

GENERAL NOTES

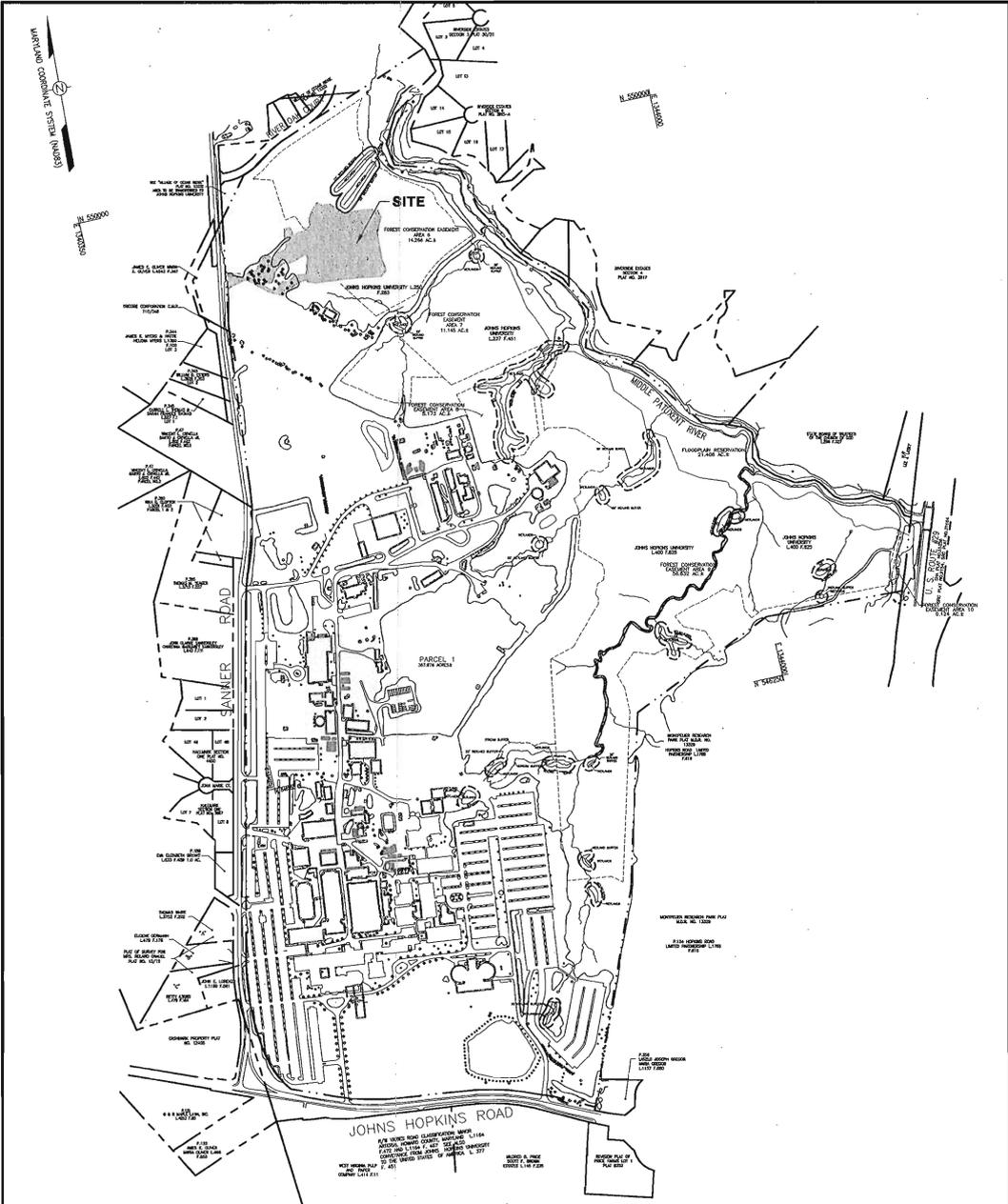
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE.
- THE CONTRACTOR SHALL CONTACT THE CONSTRUCTION INSPECTION DIVISION 24 HOURS IN ADVANCE OF COMMENCEMENT OF WORK AT (410) 313-1880.
- THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AND JHU/APL PLANT FACILITIES OFFICE (443) 778-0167 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION BEING DONE.
- CONTRACTOR TO SCHEDULE PRECONSTRUCTION MEETING WITH HOWARD COUNTY, CONSTRUCTION INSPECTION DIVISION (410-313-1880) PRIOR TO STARTING CONSTRUCTION.
- TRAFFIC CONTROL DEVICES, MARKINGS AND SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES(MUTCD). ALL STREET AND REGULATORY SIGNS SHALL BE IN PLACE PRIOR TO THE PLACEMENT OF ANY PAVING.
- THE LOCATION OF EXISTING UTILITIES AS SHOWN ON THIS PLAN ARE BASED ON FIELD LOCATIONS SUPPLEMENTED WITH EXISTING UTILITY DRAWINGS, AND SHOULD BE VERIFIED BY THE CONTRACTOR TO HIS SATISFACTION PRIOR TO CONSTRUCTION. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING UTILITIES, AND ANY DAMAGE DONE TO THEM DUE TO CONSTRUCTION ACTIVITY SHALL BE REPAIRED IMMEDIATELY AT HIS OWN EXPENSE.
- CONTRACTOR IS RESPONSIBLE FOR ALL SITE CONDITIONS, CONSTRUCTION REQUIREMENTS, AND SHALL CONFORM TO ALL STATE, FEDERAL, AND COUNTY CONSTRUCTION REGULATIONS. THE CONTRACTOR IS NOT RELIEVED OF RESPONSIBILITY SHOULD ANY REQUIRED ITEMS PERTAINING TO SITE CONSTRUCTION NOT BE INCLUDED ON THESE PLANS. CONTRACTOR IS RESPONSIBLE FOR ALL ITEMS NECESSARY TO COMPLETE THE SITE IMPROVEMENTS AS SHOWN ON THESE PLANS.
- ANY DAMAGE TO EXISTING UTILITIES, PAVEMENT, OR CURB AND GUTTER DUE TO CONSTRUCTION ACTIVITY OUTSIDE THE LIMITS OF DISTURBANCE IS TO BE REPLACED BY THE CONTRACTOR AT HIS OWN EXPENSE.
- WHERE NECESSARY, THE CONTRACTOR SHALL TEST PIT ALL EXISTING UTILITIES AT LEAST FIVE (5) DAYS PRIOR TO STARTING ANY WORK SHOWN ON THESE DRAWINGS.
- CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY PROPERTY MONUMENTS, MARKERS, SIGNS, LIGHTS, OR ANY OTHER EXISTING SITE FEATURES DISTURBED DURING CONSTRUCTION.
- ALL PLAN DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
- THE EXISTING TOPOGRAPHY IS TAKEN FROM FIELD RUN SURVEY WITH TWO FOOT CONTOUR INTERVALS PREPARED BY WHITMAN, REQUIARD & ASSOCIATES, LP DATED JANUARY 2004. JHU APPLIED PHYSICS LAB AERIAL TOPOGRAPHY AND UTILITY INFORMATION SHOWN MAY NOT REFLECT CURRENT CONDITIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY CURRENT TOPOGRAPHY AND UTILITY INFORMATION TO HIS OWN SATISFACTION.
- THE SITE BOUNDARY, BEARINGS, AND COORDINATES SHOWN ARE BASED ON ELECTRONIC FILES OBTAINED FROM WHITMAN, REQUIARD & ASSOCIATES.
- ALL WORK SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE "1994 STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROLS" PUBLISHED JOINTLY BY THE WATER RESOURCES ADMINISTRATION, SOIL CONSERVATION SERVICE, AND STATE SOIL CONSERVATION COMMITTEE.
- THE COORDINATES SHOWN HEREON ARE BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM (MAD 83). JOHNS HOPKINS UNIVERSITY CONTROL STATIONS NOS. HOPKINS, 415A, G12, 67 AND 68 WERE USED FOR THIS PROJECT.

ARCHITECTURAL PROFILE
N.T.S.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION MKK *[Signature]* 1/21/05
 CHIEF, DIVISION OF LAND DEVELOPMENT *[Signature]* 2/4/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING *[Signature]* 3/2/05

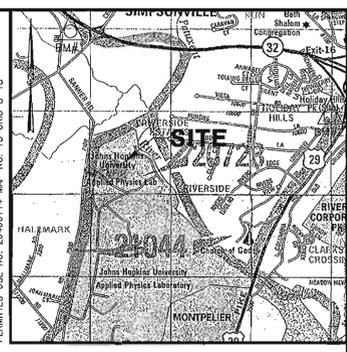
JOHNS HOPKINS APPLIED PHYSICS LABORATORY LIBRARIES SERVICE CENTER SITE DEVELOPMENT PLAN



OVERALL SITE MAP
SCALE: 1" = 500'



ARCHITECTURAL PROFILE
N.T.S.



VICINITY MAP
SCALE: 1" = 2000'

- BENCHMARKS**
- B.M.#1 - HOWARD COUNTY BENCHMARK 41BB - EAST SIDE OF GUILFORD ROAD 1760' WEST OF PINDELL SCHOOL ROAD. N553,338.80 E1,340,517.48 ELEV. 370.395
 - B.M.#2 - HOWARD COUNTY BENCHMARK 0057 - EAST SIDE OF LONGVIEW ROAD, SOUTH OF VISTA ROAD INTERSECTION. N550,835.21 E1,347,017.69 ELEV. 398.925

SHEET INDEX

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4	SITE GRADING PLAN
5	STORM DRAIN & UTILITY PLAN
6	SITE DETAILS
7	STORM DRAIN PROFILES
8	STORM DRAIN PROFILES
9	UTILITY PROFILES
10	UTILITY PROFILES
11	STORMWATER MANAGEMENT PLAN
12	STORMWATER MANAGEMENT PLAN
13	STORM DRAIN & SWM DRAINAGE AREA MAPS
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15	GEOTECHNICAL REPORT
16	EROSION & SEDIMENT CONTROL PLAN
17	EROSION & SEDIMENT CONTROL DETAILS
18	LIGHTING & LANDSCAPING PLAN
19	LIGHTING & LANDSCAPING DETAILS
20	RETAINING WALL PLAN & GENERAL NOTES
21	RETAINING WALL PROFILE, TYPICAL SECTION & DETAILS
22	GRINDER PUMP DETAILS

BUILDING SQUARE FOOTAGE TABULATION

1. PROPOSED BUILDING COVERAGE =	23,055 S.F.
2. FUTURE (ULTIMATE) BUILDING COVERAGE =	45,567 S.F.
3. TOTAL (ULTIMATE) BUILDING COVERAGE =	68,622 S.F.
1. GROSS BUILDING SQUARE FOOTAGE =	38,206 S.F.
2. FUTURE (ULTIMATE) BUILDING SQUARE FOOTAGE =	89,920 S.F.
3. TOTAL (ULTIMATE) BUILDING SQUARE FOOTAGE =	128,126 S.F.

