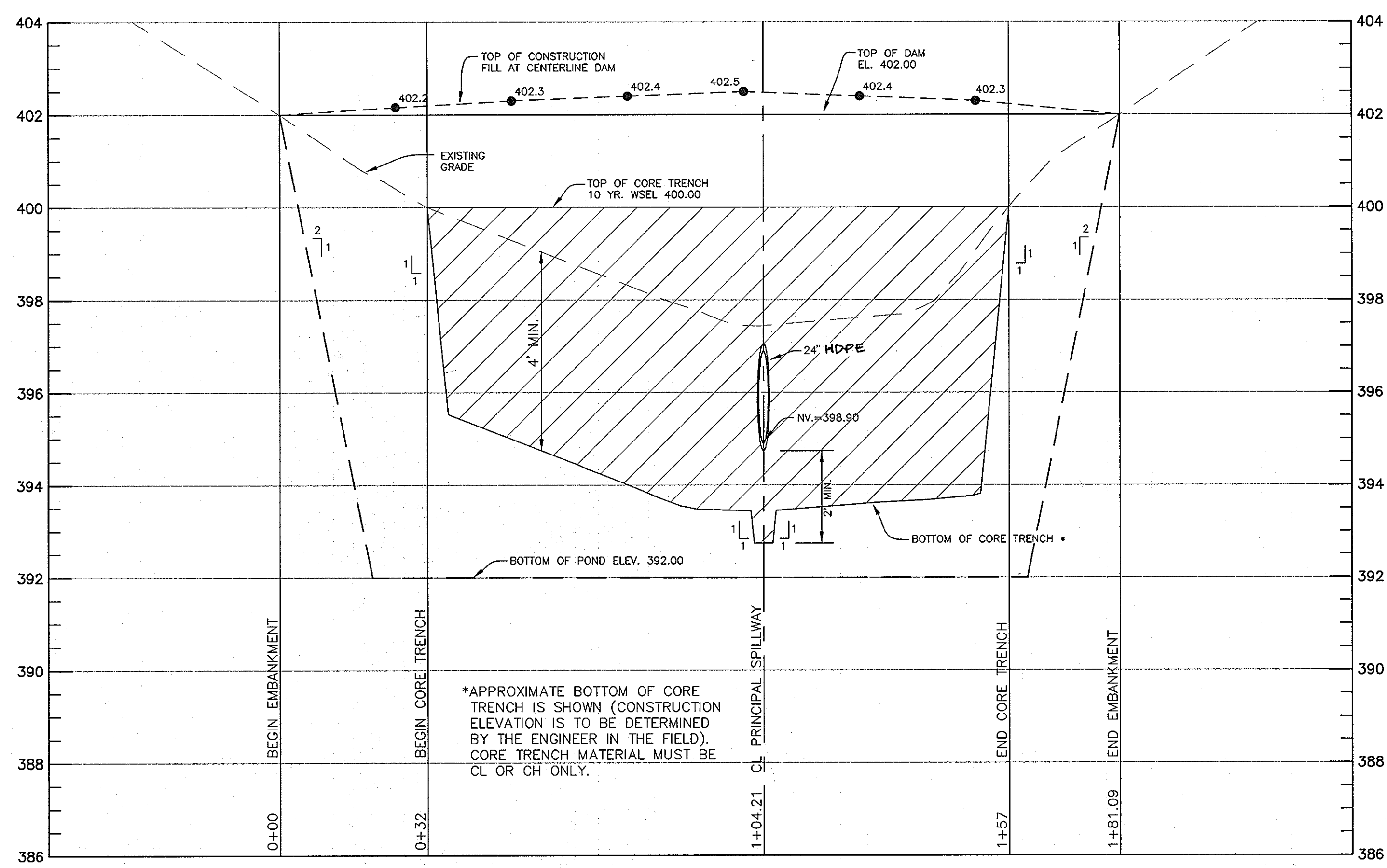


Table with columns: Riser, Trash Rack, Size, Material, Spacing, etc. for Detail 16.

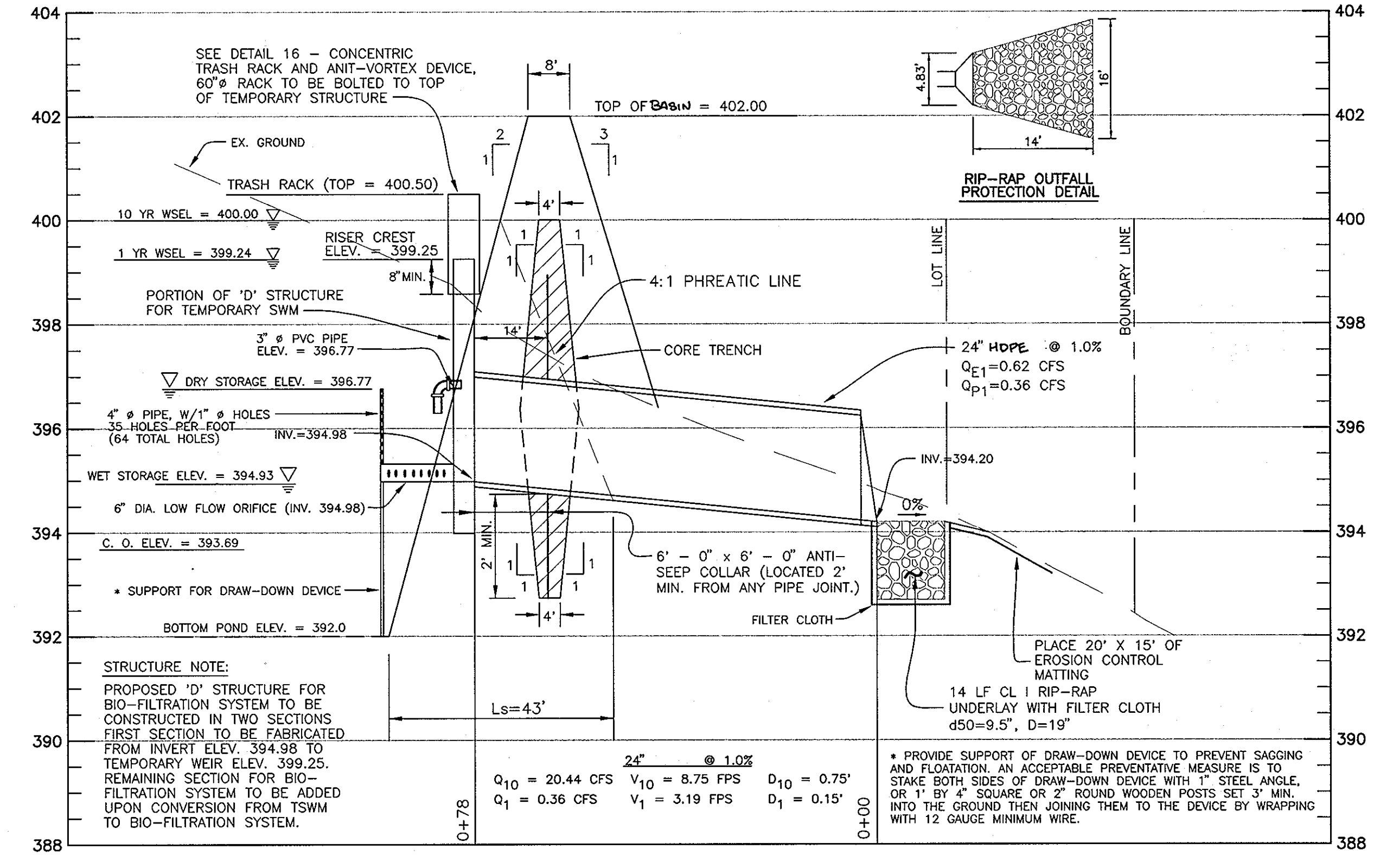


BENCHMARK ENGINEERING, INC. logo and contact information. Includes address, phone, fax, and project details for Cascade Overlook.



PROFILE ALONG CL EMBANKMENT BASIN #4

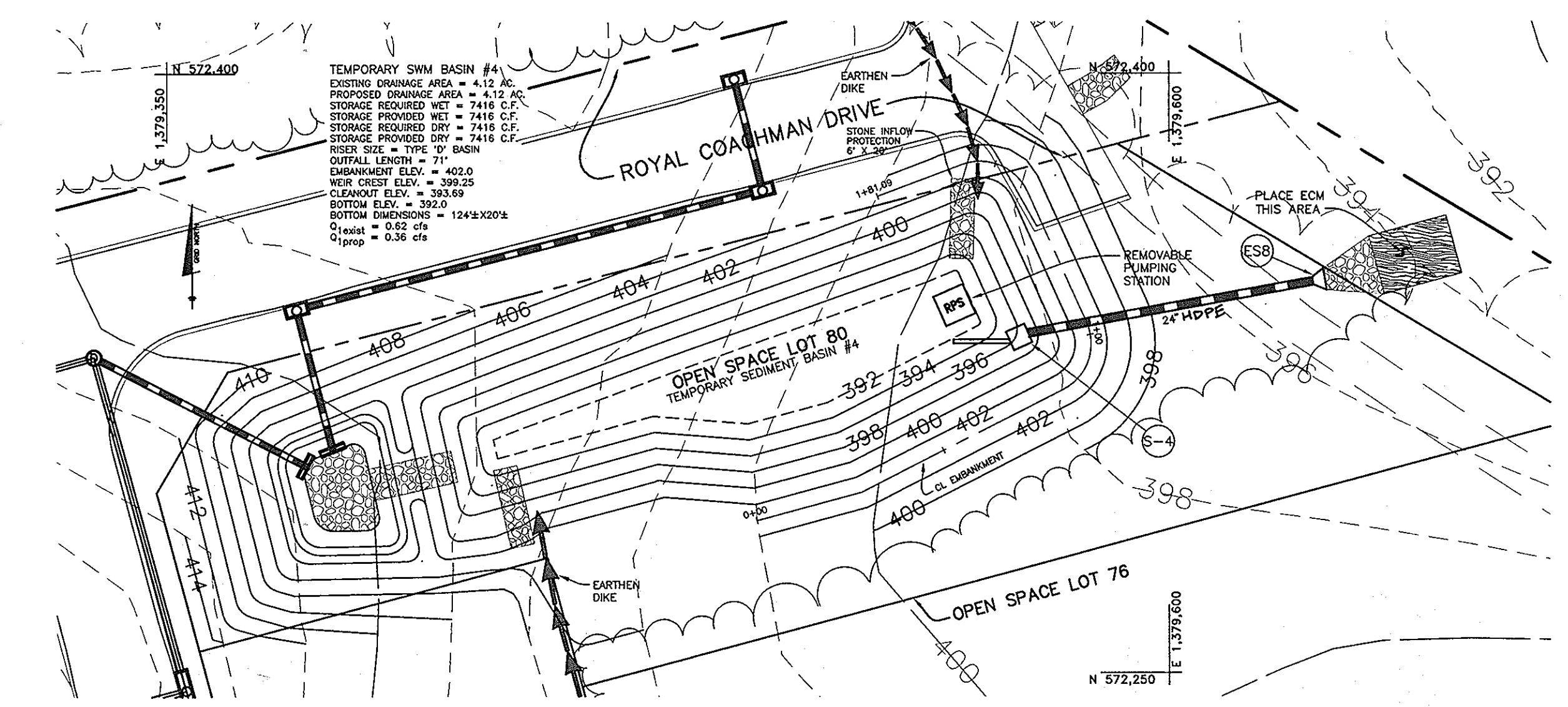
HORIZONTAL: 1"=20'
VERTICAL: 1"=2'



TEMP. SWM BASIN #4 EMBANKMENT SECTION THRU RISER

NOTE: 3" PVC PIPE FOR TEMPORARY SWM TO BE CUT OFF AND CAPPED AFTER CONVERSION TO BIO-FILTRATION FACILITY.

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



PLAN VIEW
SCALE: 1"=30'

CONSTRUCTION SPECIFICATIONS FOR SEDIMENT BASINS

BY THE DEVELOPER:	
*I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY 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 BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT.	
CASCADE OVERLOOK LLC By: <i>Steven K. Breeden</i> DEVELOPER	11/20/03 DATE
BY THE ENGINEER:	
*I/WE CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.	
<i>Donald Mason</i> ENGINEER - DONALD A. MASON, P.E. # 21443	11/19/03 DATE
THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL.	
<i>Jim Myers</i> NATURAL RESOURCES CONSERVATION SERVICE	12/14/03 DATE
THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.	
<i>William J. Whitman</i> HOWARD SOIL CONSERVATION DISTRICT	12/14/03 DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS	
<i>William J. Whitman</i> CHIEF, BUREAU OF HIGHWAYS	12-24-03 DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	
<i>Cindy Hamrick</i> CHIEF, DIVISION OF LAND DEVELOPMENT	1/19/04 DATE
<i>MAJ</i> CHIEF, DEVELOPMENT ENGINEERING DIVISION	12/20/03 DATE

- Site Preparation:** Perimeter sediment control devices must be installed prior to clearing and grubbing. Areas where the embankment is to be placed shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots or other objectionable material. The pool area shall not be cleared until completion of the dam embankment unless the pool area is to be used for borrow. In order to facilitate clean-out and restoration, the pool area (measured at the top of the pipe spillway) shall be cleared of all brush, trees, and other objectionable materials.
- Cut-off Trench:** A cut-off trench shall be excavated along the centerline of earth fill embankments. The minimum depth shall be four feet. The cut-off trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be two feet, but wide enough to permit operation of excavation and compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for the embankment. The trench shall be dewatered during the backfilling-compaction operations. For dewatering see Section D.
- Embankment:** The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks, or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) or organic materials (Unified Soil Classes CL and OH) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction. Fill material shall be placed in six-inch to eight-inch thick continuous lifts over the entire length of the fill. Compaction shall be obtained by roving and hauling the construction equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement.
- Principal Spillway:** Steel risers shall be securely attached to the barrel or barrel stub by welding the full circumference making a watertight structural connection. Concrete risers shall be poured with the principal spillway in place or precast with voids around the principal spillway filled with concrete or shrink proof grout for watertight connection. The barrel stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between barrel sections must be achieved by approved watertight band assemblies. The barrel and riser shall be placed on a firm, smooth foundation of impervious soil as the embankment is constructed. Breaching the embankment to install the barrel backfill around the pipe or anti-scoop collars. The fill material around the pipe spillway shall be placed in four inch lifts and hand compacted under and around the pipe to at least the same density as the adjacent embankment. A depth of 1.5 times the pipe diameter (min.) shall be backfilled over the principal spillway and hand compacted before crossing it with construction equipment.
- Emergency Spillway:** The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of ± 0.2 feet.

- Vegetative Treatment:** Stabilize the embankment in accordance with the appropriate vegetative Standard and Specifications immediately following construction. In no case shall the embankment remain unstabilized for more than seven (7) days. Once constructed, the top and outside face of the embankment shall be stabilized with seed and mulch. The remainder of the interior slopes should be stabilized (one time) with seed and mulch upon basin completion and monitored and maintained erosion free during the life of the basin.
- Safety:** Local requirements concerning fencing and signs shall be met, warning the public of hazards of soft sediment and floodwater.
- Maintenance:** Repair all damage caused by soil erosion and construction equipment at or before the end of each working day. Sediment shall be removed from the basin when it reaches the specified distance below the top of the riser as shown on the plan. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain. Disposal areas must be stabilized.
- Final Disposal:** When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the basin material and trapped sediments must be removed and safely disposed of and the basin shall be backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry (using methods in Section D - Dewatering), graded, and back filled.
- Conversion to Stormwater Management Structure:** After permanent stabilization of all disturbed contributory drainage areas, temporary sediment basins, if initially built and certified to meet permanent standards, may be converted to permanent stormwater management structures. To convert the basin from temporary to permanent use, the outlet structure must be modified in accordance with approved stormwater management design plans. Additional grading may also be necessary to provide the required storage volume in the basin. Conversion can only take place after all disturbed areas have been permanently stabilized to the satisfaction of the inspection authority and storm drains have been flushed.

DETAIL 16 - CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE		DETAIL 16 - CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE (cont'd)	
Riser Elev. (ft.)	Trash Rack Size (in. x in.)	Minimum Size Support Bar (in.)	Minimum Top Thickness (in.)
12	18	16	6
15	21	16	7
18	27	16	8
21	30	16	11
24	36	16	13
27	42	16	15
30	54	14	17
36	60	14	19
48	72	12	21
54	78	12	25
60	90	12	29
66	96	10	33
72	102	10	36
78	114	10	39
84	120	10	42

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. 21443, Expiration Date: 12-21-12
No As-Built Information is required on this sheet

2	5-25-2011	REVISE PIPE FROM ESB TO SA TO BE HDPE
3	5-25-2011	REVISE HDPE TO RCP CL IV
NO	DATE	REVISION

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER: CASCADE OVERLOOK, L.L.C.
P.O. BOX 417
ELICOTT CITY, MD 21041
(410) 465-4244

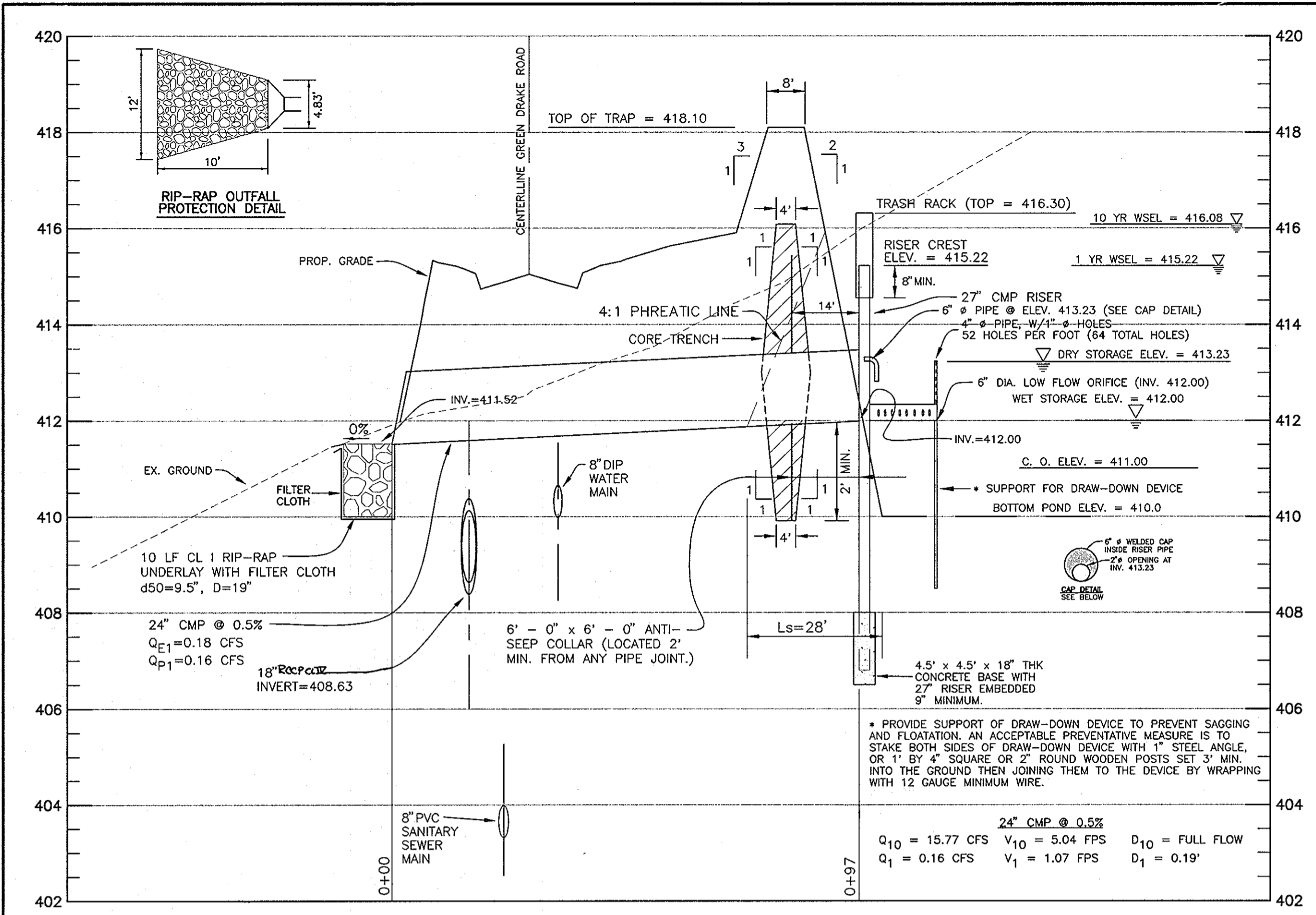
OWNER: CRAIG R. AND KAREN C. MARTIN
4937 LANDING ROAD
ELKRIDGE, MD 21075

PROJECT: CASCADE OVERLOOK SECTION ONE
LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND 100-UNBUILDABLE PARCELS 'X'

TITLE: TEMPORARY SWM BASIN #4
VP-88-130, F-88-20, S-01-04, PB-359, P-02-11

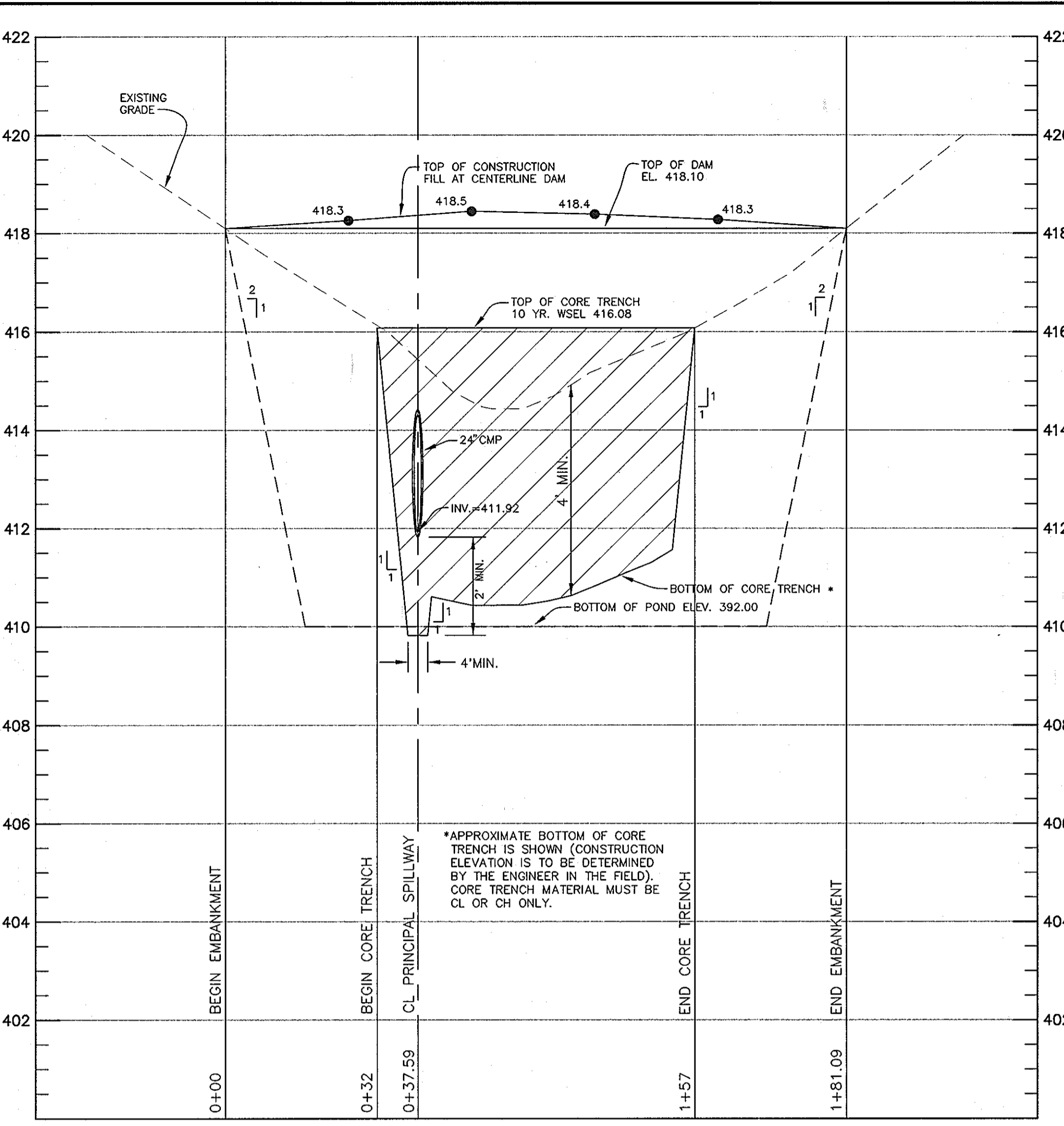
DATE: OCTOBER, 2003 PROJECT NO. 1383

DES: DAM DRN: RPS CHK: DAM SCALE: AS SHOWN DRAWING 20 OF 33



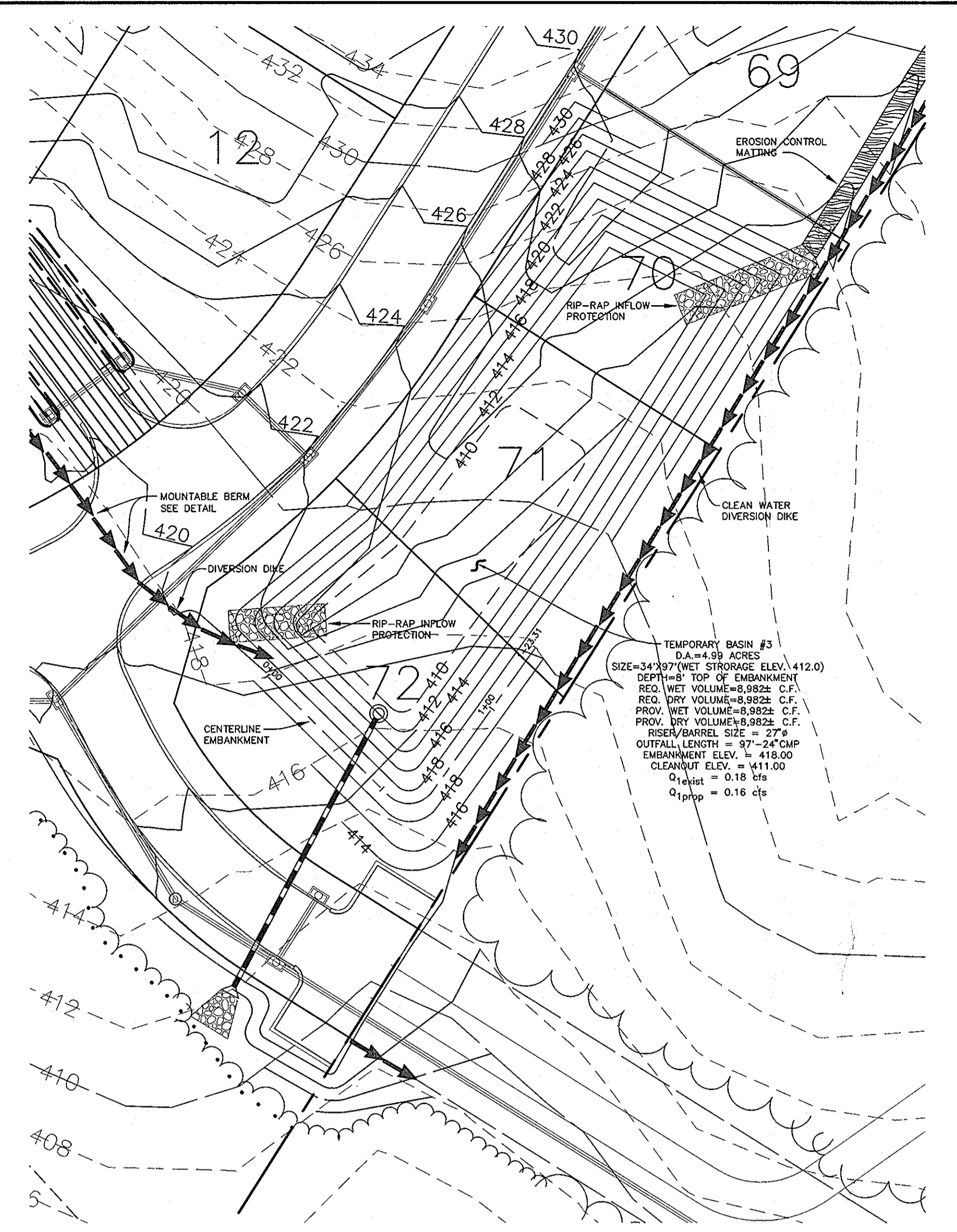
TEMP. SWM BASIN #3 EMBANKMENT SECTION THRU RISER

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



PROFILE ALONG CL EMBANKMENT TSWM BASIN #3

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



PLAN VIEW
SCALE: 1"=30'

NOTE: SAFETY FENCE TO BE PLACED ALONG ENTIRE LENGTH OF DIKE EXCEPT IN AREA OF MOUNTABLE BERM TO PERMIT CONSTRUCTION TRAFFIC TO CROSS DIKE.

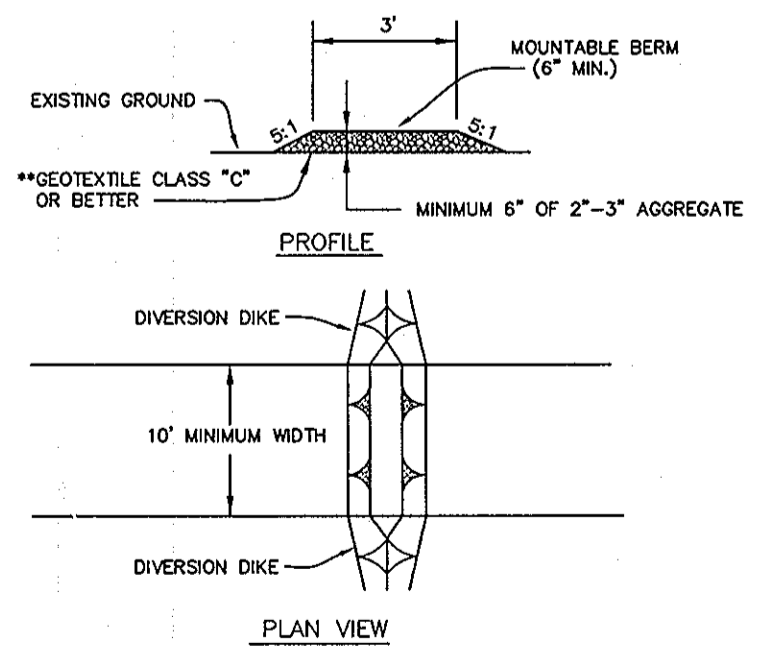
1.) FENCE POST TO BE A MINIMUM OF 6' LONG DRIVEN 16" INTO THE GROUND. POSTS TO BE 1 1/2" X 1 1/2" SQUARE (MINIMUM). STEEL POSTS WILL BE STANDARD T OR U SECTION.

2.) FENCING TO BE PLACED ALONG INTERIOR DIVERSION DIKES. DIKES ALONG PERIMETER OR ALONG EDGE OF CONSTRUCTION AREA AWAY FROM DIRECT TRAFFIC WILL NOT REQUIRE SAFETY FENCING.

3.) FENCING TO BE MAINTAINED UNTIL DIVERSION DIKES ARE REMOVED.

DIVERSION DIKE TRAFFIC PROTECTION FENCING DETAIL

NOT TO SCALE



MOUNTABLE BERM DETAIL

NOT TO SCALE

- Site Preparation:** Perimeter sediment control devices must be installed prior to clearing and grubbing. Areas where the embankment is to be placed shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots or other objectionable material. The pool area shall not be cleared until completion of the dam embankment unless the pool area is to be used for borrow. In order to facilitate clean-out and restoration, the pool area (measured at the top of the pipe spillway) shall be cleared of all brush, trees, and other objectionable materials.
- Cut-off Trench:** A cut-off trench shall be excavated along the centerline of earth fill embankments. The minimum depth shall be four feet. The cut-off trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be two feet, but wide enough to permit operation of excavation and compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for the embankment. The trench shall be dewatered during the backfilling-compaction operations. For dewatering see Section D.
- Embankment:** The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, overrotted stumps, rocks, or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) or organic materials (Unified Soil Classes OL and OH) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction. Fill material shall be placed in six-inch to eight-inch thick continuous lifts over the entire length of the fill. Compaction shall be obtained by routing and limiting the construction equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement.
- Principal Spillway:** Steel risers shall be securely attached to the barrel or barrel stub by welding the full circumference making a watertight structural connection. Concrete risers shall be poured with the principal spillway in place or precast with voids around the principal spillway filled with concrete or shrink proof grout for watertight connection. The barrel stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between barrel sections must be achieved by approved watertight band assemblies. The barrel and riser shall be placed on a firm, smooth foundation of impervious soil as the embankment is constructed. Breaching the embankment to install the barrel is unacceptable. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collars. The fill material around the pipe spillway shall be placed in four inch lifts and hand compacted under and around the pipe to at least the same density as the adjacent embankment. A depth of 1.5 times the pipe diameter (min.) shall be backfilled over the principal spillway and hand compacted before crossing it with construction equipment.
- Emergency Spillway:** The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of ± 0.2 feet.

- Vegetative Treatment:** Stabilize the embankment in accordance with the appropriate vegetative Standard and Specifications immediately following construction. In no case shall the embankment remain unstabilized for more than seven (7) days. Once constructed, the top and outside face of the embankment shall be stabilized with seed and mulch. The remainder of the interior slopes should be stabilized (one time) with seed and mulch upon basin completion and monitored and maintained erosion free during the life of the basin.
- Safety:** Local requirements concerning fencing and signs shall be met, warning the public of hazards of soft sediment and floodwater.
- Maintenance:** Repair all damage caused by soil erosion and construction equipment at or before the end of each working day. Sediment shall be removed from the basin when it reaches the specified distance below the top of the riser as shown on the riser. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain. Disposal areas must be stabilized.
- Final Disposal:** When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment disposal site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the basin material and trapped sediments must be removed and safely disposed of and the basin shall be backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry (using methods in Section D - Dewatering), graded, and back filled.
- Conversion to Stormwater Management Structure:** After permanent stabilization of all disturbed contributory drainage areas, temporary sediment basins, if initially built and certified to meet permanent standards, may be converted to permanent stormwater management structures. To convert the basin from temporary to permanent use, the outlet structure must be modified in accordance with approved stormwater management design plans. Additional grading may also be necessary to provide the required storage volume in the basin. Conversion can only take place after all disturbed areas have been permanently stabilized to the satisfaction of the inspection authority and storm drains have been flushed.

BY THE DEVELOPER:
I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY 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 BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT.

CASCADE OVERLOOK LLC
BY: *Steven K. Boeschen* MEMBER 11/20/03
STEVEN K. BOESCHEN DATE

BY THE ENGINEER:
I/WE CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTICED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

Donald Mason 11/16/03
ENGINEER - DONALD A. MASON, P.E. # 21443 DATE

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL.