SITE ANALYSIS DATA CHART

1. TOTAL PROJECT AREA:	361 ACRES +/-
2. AREA OF PLAN SUBMISSION:	6.45 ACRES +/-
3. LIMIT OF DISTRIBUTION:	6.45 ACRES +/-
4. PRESENT ZONING:	PEC
5. PROPOSED USE:	LIBRARY BOOK STORAGE FACILITY JOHNS HOPKINS UNIVERSITY
6. EXISTING NUMBER OF EMPLOYEES (JHU/APL CAMPUS):	3646
7. PROPOSED NUMBER OF EMPLOYEES (PER THIS PLAN):	20
8. TOTAL NUMBER OF EMPLOYEES (JHU/APL CAMPUS, INCL. THIS PLAN):	3666
9. MAXIMUM NUMBER OF EMPLOYEES ALLOWED PER APFO STUDY PER F-02-40:	3937
10. EXISTING MINIMUM NUMBER OF PARKING SPACES REQUIRED BY ZONING:	2953 (F-02-40)
11. EXISTING ONSITE PARKING SPACES (JHU/APL CAMPUS):	4793 (SDP 04-76)
12. PROPOSED PARKING SPACES (PER THIS PLAN):	22 (INCL. 4 HC SPACES)
13. TOTAL NUMBER OF ONSITE PARKING SPACES (JHU/APL CAMPUS, INCL. THIS PLAN):	4815
14. EXISTING BUILDING COVERAGE (JHU/APL CAMPUS):	21.1 ACRES (SDP-04-133)
15. PROPOSED BUILDING COVERAGE* (PER THIS PLAN):	68,622 SF OR 1.6 ACRES ±
16. TOTAL BUILDING COVERAGE* (JHU/APL CAMPUS, INCL. THIS PLAN):	22.7 ACRES, 6.3% OF TOTAL LOT AREA
*THE BUILDING COVERAGE INFORMATION INCLUDES THE FUTURE BUILDING AREA. SEE THE BUILDING SQUARE FOOTAGE TABULATION ON THIS SHEET.	
17. EXISTING GROSS FLOOR AREA COVERAGE (JHU/APL CAMPUS):	44.8 ACRES (SDP-04-133)
18. PROPOSED GROSS FLOOR COVERAGE* (PER THIS PLAN):	128,126 SF OR 2.94 ACRES ±
19. TOTAL GROSS FLOOR AREA COVERAGE* (JHU/APL CAMPUS, INCL. THIS PLAN):	47.74 ACRES, 13.2% OF TOTAL LOT AREA
*THE GROSS FLOOR AREA COVERAGE INFORMATION INCLUDES THE FUTURE BUILDING AREA. SEE THE BUILDING SQUARE FOOTAGE TABULATION ON THIS SHEET.	
20. CASE NUMBERS - APPLICABLE IMPROVEMENTS:	
F 02-40	- FOREST CONSERVATION, FLOODPLAIN, PUBLIC R/W
F 04-188	- FOREST CONSERVATION AND WETLANDS
SDP 04-35	- SWM BASIN G
SDP 04-56	- BALL FIELD ENTRANCE AND PARKING LOTS
SDP 04-76	- SERVICES AREA COMPLEX
SDP 04-133	- BASIN C SWM FACILITIES & LAYDOWN AREA
SDP 05-43	- SANNER ROAD IMPROVEMENTS
21. SANITARY SEWER/ WATER SERVICE: PRIVATE ONSITE SYSTEM, PUBLIC CONNECTION	
22. EXISTING OPEN SPACE AREA (LOT AREA MINUS PARKING & BUILDINGS):	286 ACRES, 81.7% OF TOTAL LOT AREA (PROVIDED BY JHU APL)
23. PROPOSED OPEN SPACE AREA:	283 ACRES, 78.4% OF TOTAL LOT AREA

OPTION 3: PREVIOUSLY ADDRESSED (Including Use of FC Bank)

File Number:	F-04-188	Project/Subdivision Name:	JOHNS HOPKINS UNIVERSITY PROPERTY (APPLIED PHYSICS LABORATORY SITE)
Comment:	Addressed by How. Co. Subdivision & Land Development Regulations, Sec. 16.1202.6(1)(i). See F-04-188 Plat # 17042 thru 17046.		

ADDRESS CHART

LOT/PARCEL NO.	STREET ADDRESS
289 / 1	11100 JOHNS HOPKINS ROAD LAUREL, MD 20723

OWNER: THE JOHNS HOPKINS UNIVERSITY
 11100 JOHNS HOPKINS ROAD LAUREL, MD 20723
 ATT. MR. JAMES LOESCH
 VOICE (443)778-5134
 FAX (443)778-6122

PERMIT INFORMATION CHART

SUBDIVISION NAME	SECTION/AREA	LOT/PARCEL NO.			
JOHNS HOPKINS UNIVERSITY PROPERTY (APPLIED PHYSICS LABORATORY SITE)	N/A	289 / 1			
PLAT # OR L/F	GRID #	ZONE	TAX MAP NO.	ELECT. DIST.	CENSUS TRACT
17042 - 17046	11	PEC	41	5TH	605102
WATER CODE:	SEWER CODE:				
E-21	6480000				

REVISIONS

NO.	DATE	DESCRIPTION

APPROVALS

REQUESTER	
PLANT FACILITIES DEPT. DIRECTOR	
CODE COMPLIANCE REVIEW	
TIC GROUP	
TIC GROUP	
SAPRT SUPERVISOR	
DIRECTOR'S OFFICE	
COORDINATOR	
SENIOR LEADER	

THE JOHNS HOPKINS UNIVERSITY
APPLIED PHYSICS LABORATORY
 JOHNS HOPKINS ROAD
 LAUREL, MARYLAND 20723-0999
 TAX MAP 41, GRID 16, PARCEL 1
 FIFTH (5TH) ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND

THE JOHNS HOPKINS UNIVERSITY

LIBRARIES SERVICE CENTER

JHU/APL INTERNAL USE

THIS DATA SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS SEP OR IN THE CASE OF A CONTRACT AWARD, TO PERFORM THE WORK REQUIRED HEREUNDER, WITHOUT THE EXPRESS WRITTEN CONSENT OF JHU/APL.

GRAPHIC SCALE

MORRIS & RITCHE ASSOCIATES, INC.
 ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
 14280 PARK CENTER DRIVE, SUITE A
 LAUREL, MARYLAND 20707
 (410) 792-9782 or (301) 776-1680
 FAX (410) 792-7395

COVER SHEET

JOB NO.: 13685

SDP-1

SHEET: 1 OF 22

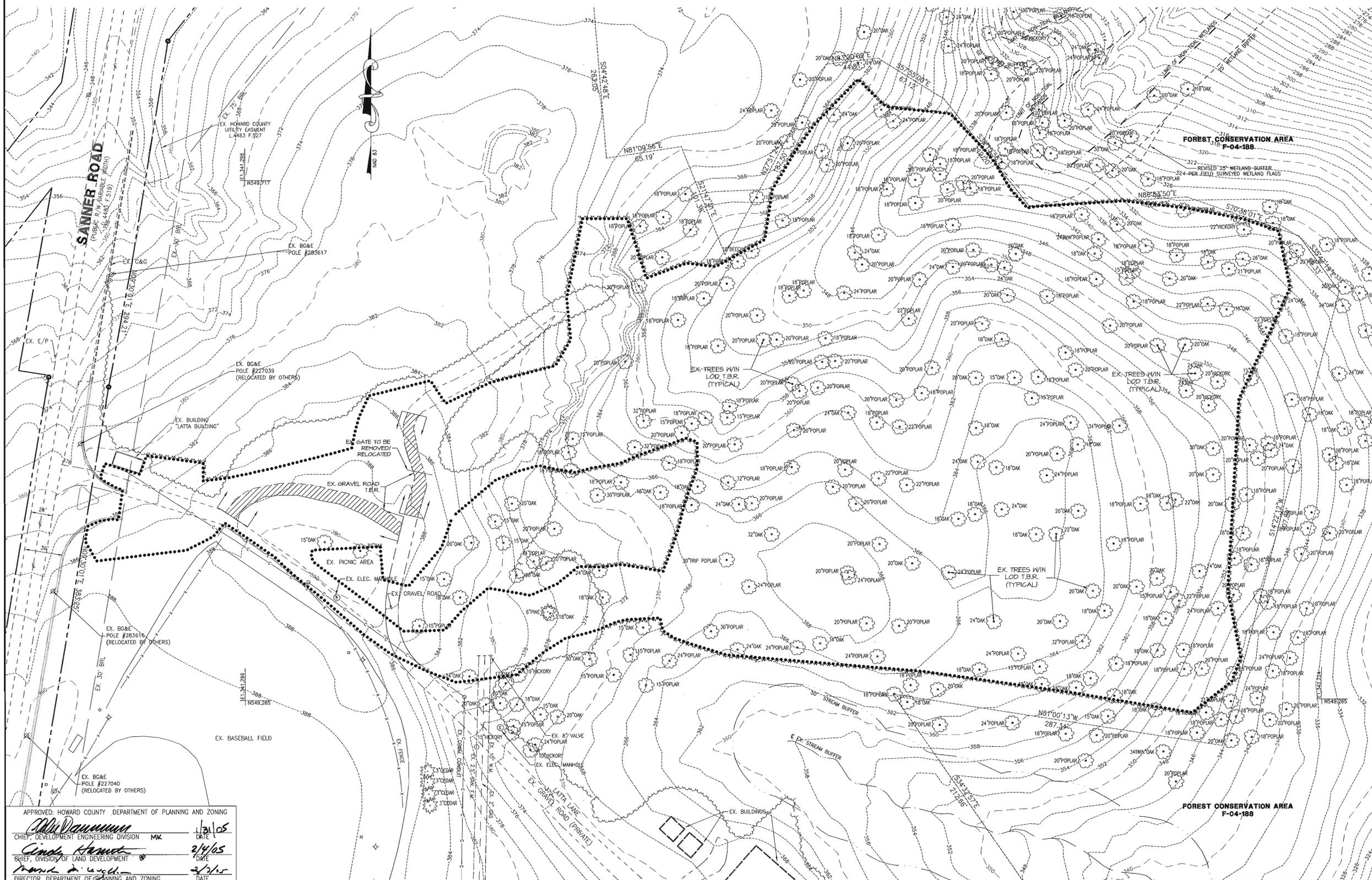
SCALE: AS SHOWN

DES. MP CHECK: TCN DATE: 01-17-05

SDP-05-42

LEGEND

- EX. TREE LINE
- EX. PROPERTY LINE
- EX. PAVEMENT
- EX. BUILDING
- EX. EASEMENT
- EX. CURB
- EX. STORM DRAIN
- EX. GAS
- EX. SANITARY F.M.
- EX. WATER
- EX. CONDUIT
- EX. WETLAND BUFFER
- EX. STREAM BUFFER
- EX. 2' CONTOUR
- EX. 10' CONTOUR
- EX. FOREST CONSERVATION AREA
- PROP. LIMIT OF DISTURBANCE
- PROP. TREE LINE
- LIMITS OF REMOVAL FOR GRAVEL ROADS
- T.B.R. = TO BE REMOVED



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

John Dammann
CHIEF, DEVELOPMENT ENGINEERING DIVISION MK 1/21/05
DATE

Carol Howard
CHIEF, DIVISION OF LAND DEVELOPMENT 2/1/05
DATE

Mark A. ...
DIRECTOR, DEPARTMENT OF PLANNING AND ZONING 2/1/05
DATE

REVISIONS

NO.	DESCRIPTION

APPROVALS

DESIGNER	DATE
PLANNING FACILITIES CHIEF	
ENGINEER	
CODE COMPLIANCE REVIEW	
TSC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTOR'S OFFICE	
COORDINATOR	
SUPERVISOR	

THE JOHNS HOPKINS UNIVERSITY
APPLIED PHYSICS LABORATORY
JOHNS HOPKINS ROAD
LAUREL, MARYLAND 20723-6099

TAX MAP 41, GRID 16, PARCEL 1
FIFTH (5TH) ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

THE JOHNS HOPKINS UNIVERSITY

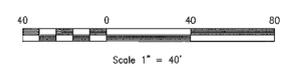


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GRAPHIC SCALE



MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS

14280 PARK CENTER DRIVE, SUITE A
LAUREL, MARYLAND 20707
(410) 782-3782 or (301) 776-1680
FAX (410) 782-7385

EXISTING CONDITIONS /DEMOLITION PLAN

JOB NO.: 13685



SDP-2

1-17-05 SHEET: 2 OF 22

SCALE: 1" = 40'

DES: LFB CHECK: TCN DATE: 01-17-05

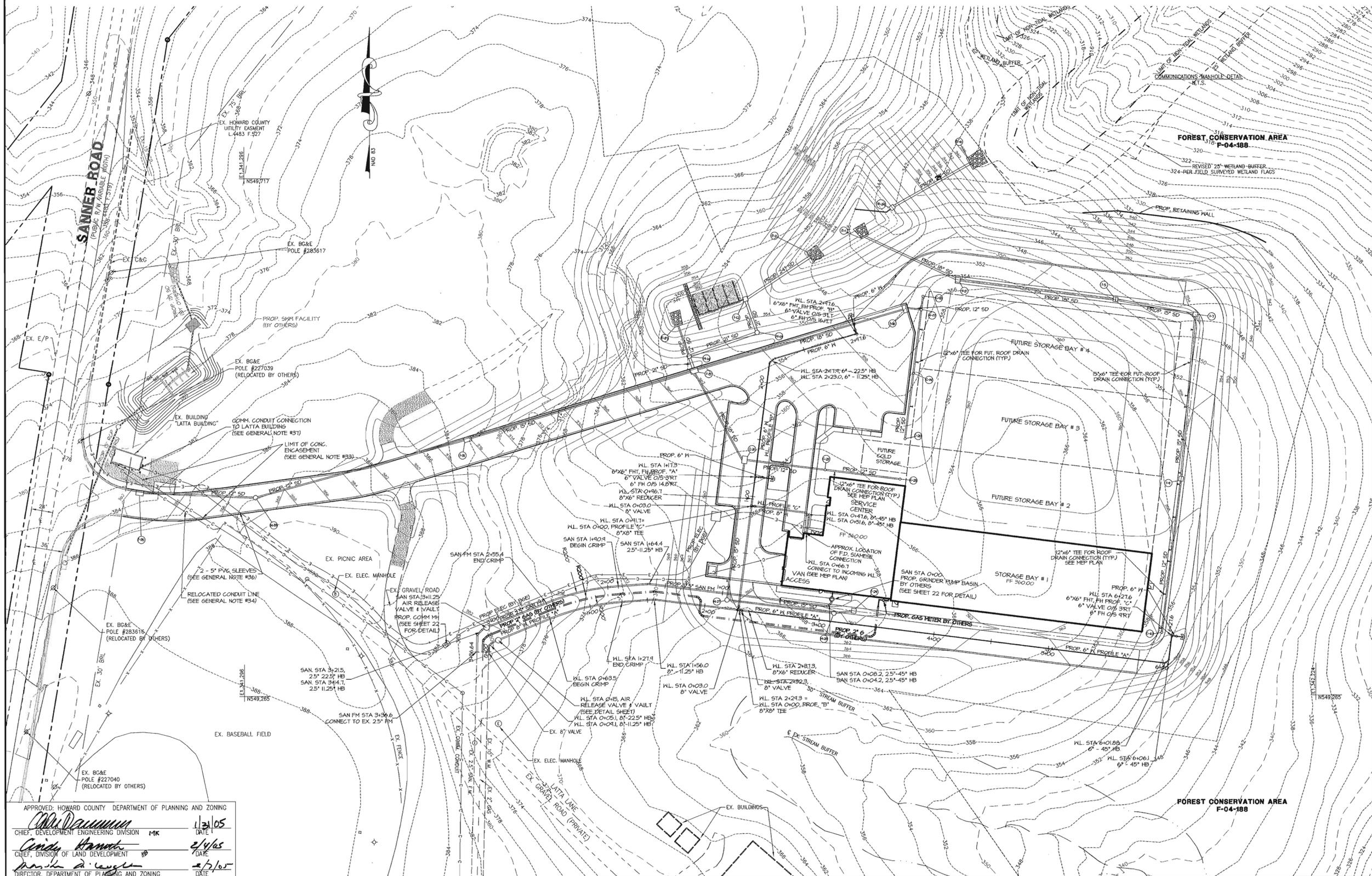
SDP-05-42

LEGEND

- EX. TREE LINE
- EX. PROPERTY LINE
- EX. PAVEMENT
- EX. BUILDING
- EX. EASEMENT
- EX. CURB
- EX. STORM DRAIN
- EX. GAS
- EX. SANITARY F.M.
- EX. WATER
- EX. CONDUIT
- EX. WETLAND BUFFER
- EX. STREAM BUFFER
- EX. 2' CONTOUR
- EX. 10' CONTOUR
- EX. FOREST CONSERVATION A
- PROP. SILT FENCE
- PROP. SUPER SILT FENCE
- PROP. RIP RAP
- PROP. LIMIT OF DISTURBANCE
- PROP. TREE LINE
- PROP. STORM DRAIN
- PROP. STORM DRAIN INLET
- PROP. ELECTRIC (BY OTHERS)
- PROP. GAS (BY OTHERS)
- PROP. SANITARY F.M.
- PROP. WATER
- PROP. FIRE HYDRANT
- PROP. WATER VALVE
- PROP. CURB
- PROP. CENTERLINE OF DRAINAGE SWALE
- PROP. FUTURE BUILDING
- PROP. BUILDING

NOTES

- ALL SPOT ELEVATIONS +300'
- SEE DETAIL SHEET (SDP-6)
- (REV. CURB & GUTTER) (STD. CURB & GUTTER)
- ** SEE ROAD IMP. PLANS ENTITLED "SANNER ROAD IMPROVEMENTS" BY AIT (SDP-05-43)
- SEE DETAIL SHEET FOR ALL SITE PAVEMENT, CURB & GUTTER, SIDEWALK, CONCRETE PADS AND MISC. SITE DETAILS.
- ASPHALT APRON SECTION TO MATCH ACCESS ROAD TYP. PAVEMENT SECTION



REVISIONS	

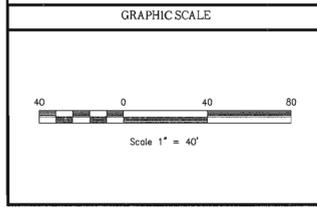
APPROVALS	
DESIGNER	
PLANNING FACILITIES DEPT	
ENGINEER	
CODE COMPLIANCE REVIEW	
TSC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTOR'S OFFICE	
COORDINATOR	
SERIAL LEADER	

THE JOHNS HOPKINS UNIVERSITY
APPLIED PHYSICS LABORATORY
 JOHNS HOPKINS ROAD
 LAUREL, MARYLAND 20723-6099
 TAX MAP 41, GRID 16, PARCEL 1
 FIFTH (5TH) ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND

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MRA
 MORRIS & RITCHIE ASSOCIATES, INC.
 ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
 14280 PARK CENTER DRIVE, SUITE A
 LAUREL, MARYLAND 20707
 (410) 782-9782 or (800) 778-1890
 FAX (410) 782-7385

UTILITY PLAN

STATE OF MARYLAND PROFESSIONAL ENGINEER

JOB NO.: 13685

SDP-5

1-17-05 SHEET: 5 OF 22

SCALE: 1" = 40'

DES: LFB CHECK: TCN DATE: 01-17-05

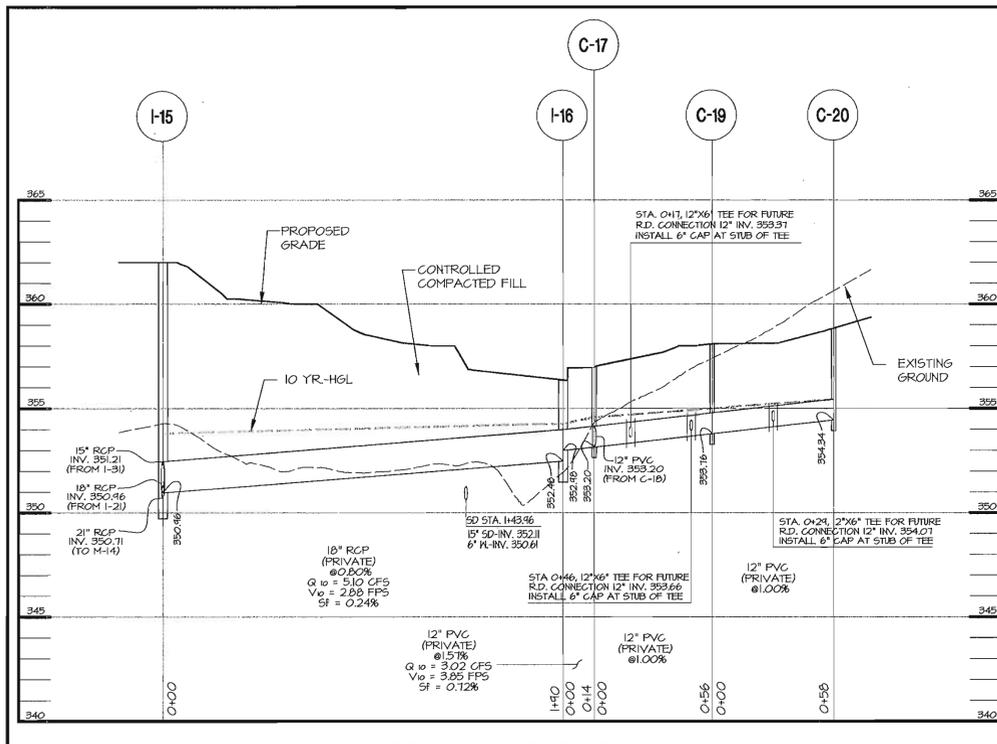
SDP-05-42

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

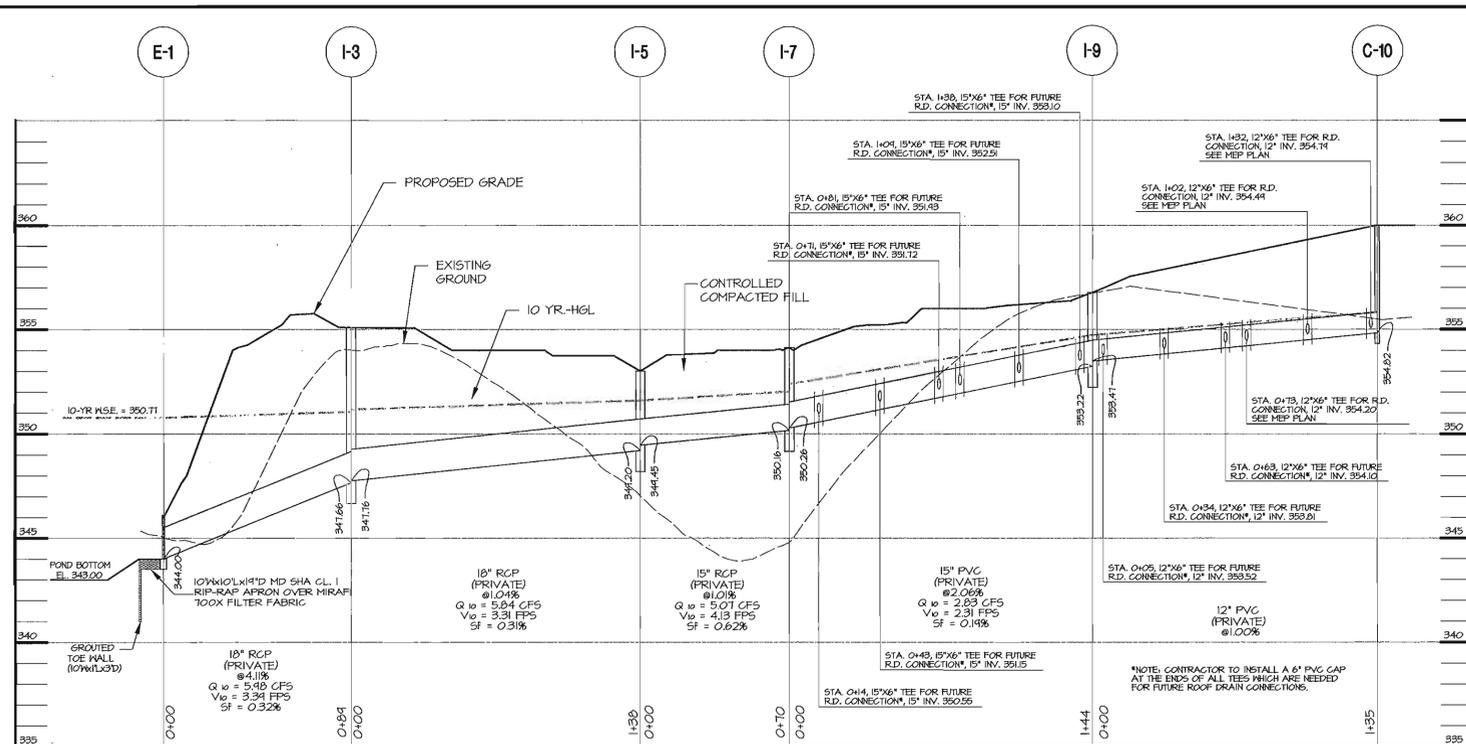
Chris D'Amico 1/21/05
 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK DATE