Jim Meyer 12/16/03
NATURAL RESOURCES CONSERVATION SERVICE DATE

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

12/16/03
HOWARD SOIL CONSERVATION DISTRICT DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
12-24-03
WILLIAM J. WILSON, JR. DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
1/14/04
CINDY HANCOCK DATE

12/21/03
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

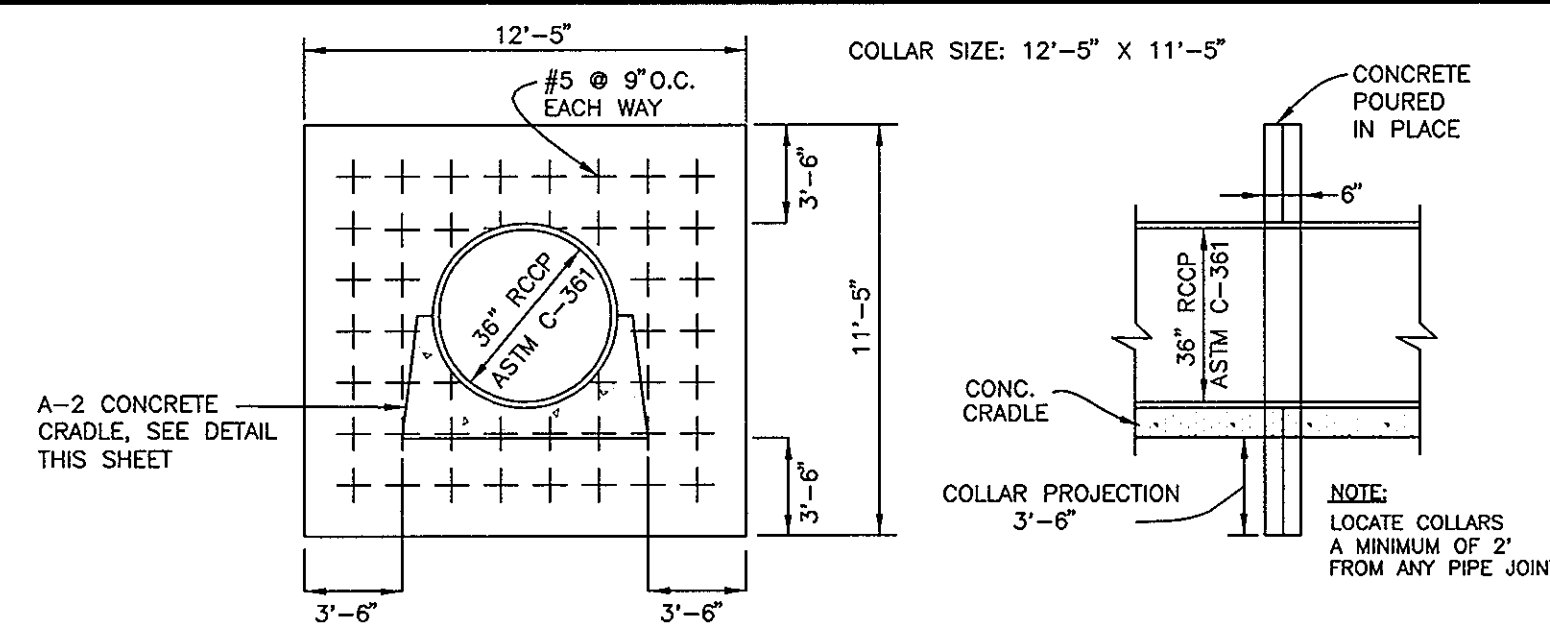
CONSTRUCTION SPECIFICATIONS FOR SEDIMENT BASINS



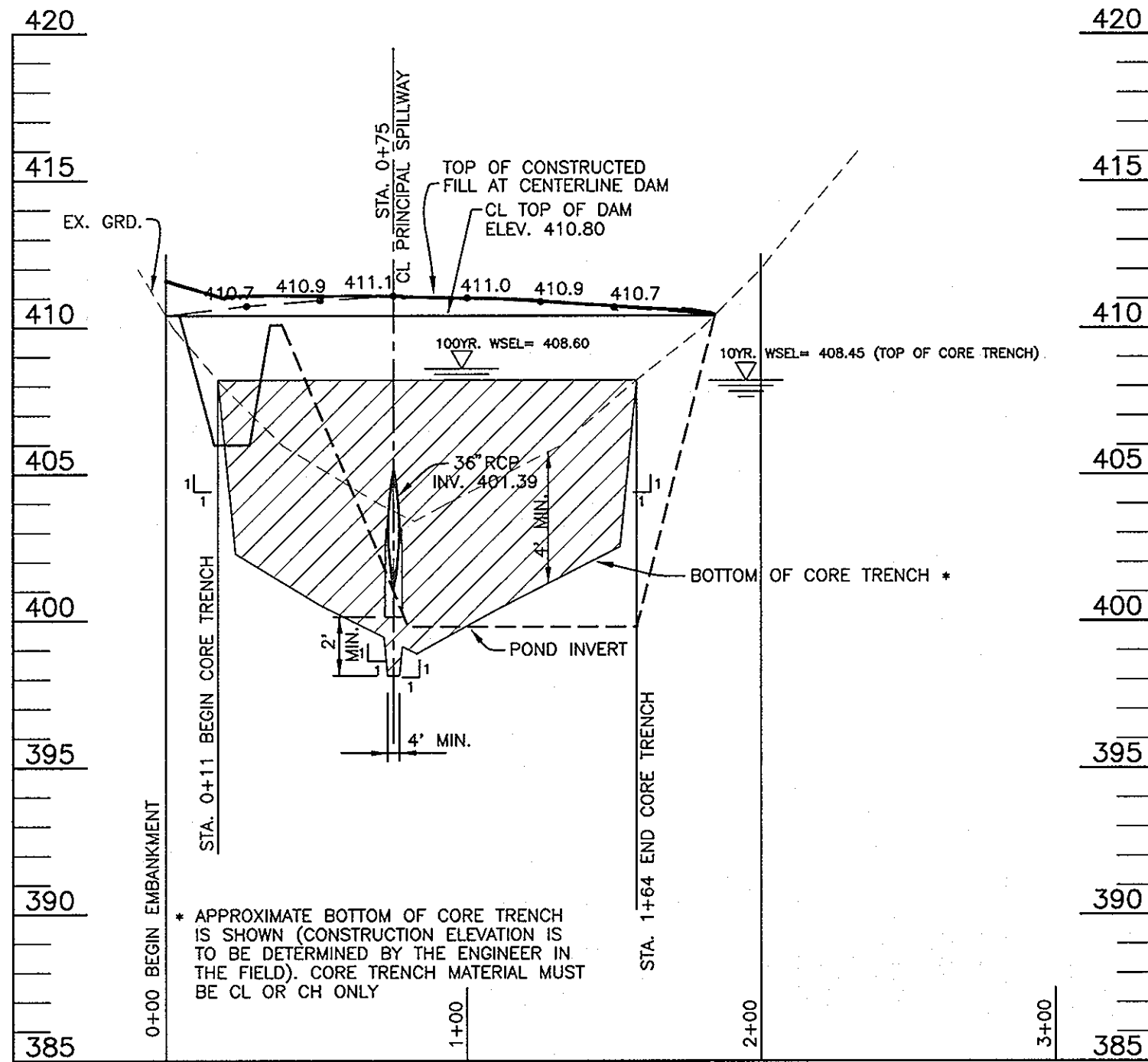
Professional Certification I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 21443 Expiration Date: 12-21-12

No As-Built information is required on this sheet

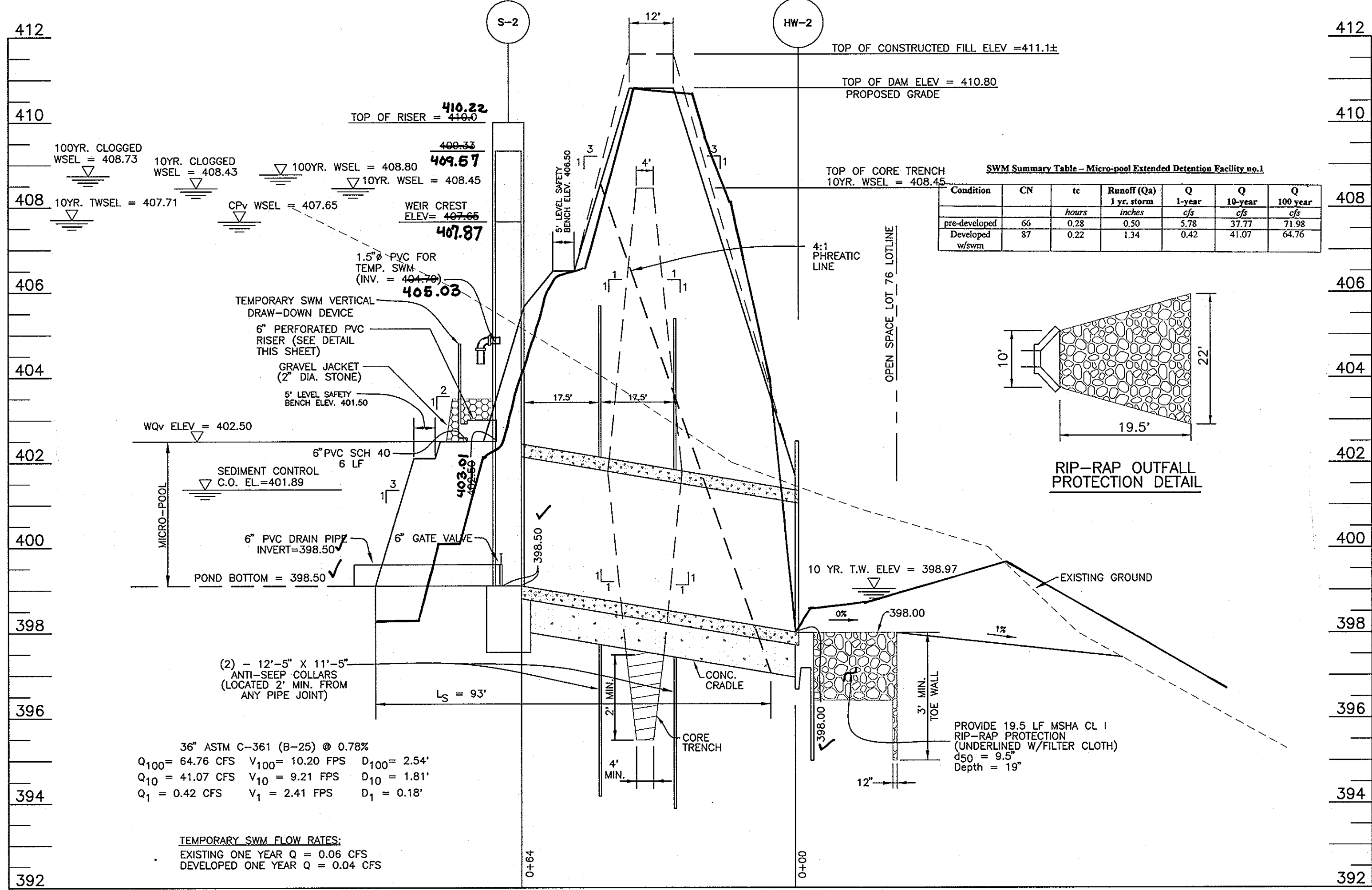
<p>REVISION</p> <p>NO. DATE REVISION</p>	
<p>REVISION: S-25-04 REVISE HDPEP TO RCP CL IV</p>	
<p>BENCHMARK ENGINEERING, INC. ENGINEERS • LAND SURVEYORS • PLANNERS</p> <p>8480 BALTIMORE NATIONAL PIKE • SUITE 418 ELLCOTT CITY, MARYLAND 21043 PHONE: 410-465-6105 FAX: 410-465-6644</p>	
<p>OWNER/DEVELOPER CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELLCOTT CITY, MD 21041 (410) 465-4244</p>	<p>PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A'</p> <p>LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND</p>
<p>OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELKRIDGE, MD 21075</p>	<p>TITLE: TEMPORARY SWM BASIN #3, PROFILES AND SEDIMENT CONTROL DETAILS VP-86-130, F-88-20, S-01-04, PB-359, P-02-11</p> <p>DATE: OCTOBER, 2003 PROJECT NO. 1383</p>
<p>DES: DAM DRN: RPS CHK: DAM</p>	<p>SCALE: AS SHOWN DRAWING: 21 OF 33</p>



ANTI-SEEP COLLAR - POND #1
NOT TO SCALE



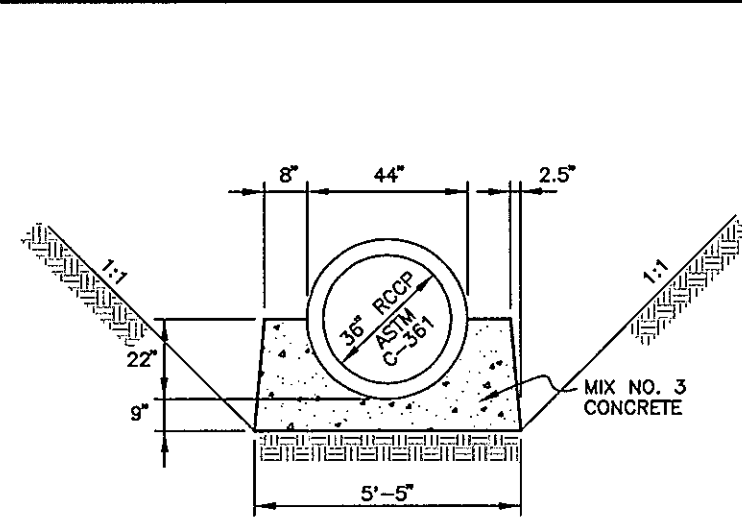
PROFILE ALONG CL OF EMBANKMENT
SECTION A-A POND #1
SCALE: 1"=50' HORIZ., 1"=5' VERT.



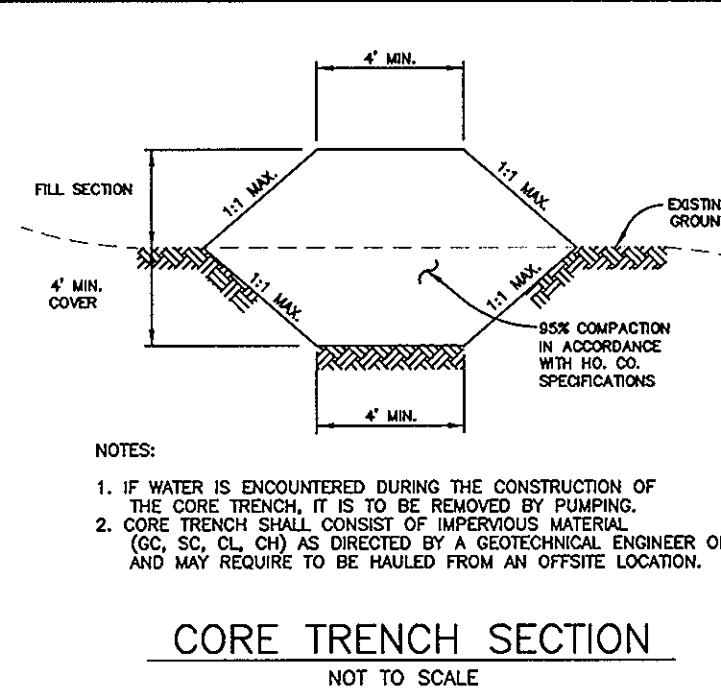
SECTION THRU PRINCIPAL SPILLWAY
SECTION B-B
POND #1
SCALE: 1"=20' HORIZ., 1"=2' VERT.

36" ASTM C-361 (B-25) @ 0.78%
Q₁₀₀ = 64.76 CFS V₁₀₀ = 10.20 FPS D₁₀₀ = 2.54'
Q₁₀ = 41.07 CFS V₁₀ = 9.21 FPS D₁₀ = 1.81'
Q₁ = 0.42 CFS V₁ = 2.41 FPS D₁ = 0.18'

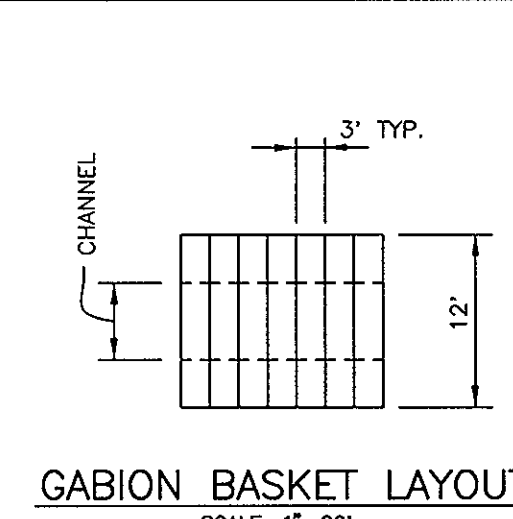
TEMPORARY SWM FLOW RATES:
EXISTING ONE YEAR Q = 0.06 CFS
DEVELOPED ONE YEAR Q = 0.04 CFS



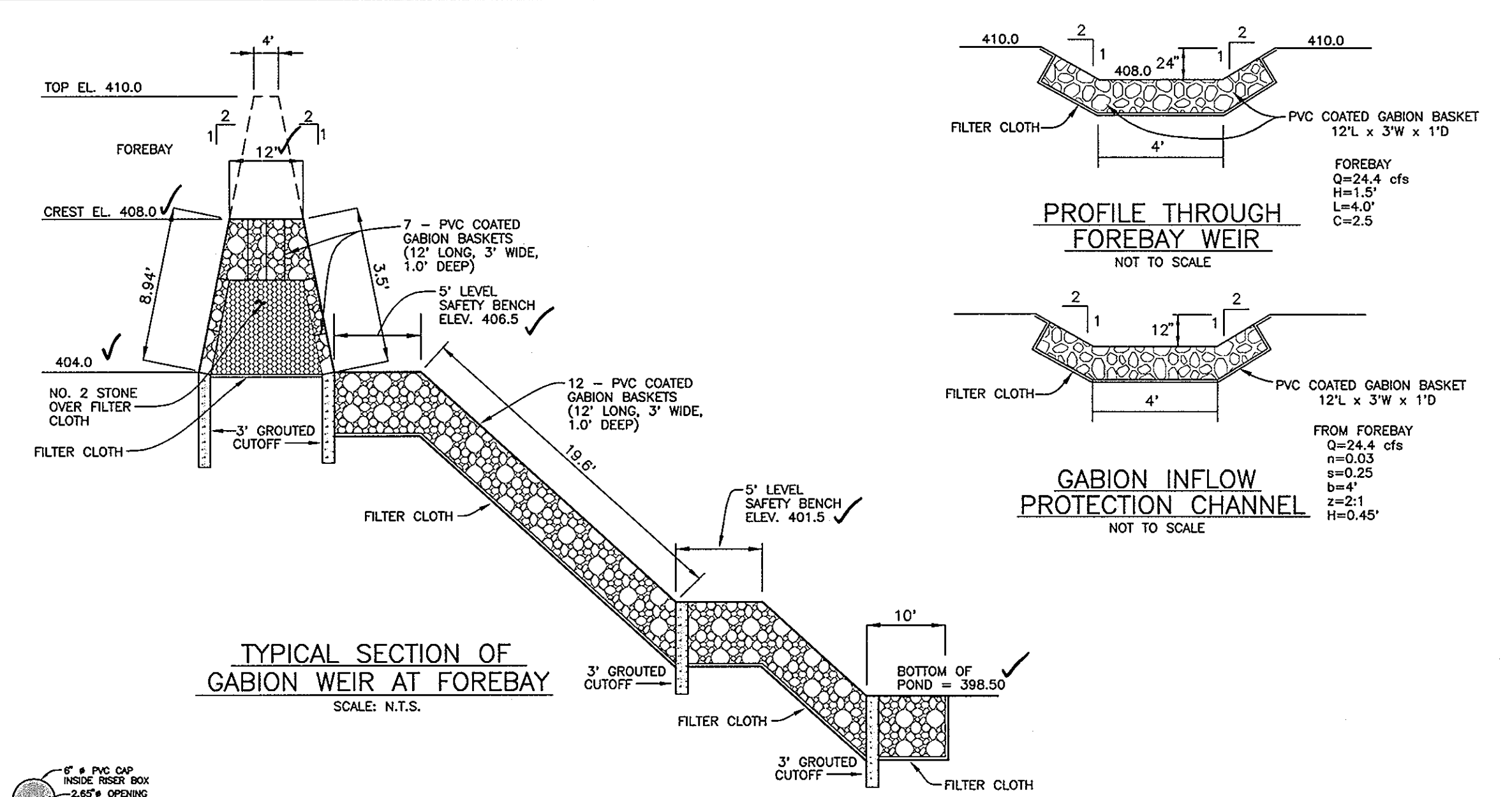
POND #1 TYPE A-2
CONCRETE CRADLE
NOT TO SCALE



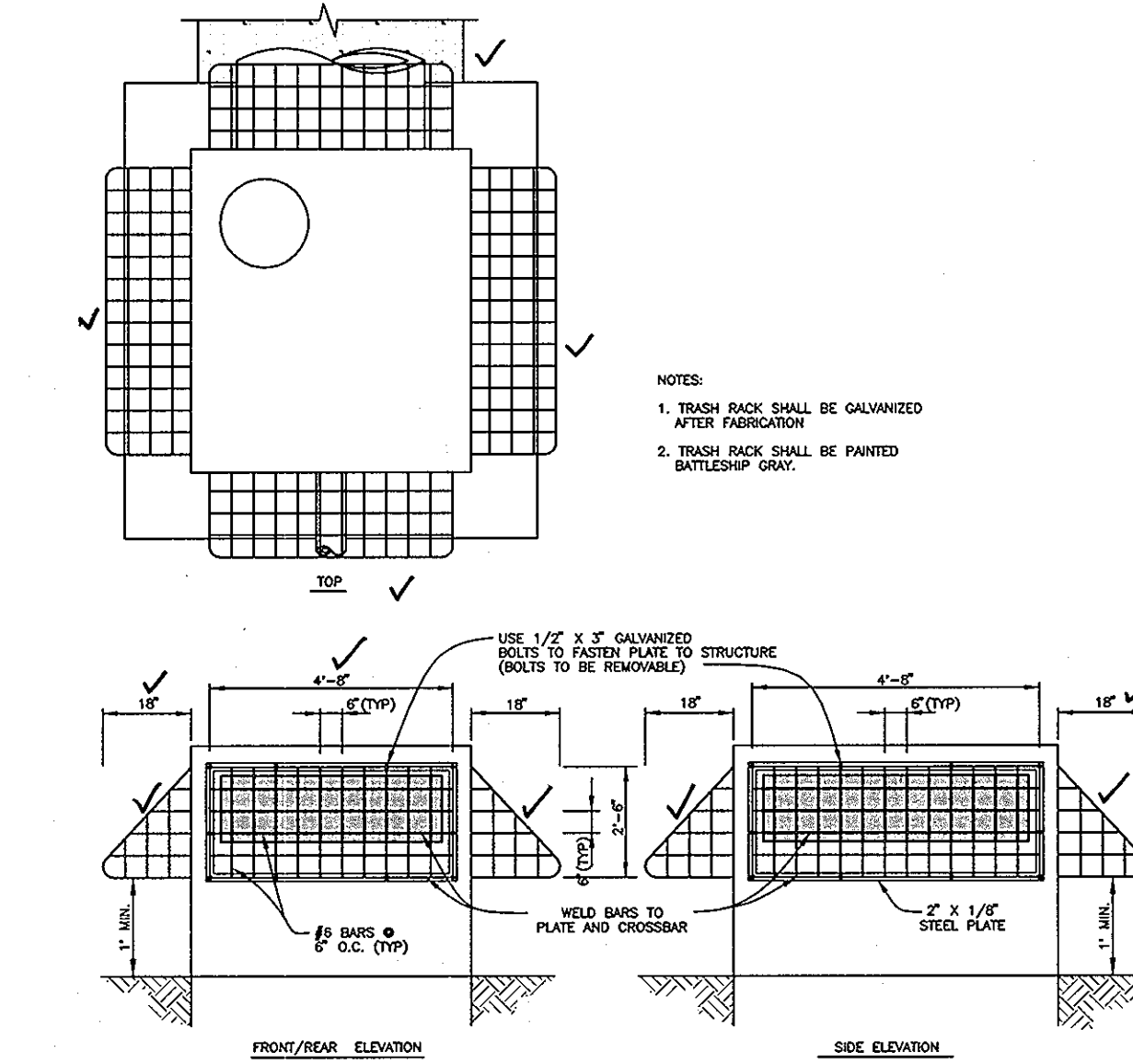
CORE TRENCH SECTION
NOT TO SCALE



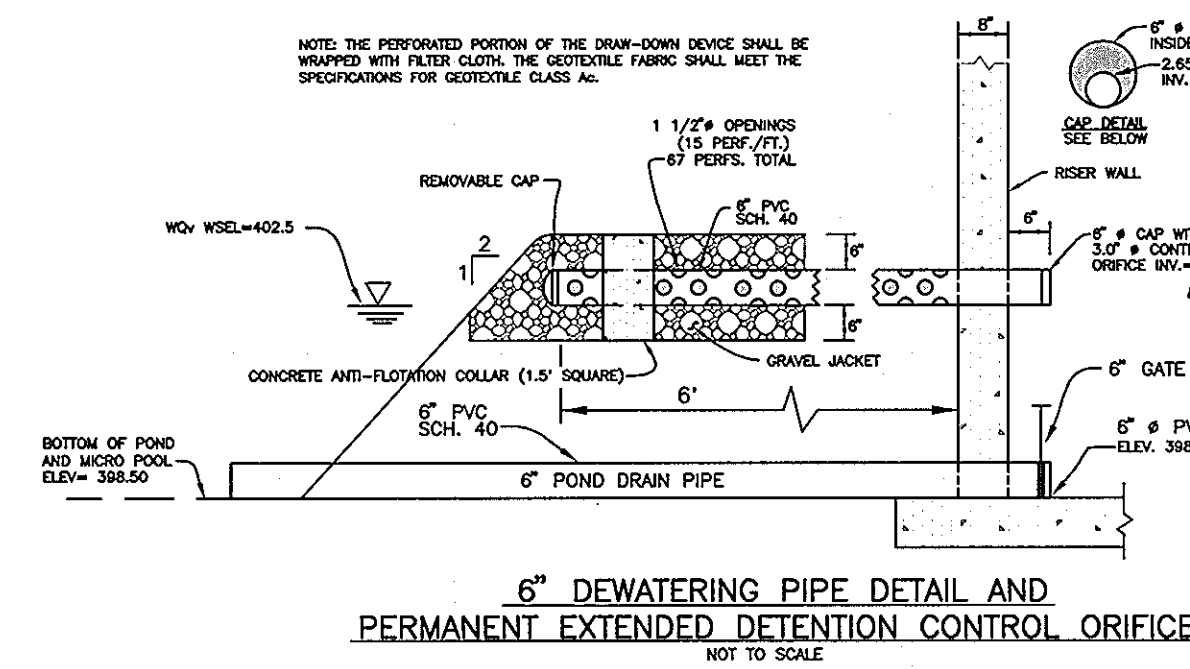
GABION BASKET LAYOUT
SCALE: 1"=20'



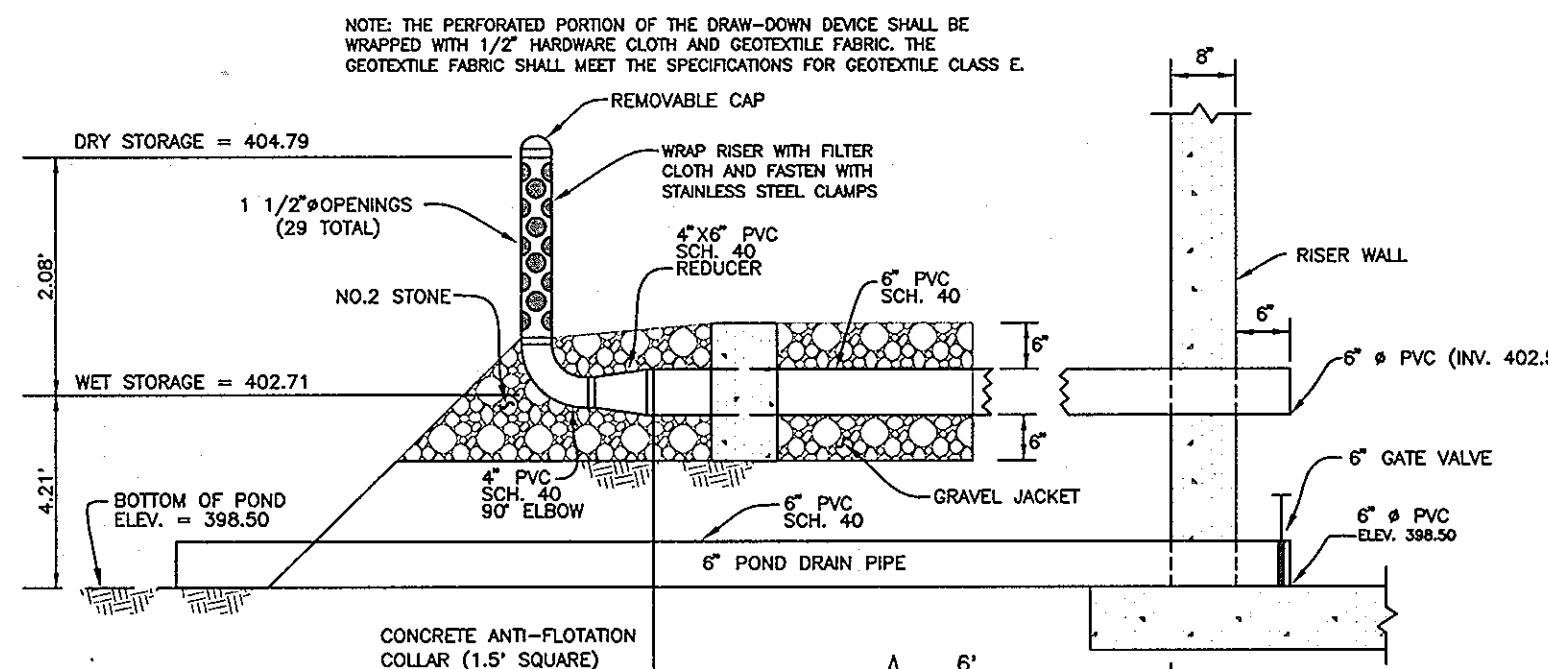
TYPICAL SECTION OF
GABION WEIR AT FOREBAY
SCALE: N.T.S.



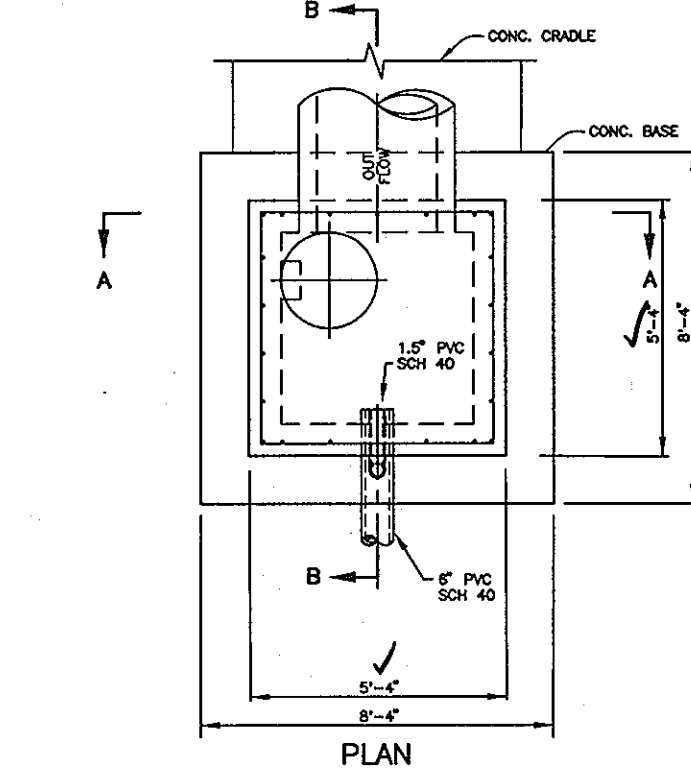
TRASH RACK DETAIL - POND #1
SCALE: N.T.S.



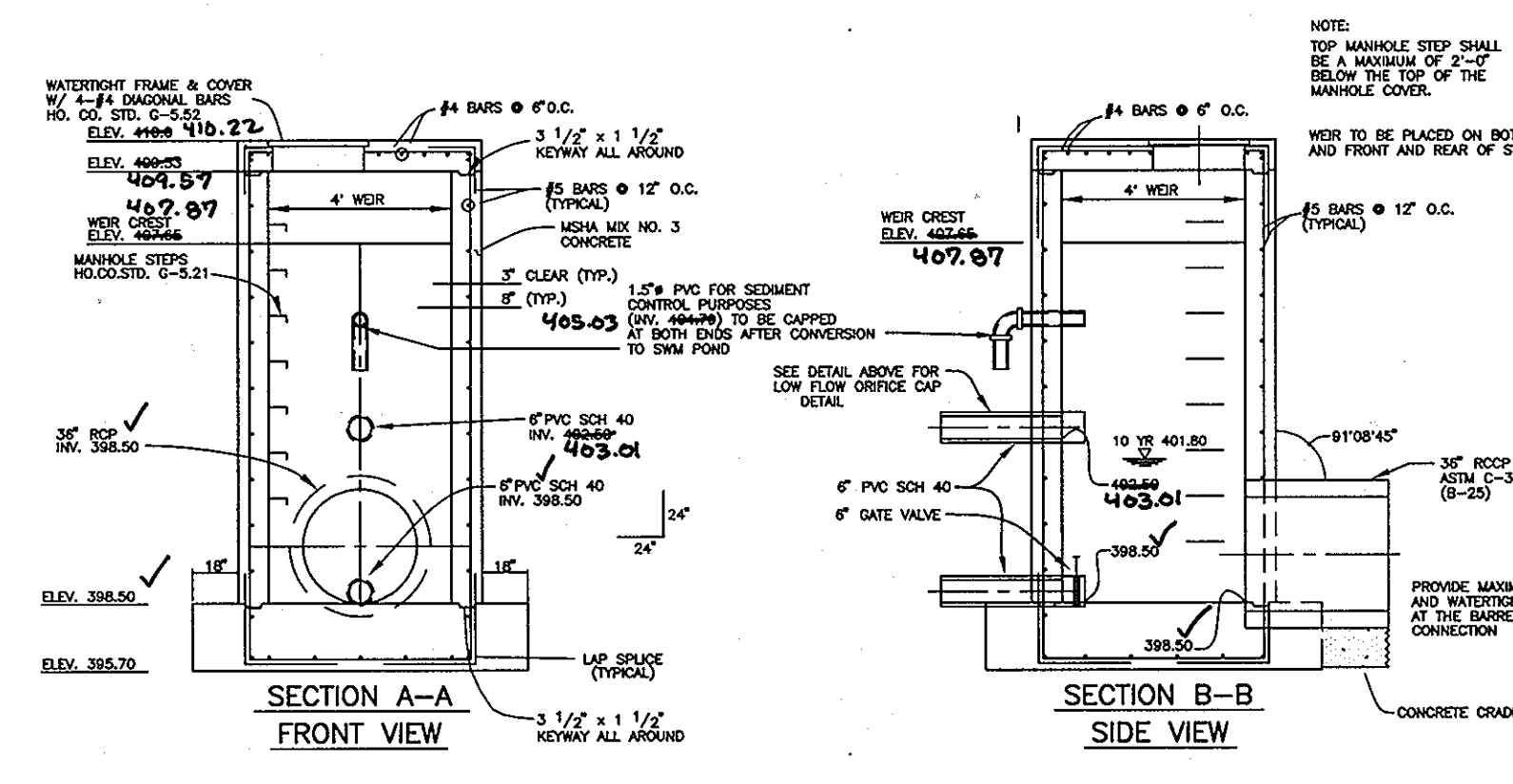
6" DEWATERING PIPE DETAIL AND
PERMANENT EXTENDED DETENTION CONTROL ORIFICE
NOT TO SCALE



POND #1 6" TEMPORARY SWM
VERTICAL DRAW-DOWN DEVICE
NOT TO SCALE



RIP-RAP OUTFALL
PROTECTION DETAIL



CONTROL STRUCTURE - POND #1
SCALE: 1"=4'

SWM Summary Table - Micro-pool Extended Detention Facility, etc.