Cindy Hamada 2/14/05
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Mark A. Lewis 2/5/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING DATE



**STORM DRAIN PROFILE
I-15 TO C-20**
HOR. 1" = 40'
VERT. 1" = 4'

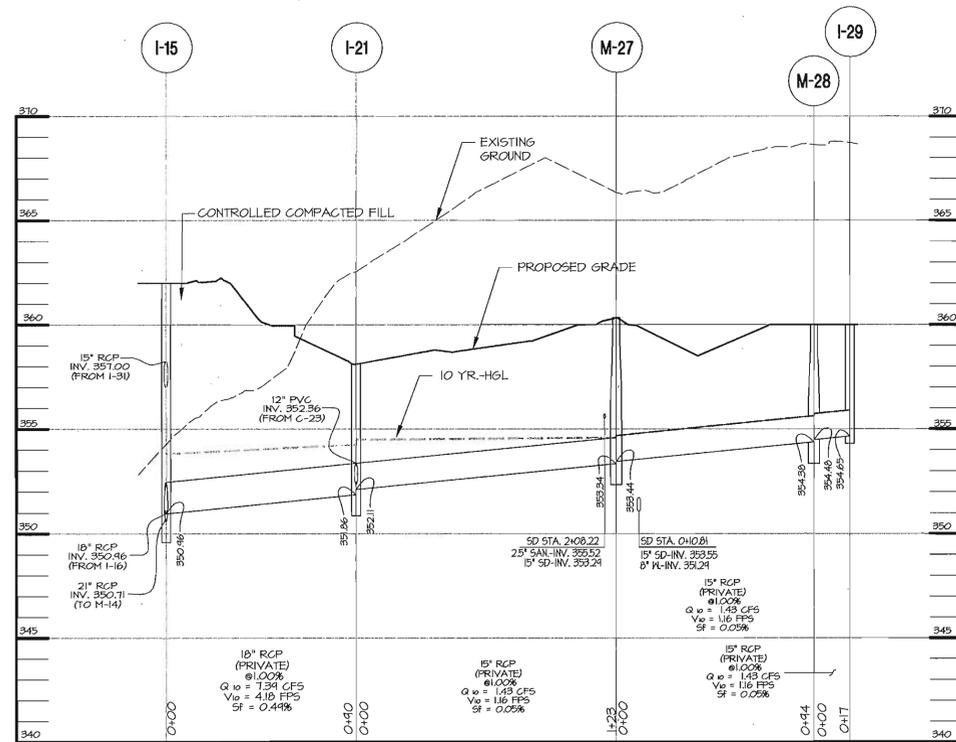


**STORM DRAIN PROFILE
E-1 TO I-9**
HOR. 1" = 40'
VERT. 1" = 4'

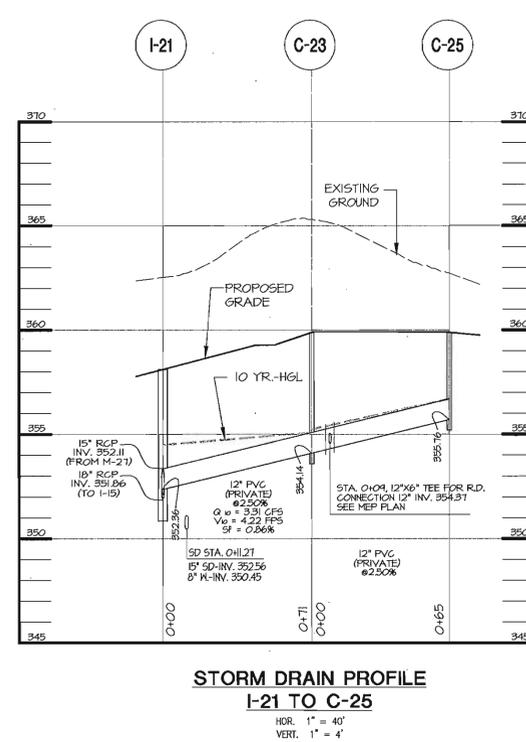
CONTROLLED AND COMPACTED FILL PER AASHTO T-180, TO BE CERTIFIED BY AN APPROVED ON-SITE GEOTECHNICAL ENGINEER

COMPACTED SPECIFICATIONS FOR UTILITIES IN FILL

- WHERE UTILITY PIPES ARE TO BE PLACED ON COMPACTED FILL, THE FOLLOWING APPLIES:
- PRIOR TO PLACEMENT OF COMPACTED FILL, ANY SOFT OR OTHERWISE UNSUITABLE SOILS ENCOUNTERED AT THE EXISTING RAINE BOTTOM OR SLOPE, SHALL BE UNDERCUT AND REMOVED FROM THE CONSTRUCTION AREA.
 - ACCEPTABLE COMPACTED FILL SHALL BE PLACED IN SIX INCH THICK LOOSE LIFTS AND COMPACTED TO AT LEAST 98 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY A.A.S.H.T.O. METHOD T-180.
 - THE COMPACTED FILL SHALL BE BENCHED INTO THE EXISTING VIRGIN SLOPES WITH EACH LIFT PLACED TO A SMOOTH TRANSITION FROM VIRGIN TO FILL SOILS.



**STORM DRAIN PROFILE
I-15 TO I-29**
HOR. 1" = 40'
VERT. 1" = 4'



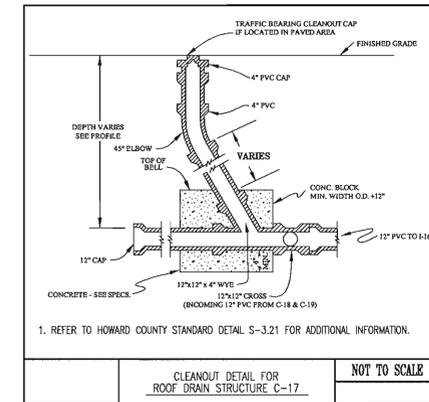
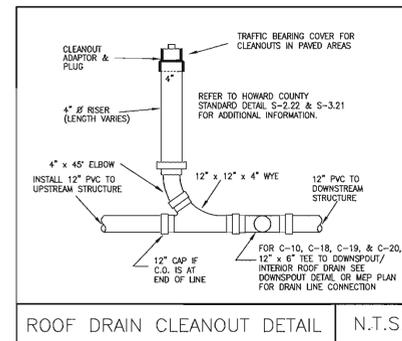
**STORM DRAIN PROFILE
I-21 TO C-25**
HOR. 1" = 40'
VERT. 1" = 4'

STORM DRAIN PIPE SCHEDULE

SIZE	TYPE	LENGTH
12"	RCP, CL. IV	320 FT
15"	RCP, CL. IV	509 FT
18"	RCP, CL. IV	507 FT
21"	RCP, CL. IV	108 FT
24"	RCP, CL. IV	68 FT

STORM DRAIN PIPE SCHEDULE

SIZE	TYPE	LENGTH
12"	PVC, SDR-35	411 FT
15"	PVC, SDR-35	144 FT



STORM DRAIN STRUCTURE SCHEDULE

STR NO.	TOP ELEV	INV IN	INV IN	INV IN	INV OUT	TYPE	REMARKS	NORTHING	EASTING
E-1	---	---	---	---	---	TYPE 'C' ENDWALL CIRCULAR PIPE, HOWARD COUNTY STD. DETAIL SD-5.21	---	549586.1705	1341834.2355
E-11	---	---	---	---	---	TYPE 'C' ENDWALL CIRCULAR PIPE, HOWARD COUNTY STD. DETAIL SD-5.21	---	549485.5005	1341787.0002
E-37	---	---	---	---	---	TYPE 'E' HEADWALL CIRCULAR PIPE, HOWARD COUNTY STD. DETAIL SD-5.31	---	549588.9128	1341671.7747
C-10	360.00	---	---	---	354.82	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	---	549319.6618	1342090.6772
C-17	357.80	353.20	353.20	---	353.20	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	---	549601.8237	1341882.6896
C-18	357.50	---	---	---	353.32	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	---	549613.5206	1341894.1629
C-19	358.10	353.76	---	---	353.76	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	---	549546.3017	1341875.6960
C-20	359.30	---	---	---	354.34	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	---	549489.0045	1341868.4787
C-23	359.80	354.14	---	---	354.14	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	---	549462.0280	1341799.1943
C-25	359.95	---	---	---	355.76	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	---	549452.8585	1341864.0517

• COORDINATES TO CENTER OF STRUCTURE AT FLOWLINE FOR DOUBLE WR & 'S' INLETS, CENTER OF STRUCTURE FOR SINGLE WR INLETS, 'D' INLET, MANHOLES & CLEANOUTS.
• TOP OF GRADE ELEVATION AT CENTER OF STRUCTURE AT FLOWLINE FOR DOUBLE WR & 'S' INLET, 'D' INLET, MANHOLE & CLEANOUT ELEVATIONS ARE AT CENTER OF RIM.

STORM DRAIN STRUCTURE SCHEDULE

STR NO.	TOP ELEV	INV IN	INV IN	INV IN	INV OUT	TYPE	REMARKS	NORTHING	EASTING
I-3	355.30	347.76	---	---	347.66	SINGLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.37	---	549532.4081	1341909.2087
I-5	353.25	349.45	---	---	349.20	SINGLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.37	---	549510.5484	1342050.9949
I-7	354.15	350.26	---	---	350.16	SINGLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.37	---	549597.4991	1342107.6104
I-9	356.91	353.47	---	---	353.22	SINGLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.37	---	549453.8610	1342120.0361
I-12	353.33	345.29	346.55	---	345.04	PRECAST STANDARD TYPE 'D' INLET, HOWARD COUNTY STD. DETAIL SD-4.39	---	549611.3234	1341730.1633
I-15	362.00	357.00	350.96	350.96	350.71	DOUBLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.35	---	549548.7066	1341685.7375
I-16	356.97	352.98	---	---	352.48	DOUBLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.35	---	549602.7474	1341668.9965
I-21	358.10	352.36	352.11	---	351.86	TYPE 'S' DOUBLE INLET, HOWARD COUNTY STD. DETAIL SD-4.23	---	549476.7770	1341729.2965
I-29	359.40	---	---	---	354.65	SINGLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.37	---	549343.6306	1341752.4709
I-31	377.82	371.82	---	---	371.57	DOUBLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.35	---	549489.2376	1341489.2441
I-35	382.35	---	---	---	378.35	DOUBLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.35	---	549443.0112	1341205.3774
M-13	358.00	347.92	---	---	347.82	STANDARD PRECAST MANHOLE, HOWARD COUNTY STD. DETAIL G-5.12	---	549582.0930	1341740.4056
M-14	361.00	350.58	---	---	350.48	STANDARD PRECAST MANHOLE, HOWARD COUNTY STD. DETAIL G-5.12	---	549561.4424	1341681.3865
M-27	360.35	353.44	---	---	353.34	STANDARD PRECAST MANHOLE, HOWARD COUNTY STD. DETAIL G-5.12	---	549348.4643	1341713.9534
M-28	360.25	354.48	---	---	354.38	STANDARD PRECAST MANHOLE, HOWARD COUNTY STD. DETAIL G-5.12	---	549336.7840	1341806.6824
M-33	387.00	377.35	---	---	377.25	STANDARD PRECAST MANHOLE, HOWARD COUNTY STD. DETAIL G-5.12	---	549438.5100	1341305.7072

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

DATE: 1/21/05
 DATE: 2/16/05
 DATE: 2/2/05

REVISIONS

NO.	DATE	DESCRIPTION

APPROVALS

PROJECT	
PLANT FACILITIES/DEPT	
CODE COMPLIANCE REVIEW	
TIC GROUP	
TOP GROUP	
SAFETY OFFICER	
INSPECTOR	
COORDINATOR	
SENIOR LEADER	

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GRAPHIC SCALE

AS SHOWN



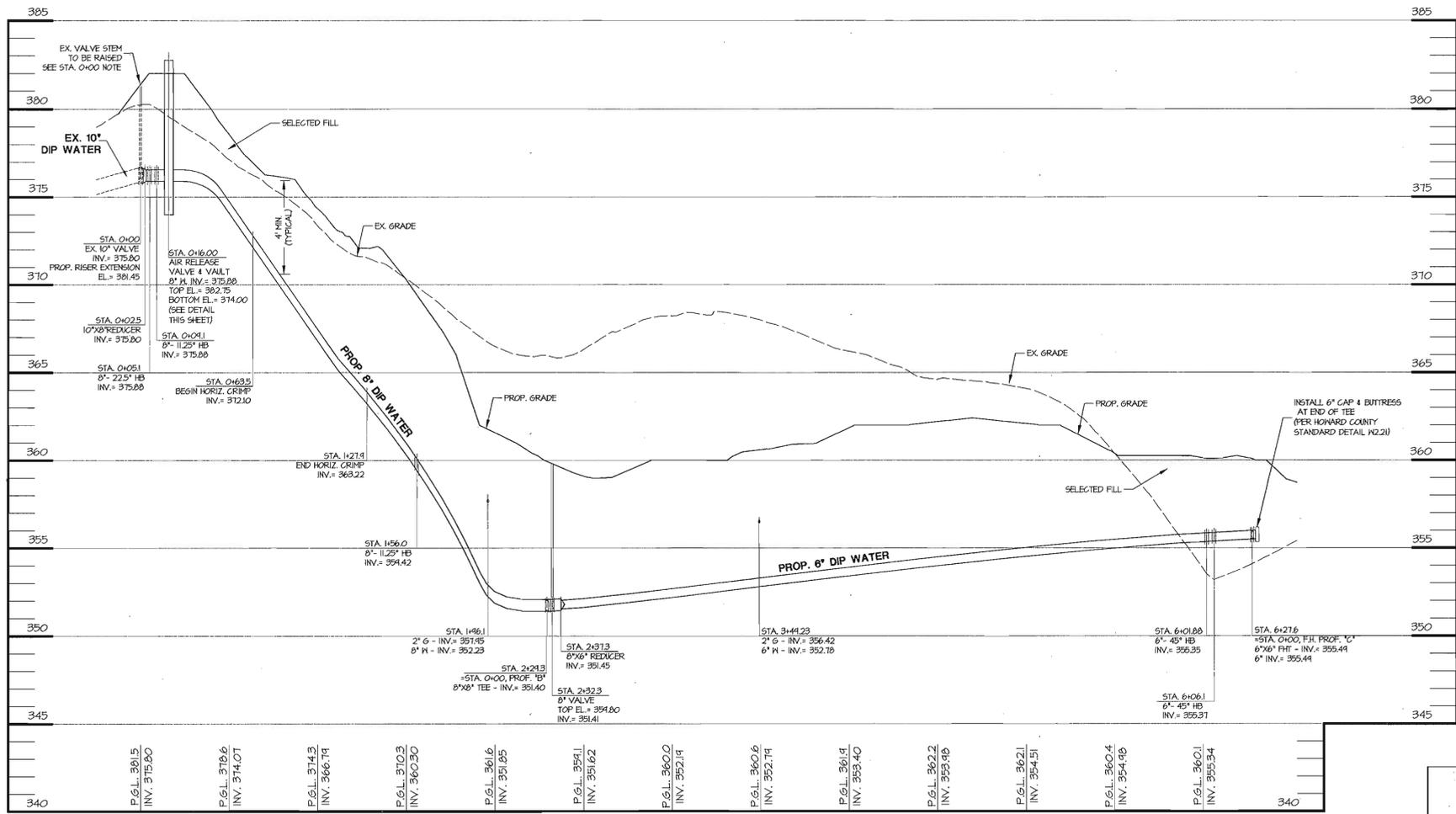
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STORM DRAIN PROFILES

JOB NO.: 13685
SDP-8
 SHEET: 8 OF 22

SCALE: 1" = 40'

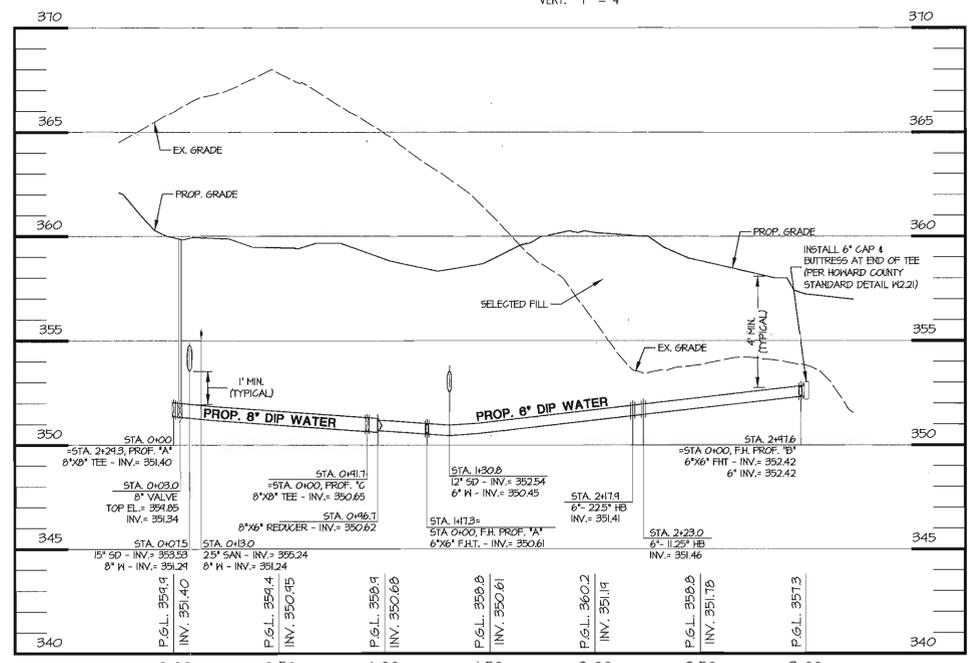
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WATER PROFILE 'A'

HOR. 1" = 40'
VERT. 1" = 4'

SEE SHEET 10 FOR WATER PIPE & FITTING SCHEDULES

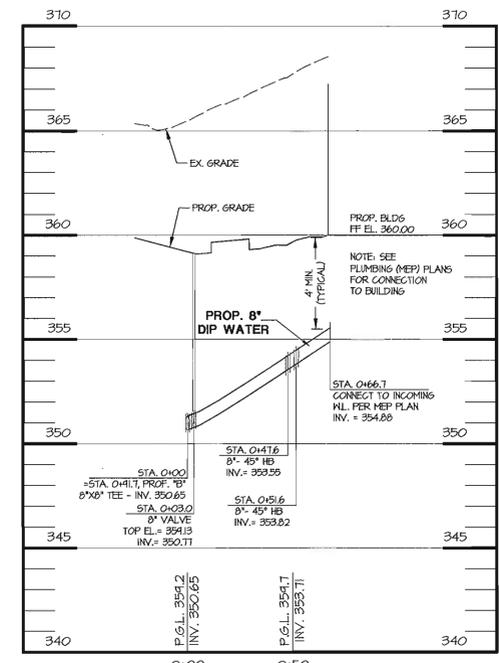


WATER PROFILE 'B'

HOR. 1" = 40'
VERT. 1" = 4'

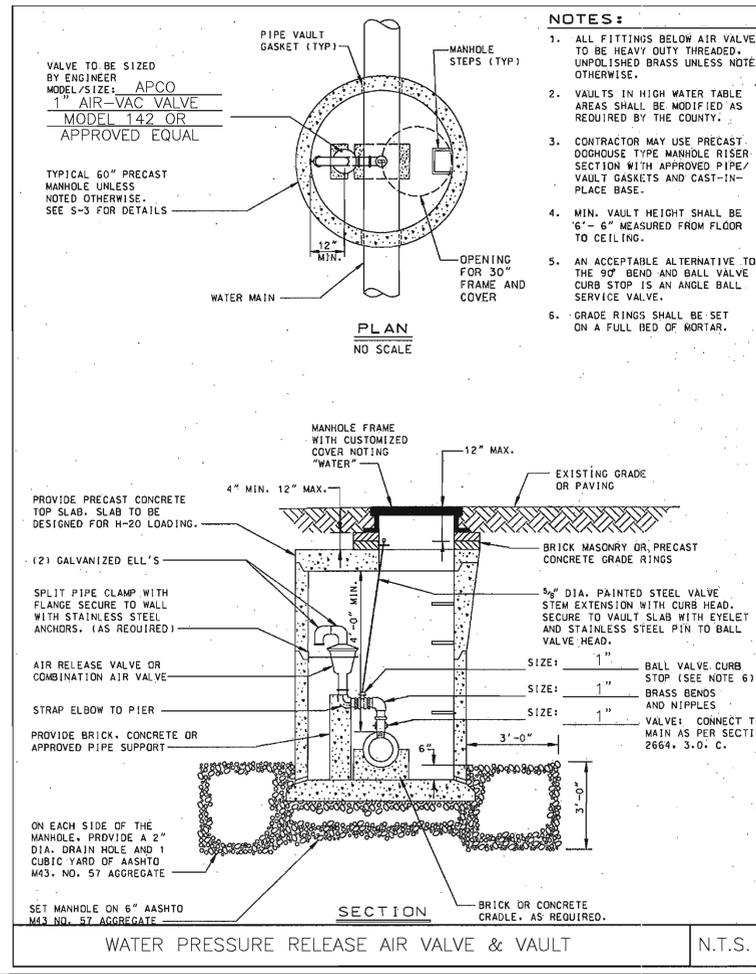
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 [Signature] 1/21/05
 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK
 [Signature] 7/4/05
 CHIEF, DIVISION OF LAND DEVELOPMENT
 [Signature] 2/3/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING

CONTROLLED AND COMPACTED FILL PER AASHTO T-180, TO BE CERTIFIED BY AN APPROVED ON-SITE GEOTECHNICAL ENGINEER



WATER PROFILE 'C'

HOR. 1" = 40'
VERT. 1" = 4'



VALVE TO BE SIZED BY ENGINEER
 MODEL/TYPE: APCO
 1" AIR-VAC VALVE
 MODEL 142 OR APPROVED EQUAL

- NOTES:**
- ALL FITTINGS BELOW AIR VALVE TO BE HEAVY DUTY THREADED, UNPOLISHED BRASS UNLESS NOTED OTHERWISE.
 - VAULTS IN HIGH WATER TABLE AREAS SHALL BE MODIFIED AS REQUIRED BY THE COUNTY.
 - CONTRACTOR MAY USE PRECAST DOGGHOUSE TYPE MANHOLE RISER SECTION WITH APPROVED PIPE/VAULT GASKETS AND CAST-IN-PLACE BASE.
 - MIN. VAULT HEIGHT SHALL BE 6'-6" MEASURED FROM FLOOR TO CEILING.
 - AN ACCEPTABLE ALTERNATIVE TO THE 90° BEND AND BALL VALVE CURB STOP IS AN ANGLE BALL SERVICE VALVE.
 - GRADE RINGS SHALL BE SET ON A FULL BED OF MORTAR.

PLAN
NO SCALE

SECTION

WATER PRESSURE RELEASE AIR VALVE & VAULT N.T.S.