Condition	CN	tc	Runoff (Qa)	Q	Q	Q
		hours	inches	1-year	10-year	100-year
pre-developed	66	0.28	0.30	5.78	37.77	71.98
developed	57	0.22	1.34	0.42	41.07	64.76

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. 21443 Expiration Date: 12-21-12



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.
Donald A. Mason
DONALD A. MASON
PE NO. 21443
DATE 4-25-11

BY THE DEVELOPER:
I, DONALD A. MASON, P.E., CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY 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 BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT.
CASCAD OVERLOOK LLC
BY: [Signature] MEMBER 11/20/03
DEVELOPER: [Signature] DATE

BY THE ENGINEER:
I, DONALD A. MASON, P.E., CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL, REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
Donald A. Mason
ENGINEER - DONALD A. MASON, P.E. # 21443
DATE 11/17/03

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL.
NATURAL RESOURCES CONSERVATION SERVICE
[Signature]
DATE 12/14/03

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.
[Signature]
DATE 12/16/03

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
[Signature]
DATE 12-24-03

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
[Signature]
DATE 1/13/04

[Signature]
DATE 12/14/03

NO	DATE	REVISION

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER: CASCAD OVERLOOK, L.L.C., P.O. BOX 417, ELLICOTT CITY, MD 21041 (410) 465-4244

OWNER: CRAIG R. AND KAREN C. MARTIN, 4937 LANDING ROAD, ELKCRIDGE, MD 21075

PROJECT: CASCAD OVERLOOK SECTION ONE, LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL "A"

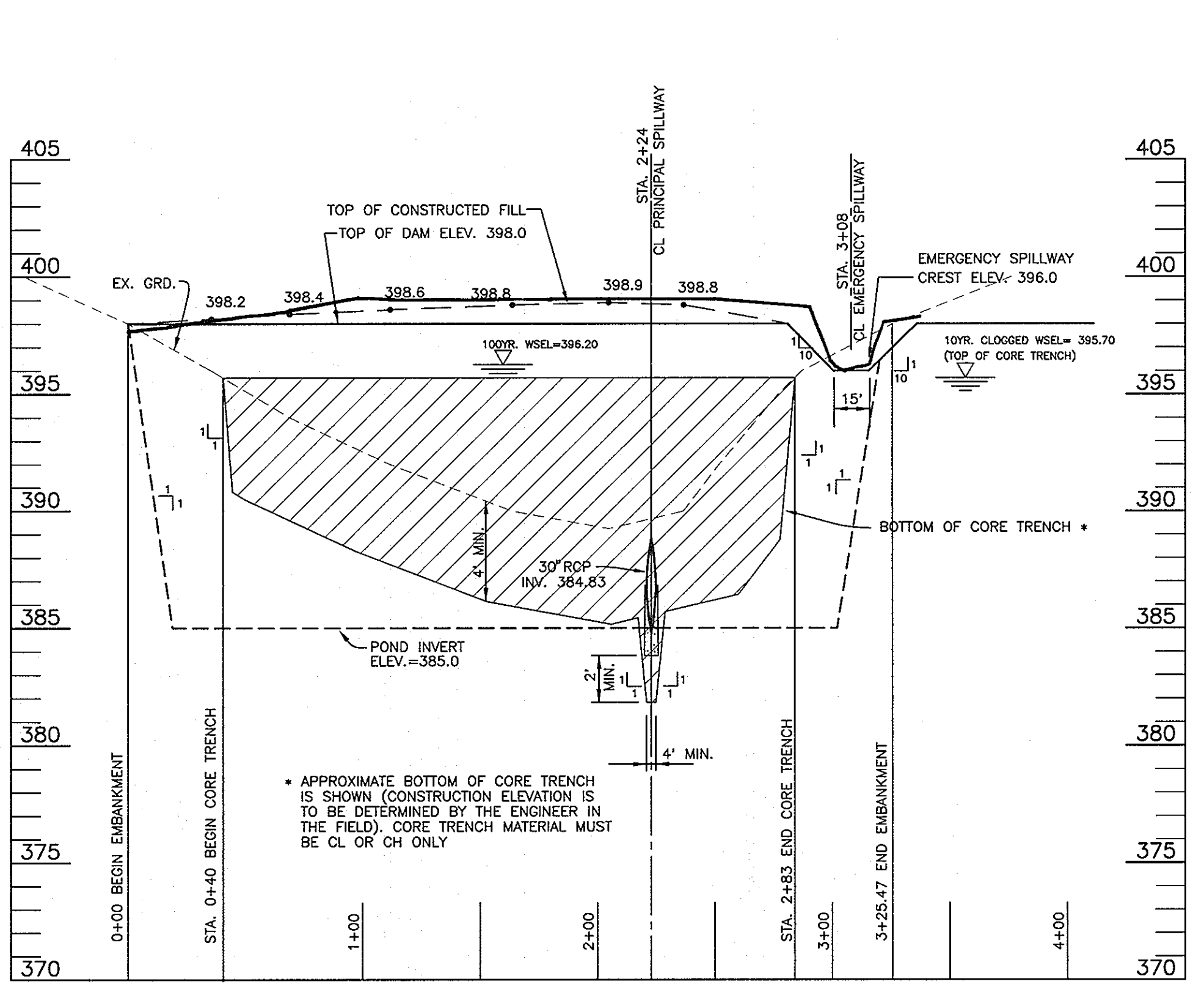
LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791, 1 st. ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

TITLE: STORMWATER MANAGEMENT DETAILS POND #1

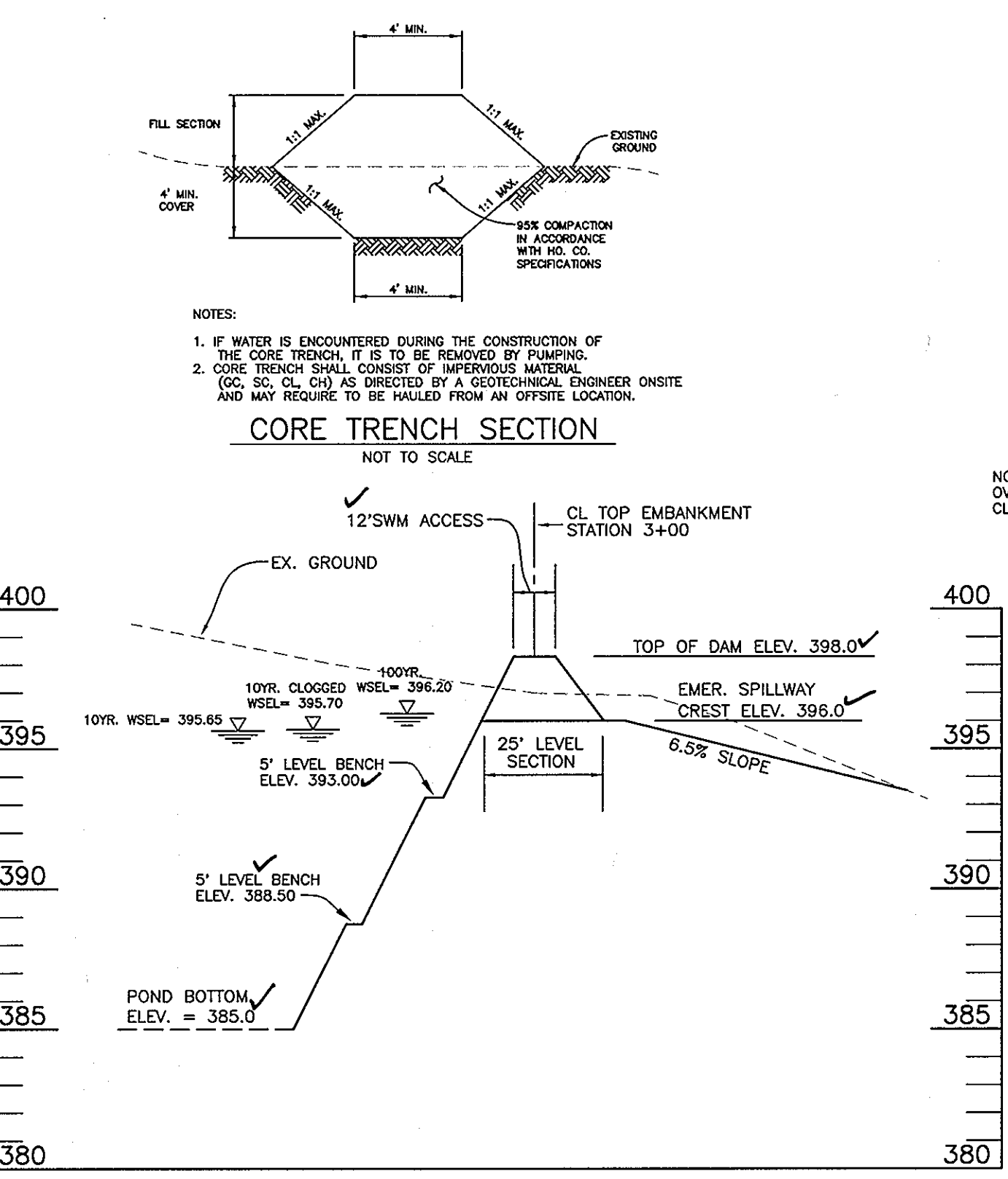
DATE: OCTOBER, 2003 PROJECT NO. 1383

DES: DAM DRN: RPTS CHK: DAM SCALE: AS SHOWN DRAWING: 22. OF 33.

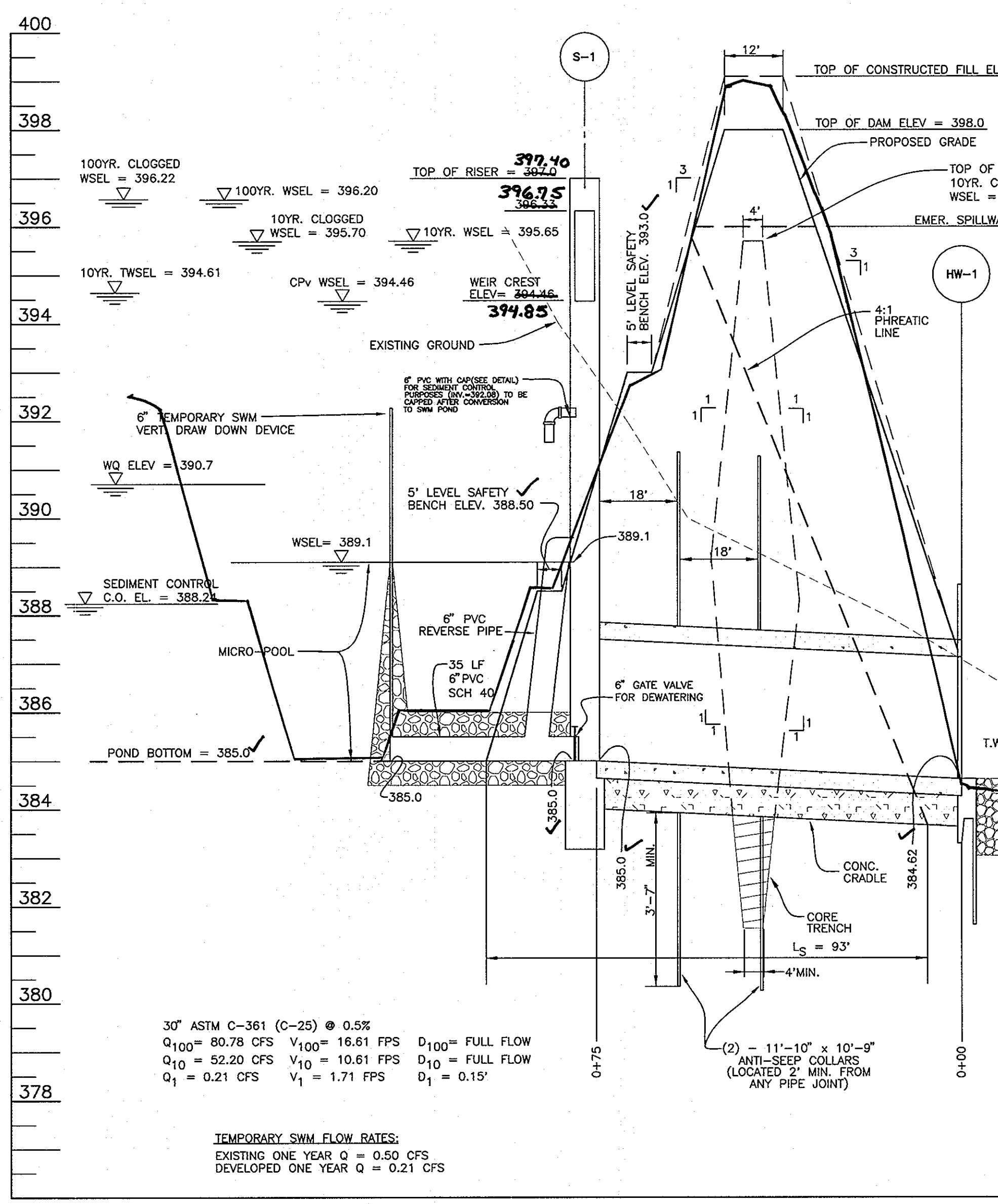
AS-BUILT F-03-134



PROFILE ALONG CL OF EMBANKMENT SECTION A-A POND #2
SCALE: 1"=50' HORIZ., 1"=5' VERT.



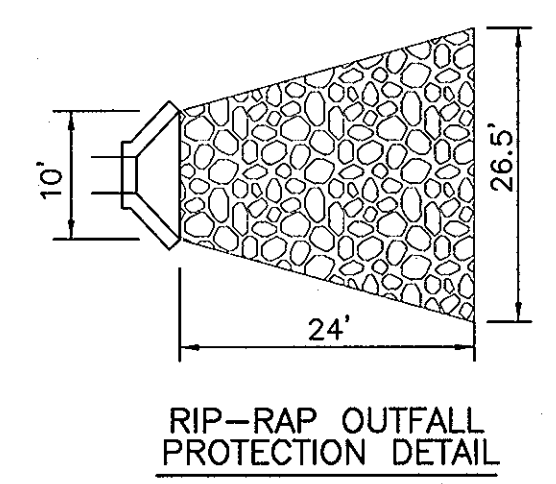
EMERGENCY SPILLWAY PROFILE SECTION C-C POND #2
SCALE: 1"=50' HORIZ., 1"=5' VERT.



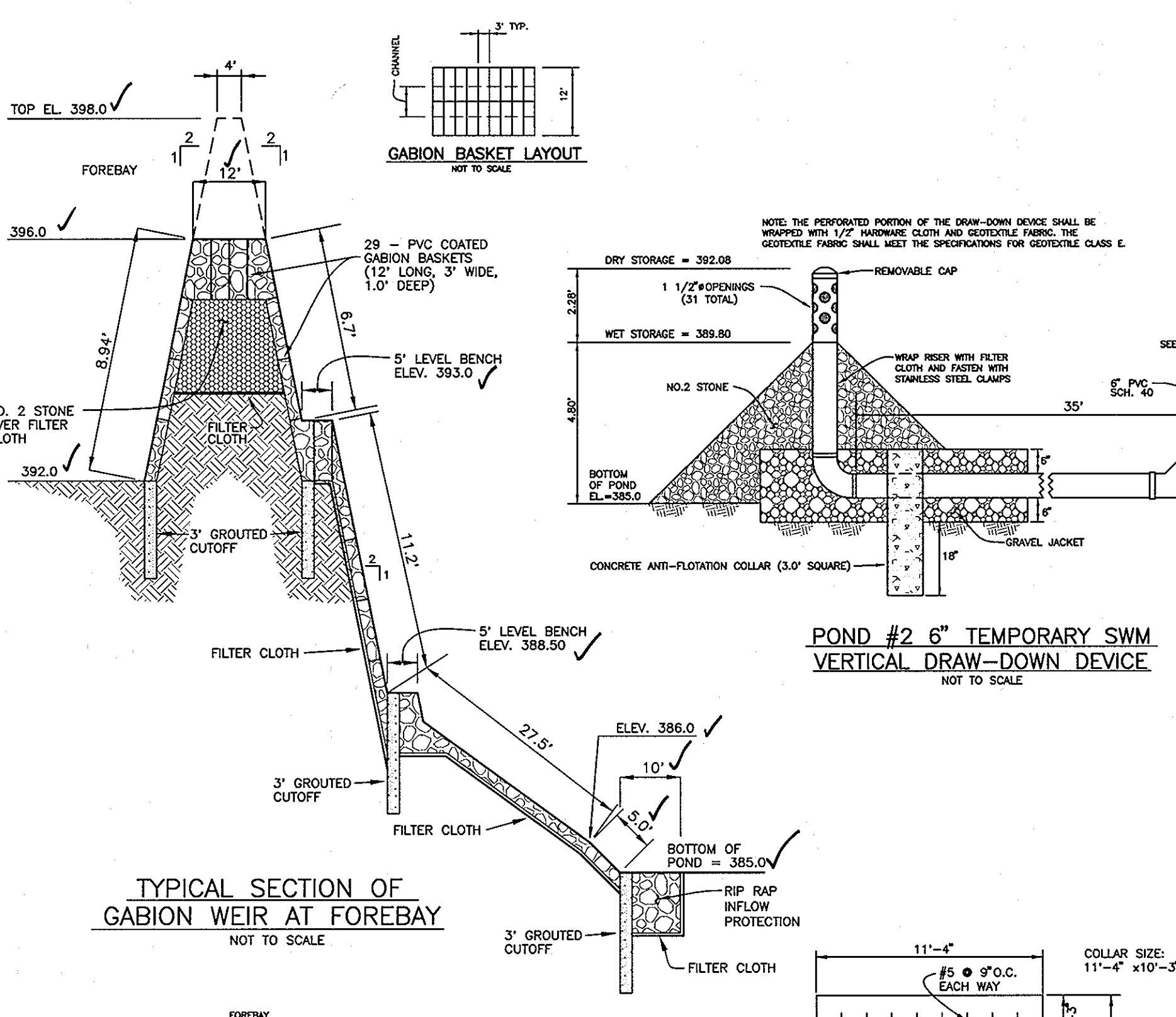
SECTION THRU PRINCIPAL SPILLWAY SECTION B-B POND #2
SCALE: 1"=20' HORIZ., 1"=2' VERT.

SWM Summary Table - Micro-pool Extended Facility no. 2

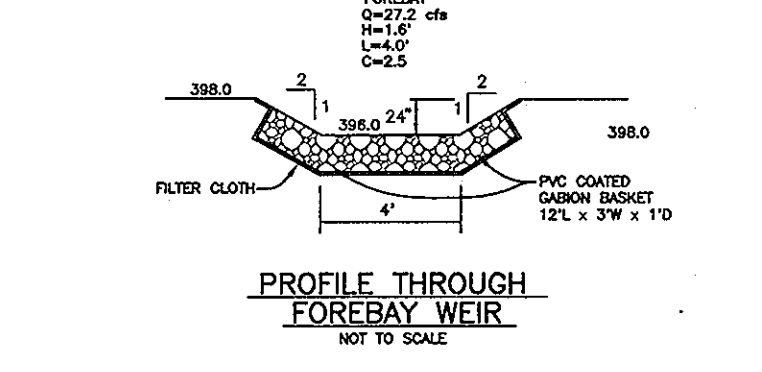
Condition	CN	tc	Runoff (Qa)			
			1 yr. storm	1-year	10-year	100 year
		hours	inches	cfs	cfs	cfs
pre-developed	62	0.44	0.25	2.17	23.88	49.50
Developed w/swm	87	0.23	1.35	0.55	52.20	80.78



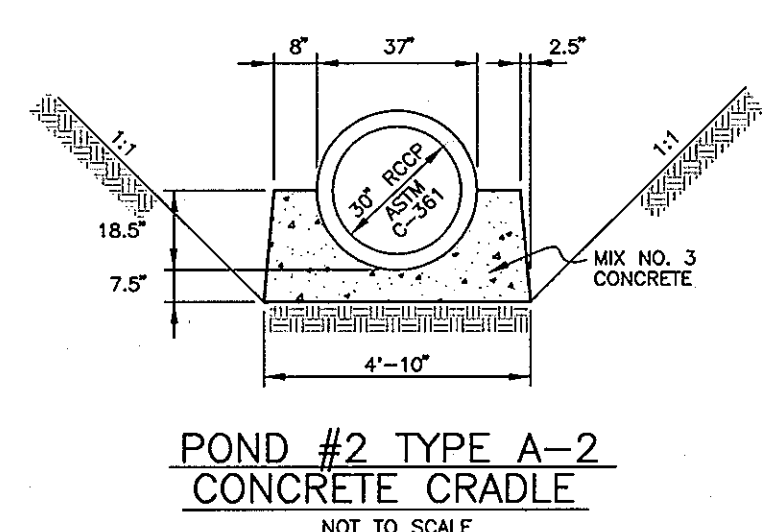
RIP-RAP OUTFALL PROTECTION DETAIL



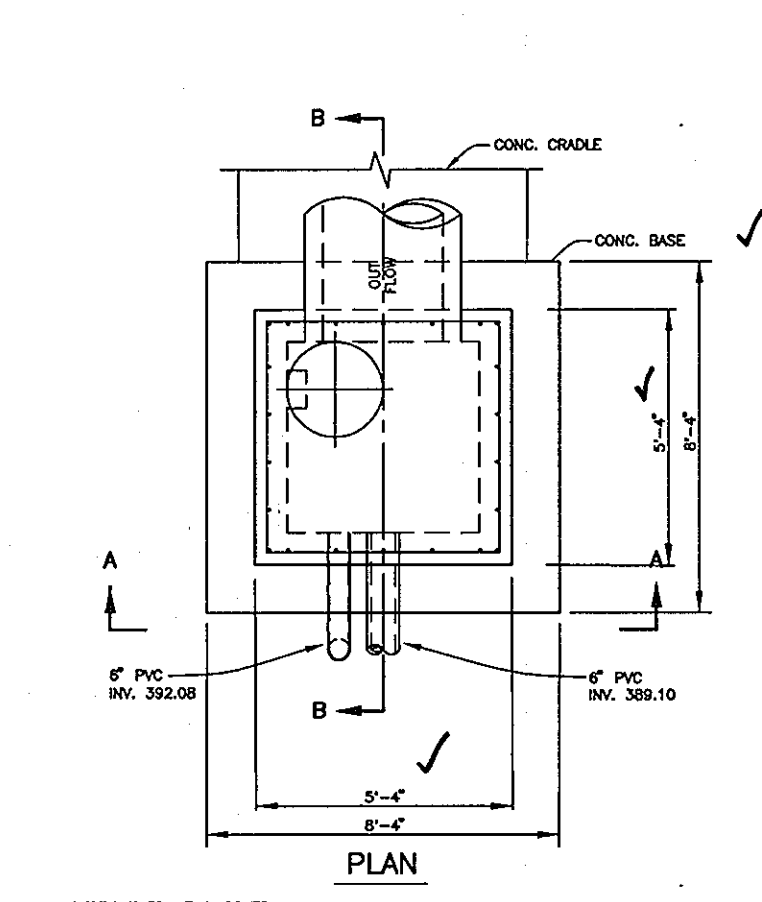
TYPICAL SECTION OF GABION WEIR AT FOREBAY
NOT TO SCALE



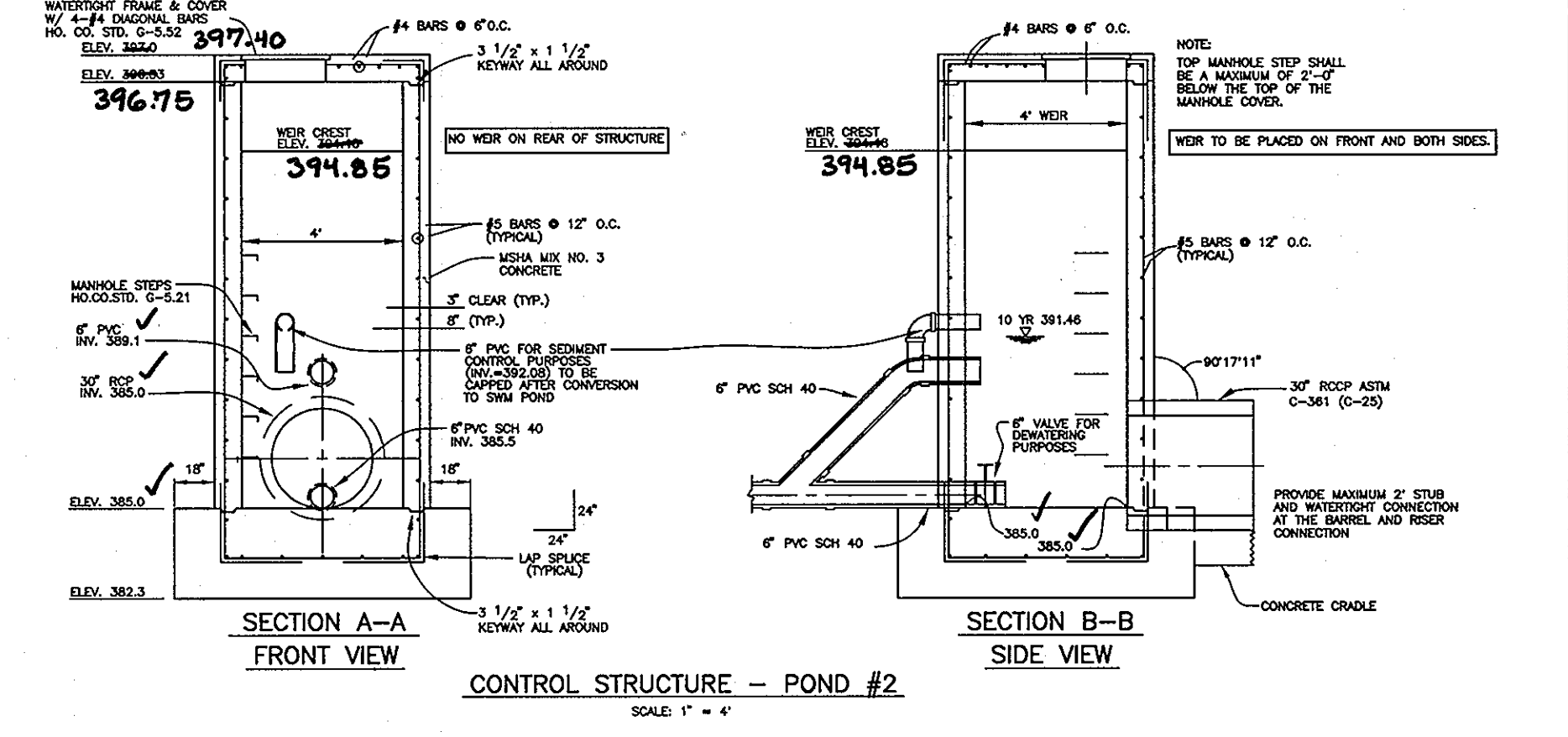
PROFILE THROUGH FOREBAY WEIR
NOT TO SCALE



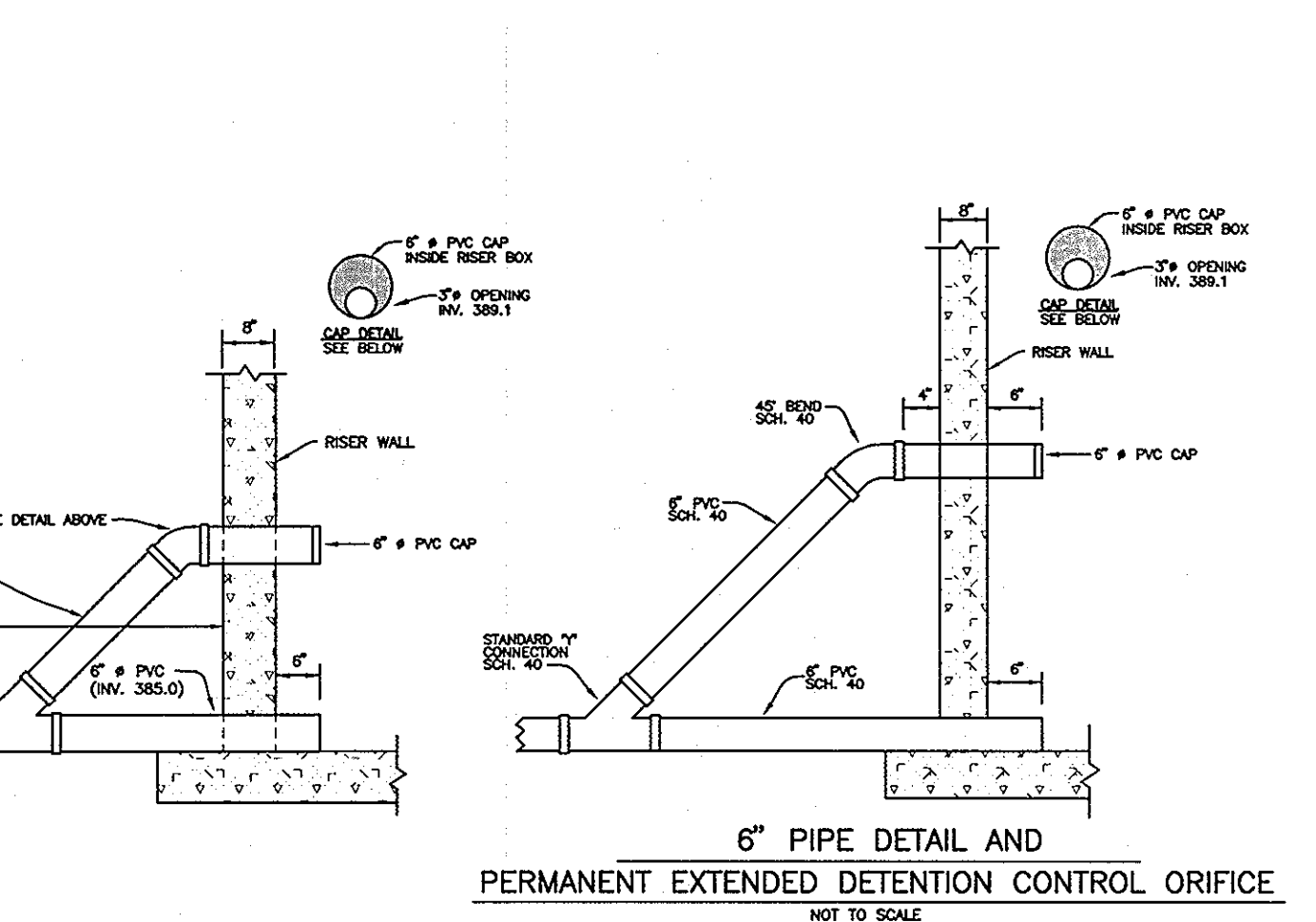
POND #2 TYPE A-2 CONCRETE CRADLE
NOT TO SCALE



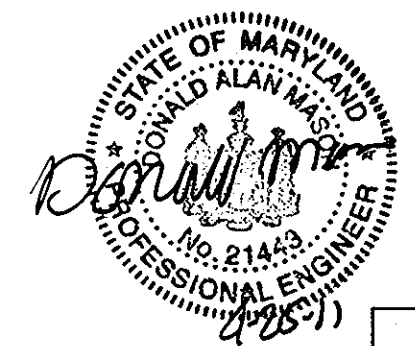
TRASH RACK DETAIL - POND #2
SCALE: N.T.S.



CONTROL STRUCTURE - POND #2
SCALE: 1" = 4'



6" PIPE DETAIL AND PERMANENT EXTENDED DETENTION CONTROL ORIFICE
NOT TO SCALE



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. 21443, Expiration Date: 12-21-12

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.

Professional: Donald A. Mason, License No. 21443, Date: 4-28-11

CERTIFY MEANS TO STATE OR DECLARE A PROFESSIONAL OPINION BASED UPON ON-SITE INSPECTIONS AND MATERIAL TESTS WHICH ARE CONDUCTED DURING CONSTRUCTION. THE ON-SITE INSPECTIONS AND MATERIAL TESTS ARE THOSE INSPECTIONS AND TESTS DEEMED SUFFICIENT AND APPROPRIATE BY COMMONLY ACCEPTED ENGINEERING STANDARDS. CERTIFY DOES NOT MEAN OR IMPLY A GUARANTEE BY THE ENGINEER NOR DOES AN ENGINEER'S CERTIFICATION RELIEVE ANY OTHER PARTY FROM MEETING REQUIREMENTS IMPOSED BY CONTRACT, EMPLOYMENT, OR OTHER MEANS, INCLUDING MEETING COMMONLY ACCEPTED INDUSTRY PRACTICES.

BY THE DEVELOPER: Cascade Overlook LLC, Donald A. Mason, License No. 21443, Date: 4-28-11

BY THE ENGINEER: Donald A. Mason, License No. 21443, Date: 4/17/03

APPROVED: Donald A. Mason, License No. 21443, Date: 4/17/03

APPROVED: Jim Myra, License No. 12/4/03, Date: 12/4/03

APPROVED: Howard County Department of Public Works, Date: 12-20-03

APPROVED: Chief, Bureau of Highways, Date: 12-20-03

APPROVED: Chief, Division of Land Development, Date: 11/9/04

APPROVED: Chief, Development Engineering Division, Date: 12/24/03

NO DATE REVISION

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER: CASCADE OVERLOOK, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MD 21041
(410) 465-4244

PROJECT: CASCADE OVERLOOK SECTION ONE
LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 74

LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160, 161, 788, & 791
1st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND

TITLE: STORMWATER MANAGEMENT DETAILS POND #2
VP-86-130, F-88-20, S-01-04, PB-359, P-02-11

DATE: OCTOBER, 2003 PROJECT NO. 1383

DES: DAM DRN: RPS CHK: DAM SCALE: AS SHOWN DRAWING 23 OF 33

AS-BUILT F-03-134

MGWC 1.4: Diversion Pipe

Temporary measure for dewatering in-channel construction sites

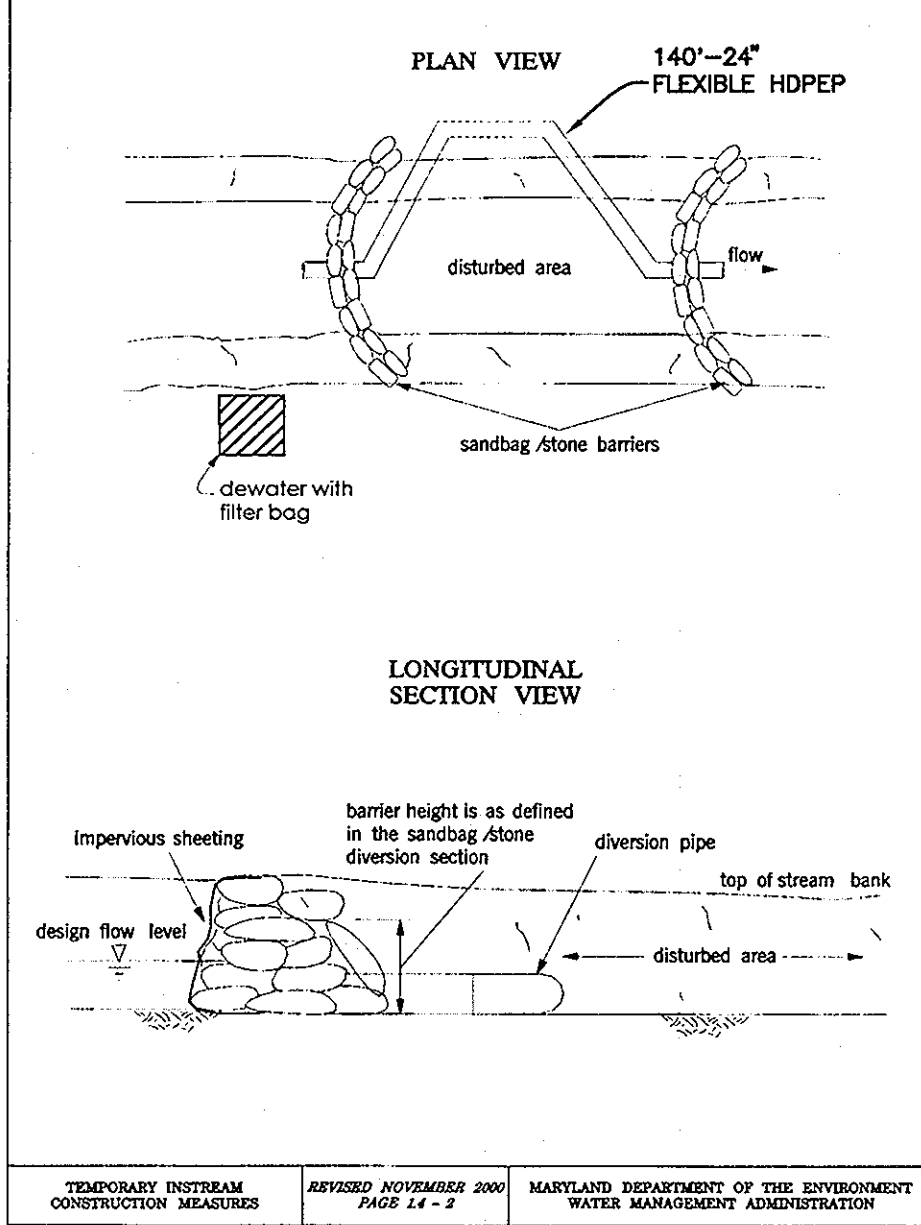
Description
The work should consist of installing flow diversion pipes in combination with sandbag or stone diversions when construction activities occur within the stream channel.

Effective Uses & Limitations
Diversion pipes with an insufficient flow capacity can cause the channel diversion to fail thereby resulting in severe erosion of the disturbed channel section under construction. Therefore, in-channel construction activities should occur only during periods of low flow.

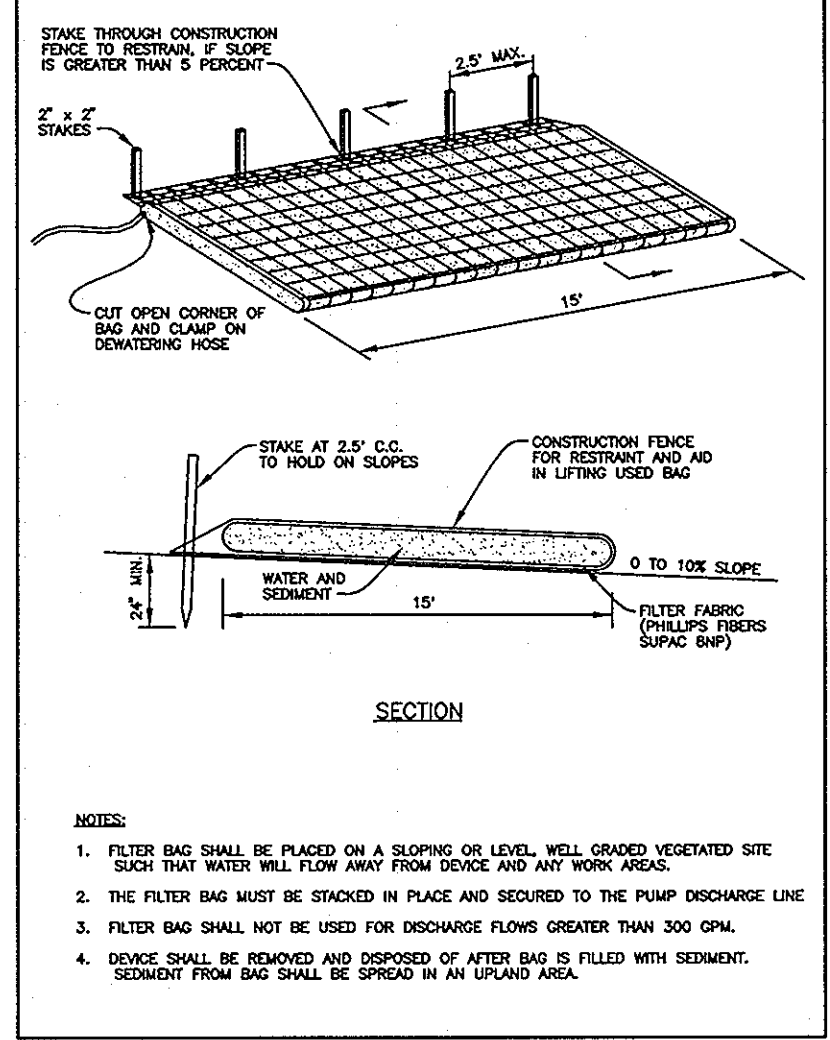
Material Specifications
Materials for stream diversions should meet the following requirements:
• Riprap: Stone should be washed and have a minimum diameter of 6 inches (15 centimeters).
• Sandbags: Sandbags should consist of materials which are resistant to ultra-violet radiation, tearing, and puncture and should be woven tightly enough to prevent leakage of fill material (i.e., sand, fine gravel, etc.).
• Sheeting: Sheeting should consist of polyethylene or other material which is impervious and resistant to puncture and tearing.