REVISIONS	

APPROVALS	
REQUESTER	
PLANNING FACILITIES DIVISION	
ENGINEER	
CODE COMPLIANCE REVIEW	

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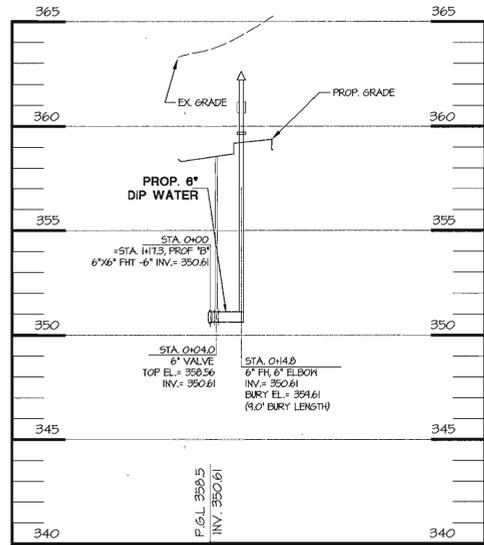
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UTILITY PROFILES

STATE OF MARYLAND PROFESSIONAL ENGINEER
 JOB NO.: 13685
SDP-9
 1-11-05 SHEET: 9 OF 22

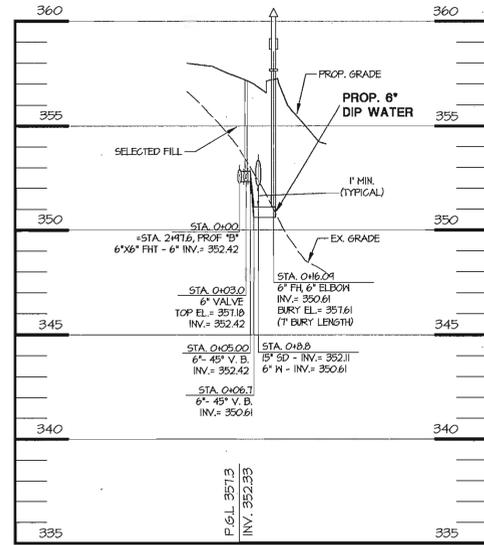
SCALE: 1" = 40'

DES: LFB CHECK: TCN DATE: 01-17-05



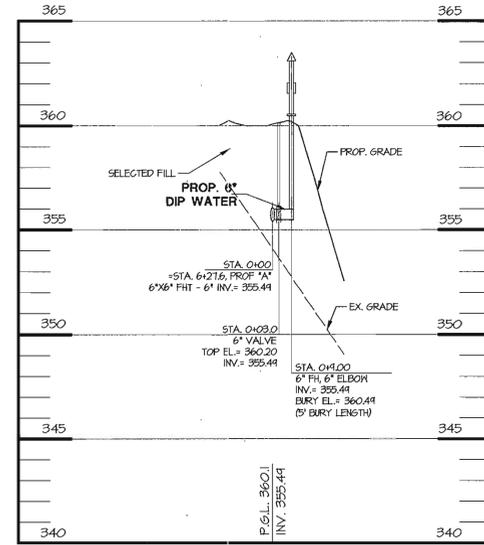
F.H. PROFILE 'A'

HOR. 1" = 40'
VERT. 1" = 4'



F.H. PROFILE 'B'

HOR. 1" = 40'
VERT. 1" = 4'



F.H. PROFILE 'C'

HOR. 1" = 40'
VERT. 1" = 4'

SANITARY PIPE SCHEDULE (PRIVATE)		
SIZE	TYPE	LENGTH
2.5"	PVC SDR 21	346 LF

WATER PIPE SCHEDULE (PRIVATE)		
SIZE	TYPE	LENGTH
10"	CLASS 50 DIP	2 LF
8"	CLASS 50 DIP	403 LF
6"	CLASS 50 DIP	622 LF

SANITARY PIPE FITTINGS SCHEDULE (PRIVATE)	
TYPE	QUANTITY
2.5"-45" HB	2
2.5"-22.5" HB	1
2.5"-11.25" HB	2
2.5"-45" VB	2
AIR RELEASE VALVE & VAULT	1

WATER PIPE FITTINGS SCHEDULE (PRIVATE)	
TYPE	QUANTITY
6" CAP & BUTTRESS	2
6" VALVE	3
8" VALVE	3
6" FIRE HYDRANTS	3
8"X8" TEE	2
6"X6" F.H.T.	3
8"-45" HB	2
8"-22.5" HB	1
8"-11.25" HB	2
6"-45" HB	2
6"-22.5" HB	1
6"-11.25" HB	1
6"-45" VB	2
10"X8" REDUCER	1
8"X6" REDUCER	2
AIR RELEASE VALVE & VAULT	1

COMPACTED SPECIFICATIONS FOR UTILITIES IN FILL

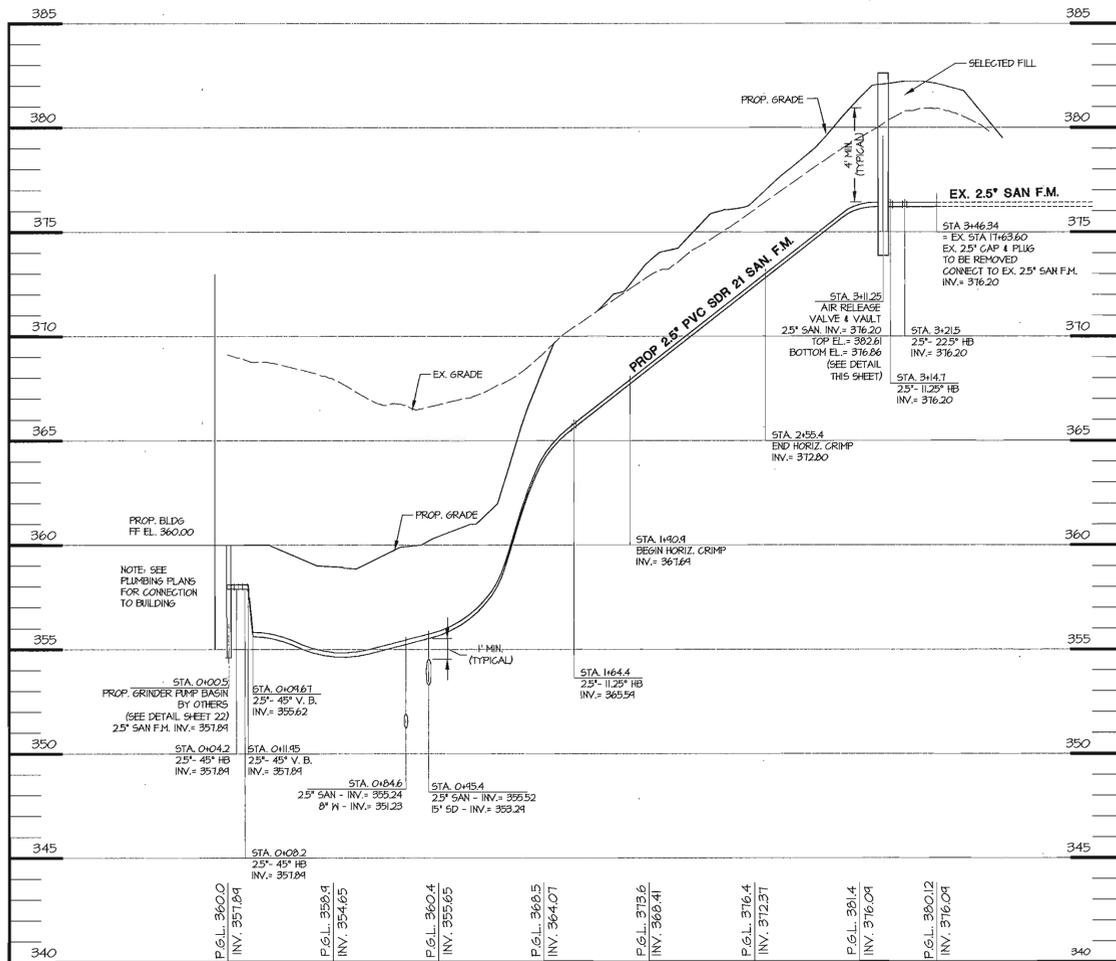
WHERE UTILITY PIPES ARE TO BE PLACED ON COMPACTED FILL, THE FOLLOWING APPLIES:

A. PRIOR TO PLACEMENT OF COMPACTED FILL, ANY SOFT OR OTHERWISE UNSUITABLE SOILS ENCOUNTERED AT THE EXISTING RAVINE BOTTOM OR SLOPE, SHALL BE UNDERCUT AND REMOVED FROM THE CONSTRUCTION AREA.

B. ACCEPTABLE COMPACTED FILL SHALL BE PLACED IN SIX INCH THICK LOOSE LIFTS AND COMPACTED TO AT LEAST 98 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY A.A.S.H.T.O. METHOD T-180.

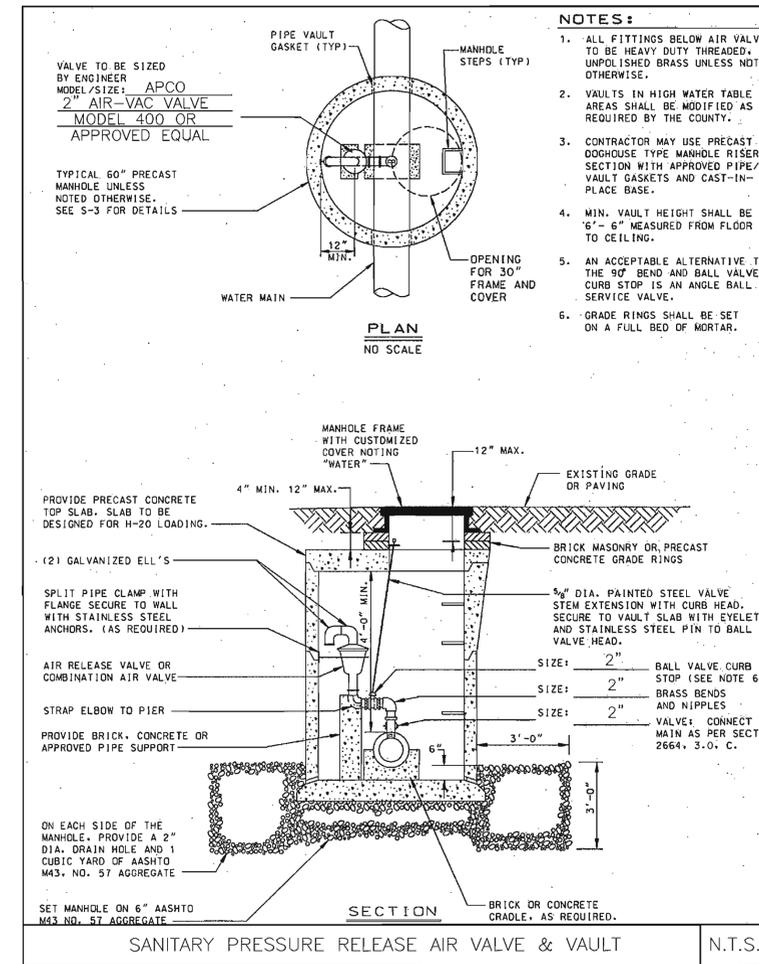
C. THE COMPACTED FILL SHALL BE BENCHED INTO THE EXISTING VIRGIN SLOPES WITH EACH LIFT PLACED TO A SMOOTH TRANSITION FROM VIRGIN TO FILL SOILS.

CONTROLLED AND COMPACTED FILL PER AASHTO T-180, TO BE CERTIFIED BY AN APPROVED ON-SITE GEOTECHNICAL ENGINEER



SANITARY F.M. PROFILE 'A'

HOR. 1" = 40'
VERT. 1" = 4'



- NOTES:**
- ALL FITTINGS BELOW AIR VALVE TO BE HEAVY DUTY THREADED, UNPOLISHED BRASS UNLESS NOTED OTHERWISE.
 - VAULTS IN HIGH WATER TABLE AREAS SHALL BE MODIFIED AS REQUIRED BY THE COUNTY.
 - CONTRACTOR MAY USE PRECAST DOORHOUSE TYPE MANHOLE RISER SECTION WITH APPROVED PIPE/VAULT GASKETS AND CAST-IN-PLACE BASE.
 - MIN. VAULT HEIGHT SHALL BE 6" - 6" MEASURED FROM FLOOR TO CEILING.
 - AN ACCEPTABLE ALTERNATIVE TO THE 90° BEND AND BALL VALVE CURB STOP IS AN ANGLE BALL SERVICE VALVE.
 - GRADE RINGS SHALL BE SET ON A FULL BED OF MORTAR.