Installation Guidelines
All erosion and sediment control devices including mandatory filter bags should be installed as the first order of business according to a plan approved by the WMA or local authority. Installation should proceed from upstream to downstream during low flow conditions. If necessary, silt fence or straw bales should be installed around the perimeter of the work area.
Diversion pipes with sandbag or stone barriers should be completed as follows (refer to detail 1.4):
1. Sandbag/stone barriers should be sized and installed as detailed in MGWC 1.5: Sandbag/Stone Diversion. The materials should be sized to withstand baseflow velocities.
2. All excavated material should be deposited and stabilized in an approved area outside the 100-year floodplain unless otherwise authorized by the WMA.
3. Sediment-laden water from the construction area should be pumped to a filter bag.
4. The diversion pipe should have a minimum capacity sufficient to convey the 2-year flow for projects with a duration of two weeks or greater. For projects of shorter duration, the capacity of the pipe can be reduced accordingly.
5. If necessary, silt fence or straw bales should be installed around the perimeter of the work area.
6. Sediment control devices are to remain in place until all disturbed areas are stabilized and the inspecting authority approves their removal.

Maryland's Guidelines To Waterway Construction DETAIL 1.4: DIVERSION PIPE



FILTER BAG DETAIL



NOTES:
1. FILTER BAG SHALL BE PLACED ON A SLOPING OR LEVEL, WELL GRADED VEGETATED SITE SUCH THAT WATER WILL FLOW AWAY FROM DEVICE AND ANY WORK AREAS.
2. THE FILTER BAG MUST BE STAKED IN PLACE AND SECURED TO THE PUMP PROTECTION LINE.
3. FILTER BAG SHALL NOT BE USED FOR INCREASED FLOWING GREATER THAN 300 CPM.
4. DEVICE SHALL BE REMOVED AND DEPOSITED AFTER BAG IS FILLED WITH SEDIMENT. SEDIMENT FROM BAG SHALL BE SPREAD IN AN UPLAND AREA.

HILLIS-CARNES ENGINEERING ASSOCIATES, INC. RECOMMENDATIONS

Embankment and Cut-off Trench Construction

The site should be stripped of topsoil and any other unsuitable materials from the embankment or structure area in accordance with Soil Conservation Guidelines. After stripping operations have been completed, the exposed subgrade materials should be proffered with a loaded dumptruck or similar equipment in the presence of a geotechnical engineer or his representative. For areas that are not accessible to a dump truck, the exposed materials should be observed and tested by a geotechnical engineer or his representative utilizing a Dynamic Cone Penetrometer. Any excessively soft or loose materials identified by proffering or penetrometer testing should be excavated to suitable firm soil, and then grades re-established by backfilling with suitable

A representative of the geotechnical Engineer should be present to monitor placement and compaction of fill for each embankment and cut-off trench. In accordance with Maryland Soil Conservation Specification 378, soils considered suitable for the center of embankment and cut-off trench shall conform to Unified Soil Classification GC, SC, CH, or CL. Per SCS 378, consideration may be given to the use of other materials in the embankment if design and construction are supervised by a geotechnical engineer.

It is our professional opinion that in addition to the soil materials described above a fine grained soil, including Silt (ML) with a plasticity index of 10 or more can be utilized for the center of the embankment and core trench. Based on the results of the test pits, it appears that surficial materials in the areas of test pits TP-1 through TP-6, TP-10 and TP-11 include silty clay and clayey silt. These materials should be suitable for core and cut-off trench material. However, exploration with test pits and additional laboratory testing should be conducted prior to construction to identify and quantify potential borrow areas. All fill materials must be placed and compacted in accordance with MD SCS 378 specifications.

Additionally, the following procedures should be utilized to construct the proposed embankments:

- Slope construction should commence at the toes of the proposed slopes and continue upwards as additional fill is placed. The **uncompacted fill placed for slope construction should be benched into the natural slopes in the abutment areas to provide good contact and to prevent the presence of weak zones.**
- Typically during slope construction, compaction equipment has difficulty compacting soils along the shoulder. It is therefore important that the bank be overfilled during slope construction and then cut back to the required geometry.
- After construction, the slopes should be promptly vegetated to prevent erosion. Also, to prevent erosion from occurring prior to sprouting of the vegetation, the slopes should be protected with straw or an erosion control geotextile.
- The embankment construction should be done under the supervision of an experienced soil inspector or the Geotechnical Engineer. Sufficient testing during fill placement should be done to verify adequate compaction.

It is recommended that test pits be performed with an excavator to determine if rock within the basin areas will require blasting. It is recommended that the **blasting within 75 ft. of the riser and principal spillway structures be performed prior to construction of the principal spillways and riser structures.**

Structure Backfill
Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining fill material. The fill shall be placed in horizontal layers not to exceed four inches thickness and compacted by hand tampers or other manually directed compaction equipment. The material needs to fill completely all spaces under and adjacent to the pipe. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless there is a compacted fill of 24\"/>

Structure Backfill may be flowable fill meeting the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 513 as modified. The mixture shall have a 100-200 psi, 28 day unconfined compressive strength. The flowable fill shall have a minimum pH of 4.0 and a minimum resistivity of 2,000 ohm-cm. Material shall be placed such that a minimum of 6\"/>

Materials - (Aluminum Pipe) - This pipe and its appurtenances shall conform to the requirements of ASHITO Specification M-196 or M-211 with watertight coupling bands or flanges. Aluminum Pipe, when used with flowable fill or when soil and/or water conditions warrant the need for increased durability, shall be fully bluminous coated per requirements of ASHITO Specification M-190 Type A. Any aluminum surfaces that are in contact with concrete shall be painted with one coat of zinc chromate primer and two coats of asphalt. Hot dip galvanized bolts may be used for connections. The pH of the surrounding soils shall be between 4 and 9.

MGWC 4.2: Utility Crossing

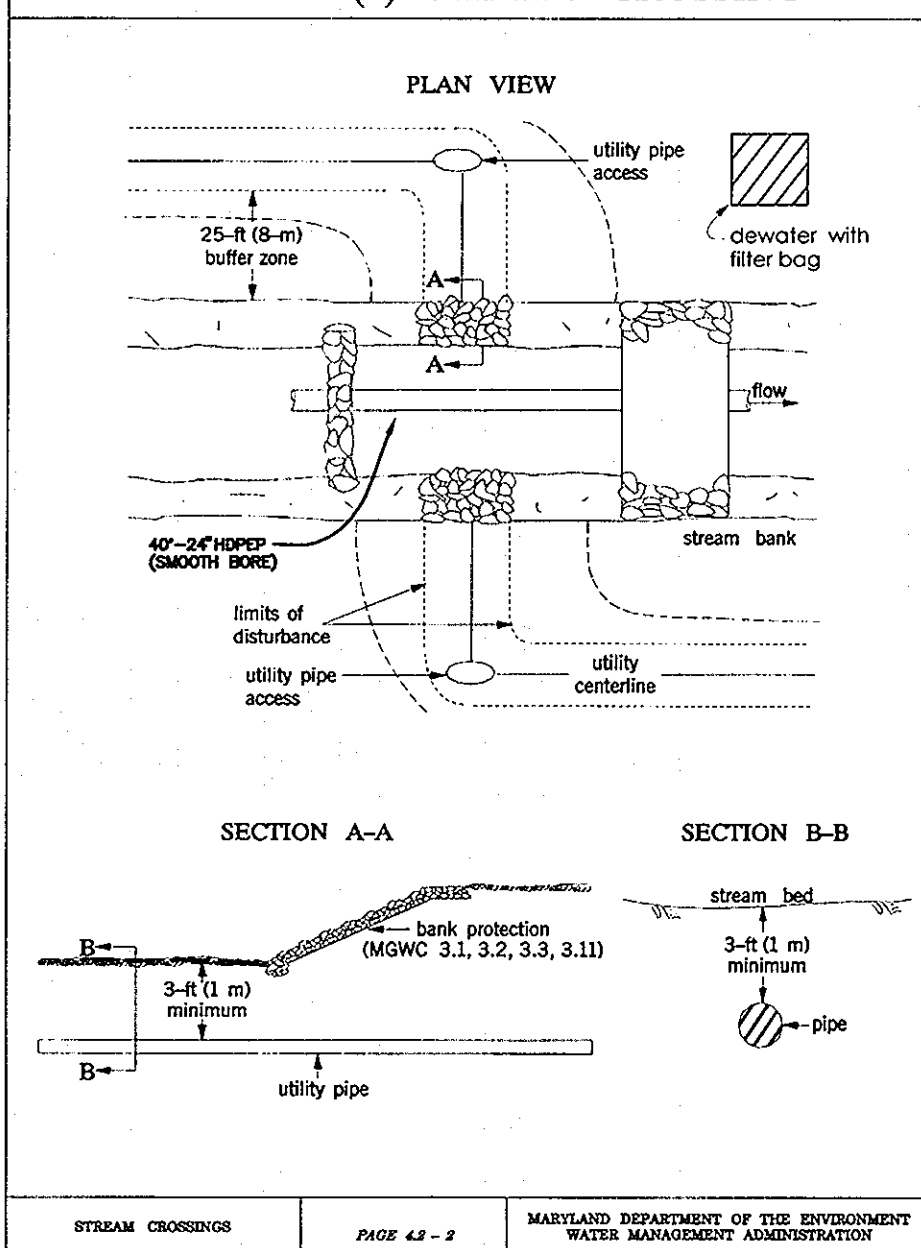
Temporary in-stream construction

Description
The work should consist of installing erosion control devices in and adjacent to the construction of utility crossings.

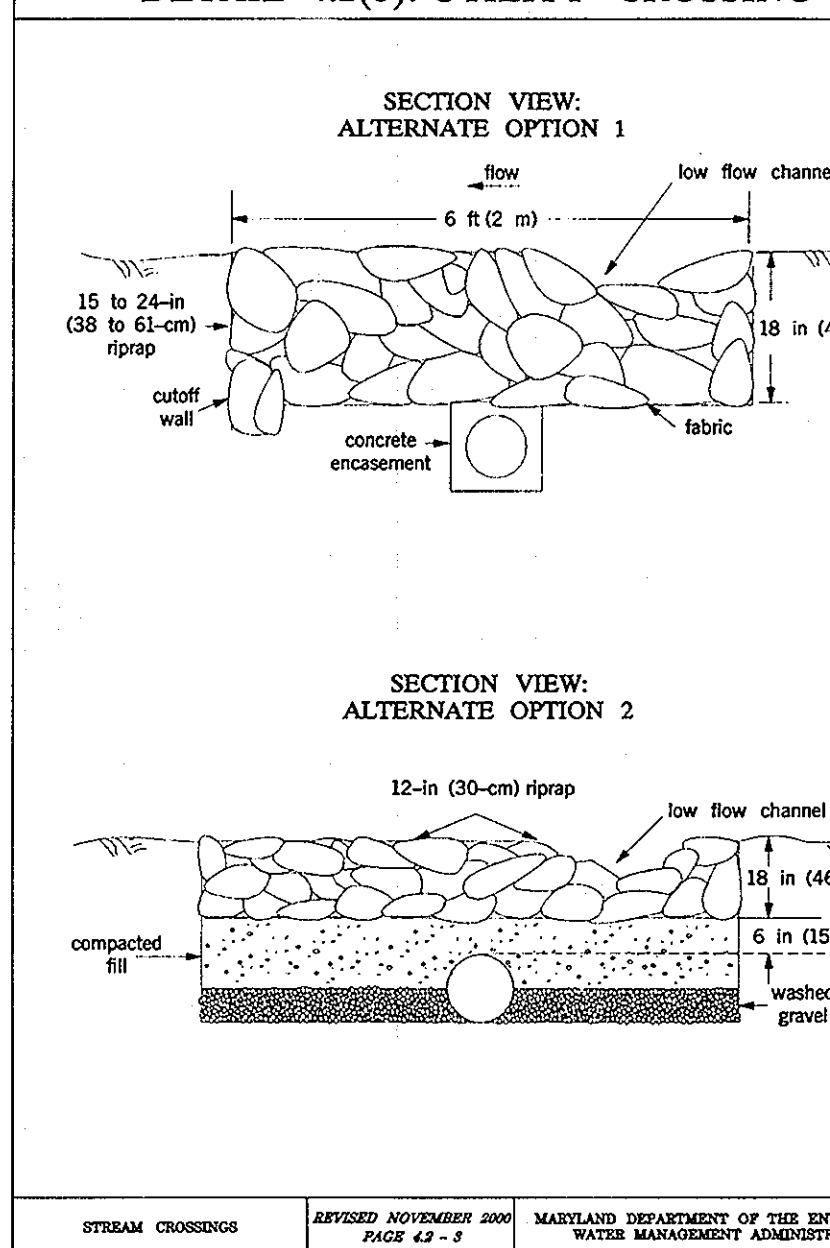
Installation Guidelines
All erosion and sediment control devices, including filter bags should be implemented as the first order of business according to a plan approved by the WMA or local authority. (See the 1994 Maryland Standards and Specifications for Soil Erosion and Sediment Control.) The proposed construction sequence is as follows (refer to Detail 4.2):

- The contractor should insure that a continuous perimeter control barrier is in place to minimize the amount of pollutants entering the flow. A diversion pipe or other measure should be installed and sandbag or stone barriers as shown in MGWC 1.5: Sandbag/Stone Diversion should be constructed according to specifications to divert the stream flow.
- All construction should take place during stream low flows. The length of construction time should be limited to a maximum of 5 consecutive days for each crossing.
- All utility crossings should be placed a minimum of 3 feet (1 meter) beneath the stream bed unless an alternate section is specifically approved by the WMA. For instances where a 3-foot cover is not viable, two alternate stabilization options are given in the Detail 4.2. A low flow channel shall be constructed through all riprap placements across the stream bed.
- The stream should be diverted by an approved temporary stream diversion, the construction of which should be disturbed banks should be stabilized. The contractor may elect to construct the utility crossing in two stages. In this case, a WMA approved flow barrier may be constructed to keep the construction area dry.
- Once the crossing is completed, the diversion should be removed from upstream to downstream. Sediment control devices including perimeter erosion controls, are to remain in place until all disturbed areas are stabilized in accordance with an approved sediment and erosion control plan and the inspecting authority approves their removal.
- Construction vehicles to cross existing stream by utilizing existing driveway west of utility crossing. By utilizing this existing driveway, eliminates the need to construct temporary vehicle crossing to install utility and minimize impact to stream and wetlands.

Maryland's Guidelines To Waterway Construction DETAIL 4.2(a): UTILITY CROSSING



Maryland's Guidelines To Waterway Construction DETAIL 4.2(b): UTILITY CROSSING



BY THE DEVELOPER:
I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL MAINTAIN CERTIFICATE OF ATTENDANCE AT THE DEPARTMENT OF ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT.

CASCADE OVERLOOK LLC
By: *Steve X. Breeden* MEMBER 11/20/03
DEVELOPER STEVE X. BREEDEN DATE

BY THE ENGINEER:
I/WE CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL, REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

Donald Mason 11/27/03
ENGINEER - DONALD A. MASON, P.E. # 21443 DATE

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL.

Jim Myers 12/10/03
NATURAL RESOURCES CONSERVATION SERVICE DATE

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION, AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

William F. Anderson 12-24-03
CHIEF, BUREAU OF HIGHWAYS #4 DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chris Hamilton 11/26/03
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

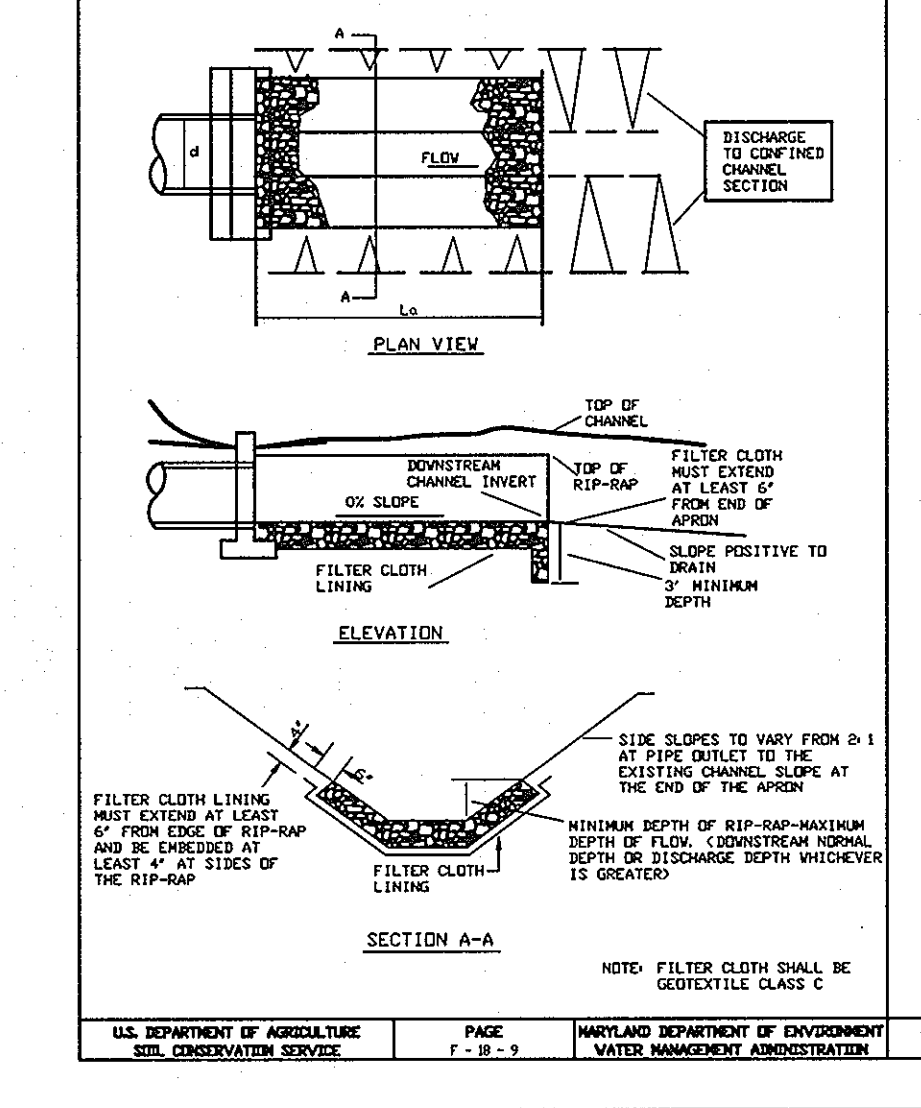
William F. Anderson 12-24-03
CHIEF, BUREAU OF HIGHWAYS #4 DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

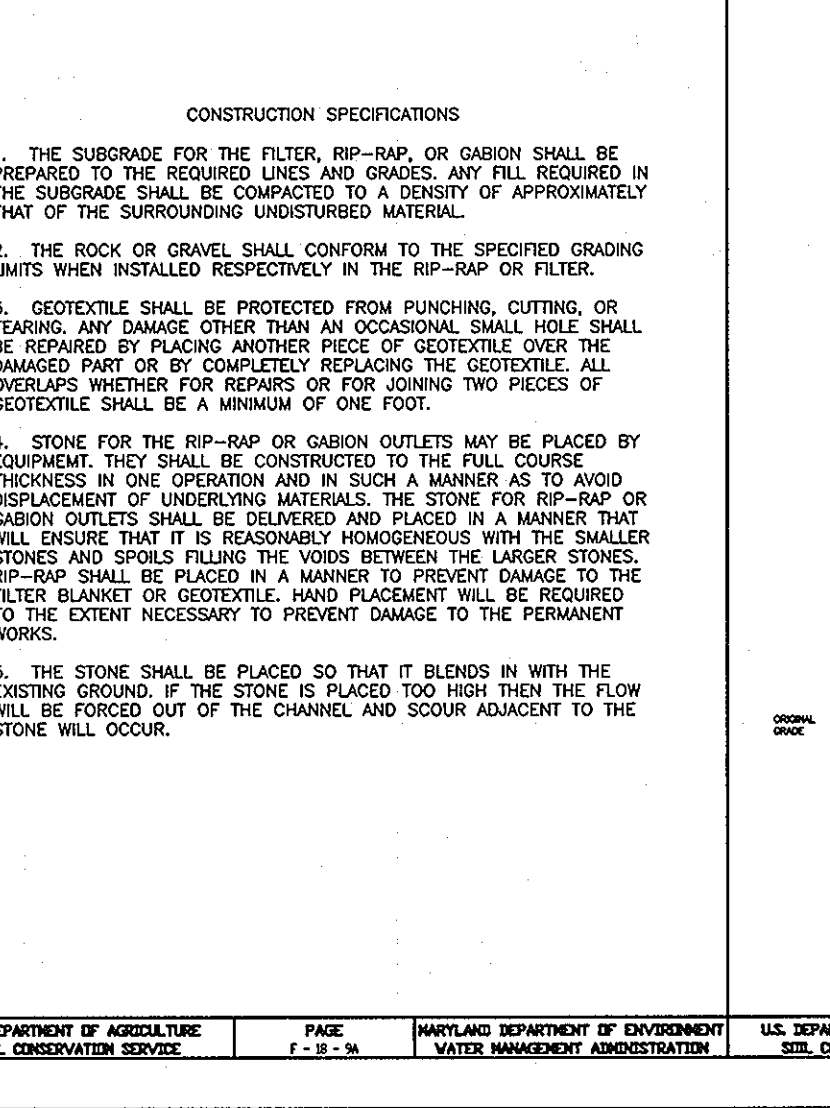
William F. Anderson 12-24-03
CHIEF, BUREAU OF HIGHWAYS #4 DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION MRS DATE

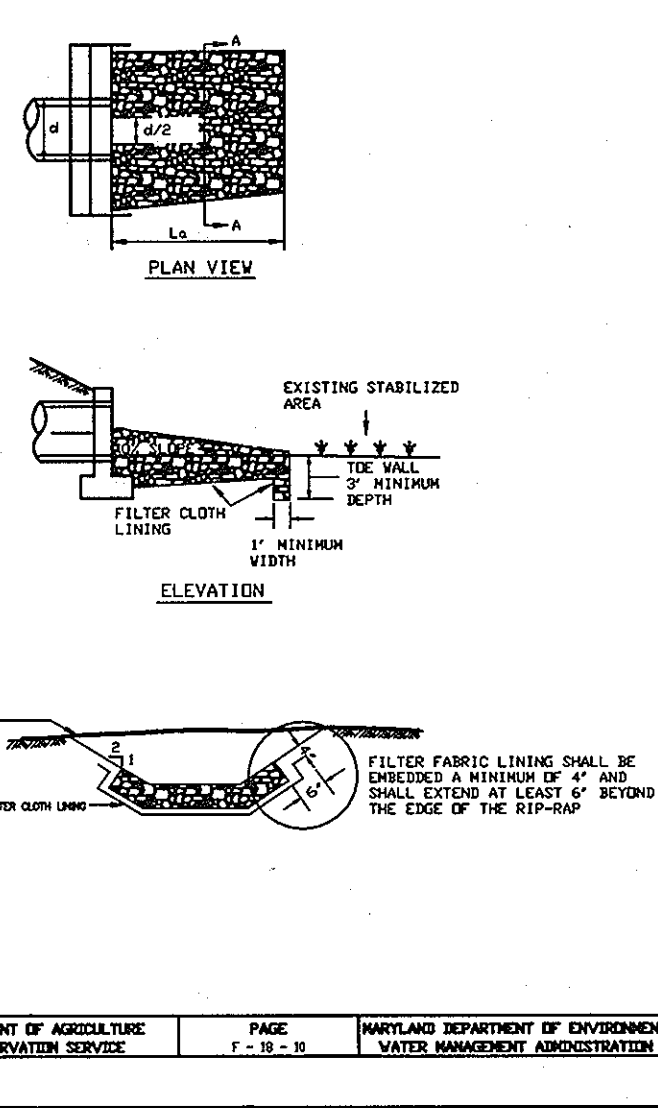
DETAIL 26 - ROCK OUTLET PROTECTION II



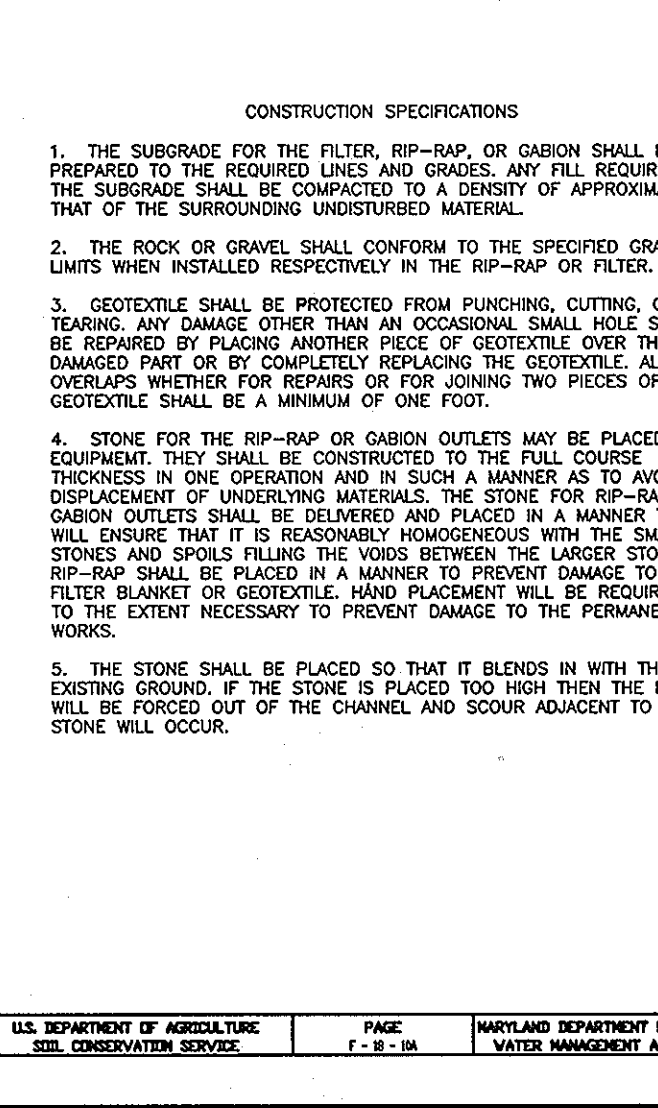
DETAIL 26 - ROCK OUTLET PROTECTION II



DETAIL 27 - ROCK OUTLET PROTECTION III



DETAIL 27 - ROCK OUTLET PROTECTION III



CONSTRUCTION SPECIFICATIONS

1. THE SUBGRADE FOR THE FILTER, RIP-RAP, OR GABION SHALL BE PREPARED TO THE REQUIRED LINES AND GRADES. ANY FILL REQUIRED IN THE SUBGRADE SHALL BE COMPACTED TO A DENSITY OF APPROXIMATELY THAT OF THE SURROUNDING UNDISTURBED MATERIAL.

2. THE ROCK OR GRABEL SHALL CONFORM TO THE SPECIFIED GRADING LIMITS WHEN INSTALLED RESPECTIVELY IN THE RIP-RAP OR FILTER.

3. GEOTEXTILE SHALL BE PROTECTED FROM PUNCHING, CUTTING, OR TEARING BY PLACING ANOTHER PIECE OF GEOTEXTILE OVER THE DAMAGED PART OR BY COMPLETELY REPLACING THE GEOTEXTILE. ALL OVERLAPS WHETHER FOR REPAIRS OR FOR JOINING TWO PIECES OF GEOTEXTILE SHALL BE A MINIMUM OF ONE FOOT.

4. STONE FOR THE RIP-RAP OR GABION OUTLETS MAY BE PLACED BY EQUIPMENT. THEY SHALL BE CONSTRUCTED TO THE FULL COURSE THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO AVOID DISPLACEMENT OF UNDERLYING MATERIALS. THE STONE FOR RIP-RAP OR GABION OUTLETS SHALL BE DELIVERED AND PLACED IN A MANNER THAT WILL ENSURE THAT IT IS REASONABLY HOMOGENEOUS WITH THE SMALLER STONES AND SPILLS FILLING THE VOIDS BETWEEN THE LARGER STONES. RIP-RAP SHALL BE PLACED IN A MANNER TO PREVENT DAMAGE TO THE FILTER BLANKET OR GEOTEXTILE. HAND PLACEMENT WILL BE REQUIRED TO THE EXTENT NECESSARY TO PREVENT DAMAGE TO THE PERMANENT WORKS.

5. THE STONE SHALL BE PLACED SO THAT IT BLENDS IN WITH THE EXISTING GROUND. IF THE STONE IS PLACED TOO HIGH THEN THE FLOW WILL BE FORCED OUT OF THE CHANNEL, AND SCOUR ADJACENT TO THE STONE WILL OCCUR.

NO DATE REVISION

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER: CASCADE OVERLOOK, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MD 21041
(410) 465-4244

PROJECT: CASCADE OVERLOOK SECTION ONE
LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCELS 12

LOCATION: TAX MAP 31, GRID 10 & 11 PARCELS 160,161, 788, & 791
1st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND

TITLE: EROSION AND SEDIMENT CONTROL DETAILS & STORMWATER MANAGEMENT NOTES
VP-88-130, F-88-20, S-01-04, PB-359, P-02-11

DATE: OCTOBER, 2003 PROJECT NO. 1383

DES: DAM DRN: RPS CHK: DAM SCALE: AS SHOWN DRAWING 24 OF 33

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. 21443 Expiration Date: 12-21-12

AS-BUILT F-03-134

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Location: Howard County, Maryland

Boring Number: B-1 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
19-19-21	SURFACE		0.0						
	Brown, moist, loose, silty SAND (SM)	D	2.3-4.5				1	10"	3" Topsoil
	Orange-brown, moist, medium dense, fine sandy SILT (ML)	LD	4.4-5.5				2	16"	Groundwater encountered at 14.5" while drilling
	Gray, moist, medium dense, silty SAND trace gravel (SM)	I	3.4-7.7				3	20"	Caved in at 10.0' at Completion
	Brown, moist, loose, sandy SILT, trace mica (ML)	I	3.4-5.6				4	24"	Caved in at 10.0' after 24 hours
	Dark brown - orange-brown, moist, medium dense, silty SILT - silty CLAY (ML-CL)	LD	3.3-4.5				5	24"	Backfilled after 24 hours
	Gray, brown, moist, very loose, fine sandy SILT (ML)	D	1.2-3.3				6	15"	Backfilled after 24 hours
	Bottom of Hole at 17.0'								

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Location: Howard County, Maryland

Boring Number: B-2 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
19-19-21	SURFACE		0.0						
	Brown, moist, medium dense, silty SAND with mica (SM)	D	3.1-13.11				1	12"	3" Topsoil
	Orange-brown, moist, medium dense, fine sandy SILT (ML)	I	6.4-10.15				2	14"	Groundwater encountered at 14.5" while drilling
	Brown, moist, medium dense, fine sandy SILT (ML)	D	6.1-10.21				3	20"	Caved in at 13.0' at Completion
	Brown, gray, moist, silty, clayey SILT (ML-CL)	LD	5.6-6.0				3	24"	Caved in at 4.0' at Completion
	Bottom of Hole at 7.5' Reveal at 7.2'						4	10"	Caved in at 4.0' after 24 hours
	Gray-brown, moist to wet, silty, clayey SILT, trace to little fine sand (ML)	I	2.3-3.4				5	13"	Backfilled after 24 hours
	Orange-brown, wet, very loose, sandy SILT (ML)	D	2.3-3.5				6	24"	
	Bottom of Hole at 17.0'								

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Location: Howard County, Maryland

Boring Number: B-3 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
19-19-21	SURFACE		0.0						
	Brown, moist, very loose to loose, fine sandy SILT, trace to little sand (ML)	D	1.2-3.5				1	10"	3" Topsoil
	Orange-brown, moist, medium dense, silty SAND, trace to little sand (SM)	I	2.4-6.11				2	16"	No groundwater encountered while drilling
	Brown, moist, medium dense to loose, sandy SILT (ML)	LD	5.6-6.0				3	24"	Caved in at 4.0' at Completion
	Bottom of Hole at 7.5' Reveal at 7.2'						4	10"	Caved in at 4.0' after 24 hours
	Orange-brown and gray, wet, medium dense, silty SILT, trace to little clay (ML-CL)	I	3.4-4.6				5	16"	
	Bottom of Hole at 12.0'								

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Location: Howard County, Maryland

Boring Number: B-4 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
19-19-21	SURFACE		0.0						
	Orange-brown, moist, medium dense, silty SAND, trace to little clay (ML-CL)	I	2.4-7.7				1	11"	3" Topsoil
	Brown, moist, medium dense to loose, sandy SILT (ML)	LD	5.7-9.8				2	12"	No groundwater encountered while drilling
	Brown, moist, medium dense to loose, sandy SILT (ML)	LD	3.4-8.8				3	18"	Caved in at 7.0' at Completion
	Orange-brown and gray, wet, medium dense, silty SILT, trace to little clay (ML-CL)	I	3.4-4.6				5	16"	
	Bottom of Hole at 12.0'								

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Location: Howard County, Maryland

Boring Number: B-5 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
19-19-21	SURFACE		0.0						
	Brown, moist, loose, silty sand, trace clay (SM)	I	2.3-4.4				1	13"	3" Topsoil
	Orange-brown, moist, wet, medium dense, silty SILT, trace to little clay (ML-CL)	D	3.4-5.5				2	16"	No groundwater encountered while drilling
	Orange-brown, moist, medium dense, SILT, trace mica (ML)	D	4.6-6.7				3	20"	Caved in at 10.0' at Completion
	Yellow-brown, moist, medium dense, silty SAND, with gravel-sized rock fragments (SM)	D	3.8-11.16				5	18"	
	Brown, moist, very dense, silty SAND with rock fragments (SM)	I	8.27-9.45				6	16"	Decomposed Rock
	Bottom of Hole at 17.0'								

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Location: Howard County, Maryland

Boring Number: B-6 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
19-19-21	SURFACE		0.0						
	Brown, moist, loose to medium dense, sandy SILT, trace gravel, trace to no clay (ML)	D	2.3-4.5				1	14"	3" Topsoil
	Brown, moist, medium dense, sandy SILT, trace to little gravel (ML)	I	5.7-7.6				2	12"	No groundwater encountered while drilling
	Brown, black, moist, medium dense, silty SAND with rock fragments (SM)	D	9.1-14.16				3	18"	Caved in at 7.0' at Completion
	Bottom of Hole at 10.0'						4	16"	
	Bottom of Test Hole at 20.0'								

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Location: Howard County, Maryland

Boring Number: B-7 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
19-19-21	SURFACE		0.0						
	Brown, moist, loose, silty SAND (SM-ML)	D	2.0-3.5				1	12"	3" Topsoil
	Brown, moist, medium dense, sandy SILT, trace to little gravel (ML)	I	6.1-15.10				2	20"	No groundwater encountered while drilling
	Brown, moist, medium dense, silty SAND (SM)	D	9.8-13.14				4	16"	
	Bottom of Hole at 12.0'								
	Bottom of Test Hole at 20.0'								

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Section 1 SWM Location: Howard County, Maryland

Boring Number: B-8 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
414.38	SURFACE		0.0						
	Light brown and white, moist, loose to dense silty sand, with decomposed rock fragments (SM-ML)	D	1.3-5				1	10"	3" Topsoil
	Brown, tan and white, moist, loose to medium dense sandy silty sand (SM-ML)	D	5-8				2	12"	No groundwater encountered while drilling
	Light brown to white, dry, medium dense to loose silty sand, with decomposed rock fragments (SM)	D	6-6				3	14"	
	Dark brown to brown, moist, dense sandy silt (ML)	D	6-11-13				5	16"	
	Bottom of Test Hole at 20.0'						6	18"	Caved in at 12.0' at Completion

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Section 1 SWM Location: Howard County, Maryland

Boring Number: B-9 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
414.38	SURFACE		0.0						
	Dark brown, moist, medium dense, sandy silty sand, trace mica (ML)	D	1.3-4				1	10"	3" Topsoil
	Light brown to white, dry, medium dense to loose silty sand, with decomposed rock fragments (SM)	D	10-9-8				2	14"	No groundwater encountered while drilling
	Brown, moist, loose, micaceous sandy silt (ML)	D	4-7				3	13"	
	Light brown and white, dry, very dense silty sand (SM)	D	14-18-25				4	10"	
	Dark brown to brown, moist, dense sandy silt (ML)	D	10-22-25				5	14"	Caved in at 12.0' at Completion
	Bottom of Test Hole at 20.0'						6	16"	

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 2

Project Name: Cascade Overlook Section 1 SWM Location: Howard County, Maryland

Boring Number: B-10 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
409.84	SURFACE		0.0						
	Dark brown, moist, medium dense, sandy silty sand, trace mica (ML)	D	3.5-7				1	13"	3" Topsoil
	Brown, moist, medium dense, sandy silty sand, trace mica (ML)	D	3-5				2	13"	No groundwater encountered while drilling
	Brown, moist, loose, micaceous sandy silt (ML)	D	3-5				3	8"	
	Light brown and white, dry, very dense silty sand (SM)	D	3-4-5				4	12"	
	Decomposed Rock	D	15-50"				5	9"	
	Bottom of Test Hole at 20.0'						6	7"	

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 2 of 2

Project Name: Cascade Overlook Section 1 SWM Location: Howard County, Maryland

Boring Number: B-10 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
409.84	SURFACE		0.0						
	Light brown and white, dry, very dense silty sand (SM)	D	2.0				1	13"	3" Topsoil
	Decomposed Rock	D	25.0-28.0				7	6"	
	Bottom of Test Hole at 25.0'								

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Section 1 SWM Location: Howard County, Maryland

Boring Number: B-11 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
399.35	SURFACE		0.0						
	Brown, dry, very loose to medium dense sandy silt (ML)	D	2.3-2				1	13"	3" Topsoil
	Brown, moist, medium dense silty sand - sandy (SM-ML)	D	7.5-11				2	14"	No groundwater encountered while drilling
	Brown, moist, medium dense silty sand - sandy (SM-ML)	D	4.7-5				3	14"	
	Brown, tan and white, dry to moist, medium dense to very dense, silty sand with decomposed rock fragments and gravel (SM)	D	2.1-11				4	14"	
	Bottom of Test Hole at 20.0'						5	12"	Caved in at 12.0' at Completion
	Bottom of Test Hole at 20.0'						6	18"	

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Section 1 SWM Location: Howard County, Maryland

Boring Number: B-11 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
399.35	SURFACE		0.0						
	Light brown and white, moist, loose to medium dense sandy silty sand (SM-ML)	D	1.3-5				1	10"	3" Topsoil
	Brown, tan and white, moist, loose to medium dense sandy silty sand (SM-ML)	D	5-8				2	12"	No groundwater encountered while drilling
	Light brown to white, dry, medium dense to loose silty sand, with decomposed rock fragments (SM)	D	6-6				3	14"	
	Dark brown to brown, moist, dense sandy silt (ML)	D	6-11-13				5	16"	
	Bottom of Test Hole at 20.0'						6	18"	Caved in at 12.0' at Completion

STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

Project Name: Cascade Overlook Section 1 SWM Location: Howard County, Maryland

Boring Number: B-10 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
409.84	SURFACE		0.0						
	Dark brown, moist, medium dense, sandy silty sand, trace mica (ML)	D	3.5-7				1	13"	3" Topsoil
	Brown, moist, medium dense, sandy silty sand, trace mica (ML)	D	3-5				2	13"	No groundwater encountered while drilling
	Brown, moist, loose, micaceous sandy silt (ML)	D	3-5				3	8"	
	Light brown and white, dry, very dense silty sand (SM)	D	3-4-5				4	12"	
	Decomposed Rock	D	15-50"				5	9"	
	Bottom of Test Hole at 20.0'						6	7"	

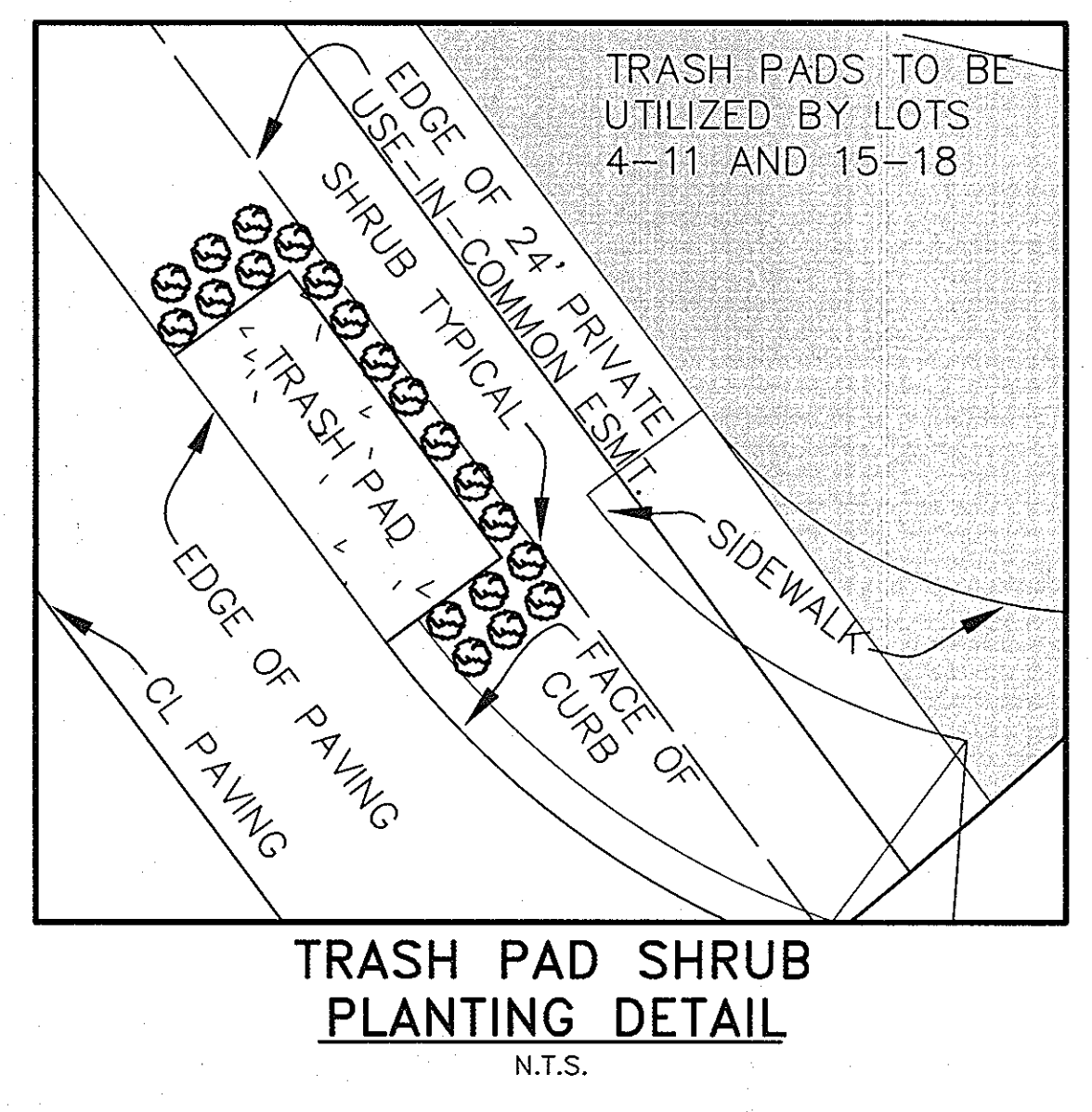
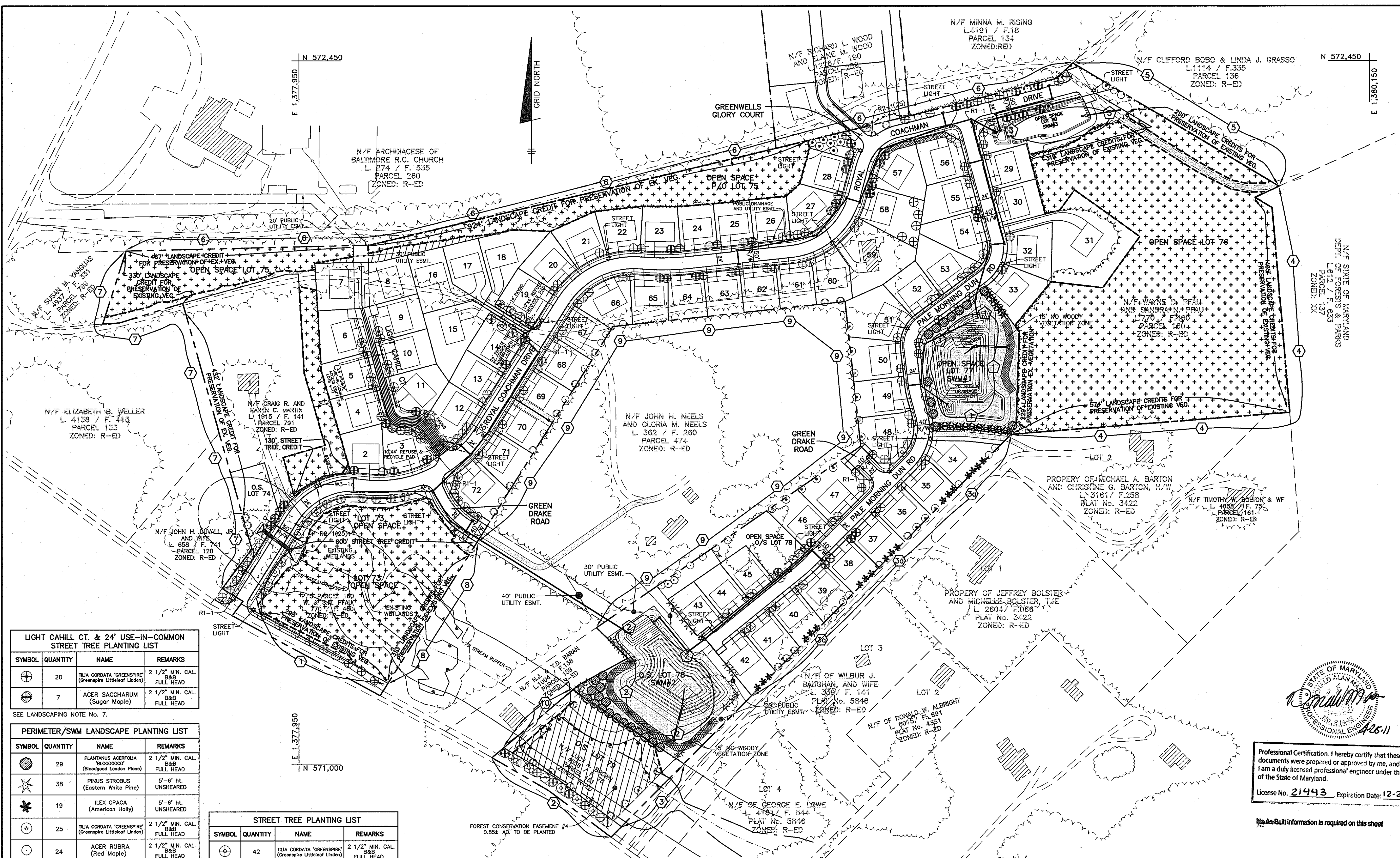
STANDARD PENETRATION TEST-DRIVING 2" OD SAMPLER 1" WITH 140# HAMMER FALLING 30" COUNT MADE AT 6" INTERVALS

HILLIS - CARNES ENGINEERING ASSOCIATES, INC. RECORD OF SOIL EXPLORATION Page 1 of 1

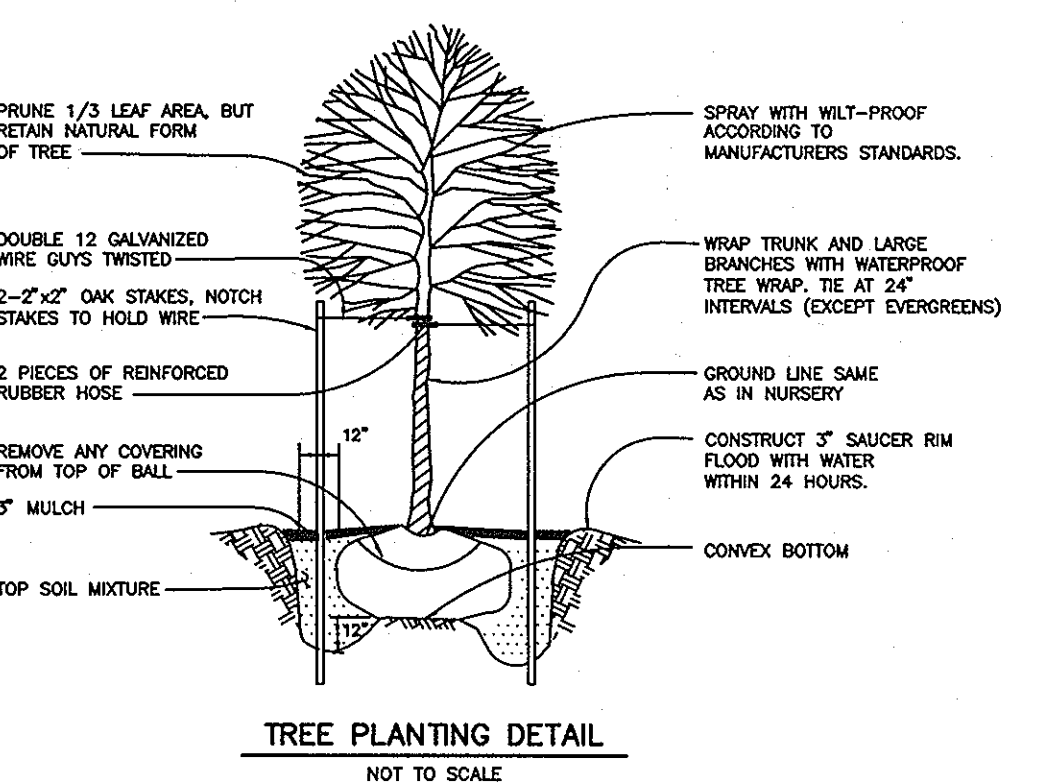
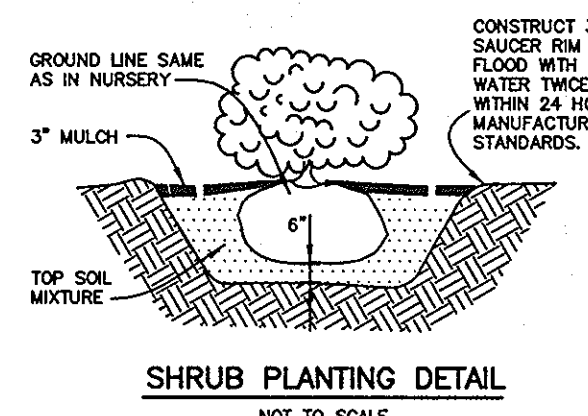
Project Name: Cascade Overlook Section 1 SWM Location: Howard County, Maryland

Boring Number: B-10 Job #: 01472A

ELEV.	SOIL DESCRIPTION	STRK	DEPTH	SCALE	CON	BLOWS	NO.	REC.	BORING & SAMPLING NOTES
409.84	SURFACE		0.0						
	Dark brown, moist, medium dense, sandy silty sand, trace mica (ML)	D	3.5-7				1	13"	3" Topsoil
	Brown, moist, medium dense, sandy silty sand, trace mica (ML)	D	3-5				2	13"	No groundwater encountered while drilling
	Brown, moist, loose, micaceous sandy silt (ML)	D	3-5				3	8"	
	Light brown and white, dry, very dense silty sand (SM)	D	3-4-5				4	12"	
	Decomposed Rock	D	15-50"				5		



- ### LANDSCAPING NOTES
- PERIMETER LANDSCAPING SHALL BE PROVIDED BY THE EXISTING VEGETATION TO REMAIN AND BY THE PLANTINGS AS SHOWN ON THESE PLANS.
 - THE DEVELOPER SHALL BE RESPONSIBLE FOR THE INTERNAL STREET PARKING PLANTINGS, THE PRESERVATION OF THE PERIMETER VEGETATION AND FOR THE PERIMETER PLANTINGS AS SHOWN ON THESE PLANS. BONDING FOR PLANTINGS IS THE OBLIGATION OF THE DEVELOPER AS PART OF THE DEVELOPER'S AGREEMENT.
 - TREES MUST BE A MINIMUM OF FOUR(4) FEET FROM THE CURB OR SIDEWALK AND MUST BE A MINIMUM OF FIVE(5) FEET FROM ANY STORM DRAIN.
 - A MINIMUM DISTANCE OF TWENTY(20) FEET MUST BE MAINTAINED BETWEEN ANY TREES LOCATED ALONG THE CURB LINE AND FROM ANY STREET LIGHTS.
 - THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SEC.-16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL.
 - FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING WILL BE POSTED AS PART OF THE DPW DEVELOPERS AGREEMENT IN THE AMOUNT OF \$49,650.00.
 - TWENTY-SEVEN STREET TREES ALONG LIGHT CHAILL COURT AND THE 24' USE-IN-COMMON DRIVEWAY (BETWEEN LOTS 14 AND 19) ARE TO COUNT AS LANDSCAPE TREES FOR PURPOSE OF SURETY.



LIGHT CAHILL CT. & 24' USE-IN-COMMON STREET TREE PLANTING LIST

SYMBOL	QUANTITY	NAME	REMARKS
⊕	20	TILIA CORDATA 'GREENSPIRE' (Greenspire Littleleaf Linden)	2 1/2" MIN. CAL. FULL HEAD
⊕	7	ACER SACCHARUM (Sugar Maple)	2 1/2" MIN. CAL. FULL HEAD

PERIMETER/SWM LANDSCAPE PLANTING LIST

SYMBOL	QUANTITY	NAME	REMARKS
⊙	29	PLATANUS ACERIFOLIA 'BLOODGOOD' (Bloodgood London Plane)	2 1/2" MIN. CAL. FULL HEAD
★	38	PINUS STROBUS (Eastern White Pine)	5'-6" ht. UNSHEARED
✱	19	ILEX OPACA (American Holly)	5'-6" ht. UNSHEARED
⊕	25	TILIA CORDATA 'GREENSPIRE' (Greenspire Littleleaf Linden)	2 1/2" MIN. CAL. FULL HEAD
⊕	24	ACER RUBRA (Red Maple)	2 1/2" MIN. CAL. FULL HEAD
⊕	28	ACER SACCHARUM (Sugar Maple)	2 1/2" MIN. CAL. FULL HEAD
⊕	40	TAXUS MEDIA 'DENSIFORMIS' (Densiformis Yew)	2' - 2.5' HT. 15' - 18' WIDTH 24" SPACING

STREET TREE PLANTING LIST

SYMBOL	QUANTITY	NAME	REMARKS
⊕	42	TILIA CORDATA 'GREENSPIRE' (Greenspire Littleleaf Linden)	2 1/2" MIN. CAL. FULL HEAD
⊕	86	ACER RUBRA (Red Maple)	2 1/2" MIN. CAL. FULL HEAD
⊕	78	ACER SACCHARUM (Sugar Maple)	2 1/2" MIN. CAL. FULL HEAD

SCHEDULE A PERIMETER LANDSCAPE EDGE

CATEGORY	ADJACENT TO PERIMETER PROPERTIES										ADJACENT TO TRASH PAD	
	(1) B	(2) A	(3) A	(4) A	(5) A	(6) A	(7) A	(8) A	(9) A	(10) A		
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER	298'	292'	183'	773'	1094'	494'	2000'	957'	343'	1985'	186'	28'(EA.)
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	**YES 298'	NO	NO	NO	**YES 1039'	**YES 290'	**YES 1391'	**YES 762'	**YES 313'	NO	NO	NO
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
NUMBER OF PLANTS REQUIRED	5	3	15	1	3	10	3	1	33	3	-	-
SHADE TREES	-	-	-	-	-	-	-	-	-	-	-	-
EVERGREEN TREES	-	-	-	-	-	-	-	-	-	-	-	-
SHRUBS (10:1 SUBSTITUTION)	-	-	-	-	-	-	-	-	-	-	-	20 (EA. PAD)
NUMBER OF PLANTS PROVIDED	5	3	15	1	3	10	3	1	33	3	-	-
SHADE TREES	-	-	-	-	-	-	-	-	-	-	-	-
EVERGREEN TREES	-	-	-	-	-	-	-	-	-	-	-	-
SHRUBS (10:1 SUBSTITUTION)	-	-	-	-	-	-	-	-	-	-	-	20 (EA. PAD)

SCHEDULE D STORMWATER MANAGEMENT AREA LANDSCAPING

LINEAR FEET OF PERIMETER	850' TYPE 'B'	1115' TYPE 'B'	820' TYPE 'B'
	NUMBER OF TREES REQUIRED	17	22
SHADE TREES (1:50)	21	28	21
EVERGREEN TREES (1:40)	-	-	-
CREDIT FOR EXISTING VEGETATION (NO, YES AND LINEAR FEET)	**YES 229'	NO	**YES 315'
CREDIT FOR OTHER LANDSCAPING (NO, YES AND LINEAR FEET)	NO	**YES 254'	YES 505'
NUMBER OF TREES REQUIRED AFTER CREDITS	-	-	-
SHADE TREES (1:50)	12	17	-
EVERGREEN TREES (1:40)	16	22	-
OTHER TREES (2:1 SUBSTITUTION)	-	-	-

LANDSCAPE LEGEND

SYMBOL	DESCRIPTION
⊕	STREET TREES AND PERIMETER TREES TO BE PROVIDED BY THE DEVELOPER
⊙	SHADE TREES ALONG STORMWATER MANAGEMENT TO BE PROVIDED BY THE DEVELOPER
★	EVERGREEN TREES ALONG STORMWATER MANAGEMENT AREA TO BE PROVIDED BY THE DEVELOPER
✱	HOLLY TREES ALONG PERIMETER TO BE PROVIDED BY THE DEVELOPER
⊕	TAXUS MEDIA 'DENSIFORMIS' / DENISIFORMIS YEW EVERGREEN SHRUBS TO BE PLANTED ALONGSIDE TRASH PAD LOCATIONS TO BE PROVIDED BY THE DEVELOPER.
⊕	15' NO WOODY VEGETATION ZONE
⊕	FOREST CONSERVATION EASEMENT
⊕	FOREST CONSERVATION EASEMENT REFORESTATION AREA

STREET TREE CALCULATIONS

STREET TREES REQUIRED FOR 10,034 LF OF RIGHT-OF-WAY WITH 730 LF OF CREDIT FOR PRESERVING EXISTING VEGETATION (10,034 - 730) / 40 = 233 TREES REQUIRED
233 TREES PROVIDED

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. 21443 Expiration Date: 12-21-12

NO	DATE	REVISION
2	10-12-2011	ADD 2 RED MAPLES ON LOT 43, 5 ON LOT 58, AND 1 ON OPEN SPACE LOT 80
1	2-5-04	ADD 18" HDPE CULVERT

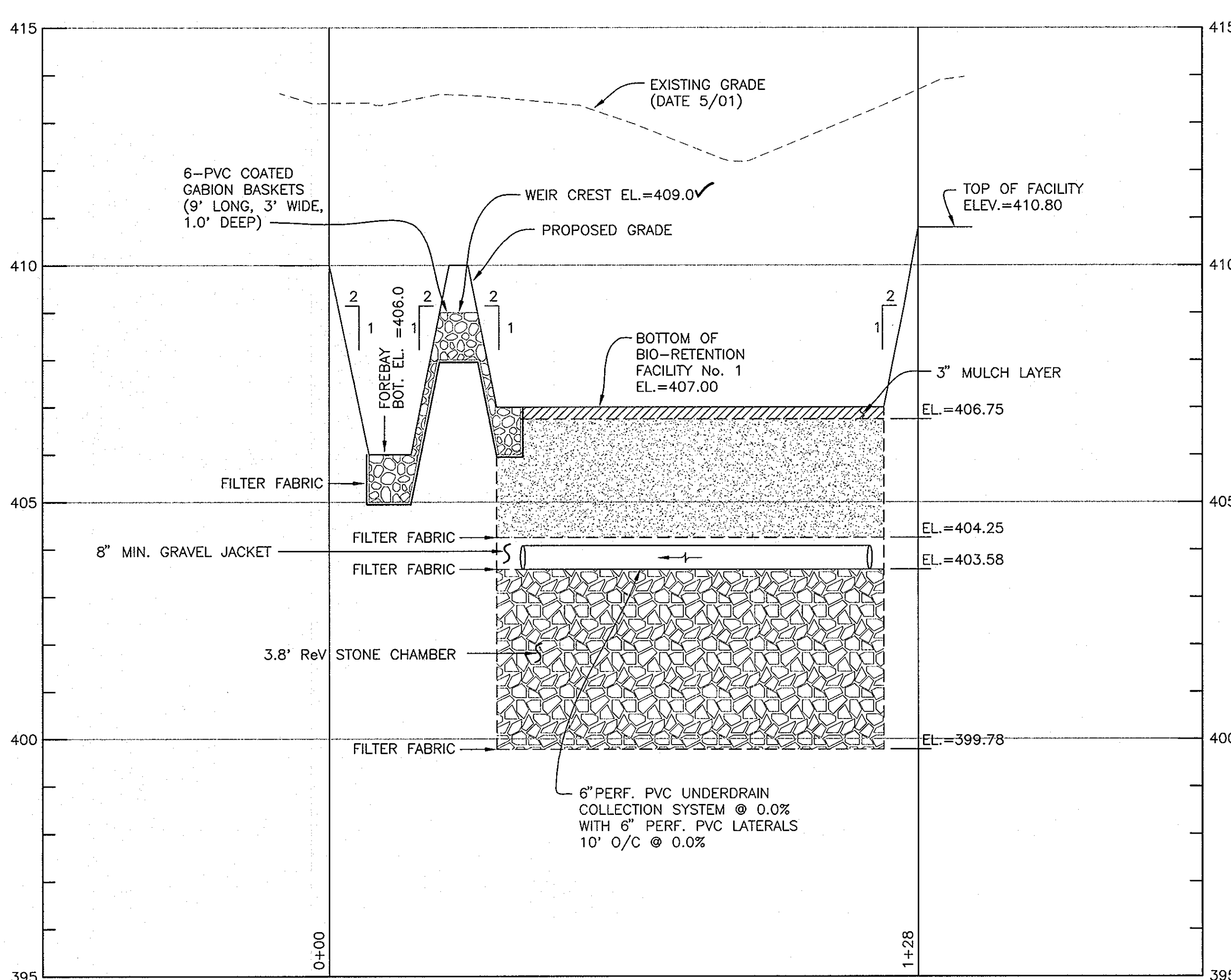
BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER: CASCADE OVERLOOK, L.L.C.
P.O. BOX 417, ELLICOTT CITY, MD 21041
(410) 465-4244

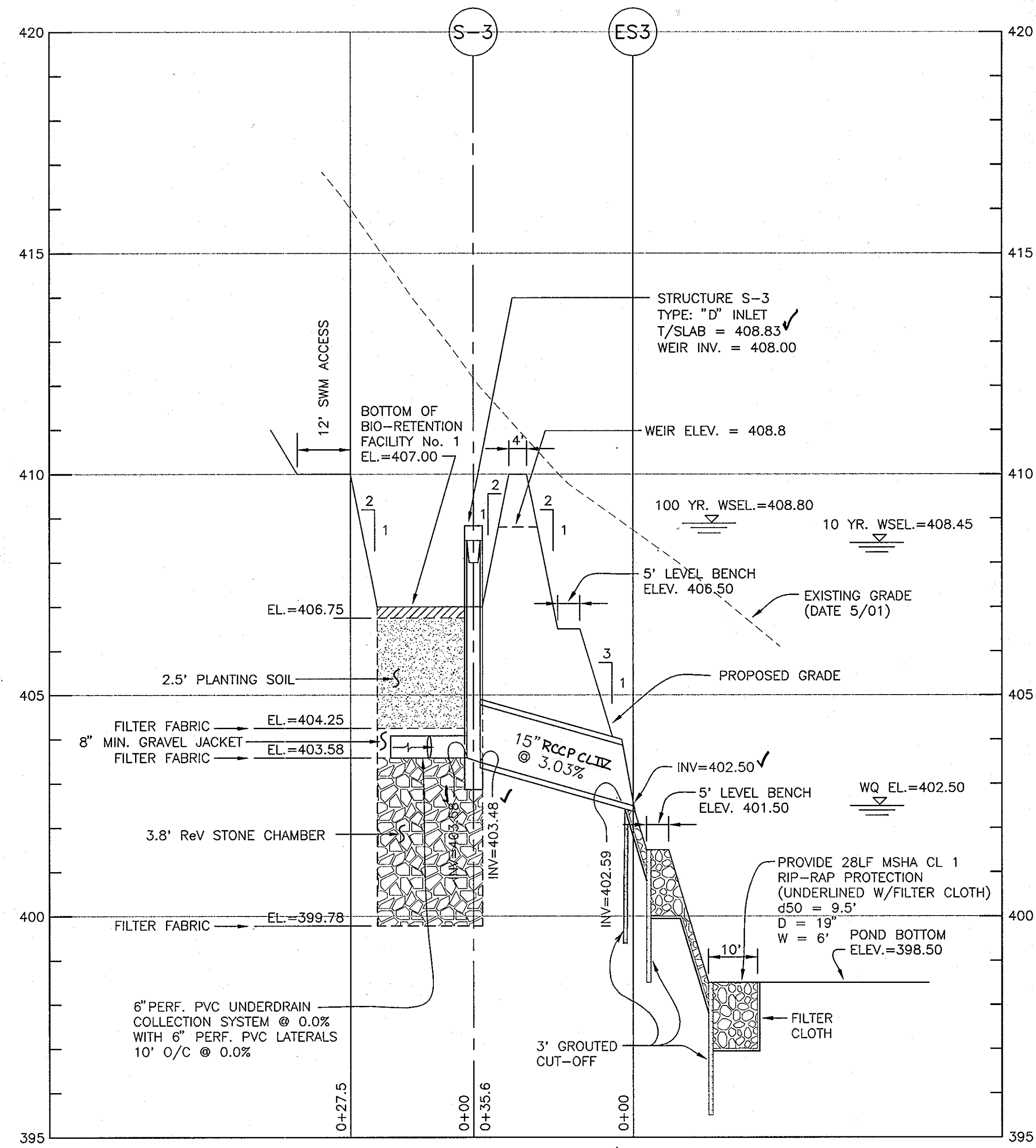
PROJECT: CASCADE OVERLOOK SECTION ONE
LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCELS XX

LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791
1st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND

TITLE: LANDSCAPE PLAN
DATE: DECEMBER, 2003 PROJECT NO. 1383
SCALE: AS SHOWN DRAWING 26 OF 33



**BIO-RETENTION FACILITY #1
SECTION A-A**
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'



**BIO-RETENTION FACILITY #1
SECTION B-B**
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'

MATERIAL	SPECIFICATION	SIZE	NOTES
PLANTINGS (IF REQUIRED)	SEE APPENDIX A: TABLE A.4	N/A	PLANTINGS ARE SITE SPECIFIC
PLANTING SOIL (2.5' TO 4.0' DEEP)	SAND: 55-60% SILT: 30-35% CLAY: 10-25%	N/A	USDA SOIL TYPES: LOAMY SAND, SANDY LOAM OR LOAM
MULCH	SHREDDED HARDWOOD	N/A	AGED 6 MONTHS, MINIMUM
PEA GRAVEL DAPHRAGM AND CURTAIN DRAIN	PEA GRAVEL: ASTM D-448 ORNAMENTAL STONE: WASHED COBBLES	PEA GRAVEL: NO. 4 STONE: 2" TO 4"	
GEOTEXTILE (CLASS "C")	APPARENT OPENING SIZE: (ASTM D-4751) TENSILE STRENGTH: (ASTM D-4833) PUNCTURE RESISTANCE: (ASTM D-4833)	N/A	FOR USE AS NECESSARY BENEATH UNDERDRAINS ONLY
UNDERDRAIN GRAVEL	ASTM M-43	0.375" TO 0.750"	
UNDERDRAIN PIPING	F758, TYPE PS28 OR ASHTRIO M-278	4" TO 6" RIGID SCH 40 PVC OR SDR35	3/8" PERFORATED 6" O/C, 4 HOLES PER ROW; MINIMUM OF 3' OF GRAVEL OVER PIPES, NOT NECESSARY UNDERNEATH PIPES
POURED-IN-PLACE CONC. (IF REQUIRED)	MSHA MIX NO. 3 FC-300000 @ 28 DAYS NORMAL WEIGHT, AIR ENTRAINED, REINFORCING TO MEET ASTM 615-60	N/A	ON-SITE TESTING OF POWDER-IN-PLACE CONC. REQUIRED: 28 DAY STRENGTH TEST AND SLUMP TEST; ALL CONC. DESIGN (CAST -IN-PLACE OR PRE-CAST) NOT USING PREVIOUSLY APPROVED STATE OR LOCAL STANDARDS REQUIRED; DESIGN DRAWINGS SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND - DESIGN TO INCLUDE MEETING ACI CODE 308.8/89; VERTICAL LOADING (H-10 or H-20) ALLOWABLE HORIZONTAL LOADING (BASED ON SOIL PRESSURES); AND ANALYSIS OF POTENTIAL CRACKING

OPERATION & MAINTENANCE SCHEDULE FOR BIO-RETENTION AREAS

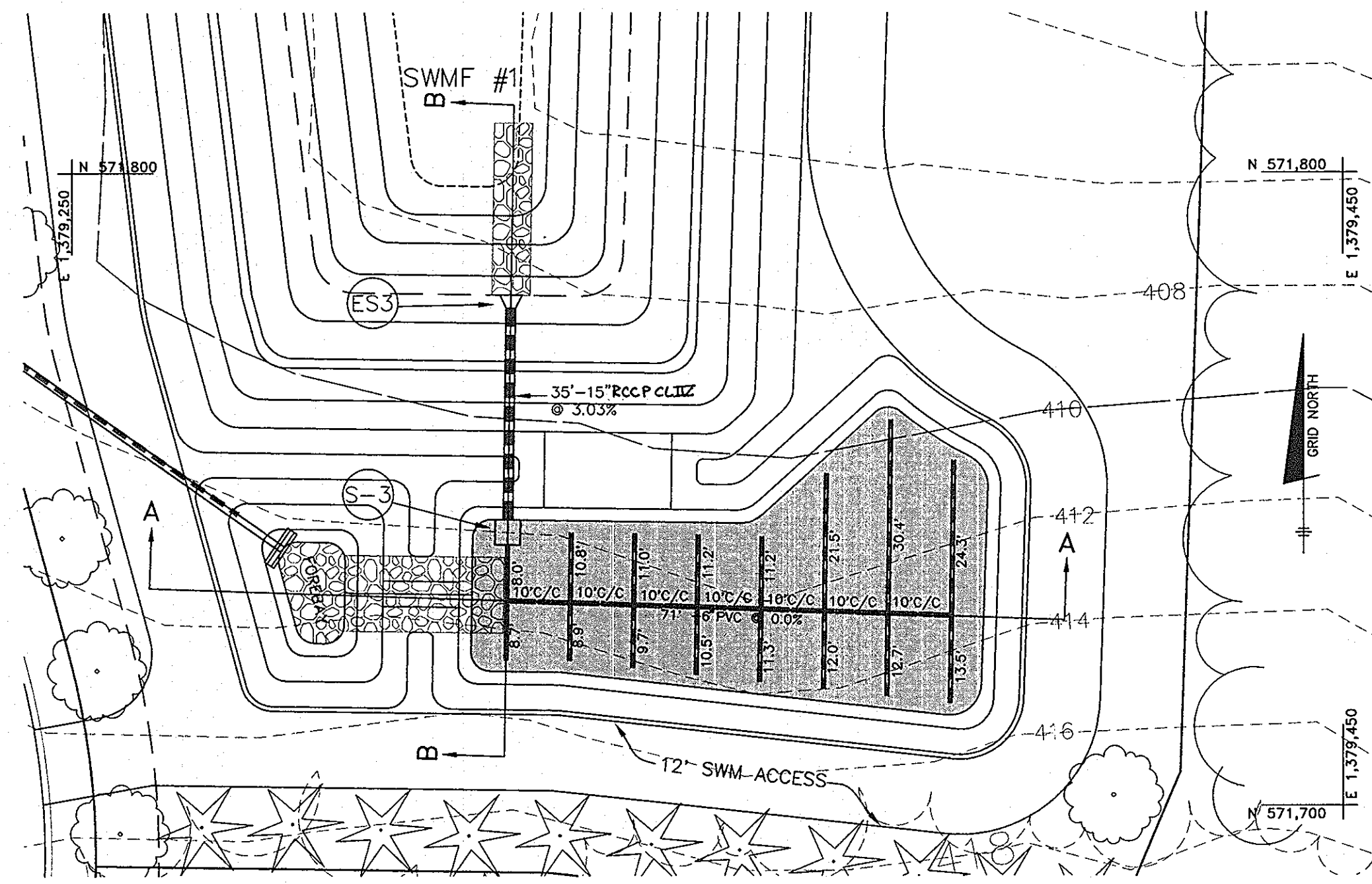
- ANNUAL MAINTENANCE OF PLANT MATERIAL, MULCH LAYER AND SOIL LAYER IS REQUIRED. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH-OUT. ANY REPLACEMENT OF MULCH SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE & INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL & PRUNING.
- SCHEDULE OF PLANT INSPECTION WILL BE TWICE A YEAR IN THE SPRING AND FALL. THIS INSPECTION WILL INCLUDE: REMOVAL OF DEAD & DISEASED VEGETATION CONSIDERED BEYOND TREATMENT; TREATMENT OF ALL DISEASED TREES & SHRUBS; AND REPLACEMENT OF ALL DEFICIENT STAKES & WIRES.
- MULCH SHALL BE INSPECTED EACH SPRING. REMOVE THE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER ONCE EVERY 2 TO 3 YEARS.
- SOIL EROSION TO BE ADDRESSED ON AN AS-NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER HEAVY STORM EVENTS.