REVISIONS	

APPROVALS	
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ENGINEER	
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TSC GROUP	
TSP GROUP	
SURVEY	
DESIGN	
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OPERATIONS	
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UTILITY PROFILES
JOB NO.: 13685
SDP-10
SHEET: 10 OF 22
SCALE: 1" = 40'
DES: LFB CHECK: TCN DATE: 01-17-05
SDP-05-42

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
CHIEF, DEVELOPMENT ENGINEERING DIVISION
DATE: 1/21/05
CHIEF, DIVISION OF LAND DEVELOPMENT
DATE: 2/1/05
DIRECTOR, DEPARTMENT OF PLANNING AND ZONING
DATE: 2/1/05

INFILTRATION TRENCH GENERAL NOTES AND SPECIFICATIONS

- AN INFILTRATION TRENCH MAY NOT RECEIVE RUN-OFF UNTIL THE ENTIRE CONTRIBUTING DRAINAGE AREA TO THE INFILTRATION TRENCH HAS RECEIVED FINAL STABILIZATION.
- HEAVY EQUIPMENT AND TRAFFIC SHALL BE RESTRICTED FROM TRAVELING OVER THE PROPOSED LOCATION OF THE INFILTRATION TRENCH TO MINIMIZE COMPACTION OF THE SOIL.
- EXCAVATE THE INFILTRATION TRENCH TO THE DESIGN DIMENSIONS. EXCAVATED MATERIALS SHALL BE PLACED AWAY FROM THE TRENCH SIDES TO ENHANCE TRENCH WALL STABILITY. LARGE TREE ROOTS MUST BE TRIMMED FLUSH WITH THE TRENCH SIDES IN ORDER TO PREVENT FABRIC PUNCTURING OR TEARING OF THE FILTER FABRIC DURING SUBSEQUENT INSTALLATION PROCEDURES. THE SIDE WALLS OF THE TRENCH SHALL BE ROUGHENED WHERE SHEARED AND SEALED BY HEAVY EQUIPMENT.
- A CLASS "C" GEOTEXTILE OR BETTER (SEE SECTION 24.0, MATERIAL SPECIFICATIONS, 1994 STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, MDE, 1994) SHALL INTERFACE BETWEEN THE TRENCH SIDE WALLS AND BETWEEN STONE RESERVOIR AND GRAVEL FILTER LAYERS. A PARTIAL LIST OF NON-WOVEN FABRICS THAT MEET THE CLASS "C" CRITERIA FOLLOWS. ANY ALTERNATIVE FILTER FABRIC MUST BE APPROVED BY THE PLAN APPROVAL AUTHORITY.
 - AMOCO 4552
 - GEOLON N70
 - WESTEC N07
 - CARTHAGE FX-80S
 - MIRAFI 180-N

THE WIDTH OF GEOTEXTILE MUST INCLUDE SUFFICIENT MATERIAL TO CONFORM TO THE TRENCH PERIMETER IRREGULARITIES AND FOR A 6-INCH MINIMUM TOP OVERLAP. THE FILTER FABRIC SHALL BE TUCKED UNDER THE SAND LAYER ON THE BOTTOM OF THE INFILTRATION TRENCH FOR A DISTANCE OF 6 TO 12 INCHES. STONES OR OTHER ANCHORING OBJECTS SHOULD BE PLACED ON THE TOP OF THE TRENCH TO KEEP THE TRENCH OPEN DURING WINDY PERIODS. WHEN OVERLAPS ARE REQUIRED BETWEEN ROLLS, THE UPHILL ROLL SHOULD LAP A MINIMUM OF 2 FEET OVER THE DOWNHILL ROLL IN ORDER TO PROVIDE A SHINGLED EFFECT.

- IF A 6" SAND FILTER LAYER IS PLACED ON THE BOTTOM OF THE INFILTRATION TRENCH, THE SAND FOR THE FILTRATION TRENCH SHALL BE WASHED AND MEET AASHTO-M-43, SIZE NO. 9 OR NO. 10. ANY ALTERNATIVE SAND GRADATION MUST BE APPROVED BY THE PLAN APPROVAL AUTHORITY.
- THE STONE AGGREGATE SHOULD BE PLACED IN A MAXIMUM LOOSE LIFT THICKNESS OF 12 INCHES. THE GRAVEL (ROUNDED "BANK RUN" GRAVEL IS PREFERRED) FOR THE INFILTRATION TRENCH SHALL BE WASHED AND MEET ONE OF THE FOLLOWING AASHTO-M-43, SIZE NO. 2 OR NO. 3.
- FOLLOWING THE STONE AGGREGATE PLACEMENT, THE FILTER FABRIC SHALL BE FOLDED OVER THE STONE AGGREGATE TO FORM A 6-INCH MINIMUM LONGITUDINAL LAP. THE DESIRED FILL SOIL OR STONE AGGREGATE SHALL BE PLACED OVER THE LAP AT SUFFICIENT INTERVALS TO MAINTAIN THE LAP DURING SUBSEQUENT BACKFILLING.
- CARE SHALL BE EXERCISED TO PREVENT NATURAL OR FILL SOILS FROM INTERMIXING WITH THE STONE AGGREGATE. ALL CONTAMINATED STONE AGGREGATE SHALL BE REMOVED AND REPLACED WITH UNCONTAMINATED STONE AGGREGATE.
- VOIDS MAY OCCUR BETWEEN FABRIC AND THE EXCAVATION SIDES SHALL BE AVOIDED. REMOVING BOULDERS OR OTHER OBSTACLES FROM THE TRENCH WALLS IS ONE SOURCE OF SUCH VOIDS. THEREFORE, NATURAL SOILS SHOULD BE PLACED IN THOSE VOIDS AT THE MOST CONVENIENT TIME DURING CONSTRUCTION TO ENSURE FABRIC CONFORMITY TO THE EXCAVATION SIDES.
- VERTICALLY EXCAVATED WALLS MAY BE DIFFICULT TO MAINTAIN IN AREAS WHERE SOIL MOISTURE IS HIGH OR WHERE SOFT COHESIVE OR COHESIONLESS SOILS ARE DOMINANT. THESE CONDITIONS MAY REQUIRE LAYING BACK OF THE SIDE SLOPES TO MAINTAIN STABILITY.
- PVC DISTRIBUTION PIPES SHALL BE SCHEDULE 40 AND MEET ASTM-D-1785. ALL FITTINGS SHALL MEET ASTM-D-2729. PERFORATIONS SHALL BE 3/8" IN DIAMETER. A PERFORATED PIPE SHALL BE PROVIDED ONLY WITHIN THE INFILTRATION TRENCH AND SHALL TERMINATE 1 FOOT SHORT OF THE INFILTRATION TRENCH WALL. THE END OF THE PVC PIPE SHALL BE CAPPED. NOTE: PVC PIPE WITH A WALL THICKNESS CLASSIFICATION OF SDR-35 MEETING ASTM-D-3034 IS AN ACCEPTABLE SUBSTITUTE FOR THE SCHEDULE 40 PIPE.
- THE OBSERVATION WELL IS TO CONSIST OF 6-INCH DIAMETER PERFORATED PVC SCHEDULE 40 PIPE (M278 OR F758, TYPE PS 28) WITH A CAP SET FLUSH TO FINAL PAVED SURFACE AND IS TO BE LOCATED NEAR THE LONGITUDINAL CENTER OF THE INFILTRATION TRENCH. THE PIPE SHALL HAVE A PLASTIC COLLAR WITH RIBS TO PREVENT ROTATION WHEN REMOVING THE CAP. THE SCREW TOP LID SHALL BE A CLEANOUT WITH A LOCKING MECHANISM OR SPECIAL BOLT TO DISCOURAGE VANDALISM. THE DEPTH TO THE INVERT SHALL BE MARKED ON THE LID. THE PIPE SHALL BE PLACED VERTICALLY WITHIN THE GRAVEL PORTION OF THE INFILTRATION TRENCH AND A CAP PROVIDED AT THE BOTTOM OF THE PIPE. THE BOTTOM OF THE CAP SHALL REST ON THE INFILTRATION TRENCH BOTTOM.
- CORRUGATED METAL DISTRIBUTION PIPES SHALL CONFORM TO AASHTO-M-36, AND SHALL BE ALUMINIZED IN ACCORDANCE WITH AASHTO-M-274. ALUMINIZED PIPE IN CONTACT WITH CONCRETE SHALL BE COATED WITH AN INERT COMPOUND CAPABLE OF PREVENTING THE DECELERATION EFFECT OF ALUMINUM ON THE CONCRETE. PERFORATED DISTRIBUTION PIPES SHALL CONFORM TO AASHTO-M-36, CLASS 2 AND SHALL BE PROVIDED ONLY WITHIN THE INFILTRATION TRENCH AND SHALL TERMINATE 1 FOOT SHORT OF THE INFILTRATION TRENCH WALL. AN ALUMINIZED METAL PLATE SHALL BE WELDED TO THE END OF THE PIPE.
- IF A DISTRIBUTION STRUCTURE WITH A WET WELL IS USED, A 4-INCH DRAIN PIPE SHALL BE PROVIDED AT OPPOSITE ENDS OF THE INFILTRATION TRENCH DISTRIBUTION STRUCTURE. TWO (2) CUBIC FEET OF POROUS BACKFILL MEETING AASHTO-M-43, SIZE NO. 57 SHALL BE PROVIDED AT EACH DRAIN.
- IF A DISTRIBUTION STRUCTURE IS USED, THE MANHOLE COVER SHALL BE BOLTED TO THE FRAME.

SAND FILTER SPECIFICATIONS

- MATERIAL SPECIFICATIONS FOR SAND FILTER
- THE ALLOWABLE MATERIALS FOR SAND FILTER CONSTRUCTION ARE DETAILED IN TABLE B.3.1. (SEE PAGE SDP-23)
- SAND FILTER TESTING SPECIFICATIONS

UNDERGROUND SAND FILTERS, FACILITIES WITHIN SENSITIVE GROUNDWATER AQUIFERS, AND FILTERS DESIGNED TO SERVE URBAN HOT SPOTS ARE TO BE TESTED FOR WATER TIGHTNESS PRIOR TO PLACEMENT OF FILTER MEDIA. ENTRANCES AND EXITS SHOULD BE PLUGGED AND THE SYSTEM COMPLETELY FILLED WITH WATER TO DEMONSTRATE WATER TIGHTNESS. WATER TIGHTNESS MEANS NO LEAKAGE FOR A PERIOD OF 8 HOURS.

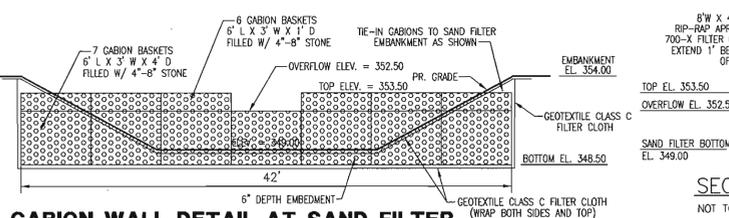
- ALL OVERFLOW WEIRS, MULTIPLE ORIFICES AND FLOW DISTRIBUTION SLOTS ARE TO BE FIELD-TESTED TO VERIFY ADEQUATE DISTRIBUTION OF FLOWS.
- SAND FILTER CONSTRUCTION SPECIFICATIONS

PROVIDE SUFFICIENT MAINTENANCE ACCESS (I.E., 12-FOOT-WIDE ROAD WITH LEGALLY RECORDED EASEMENT). VEGETATED ACCESS SLOPES ARE TO BE MAXIMUM OF 10%; GRAVEL SLOPES TO 15%; PAVED SLOPES TO 25%. ABSOLUTELY NO RUNOFF IS TO ENTER THE FILTER UNTIL ALL CONTRIBUTING DRAINAGE AREAS HAVE BEEN STABILIZED. SURFACE OR FILTER BED IS TO BE LEVEL.