SWMF - LANDSCAPE DATA

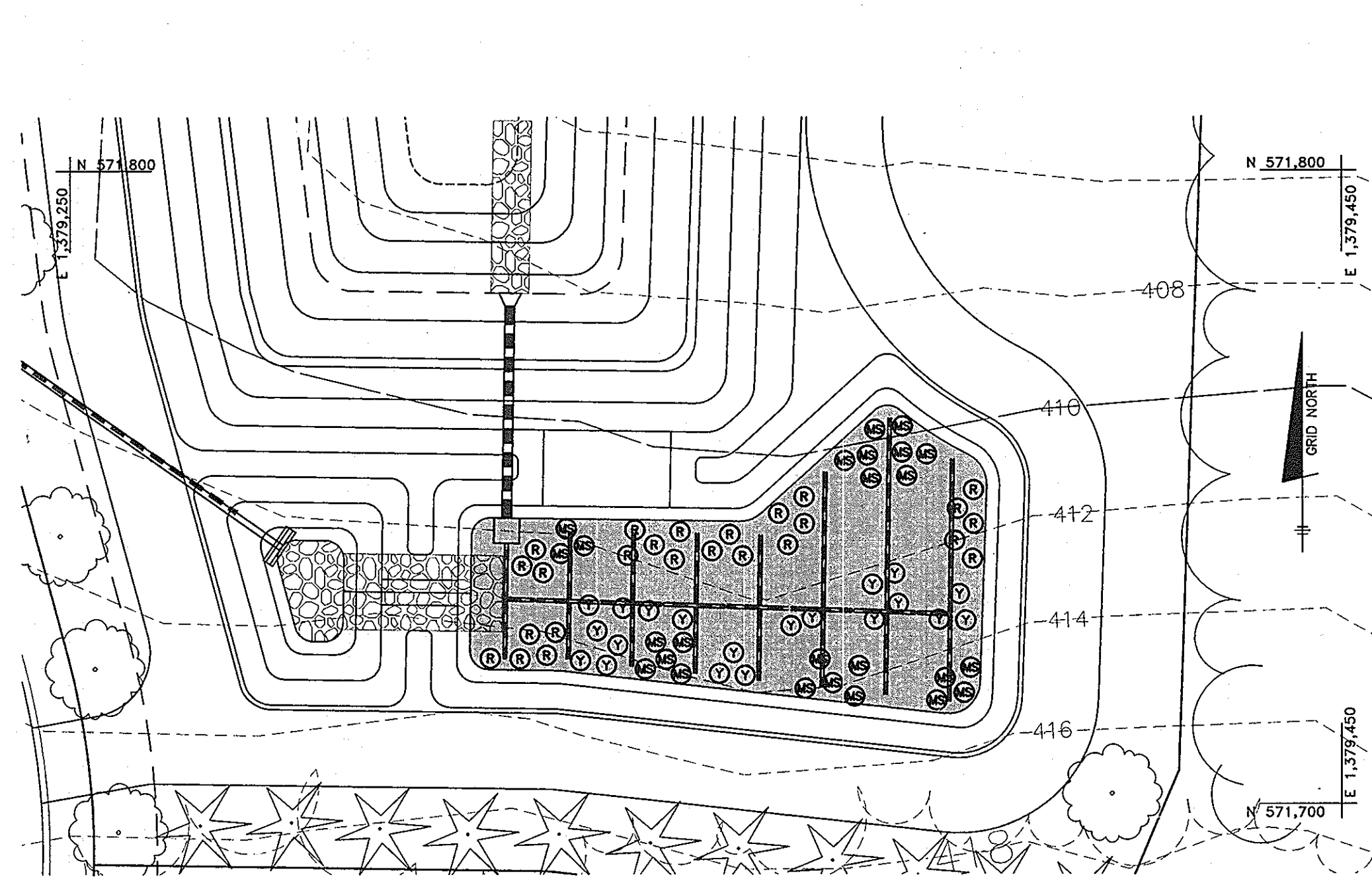
HYDROLOGIC ZONE 3 - REGULARLY INUNDATED SHORELINE FRINGE (HIGH MARSH)
HYDROLOGIC CONDITION - 0' TO 1'-0" DEEP HARDINESS - TEMPERATE ZONE 6b (-5' TO 0')
SEE SHEET 4 FOR SEQUENCE OF CONSTRUCTION

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

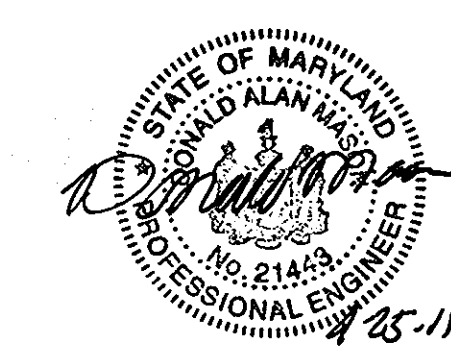
SYMBOL	QUANTITY	NAME	REMARKS
(R)	25	RHOODODENDRON MAXIMUM "RHODODENDRON, ROSEBAY"	1.0' - 3.5' HT. 15" - 18" WIDTH 18" - 24" SPACE MIN.
(Y)	20	ILEX VOMITORIA "WALPOUN HOLLY"	5.0' - 6.0' HT. UNSHARED
(MS)	25	SPARGAN ALBA MEADOW-SWEET, NARROW LEAF	1.5' - 2.5' HT. 15" - 18" WIDTH 18" - 24" SPACE MIN.



PLAN VIEW
SCALE: 1" = 20'



PLANTING PLAN VIEW
SCALE: 1" = 20'



AS-BUILT CERTIFICATION
I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
Donald Mason, P.E. No. 21443 Date 4-25-11

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. 21443 Expiration Date: 12-21-12

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William J. ... 12-24-03 DATE
CHIEF, BUREAU OF HIGHWAYS
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Cindy Hamstra 1/2/04 DATE
CHIEF, DIVISION OF LAND DEVELOPMENT
... 1/2/04 DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION

5-26-04	REVISE HDPEP TO RCCP CLIV	NO DATE	REVISION
BENCHMARK ENGINEERING, INC.			
8480 BALTIMORE NATIONAL PIKE & SUITE 418 ELLICOTT CITY, MARYLAND 21043 PHONE: 410-465-6105 FAX: 410-465-6644			
OWNER/DEVELOPER CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MD 21041 (410) 465-4244		PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-RELEASABLE PARCEL 'A'	
OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELK RIDGE, MD 21075		LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160, 161, 788, & 791 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND	
DES: DAM DRN: RPS CHK: DAM		TITLE: BIO-RETENTION PLANTING DETAILS DATE: OCTOBER, 2003 PROJECT NO. 1383	
SCALE: AS SHOWN		DRAWING 22 OF 33	

MATERIAL	SPECIFICATION	SIZE	NOTES:
PLANTINGS (IF REQUIRED)	SEE APPENDIX A: TABLE A.4	N/A	PLANTINGS ARE SITE SPECIFIC
PLANTING SOIL (2" TO 4" DEEP)	SAND: 35-50% SILT: 30-35% CLAY: 10-25%	N/A	USDA SOIL TYPES: LOAMY SAND, SANDY LOAM OR LOAM
MULCH	SHREDED HARDWOOD	N/A	AGED 6 MONTHS, MINIMUM
PEA GRAVEL DIAPHRAGM AND CURTAIN DRAIN	PEA GRAVEL: ASTM D-448 ORNAMENTAL STONE: WASHED COBBLES	PEA GRAVEL: NO. 8 STONE: 2" TO 5"	
GEOTEXTILE (CLASS "C")	APPROVED GRIND SIZE: (ASTM D-4751) GRAB TENSILE STRENGTH: (ASTM D-4532) PUNCTURE RESISTANCE: (ASTM D-4833)	N/A	FOR USE AS NECESSARY BENEATH UNDERDRAINS ONLY
UNDERDRAIN GRAVEL	ASHTO M-43	0.375" TO 0.750"	
UNDERDRAIN PIPING	7.5" TYPE F958 OR ASHTO M-278	4" TO 6" RIGID	3/8" PERFORATED 0" O/C, 4 HOLES PER ROW, MINIMUM OF 3" OF GRAVEL OVER PIPES, NOT NECESSARY UNDERNEATH PIPES
POURED-IN-PLACE CONC. (IF REQUIRED)	MSHA MIX NO. 3, FC=3000psi @ 28 DAYS, NORMAL WEIGHT, AIR ENTRAINED, REINFORCING TO MEET ASTM 615-03	N/A	ON-SITE TESTING OF POURED-IN-PLACE CONC. REQUIRED; 28 DAY STRENGTH TEST AND SLUMP TEST; ALL CONC. DESIGN (CAST-IN-PLACE OR PRE-CAST) NOT USING PREVIOUSLY APPROVED STORE OR LOCAL STANDARDS REQUIRES DESIGN DRAWINGS SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND. DESIGN TO INCLUDE MEETING A3 CODE 150A/15B VERTICAL LOADING (H-10 or H-20) ALLOWABLE HORIZONTAL LOADING (BASED ON SOIL PRESSURES); AND ANALYSIS OF POTENTIAL CRACKING.

OPERATION & MAINTENANCE SCHEDULE FOR BIO-RETENTION AREAS

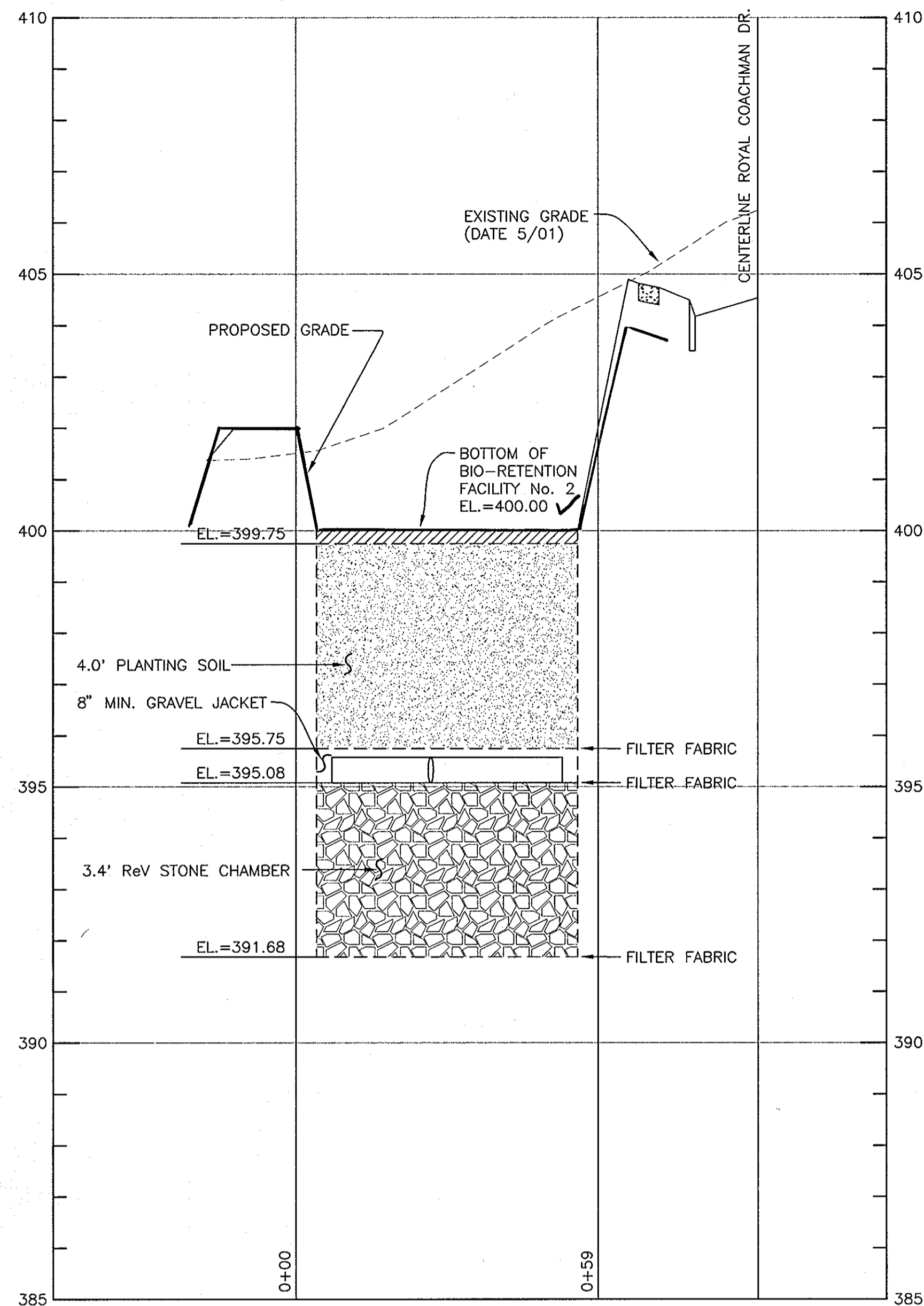
- ANNUAL MAINTENANCE OF PLANT MATERIAL, MULCH LAYER AND SOIL LAYER IS REQUIRED. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH-OUT. ANY REPLACEMENT OF MULCH SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE & INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL & PRUNING.
- SCHEDULE OF PLANT INSPECTION WILL BE TWICE A YEAR IN THE SPRING AND FALL. THIS INSPECTION WILL INCLUDE: REMOVAL OF DEAD & DISEASED VEGETATION CONSIDERED BEYOND TREATMENT; TREATMENT OF ALL DISEASED TREES & SHRUBS; AND REPLACEMENT OF ALL DEFICIENT STAKES & WIRES.
- MULCH SHALL BE INSPECTED EACH SPRING. REMOVE THE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER ONCE EVERY 2 TO 3 YEARS.
- SOIL EROSION TO BE ADDRESSED ON AN AS-NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER HEAVY STORM EVENTS.

SWMF - LANDSCAPE DATA

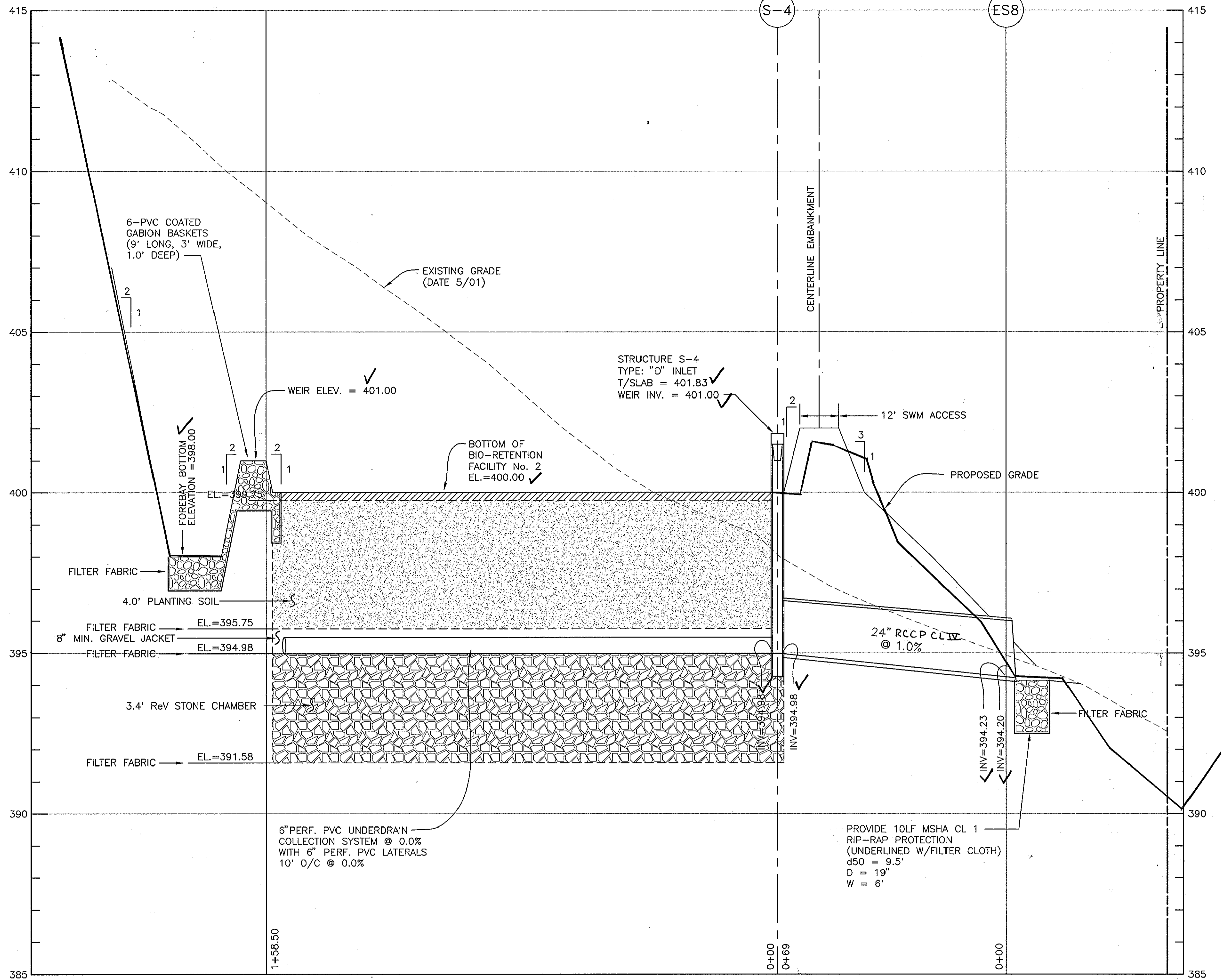
HYDROLOGIC ZONE 3 - REGULARLY INUNDATED SHORELINE FRINGE (HIGH MARSH)
HYDROLOGIC CONDITION - 0" TO 1'-0" DEEP HARDINESS - TEMPERATE ZONE 6b (-5' TO 0')
SEE SHEET 4 FOR SEQUENCE OF CONSTRUCTION

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

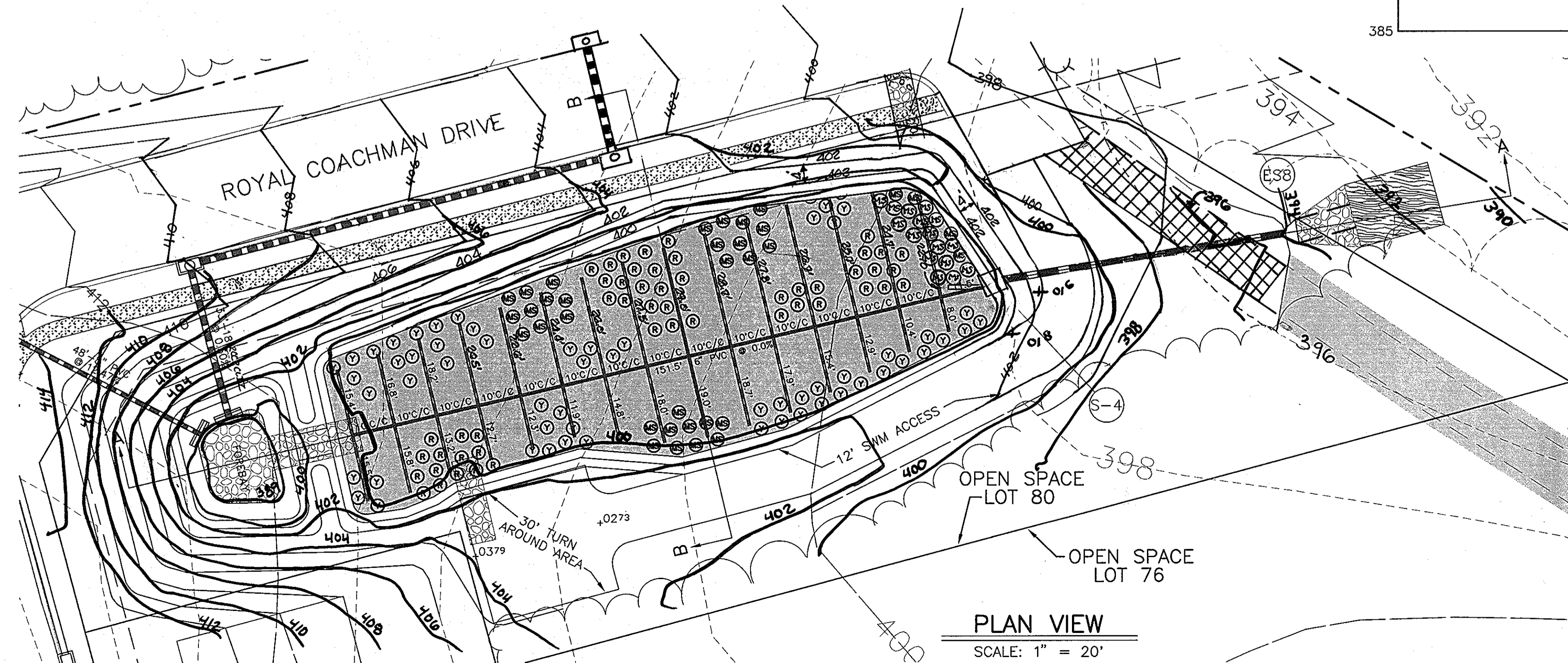
SWMF PLANTING LIST			
SYMBOL	QUANTITY	NAME	REMARKS
(R)	50	RHOYODENDRON MAXIMUM "RHODODENDRON, ROSEBAY"	1.0' - 1.5' HT. 12" - 18" WIDTH 18" - 24" SPACE MIN.
(T)	60	ILEX VOMITORIA "VAUPOIN HOLLY"	5.0' - 6.0' HT. UNSHARED
(MS)	50	SPINAKA ALBA MEADOW-SWEET, NARROW LEAF	1.5' - 2.5' HT. 12" - 18" WIDTH 18" - 24" SPACE MIN.



**BIO-RETENTION FACILITY #2
SECTION B-B**
HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 2'



**BIO-RETENTION FACILITY #2
SECTION A-A**
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'



PLAN VIEW
SCALE: 1" = 20'

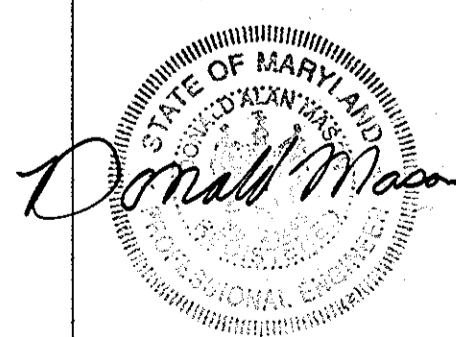
AS-BUILT CERTIFICATION
I hereby certify, by my seal, that the facilities shown on this plan were constructed as shown on this AS-BUILT plan.
Donald Mason, P.E. No. 21443 Date 4-25-11



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. 21443, Expiration Date: 12-21-12

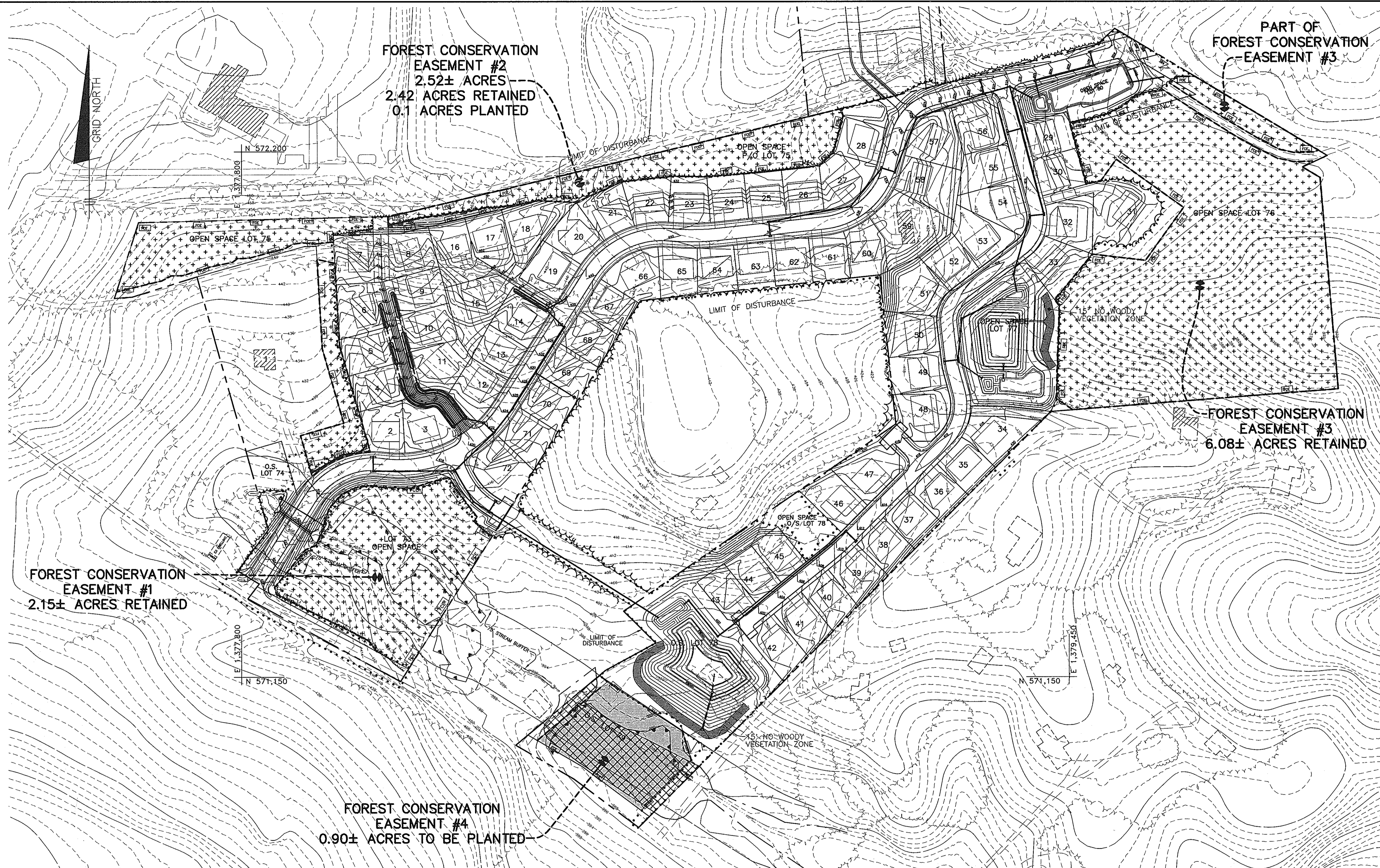
NO	DATE	REVISION
10-11-04		REVISED BIO-RETENTION FACILITY #2
5-25-04		REVISE HDPE TO RCCP CL IV

BENCHMARK ENGINEERING, INC.
ENGINEERS • LAND SURVEYORS • PLANNERS
8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS <i>William J. Anderson</i> CHIEF, BUREAU OF HIGHWAYS DATE: 12-24-03	OWNER/DEVELOPER CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELLCOTT CITY, MD 21041 (410) 465-4244
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING <i>Cindy Hamilton</i> CHIEF, DIVISION OF LAND DEVELOPMENT DATE: 1/13/04	OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELKRIDGE, MD 21075
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE: 11/20/03	PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A' LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160, 161, 788, & 791 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND TITLE: BIO-RETENTION PLANTING DETAILS DATE: OCTOBER, 2003 PROJECT NO. 1383

DES: DAM	DRN: RPS	CHK: DAM	SCALE: AS SHOWN	DRAWING: 28 OF 33
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FOREST CONSERVATION EASEMENT #2
2.52± ACRES
2.42 ACRES RETAINED
0.1 ACRES PLANTED

PART OF FOREST CONSERVATION EASEMENT #3

FOREST CONSERVATION EASEMENT #3
6.08± ACRES RETAINED

FOREST CONSERVATION EASEMENT #1
2.15± ACRES RETAINED

FOREST CONSERVATION EASEMENT #4
0.90± ACRES TO BE PLANTED

I. BASIC SITE DATA

ACRES (1/10 acre)	
GROSS SITE AREA	36.8
AREA WITHIN 100 YEAR FLOODPLAIN	0.7
AREA WITHIN AGRICULTURAL USE OR PRESERVATION	0.7
PARCEL (IF APPLICABLE)	N/A
NET TRACT AREA	36.1
LAND USE CATEGORY (R-RD, R-RMD, R-S, C/1/0, I)	R-ED

II. INFORMATION FOR CALCULATIONS

A. NET TRACT AREA	36.1
B. REFORESTATION THRESHOLD (20% x A)	7.2
C. AFFORESTATION MINIMUM (15% x A)	5.4
D. EXISTING FOREST ON NET TRACT AREA	27.6
E. FOREST AREAS TO BE CLEARED	17.0
F. FOREST AREAS TO BE RETAINED	10.6
G. BREAK EVEN POINT	11.3

- III. DETERMINING REQUIREMENTS: AFFORESTATION OR REFORESTATION
- 1. Reforestation**
If existing forest areas equal or exceed the afforestation minimum (if D equals or is more than C), and clearing of forest areas is proposed, reforestation requirements may apply.
GO TO SECTION IV
If existing forest areas equal or exceed the afforestation minimum (if D equals or is more than C), and no clearing of existing forest resources is proposed, no reforestation is required. No further calculations are needed.
 - 2. Afforestation**
If existing forest areas are less than the afforestation minimum (if D is less than C), afforestation requirements apply.
GO TO SECTION V

IV. REFORESTATION CALCULATIONS

ACRES (1/10 acre)	
A. NET TRACT AREA	36.1
B. REFORESTATION THRESHOLD (20% x A)	7.2
D. EXISTING FOREST ON NET TRACT AREA	27.6
E. FOREST AREAS TO BE CLEARED	17.0
F. FOREST AREAS TO BE RETAINED	10.6
G. FOREST AREAS CLEARED ABOVE REFORESTATION THRESHOLD (D-F, if F equals or is greater than B, Alternate 1) (D-S, if F is less than B, Alternate 2)	17.0
H. FOREST AREAS CLEARED BELOW REFORESTATION THRESHOLD (B-F, if applicable)	N/A
I. FOREST AREAS RETAINED ABOVE REFORESTATION THRESHOLD (F-B, Retention Credit, if applicable)	3.4

- SELECT THE ALTERNATE THAT APPLIES:
- 1. Clearing above the threshold only**
If forest areas to be retained equal or are greater than the reforestation threshold (if F equals or is greater than B), the following calculations apply:
REFORESTATION FOR CLEARING ABOVE THRESHOLD 4.3
 $G \times 1/4$
CREDIT FOR FOREST AREAS RETAINED ABOVE THRESHOLD 3.4
I = Retention Credit
TOTAL REFORESTATION REQUIRED 0.9
 $(G \times 1/4) - I$
If the total reforestation requirement is equal to or less than 0, no reforestation is required.
 - 2. Clearing below the threshold**
If forest areas to be retained are less than the reforestation threshold (if F is less than B), the following calculations apply:
REFORESTATION FOR CLEARING ABOVE THRESHOLD
 $G \times 1/4$
REFORESTATION FOR CLEARING BELOW THRESHOLD
 $H \times 2$
TOTAL REFORESTATION REQUIRED
 $(G \times 1/4) + (H \times 2)$
Since clearing occurs below the threshold, no forest retention credit is possible.

Eco-Science Professionals, Inc.
CONSULTING ECOLOGISTS
MD DNR Qualified Professional
USACOE Wetland Deliberator
Certification # WD02P3MD6104482
John P. Casales

LEGEND

	EXISTING CONTOURS
	PROPOSED CONTOURS
	LIMIT OF WETLANDS
	100 YEAR FLOODPLAIN
	FOREST TO BE RETAINED
	EXISTING SPECIMEN TREE
	LIMITS OF FOREST CONSERVATION EASEMENT
	TEMPORARY PROTECTIVE FENCING
	PERMANENT PROTECTIVE SIGNAGE
	FOREST CONSERVATION EASEMENT RETENTION
	FOREST CONSERVATION EASEMENT PLANTED
	100 YEAR FLOODPLAIN, DRAINAGE AND UTILITY ESMT.
	15 "NO WOODY VEGETATION ZONE"

PLAN VIEW
SCALE: 1" = 100'

SPECIMEN TREE DO NOT REMOVE	FOREST RETENTION AREA MACHINERY, DUMPING OR STORAGE OF ANY MATERIALS IS PROHIBITED	Forest Conservation Easement Unauthorized disturbances of vegetation is prohibited. Violators are subject to fines as imposed by the Howard County Forest Conservation Act of 1992.
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SITE DATA

ACRES	
GROSS AREA:	36.8
EX. LOTS/UNFORESTED PRESERVATION PARCEL/FLOODPLAIN:	0.7
NET TRACT AREA (NTA):	36.1
EXISTING FOREST ON NTA:	27.6
REFORESTATION THRESHOLD:	7.2
FOREST TO BE CLEARED:	17.0
FOREST TO BE RETAINED (NTA):	10.6
REFORESTATION REQUIRED:	0.9
REFORESTATION PROPOSED:	1.0
CREDIT FOR LANDSCAPING:	0.05

SURETY AMOUNT:
RETENTION \$0.20 PER S.F. X 10.6 ACRES = \$92,347.20
REFORESTED \$0.50 PER S.F. X 1.0 ACRES - 0.05 ACRES CREDIT = \$20,691.00

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. 21443 Expiration Date: 12-21-12
No As-Built Information is required on this sheet

NO	DATE	ADD 18" HDPE CULVERT	REVISION
1	2-5-04		

BENCHMARK ENGINEERING, INC.
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8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELICOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William J. ... 12-20-03
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Wendy Hamilton 1/13/04
... 1/14/04

OWNER/DEVELOPER: CASCADE OVERLOOK, L.L.C.
P.O. BOX 417, ELLICOTT CITY, MD 21041 (410) 465-4244

OWNER: CRAIG R. AND KAREN C. MARTIN
4937 LANDING ROAD, ELK RIDGE, MD 21075

PROJECT: CASCADE OVERLOOK SECTION ONE
LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A'

LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160, 161, 788, & 791 1st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND

TITLE: FOREST CONSERVATION PLAN
VP-86-130, F-88-20, S-01-04, PB-358, P-02-11
DATE: OCTOBER, 2003 PROJECT NO. 1383

DES: DAM DRN: RPS CHK: SCALE: 1" = 100' DRAWING 22 OF 33

See FCP Sheet 2 for FCP notes, details and specifications

PLANTING SPECIFICATIONS

Planting Schedule

FOREST PROTECTION PROCEDURES - Preconstruction Phase

- The edge of the woods to be protected will be marked (staked or flagged) in the field per the limits of forest conservation easement shown in the approved site development plan prior to the start of construction activity. All areas within protective easement are to be considered "off limits" to any construction activities. The optional protective fencing shall be installed at the outside edge of forested areas and should be combined with sediment control devices when possible. The limit of the critical root zone and therefore the location of the protective devices is to be determined as follows:

Edge of Forested Area - 1 foot of protective radius/inch of DBH or an eight foot protective radius, whichever is greater.

Critical Root Zone for the forest on this site is an average of 12 feet from the trunk of the tree. Critical root zones for Specimen Tree #1 and #2 are 34' and 30'.

- Construction activities expressly prohibited within the preservation areas are:

Placing or stockpiling backfill or top soil in protected areas
Felling trees into protected areas
Driving construction equipment into or through protected areas
Burning in or in close proximity to protected areas
Stacking or storing supplies of any kind
Concrete wash-off areas
Conducting trenching operations
Grading beyond the limits of disturbance
Parking vehicles or construction equipment
Removal of root mat or topsoil
Siting and construction of:
Utility lines
Access roads
Impervious surfaces
Stormwater management devices
Staging areas

- Protective fencing (see Figure "Protective Fencing") shall be the responsibility of the general contractor. The general contractor shall affix signs to the fencing at 25' minimum intervals indicating that these areas are Forest Retention Area (see Figure "Signage"). The general contractor shall take great care to assure the restricted areas are not violated and that root systems are protected from smothering, flooding, excessive wetting from dewatering operations, off-site runoff, spillage, and drainage or solutions containing materials hazardous to tree roots.

- The general contractor shall be responsible for any tree damaged or destroyed within the preservation areas whether caused by the contractor, his agents, employees, subcontractors, or licensees.

- Foot traffic shall be kept to a minimum in the protective areas.

- All trees which are not to be preserved within fifty feet of any tree preservation areas are to be removed in a manner that will not damage those trees that are designated for preservation. It is highly recommended that tree stumps within this fifty foot area be ground out with a stump grinding machine to minimize damage.

- The general contractor shall designate a "wash out" area onsite for concrete trucks which will not drain toward a protected area.

- A pre-construction meeting shall be held with local authorities before any disturbance has taken place on site.

FOREST PROTECTION PROCEDURES - Construction Phase

Forest and tree conditions should be monitored during construction and corrective measures taken when appropriate.

The following shall be monitored:

- Soil compaction
- Root injury - prune and monitor; consider crown reduction
- Limb injury - prune and monitor
- Flooded conditions - drain and monitor; correct problem
- Drought conditions - water and monitor; correct problem
- Other stress signs - determine reason, correct, and monitor

FOREST PROTECTION PROCEDURES - Post Construction Phase

The following measures shall be taken:

- Corrective measures if damages were incurred due to negligence:
 - Stress reduction
 - Removal of dead or dying trees. This may be done only if trees pose an immediate safety hazard.

- Removal of temporary structures:
 - No burial of discarded materials will occur onsite within the conservation area.
 - No open burning within 100 feet of a wooded area.
 - All temporary forest protection structures will be removed after construction.
 - Remove temporary roads by removing stone or broadcasting mulch; pre-construction elevation should be maintained.
 - Aerate compacted soil.
 - Replant disturbed sites with trees, shrubs and/or herbaceous plants.
 - Retain signs for retention areas or specimen trees.
 - A County official shall inspect the entire site.

- Future protection measures:
 - Howard County and the developer shall arrange for the dedication of an appropriate forest conservation easement at a later date.

FOREST PROTECTION PROCEDURES - Preconstruction Phase

Stress Reduction and Protection of Specimen Trees Isolated from Forest Retention Areas and General Forest Retention Areas (as they may apply)

Isolated specimen trees that are to be preserved will be examined to determine if stress reduction techniques are needed. Protective measures and their evaluation criteria are provided on this plan only if they are employed herein.

Root Pruning

Evaluation Criteria

Will the critical root zone be affected by construction activities such as grade changes, digging for foundations and roads or utility installation?

Design Considerations

- Prune prior to construction as shown on the plan (see Figure "Root Pruning Detail.")
- Prune root with a clean cut using proper pruning equipment such as a vibratory knife.
- Exact location of pruning trench should be identified, and immediately backfilled to cover exposed roots after pruning with soil removed other topsoil, peat moss, or other suitable material or with other high organic soil.
- For trees over 15" in diameter, root pruning may be done up to one year in advance of construction.
- Tree(s) will be monitored for signs of stress.

Crown Reduction or Pruning

Evaluation Criteria

Has the root system been significantly reduced (>30%) or are there dead, damaged, or diseased limbs?

Design Considerations

- Reduce only at specified times of the year:
Flowering trees - only after flowering and before bud set
Non-flowering trees - in late winter, early spring or mid summer
- No more than 1/3 of the crown should be removed at one time using acceptable pruning methods (see Figure "Crown Reduction Detail.")
- Monitor for signs of stress

Watering

Evaluation Criteria

Will construction activities alter the hydrology of the site? Has or will root pruning occur?

Design Considerations

- Water only as necessary
- Monitor for signs of stress (see Figure "Tree Planting and Maintenance Calendar")

Fertilizing

Evaluation Criteria

Is or will be tree(s) be under stressful conditions? Has or will root pruning occur?

Design Considerations

- Use low nitrogen and slow release fertilizers.
- Apply in late fall or early spring (see Figure "Tree Planting and Maintenance Calendar")
- For small trees (<3" in diameter), use punch hole method or pressurized injection method (see Figure "Application of Fertilizers by Injection.")
- For larger trees (>3" diameter), use punch hole method or pressurized injection method (see Figure "Application of Fertilizers by Injection.")
- Do not apply fertilizer any closer than 3' from tree trunk for pressurized injection method.
- Monitor for signs of stress.

Planting/Soil Specifications

- Planting of nursery stock shall take place between March 15th and April 30th. Container stock may be planted September 1-October 30.
- A twelve (12) inch layer of topsoil shall be spread over all afforestation areas impacted by site grading to assure a suitable planting area. Disturbed areas shall be seeded and stabilized as per general construction plan for project. Planting areas not impacted by site grading shall have no additional topsoil installed.
- All bareroot planting stock shall have their root systems dipped into an anti-desiccant gel prior to planting.
- Plants shall be installed so that the top of root mass is level with the top of existing grade. Backfill in the planting pits shall consist of 3 parts existing soil to 1 part pine fines or equivalent.
- Fertilizer shall consist of Agriform 22-8-2, or equivalent, applied as per manufacturer's specifications.
- A two (2) inch layer of hardwood mulch shall be placed over the root area of all plantings.
- Plant material shall be transported to the site in a tarped or covered truck. Plants shall be kept moist prior to planting.
- All non-organic debris associated with the planting operation shall be removed from the site by the contractor.

Sequence of Construction

- Plants shall be installed as per Plant Schedule and the Planting/Soil Specifications for the project.
- Upon completion of the planting, signage shall be installed as per the Forest Retention Area Protection Devices shown on Sheet 2 of the Forest Conservation Plan.
- Plantings shall be maintained and guaranteed in accordance with the Maintenance and Guarantee requirements for project.

Maintenance of Plantings

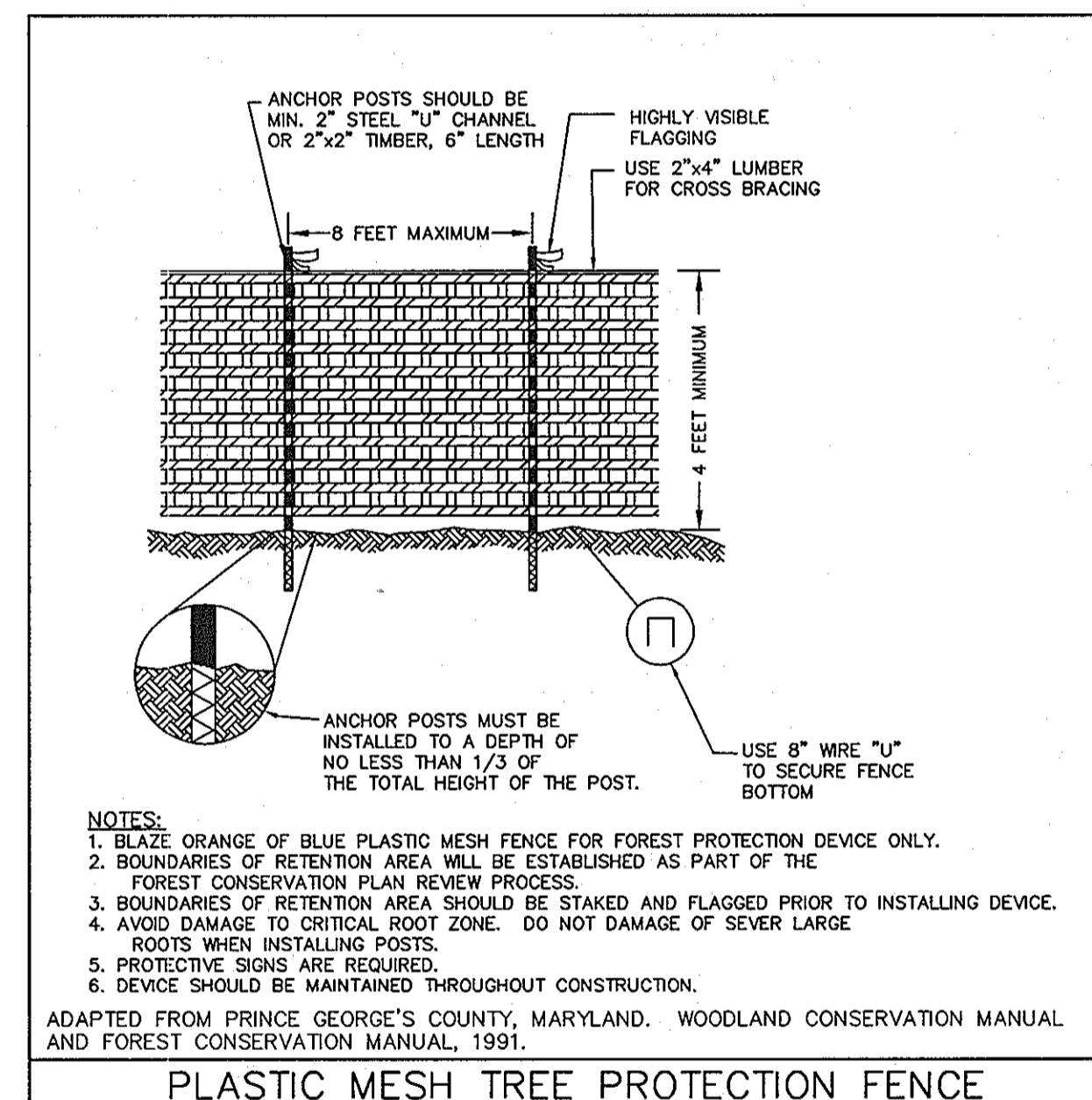
- Maintenance of plantings shall last for a period of 24 months.
- All plant material shall be watered twice a month during the 1st growing season. Watering may be more or less frequent depending on weather conditions. Watering during second growing season, to be once a month during May-September, if needed.
- Invasive exotics and noxious weeds will be removed from reforestation areas. Old field successional species will be retained.
- Plants will be examined a minimum two times during the growing season for serious plant pests and diseases. Serious problems will be treated with the appropriate agent.
- Dead branches will be pruned from plantings.

Guarantee Requirements

- After one growing season, plant material shall be maintained at 90% survival threshold. A 75 percent survival rate of forestation plantings will be required at the end of the 24 month maintenance period. All plant material below the 75 percent threshold will be replaced at the beginning of the next growing season.
- The contractor will not be liable for plant loss due to theft or vandalism.

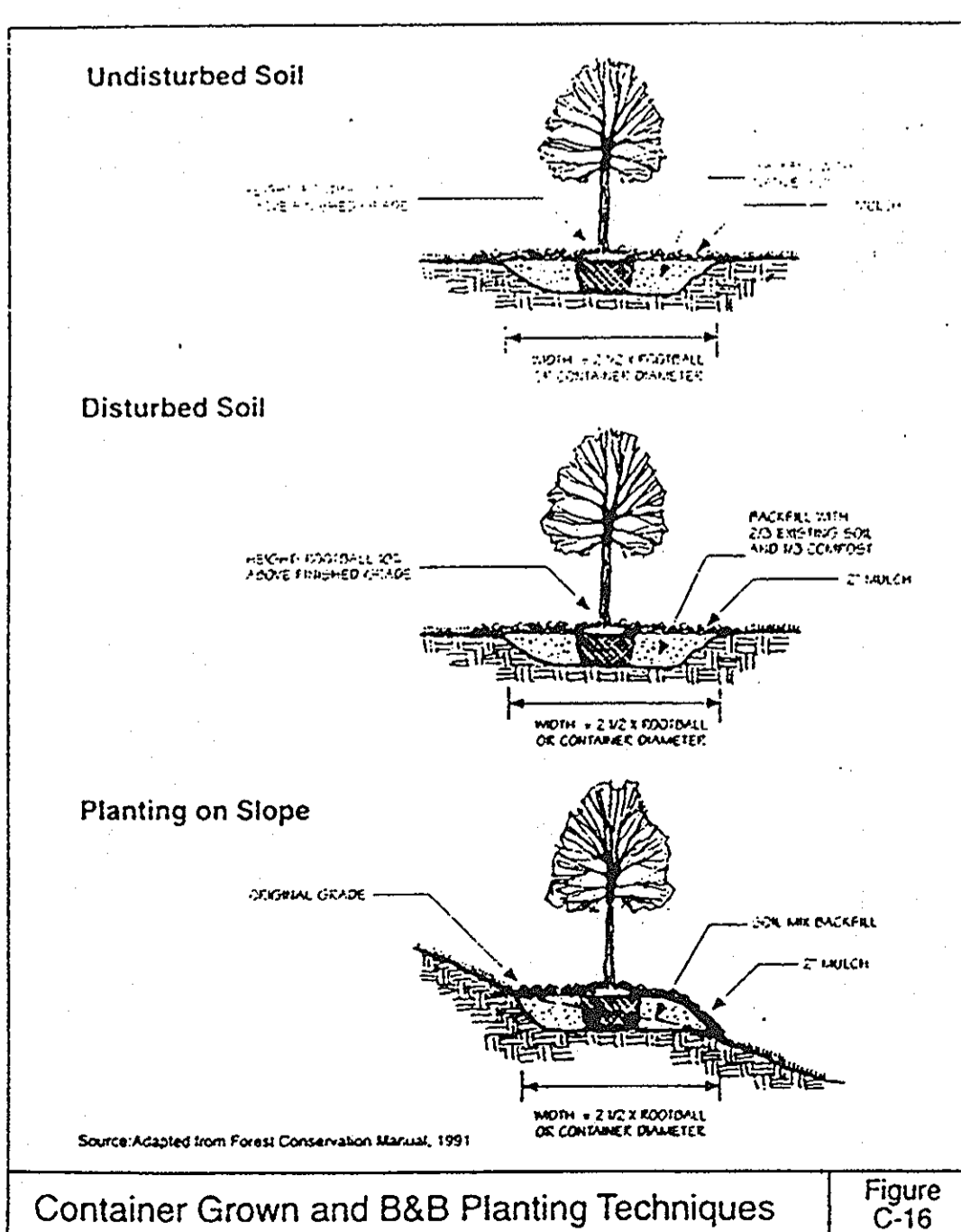
Surety for Retention and Reforestation

- The developer shall post a surety (bond, letter of credit) to ensure that reforestation plantings are completed. Upon acceptance of the plantings by the County, the bond shall be released. Financial surety for the Forest Conservation plantings will be posted as part of the DPW developer's agreement. Retention \$0.20 x 10.6 acres = \$2,120.00, and reforested \$0.50 x 1.0 acres = 0.05 acres credit for landscaping = \$20,691.00. Total = \$22,811.00



FCP NOTES

- ANY FOREST CONSERVATION EASEMENT (FCE) AREA SHOWN HEREON IS SUBJECT TO PROTECTIVE COVENANTS WHICH MAY BE FOUND IN THE LAND RECORDS OF HOWARD COUNTY WHICH RESTRICT THE DISTURBANCE AND USE OF THESE AREAS.
- THE FOREST CONSERVATION EASEMENTS HAVE BEEN ESTABLISHED TO FULFILL THE REQUIREMENTS OF SECTION 16.1200 OF THE HOWARD COUNTY CODE, FOREST CONSERVATION ACT. NO CLEARING, GRADING, OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION EASEMENTS; HOWEVER, FOREST MANAGEMENT PRACTICES AS DEFINED IN THE DEED OF FOREST CONSERVATION EASEMENT ARE ALLOWED.
- FORESTED AREAS OCCURRING OUTSIDE OF THE FCE SHALL NOT BE CONSIDERED PART OF THE FCE AND SHALL NOT BE SUBJECT TO PROTECTIVE LAND COVENANTS.
- LIMITS OF DISTURBANCE SHALL BE RESTRICTED TO AREAS OUTSIDE THE LIMIT OF TEMPORARY FENCING OR THE FCE BOUNDARY, WHICHEVER IS GREATER.
- THERE SHALL BE NO CLEARING, GRADING, CONSTRUCTION OR DISTURBANCE OF VEGETATION IN THE FOREST CONSERVATION EASEMENT, EXCEPT AS PERMITTED BY HOWARD COUNTY DPZ.
- NO STOCKPILES, PARKING AREAS, EQUIPMENT CLEANING AREAS, ETC. SHALL OCCUR WITHIN AREAS DESIGNATED AS FOREST CONSERVATION EASEMENTS.
- TEMPORARY FENCING SHALL BE USED TO PROTECT FOREST RESOURCES DURING CONSTRUCTION. THE FENCING SHALL BE PLACED ALONG ALL FCE BOUNDARIES WHICH OCCUR WITHIN 15 FEET OF THE PROPOSED LIMITS OF DISTURBANCE.
- PERMANENT SIGNAGE SHALL BE PLACED 50-100' APART ALONG THE BOUNDARIES OF ALL AREA INCLUDED IN FOREST CONSERVATION EASEMENTS.
- THE FOREST CONSERVATION OBLIGATIONS INCURRED BY THIS SITE DEVELOPMENT PLAN HAVE BEEN MET THROUGH THE RETENTION, IN AN EASEMENT, OF 10.6 ACRES OF EXISTING RETAINED FOREST AND 1.0 ACRES - 0.05 ACRES OF CREDIT FOR REFORESTATION. FOR A TOTAL OF 11.55 ACRES OF FOREST CONSERVATION EASEMENTS WILL BE CREATED FOR THIS PROJECT.



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. 21943, Expiration Date: 12-21-12

No As-Built information is required on this sheet

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
 [Signature] 12-24-03
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 [Signature] 1/12/04
 CHIEF, DIVISION OF LAND DEVELOPMENT

APPROVED: [Signature] 12/16/03
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

FCE Planting Area 2 (0.10 acres)

Qty.	Species	Size	Spacing
3	Acer rubrum - Red maple	2 1/2" - 3" dia.	*
3	Fraxinus pennsylvanica - Green ash	2 1/2" - 3" dia.	*
6	Quercus alba - White oak	2 1/2" - 3" dia.	*

FCE Planting Area 4 (0.9 acres)

Qty.	Species	Size	Spacing
50	Acer rubrum - Red maple	2-3 whip	**
50	Betula nigra - River birch	2-3 whip	**
70	Fraxinus pennsylvanica - Green ash	2-3 whip	**
45	Nyssa sylvatica - Black gum	2-3 whip	**
40	Quercus palustris - Pin oak	2-3 whip	**
60	Salix nigra - Black willow	2-3 whip	**

Key:

- * - landscape sized trees shall be installed on 20 foot centers in a random pattern throughout the easement. The trees should not be placed in a grid.
- ** Plantings to be spaced on 11 foot centers, plantings should be installed in rows to facilitate future maintenance. Where possible rows should be made along contour. Shelters required per County regulations.

Planting Notes:

- No motorized vehicles permitted within wetlands.
- Plants should be flagged to aid on location during maintenance, 2-3' whip plantings should also be planted in grid pattern to facilitate maintenance and removal of invasive and exotic species.

Eco-Science Professionals, Inc. CONSULTING ECOLOGISTS

MD DNR Qualified Professional
 USAACR Wetland Designer
 Certified by WPC/DE/MS/MD/VA

P.O. Box 5006 Glen Arm, MD 21057 (410) 592-6752

John P. Casade

NO	DATE	REVISION

BENCHMARK ENGINEERING, INC.
 ENGINEERS • LAND SURVEYORS • PLANNERS

8480 BALTIMORE NATIONAL PIKE • SUITE 418
 ELLICOTT CITY, MARYLAND 21043
 PHONE: 410-465-6105 FAX: 410-465-6644

11/17/03

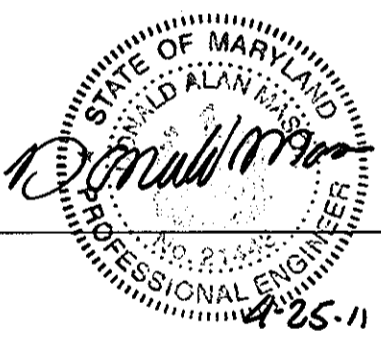
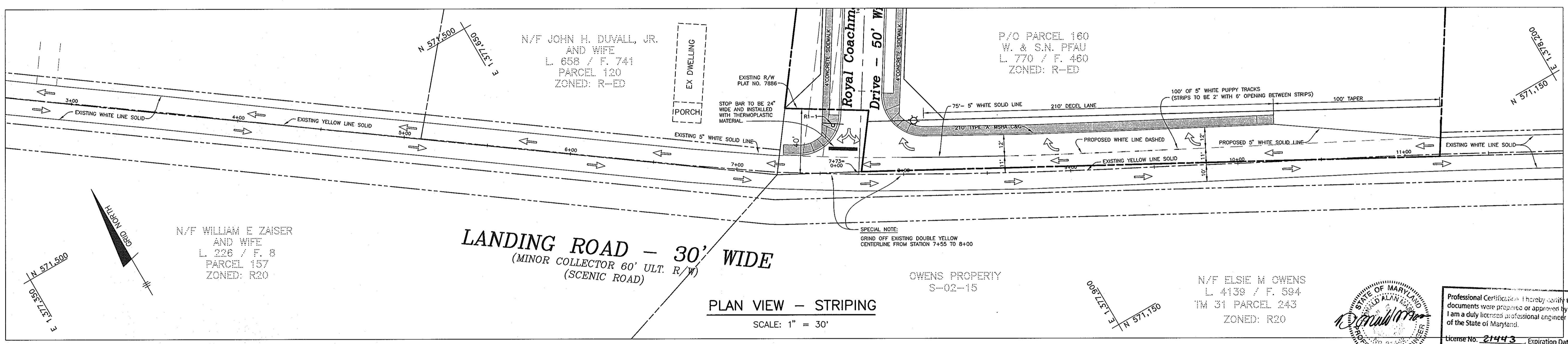
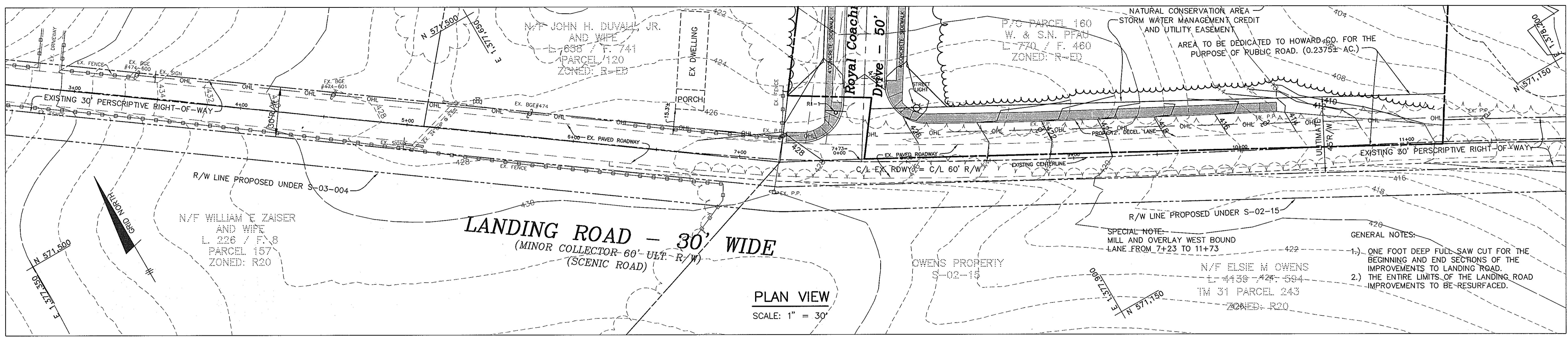
PROJECT: CASCADE OVERLOOK SECTION ONE
 LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 74

LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791 1st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND

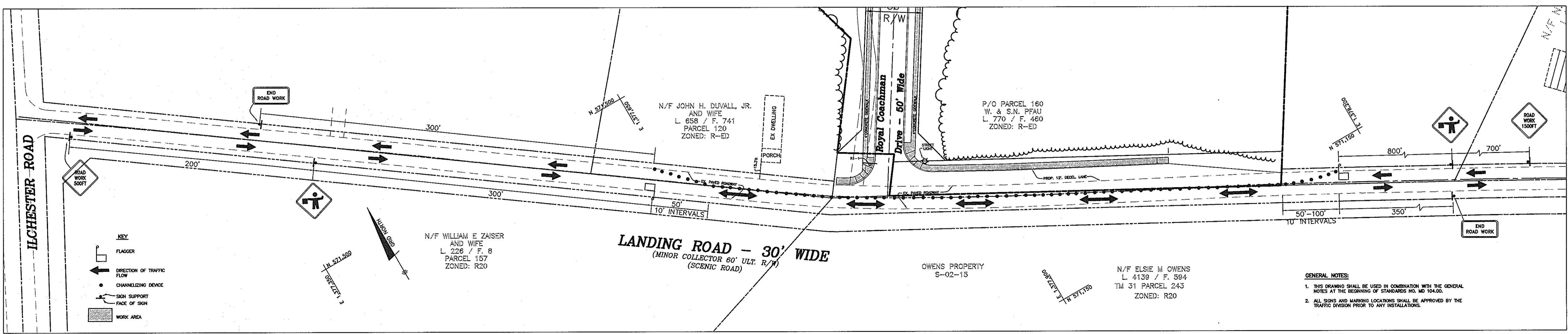
TITLE: FOREST CONSERVATION NOTES AND DETAILS
 VP-86-130, F-88-20, S-01-04, PB-359, P-02-11

DATE: OCTOBER, 2003 PROJECT NO. 1383

DES: DAM DRN: RPS CHK: SCALE: AS SHOWN DRAWING 30 OF 33



Professional Certificate I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 21443, Expiration Date: 12-21-12



NOTE: CONTRACTOR SHALL SCHEDULE TO COMPLETE A MINIMUM OF A STONE BASE BY THE END OF EACH DAY AND THE ROAD SHALL BE RETURNED TO TWO LANE TRAFFIC WHEN NOT ATTENDED BY FLAGGERS.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William Z. ... 12-24-03
CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Cindy ... 1/12/04
CHIEF, DIVISION OF LAND DEVELOPMENT

NO	DATE	REVISION

BENCHMARK ENGINEERING, INC.
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8480 BALTIMORE NATIONAL PIKE • SUITE 418
ELLCOTT CITY, MARYLAND 21043
PHONE: 410-465-6105 FAX: 410-465-6644

OWNER/DEVELOPER
CASCADE OVERLOOK, L.L.C.
P.O. BOX 417
ELLCOTT CITY, MD 21041
(410) 465-4244

OWNER
CRAIG R. AND KAREN C. MARTIN
4937 LANDING ROAD
ELK RIDGE, MD 21075

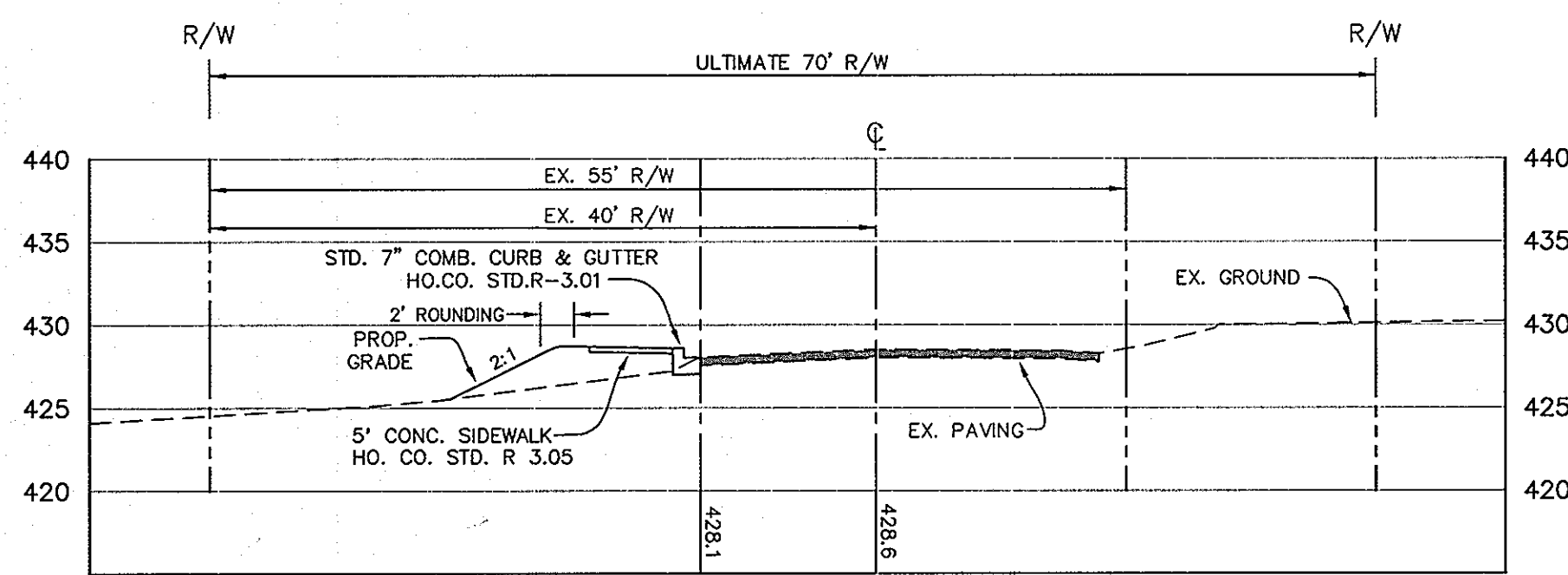
PROJECT: CASCADE OVERLOOK SECTION ONE
LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A'

LOCATION:
TAX MAP 31, GRID 10 & 11, PARCELS 160, 161, 788, & 791
1 ST. ELECTION DISTRICT HOWARD COUNTY, MARYLAND

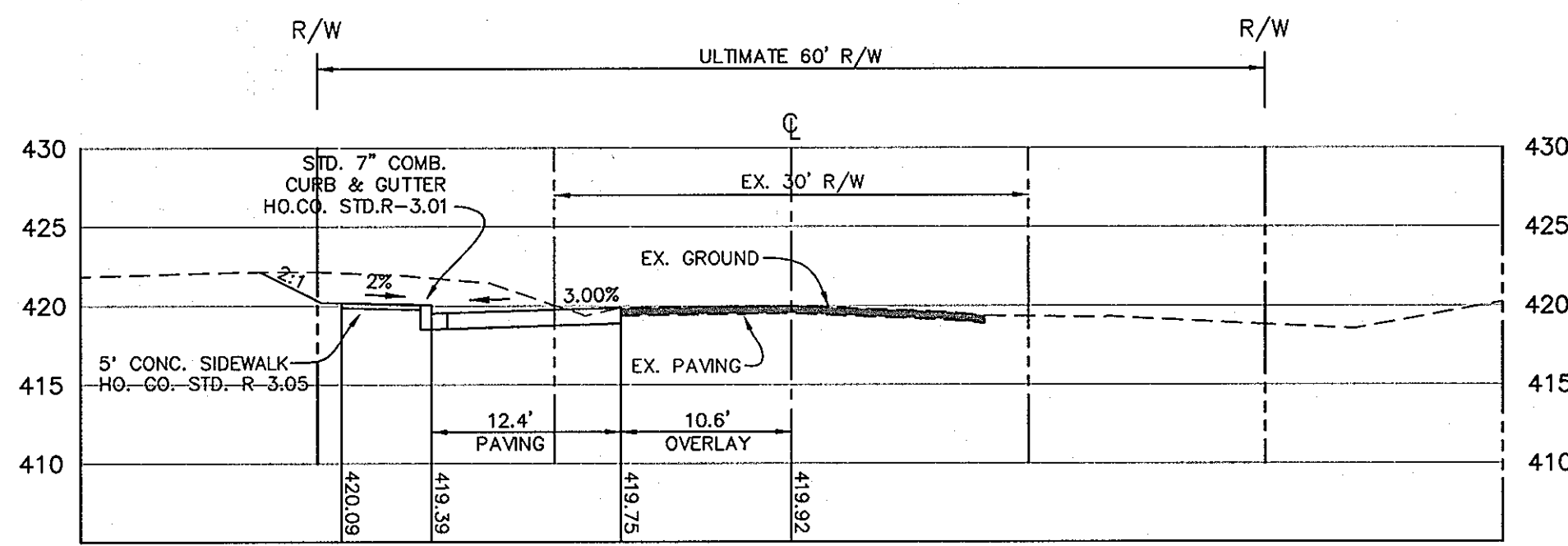
TITLE: ENTRANCE, STRIPING AND TRAFFIC CONTROL PLAN
VP-88-130, F-88-20, S-01-04, PB-359, P-02-11

DATE: OCTOBER, 2003 **PROJECT NO. 1383**

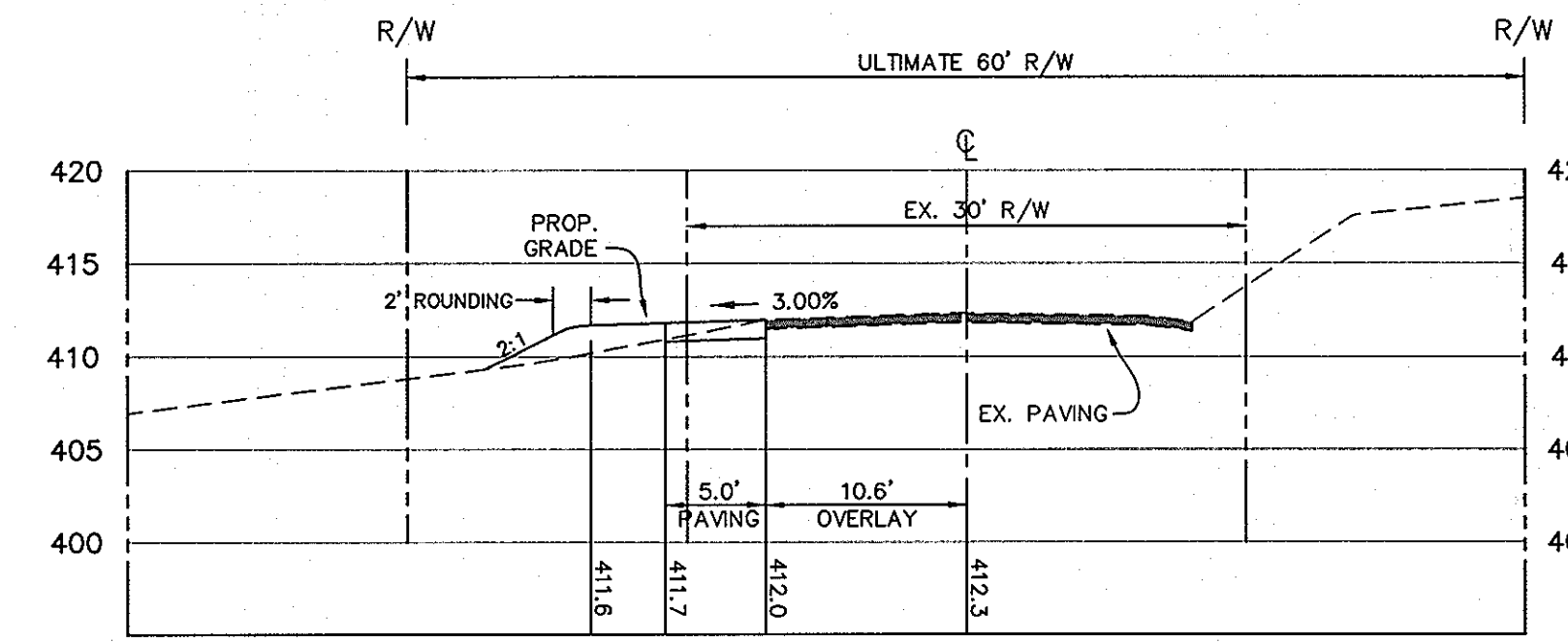
DES: DAM DRN: RPS CHK: DAM SCALE: AS SHOWN DRAWING 31 OF 33



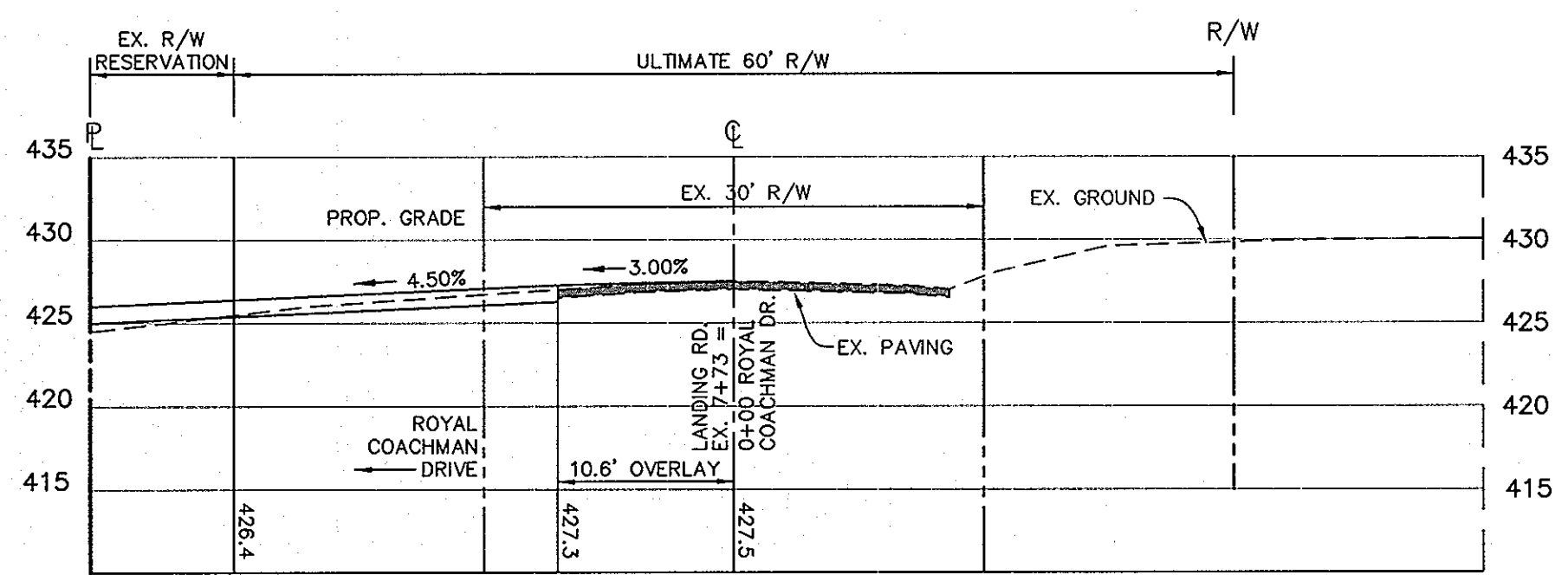
EX. LANDING ROAD - STA.7+27.66



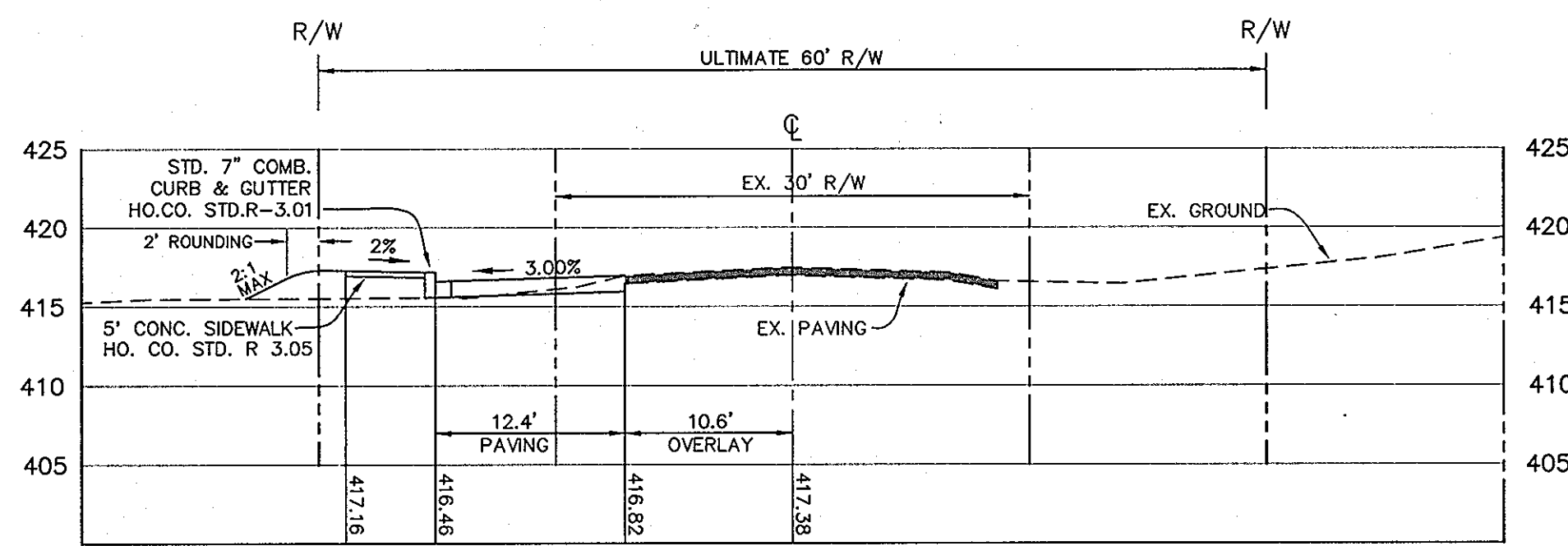
EX. LANDING ROAD - STA.9+25



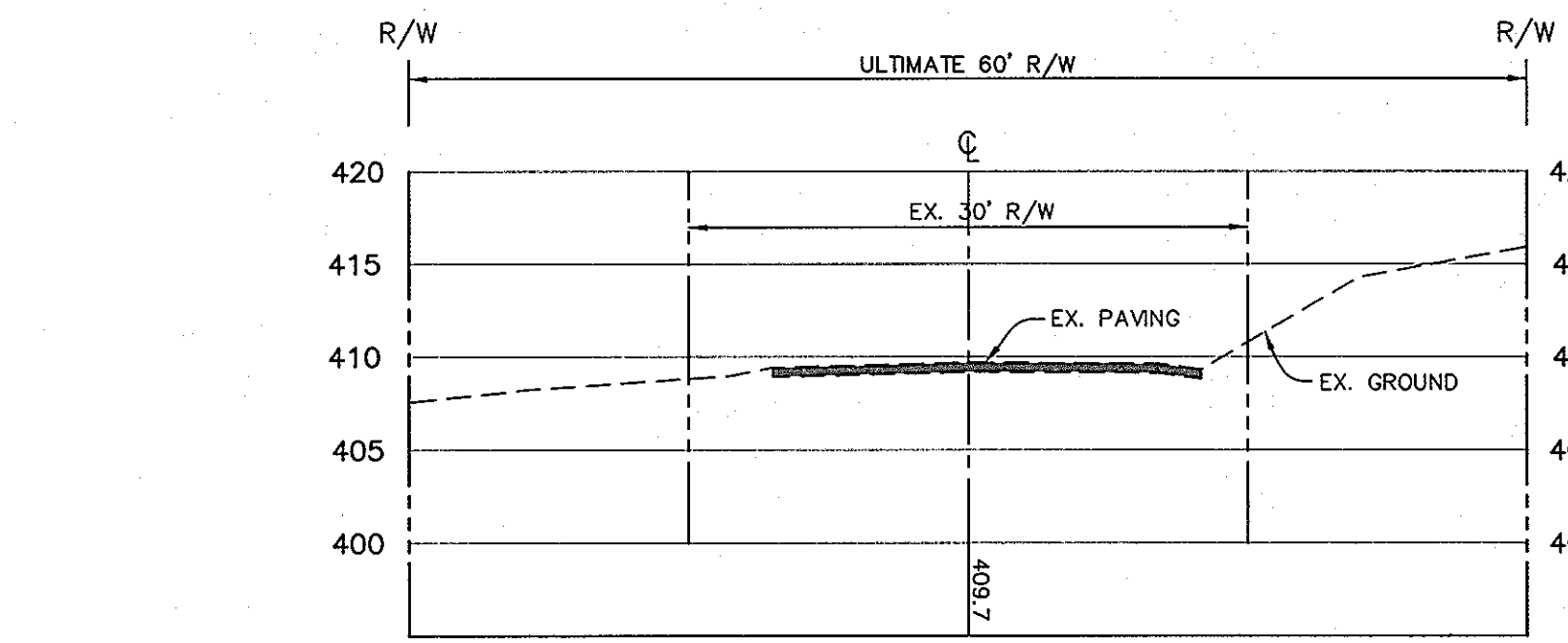
EX. LANDING ROAD - STA.10+75



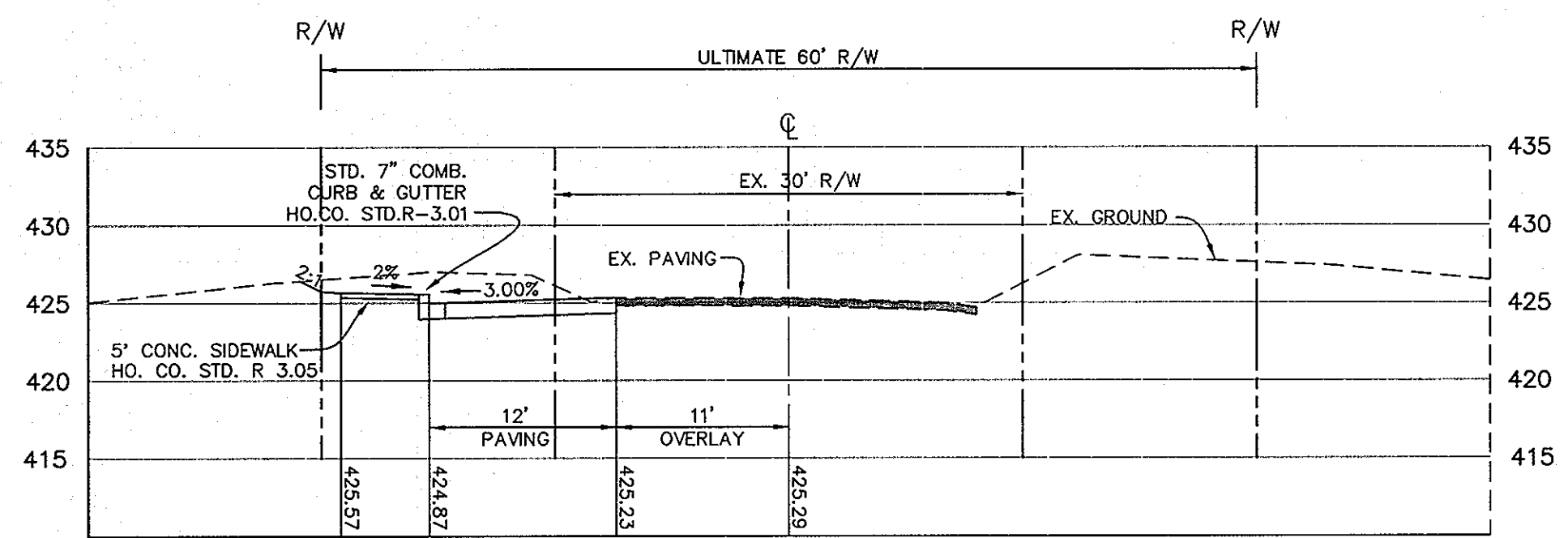
EX. LANDING ROAD STA.7+73 @ PROP. ROYAL COACHMAN DR. STA.0+00



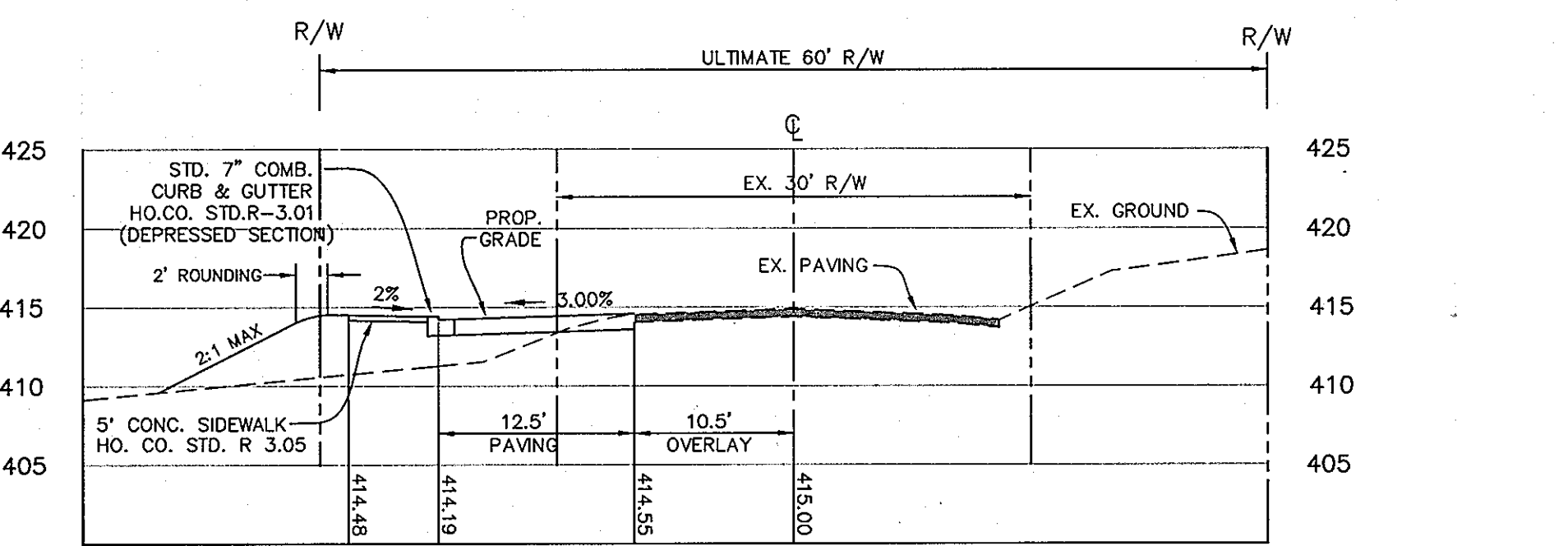
EX. LANDING ROAD - STA.9+75



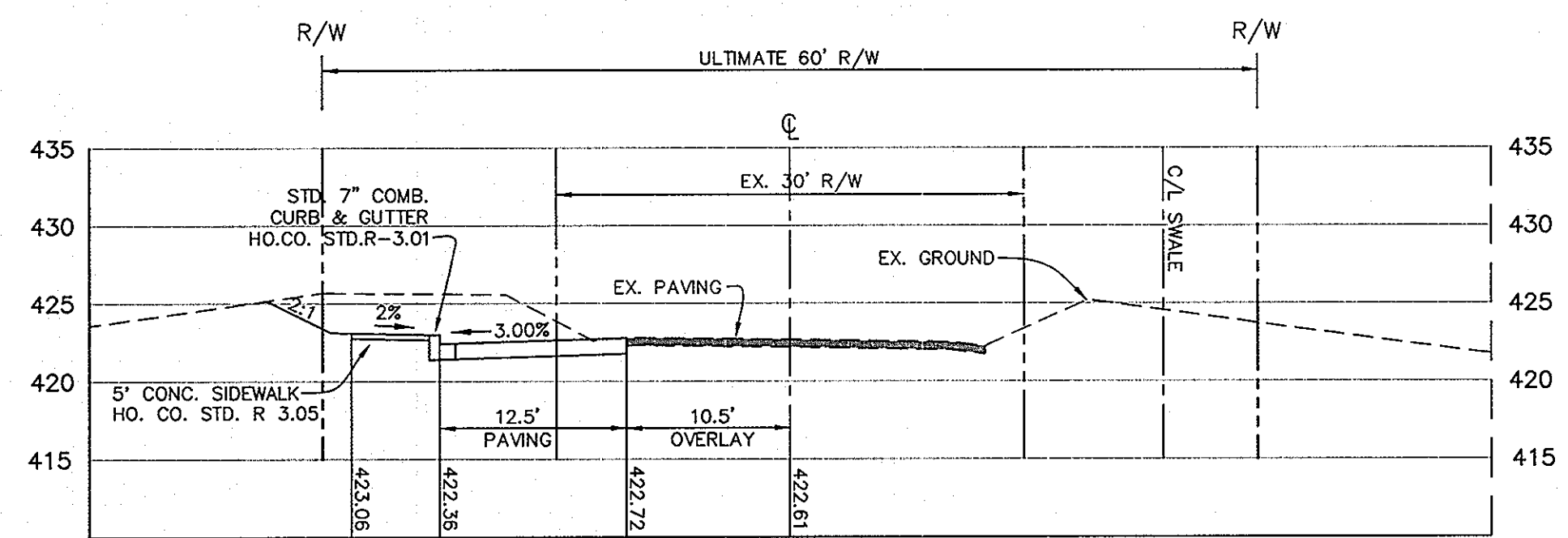
EX. LANDING ROAD - STA.11+22



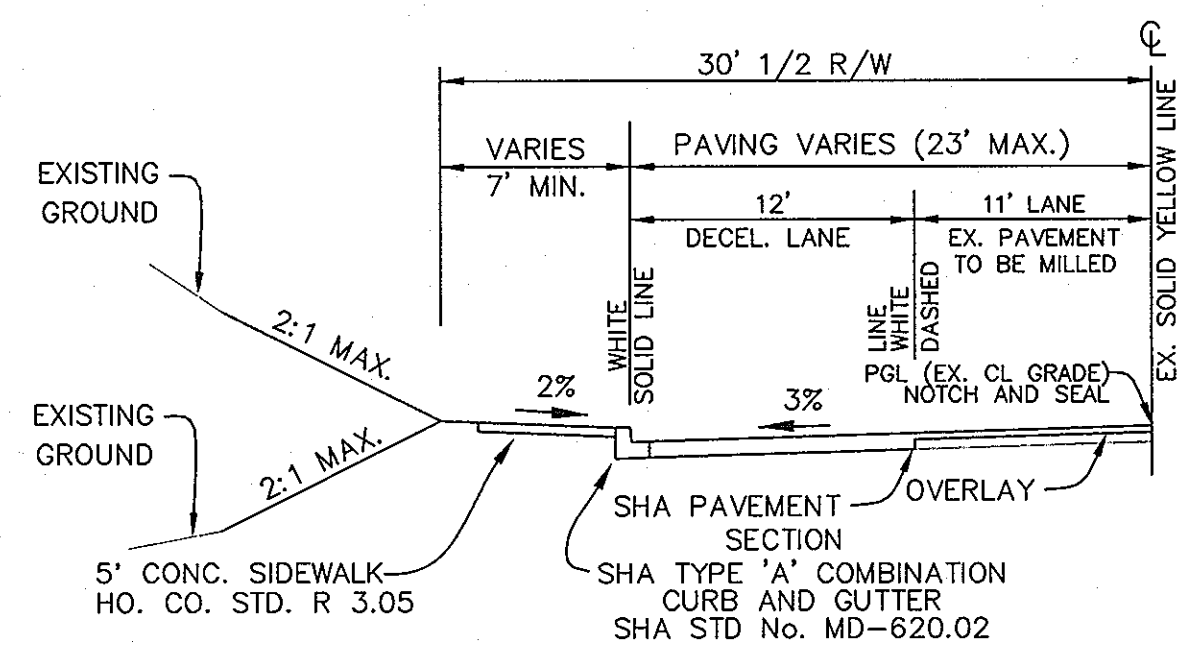
EX. LANDING ROAD - STA.8+25



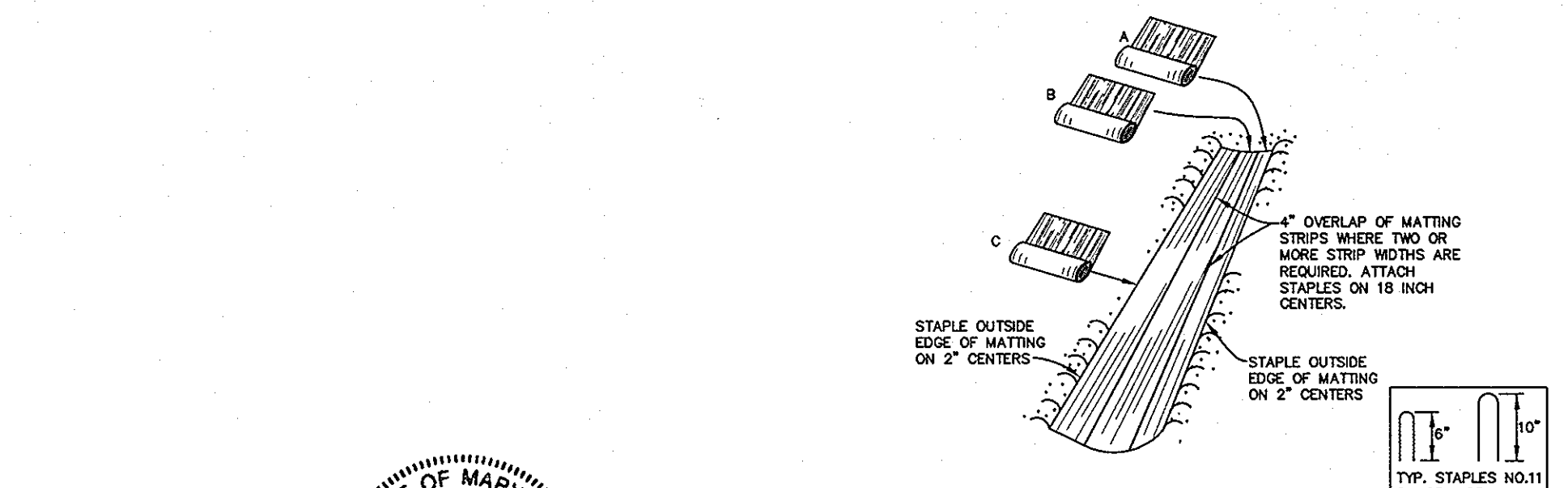
EX. LANDING ROAD - STA.10+23



EX. LANDING ROAD - STA.8+75

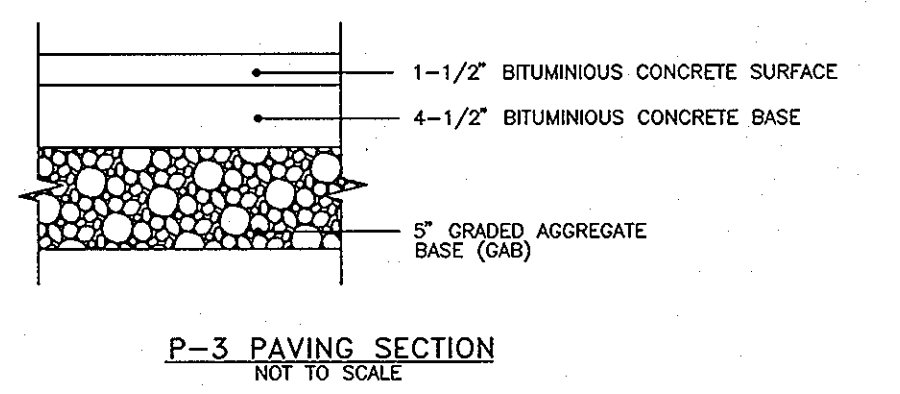


TYPICAL WIDENING SECTION
LANDING ROAD - CURB AND GUTTER
NOT TO SCALE



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. 21443, Expiration Date: 12-21-12

No As-Built information is required on this sheet



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
 [Signature] 12-24-03
 CHIEF, BUREAU OF HIGHWAYS
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 [Signature] 1/13/14
 CHIEF, DIVISION OF LAND DEVELOPMENT
 [Signature] 1/13/14
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

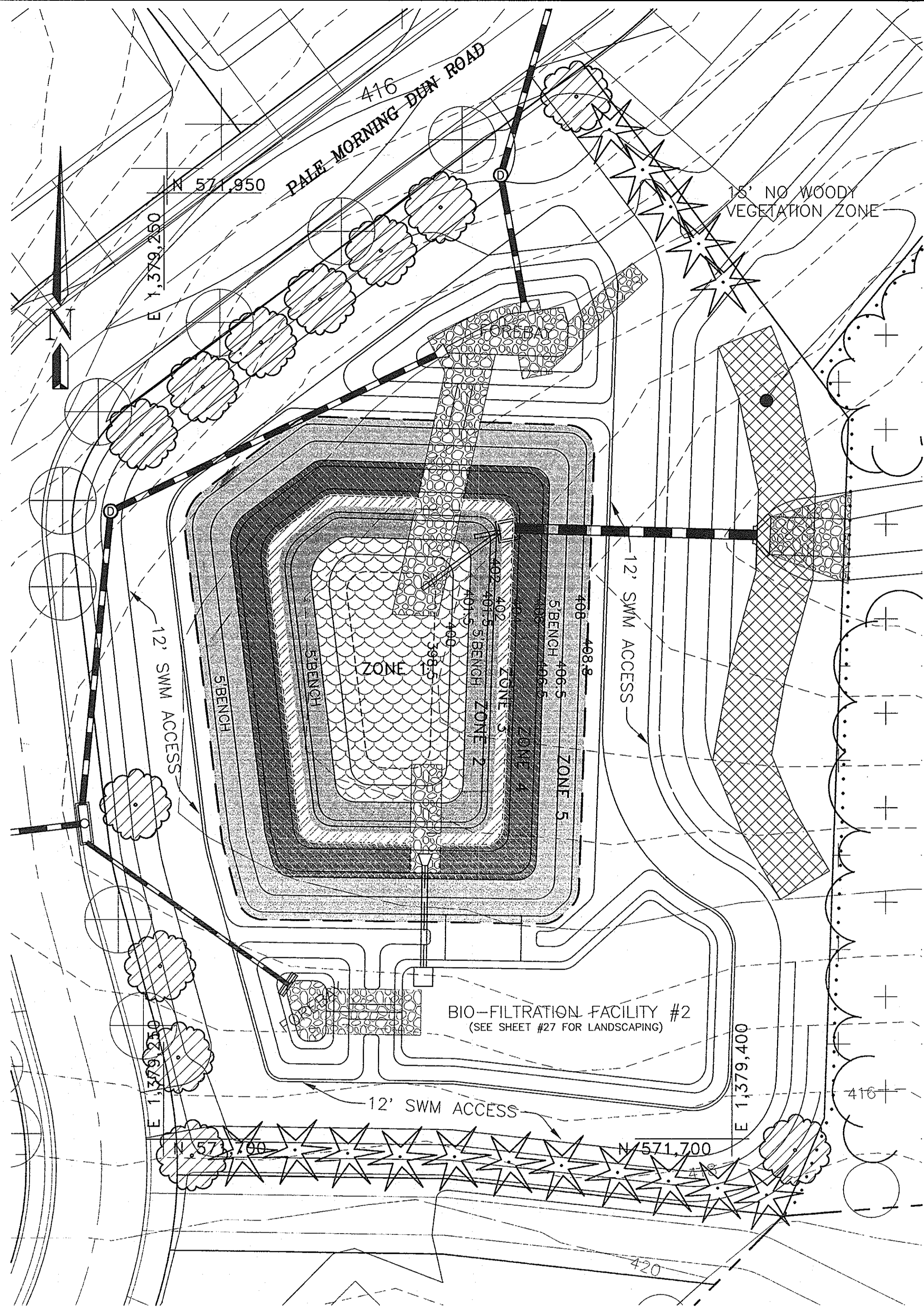
- CONSTRUCTION SPECIFICATIONS
- KEY-IN THE MATTING BY PLACING THE TOP EDGES OF THE MATTING IN A NARROW TRENCH 6" IN DEPTH. BACKFILL THE TRENCH AND TAMP FIRMLY TO CONFORM TO THE CHANNEL CROSS-SECTION. SECURE WITH A ROW OF STAPLES ABOUT 4" DOWN SLOPE FROM THE TRENCH. SPACING BETWEEN STAPLES IS 6".
 - STAPLE THE 4" OVERLAP IN THE CHANNEL CENTER USING AN 18" SPACING BETWEEN STAPLES.
 - BEFORE STAPLING THE OUTER EDGES OF THE MATTING, MAKE SURE THE MATTING IS SMOOTH AND IN FIRM CONTACT WITH THE SOIL.
 - STAPLES SHALL BE PLACED 2' APART WITH 4 ROWS FOR EACH STRIP, 2 OUTER ROWS, AND 2 ALTERNATING ROWS DOWN THE CENTER.
 - WHERE ONE ROLL OF MATTING ENDS AND ANOTHER BEGINS, THE END OF THE TOP STRIP SHALL OVERLAP THE UPPER END OF THE LOWER STRIP BY 4', SNIP-LAP FASHION. REINFORCE THE OVERLAP WITH A DOUBLE ROW OF STAPLES SPACED 6" APART IN A STAGGERED PATTERN ON EITHER SIDE.
 - THE DISCHARGE END OF THE MATTING UNDER SHOULD BE SIMILARLY SECURED WITH 2 DOUBLE ROWS OF STAPLES.
- NOTE: IF FLOW WILL ENTER FROM THE EDGE OF THE MATTING THEN THE AREA EFFECTED BY THE FLOW MUST BE KEYED-IN.

SOIL STABILIZATION MATTING
 NOT TO SCALE

NO DATE REVISION

BENCHMARK ENGINEERING, INC.
 ENGINEERS • LAND SURVEYORS • PLANNERS
 8480 BALTIMORE NATIONAL PIKE & SUITE 418
 ELLICOTT CITY, MARYLAND 21043
 PHONE: 410-465-6105 FAX: 410-465-6644

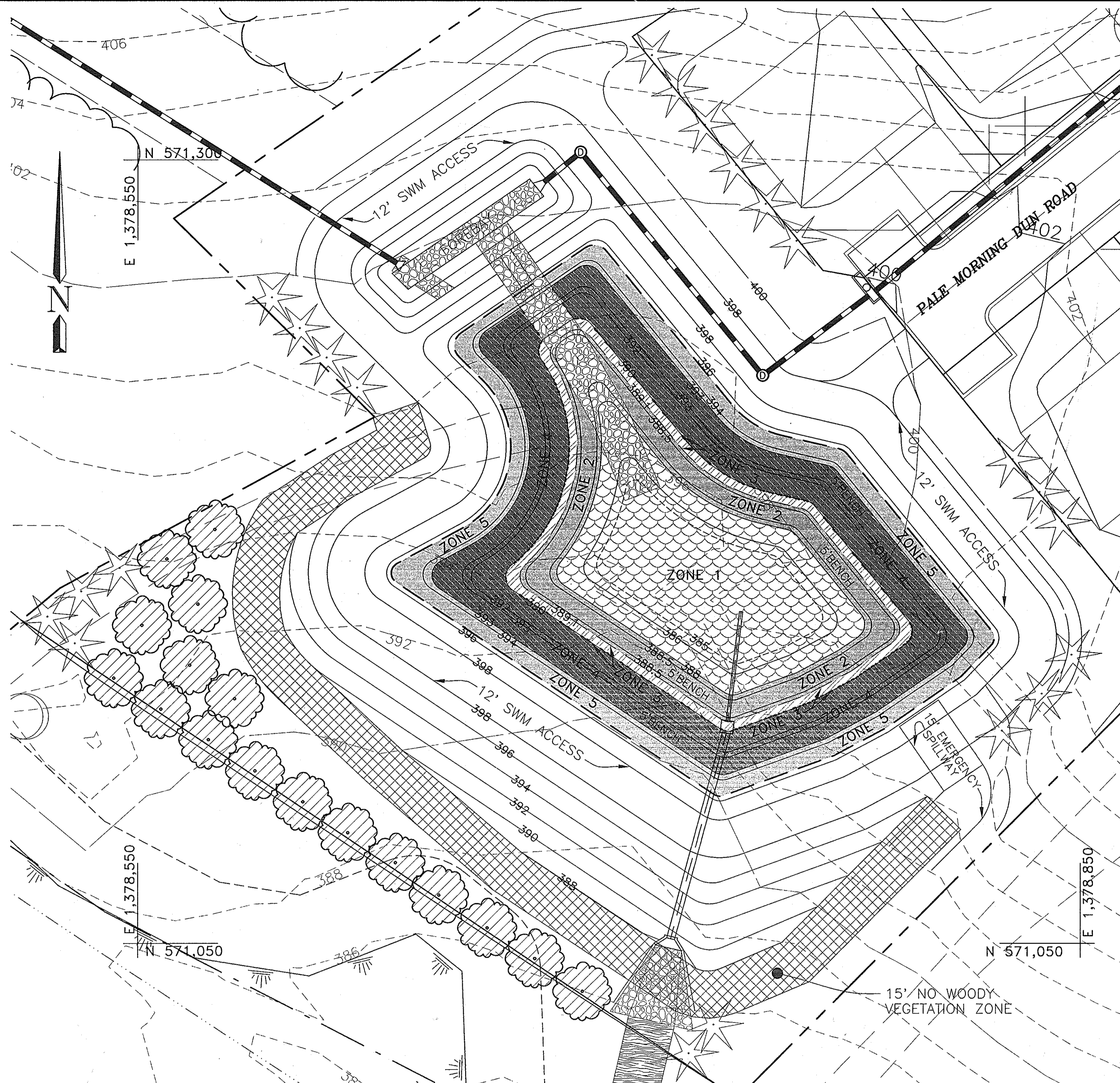
OWNER/DEVELOPER	PROJECT: CASCADE OVERLOOK SECTION ONE
CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELlicOTT CITY, MD 21041 (410) 465-4244	LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL 'A'
OWNER	LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160, 161, 788, & 791 1st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND
CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELK RIDGE, MD 21075	TITLE: ROADWAY CROSS-SECTIONS EX. LANDING ROAD
DES: DAM DRN: RPS	DATE: OCTOBER, 2003 PROJECT NO. 1383
CHK: DAM	SCALE: AS SHOWN DRAWING 32 OF 33



PLANTING PLAN VIEW
SCALE: 1" = 20'

ZONE	AREA	PLANT MIX
1	2299 SF	25% WATER LILLY 75% SAGO POND PLANT
2	1762 SF	50% BROAD WATER WEED 25% DUCK POTATO 25% ARROW ARUM
3	801 SF	50% RICE CUTGRASS 50% SWITCHGRASS
4	2781 SF	50% LOVEGRASS 25% VIOLETS 25% CONEFLOWER
5	4400 SF	100% FESCUES
6	0 SF	N/A

- NOTES:
1. LOOSEN SOIL IN PLANTING ZONES TO A DEPTH OF THREE TO FIVE INCHES BEFORE PLANTING.
 2. PLANTING HOLES TO HAVE A DIAMETER 6" GREATER THAN THE ROOT BALL BEING PLANTED IN THEM.
 3. NO WOODY VEGETATION IS PERMITTED WITH 15' OF THE TOE OF THE SLOPE OR 25' OF THE SPILLWAY.



PLANTING PLAN VIEW
SCALE: 1" = 20'

ZONE	AREA	PLANT MIX
1	4104 SF	25% WATER LILLY 75% SAGO POND PLANT
2	2438 SF	50% BROAD WATER WEED 25% DUCK POTATO 25% ARROW ARUM
3	1050 SF	50% RICE CUTGRASS 50% SWITCHGRASS
4	5751 SF	50% LOVEGRASS 25% VIOLETS 25% CONEFLOWER
5	3200 SF	100% FESCUES
6	0 SF	N/A

- NOTES:
1. LOOSEN SOIL IN PLANTING ZONES TO A DEPTH OF THREE TO FIVE INCHES BEFORE PLANTING.
 2. PLANTING HOLES TO HAVE A DIAMETER 6" GREATER THAN THE ROOT BALL BEING PLANTED IN THEM.
 3. NO WOODY VEGETATION IS PERMITTED WITH 15' OF THE TOE OF THE SLOPE OR 25' OF THE SPILLWAY.

LEGEND:

ZONE 1	[Cross-hatch pattern]
ZONE 2	[Diagonal lines /]
ZONE 3	[Diagonal lines \]
ZONE 4	[Horizontal lines]
ZONE 5	[Vertical lines]
RIP-RAP	[Stippled pattern]
EROSION CONTROL MATTING	[Wavy line pattern]



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. 21443 Expiration Date: 12-21-12

No As-Built information is required on this sheet

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William J. Mather 12-21-03
CHIEF, BUREAU OF HIGHWAYS
DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Cindy Hamilton 1/13/04
CHIEF, DIVISION OF LAND DEVELOPMENT
DATE

NO.	DATE	REVISION
BENCHMARK ENGINEERS • LAND SURVEYORS • PLANNERS ENGINEERING, INC. 8480 BALTIMORE NATIONAL PIKE • SUITE 418 ELLICOTT CITY, MARYLAND 21043 PHONE: 410-465-6105 FAX: 410-465-6644		
PROJECT: CASCADE OVERLOOK SECTION ONE LOTS 1 - 72 AND OPEN SPACE LOTS 73 - 80 AND NON-BUILDABLE PARCEL "A"		LOCATION: TAX MAP 31, GRID 10 & 11, PARCELS 160,161, 788, & 791 1 st. ELECTION DISTRICT HOWARD COUNTY, MARYLAND
OWNER/DEVELOPER CASCADE OVERLOOK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MD 21041 (410) 465-4244		TITLE: SWM LANDSCAPING PLAN AND PLANTING DETAILS VP-86-130, F-88-20, S-01-04, PB-359, P-02-11 DATE: DECEMBER, 2003 PROJECT NO. 1383
OWNER CRAIG R. AND KAREN C. MARTIN 4937 LANDING ROAD ELK RIDGE, MD 21075		SCALE: AS SHOWN DRAWING 33 OF 33
DES: DAM	DRN: RPS	CHK: DAM
AS-BUILT F-03-134		

12/5/03