ALL UNDERGROUND SAND FILTERS SHOULD BE CLEARLY DELINEATED WITH SIGNS SO THAT THEY MAY BE LOCATED WHEN MAINTENANCE IS DUE. SURFACE SAND FILTERS MAY BE PLANTED WITH APPROPRIATE GRASSES. SEE APPENDIX A. "POCKET" SAND FILTERS (AND RESIDENTIAL BIORETENTION FACILITIES LARGER THAN AN ACRE) SHALL BE SIZED WITH A STONE "WINDOW" THAT COVERS APPROXIMATELY 10% OF THE FILTER AREA. THIS "WINDOW" SHALL BE FILLED PEA GRAVEL (3/4" INCH STONE)

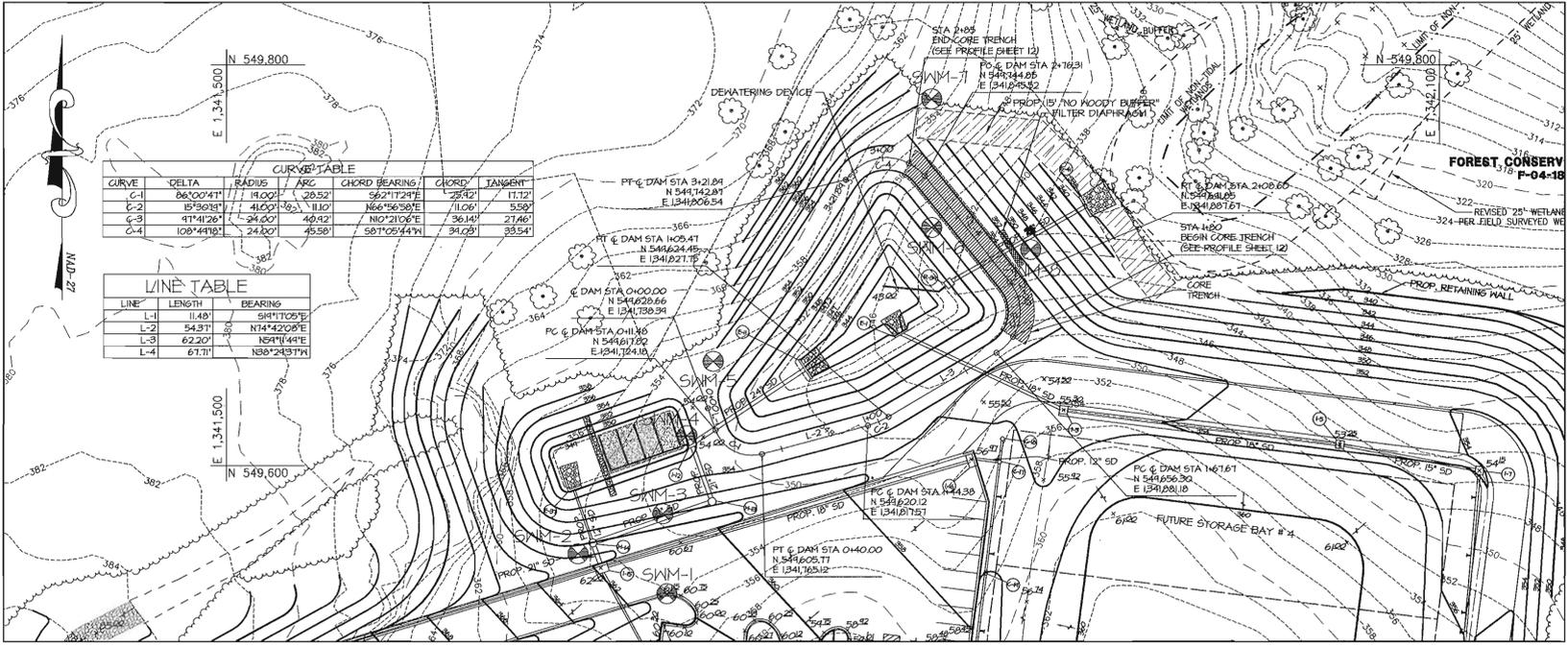
OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED SURFACE STORMWATER FILTRATION SYSTEMS

- THE STORMWATER WETLAND FACILITY SHALL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHALL BE PERFORMED DURING WET WEATHER TO DETERMINE IF THE FACILITY IS FUNCTIONING PROPERLY.
- THE TOP AND SIDE SLOPES OF THE EMBANKMENT SHALL BE MOWED A MINIMUM OF ONCE A YEAR, WHEN VEGETATION REACHES 18" IN HEIGHT OR AS NEEDED.
- FILTERS THAT HAVE A GRASS COVER SHALL BE MOWED A MINIMUM OF 3 (THREE) TIMES PER GROWING SEASON TO MAINTAIN A MAXIMUM GRASS HEIGHT OF LESS THAN 12 INCHES.
- DEBRIS AND LITTER SHALL BE REMOVED DURING REGULAR MOWING OPERATION AND AS NEEDED.
- VISIBLE SIGNS OF EROSION IN THE FACILITY SHALL BE REPAIRED AS SOON AS IT IS NOTICED.
- REMOVE SILT WHEN IT EXCEEDS 4 (FOUR) INCHES DEEP IN THE FOREBAY.
- WHEN WATER PONDS ON THE SURFACE OF THE FILTER BED FOR MORE THAN 72 HOURS, THE TOP FEW INCHES OF DISCOLORED MATERIAL SHALL BE REPLACED WITH FRESH MATERIAL. PROPER CLEANING AND DISPOSAL OF THE REMOVED MATERIALS AND LIQUID MUST BE FOLLOWED BY THE OWNER.
- A LOG BOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH FACILITY DRAINS.
- THE MAINTENANCE LOG BOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
- ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION SYSTEM HAVE BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.



- INSTALLATION NOTES**
- GABION BASKETS SHALL BE CONSTRUCTED OF GALVANIZED 1/2" MESH WIRE OR APPROVED EQUIVALENT.
 - GABION INSTALLATION SHALL BE PERFORMED ACCORDING TO GABION MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.
 - TOP GABION BASKETS TO BE STAGGERED OVER BOTTOM BASKETS PER MANUFACTURER'S RECOMMENDATIONS.
 - TOP GABION BASKETS TO BE FASTENED TO BOTTOM BASKETS PER MANUFACTURER'S RECOMMENDATIONS.

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



CURVED TABLE

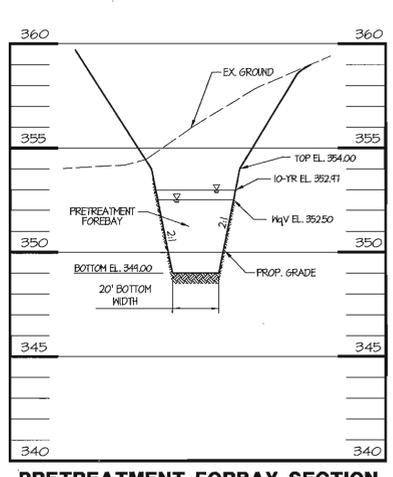
CURVE	DELTA	RADIUS	ARC	CHORD BEARING	CHORD	TANGENT
C-1	86°00'41"	11.00'	20.52'	S62°17'24"E	25.82'	11.72'
C-2	15°30'18"	41.00'	11.10'	N66°56'38"E	11.06'	5.59'
C-3	41°41'28"	24.00'	40.42'	N10°21'06"E	36.14'	21.46'
C-4	108°44'10"	24.00'	45.58'	S87°05'44"W	34.03'	33.54'

LINE TABLE

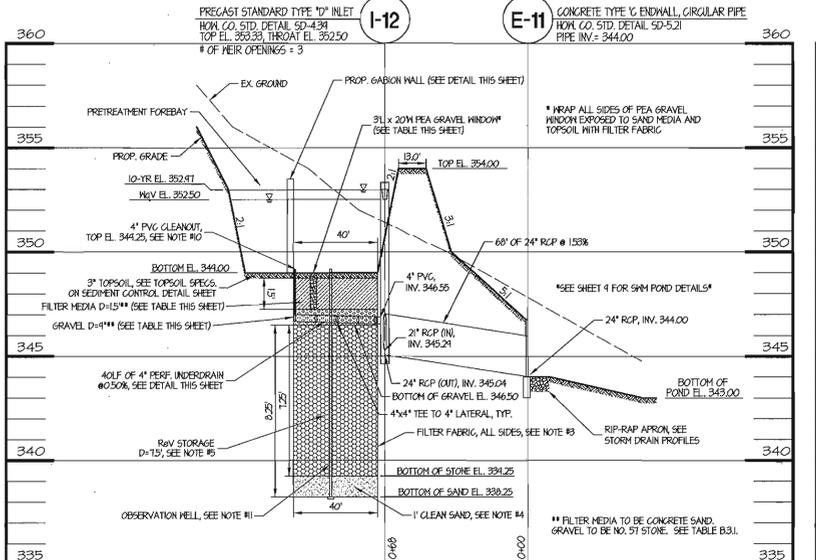
LINE	LENGTH	BEARING
L-1	11.48'	S81°12'09"E
L-2	54.97'	N74°42'09"E
L-3	62.20'	N57°14'44"E
L-4	61.71'	N80°24'37"W

STORMWATER MANAGEMENT PLAN (PRIVATE FACILITY)
 SCALE: 1" = 40'

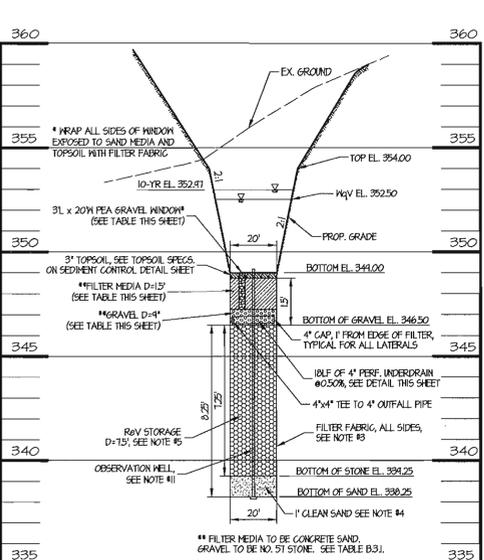
I-12 TO BE A PRECAST STRUCTURE WITH 3 HOLE OPENINGS PLACED AT THE FRONT AND SIDES OF THE INLET. BACK OF INLET (AGAINST FILL SLOPE) WILL NOT HAVE A HOLE OPENING.



PRETREATMENT FORBAY SECTION
 HOR. 1" = 40'
 VERT. 1" = 4'



SAND FILTER PROFILE
 HOR. 1" = 40'
 VERT. 1" = 4'



SAND FILTER SECTION
 HOR. 1" = 40'
 VERT. 1" = 4'

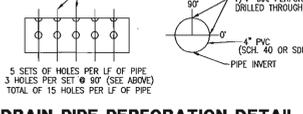
GRADATION CHART FOR ASTM C-33 CONCRETE SAND

SIÉVE SIZE	mm	% PASSING
3/8 IN.	9.5	100
No. 4	4.75	90-100
No. 10	2.00	70-100
No. 20	0.850	50-85
No. 50	0.300	25-50
No. 100	0.150	8-30
No. 140	0.106	0-15
No. 200	0.075	0-5

GRADATION CHART FOR No. 57 STONE

SIÉVE SIZE	% PASSING
1-1/2"	100
1"	95-100
1/2"	25-60
No. 4	0-10
No. 8	0-5

DRAIN PIPE PERFORATION DETAIL
 SCALE: N.T.S.



SAND FILTER FILTER BED DETAIL
 SCALE: N.T.S.

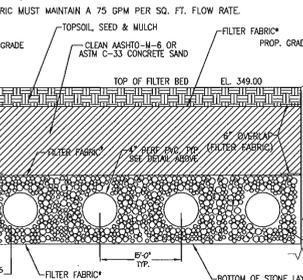


TABLE B.3.1 MATERIAL SPECIFICATIONS FOR SAND FILTERS

MATERIAL	SPECIFICATION/TEST METHOD	SIZE	NOTES
PEA GRAVEL	AASHTO-M-43	0.25" - 0.50"	WASHED, RIVER RUN, ROUND DIAMETER
SAND	CLEAN AASHTO-M-6 OR ASTM-C-33 CONCRETE SAND, SEE GRADATION CHART	0.02" TO 0.04"	SAND SUBSTITUTIONS SUCH AS DIABASE AND GRANITONE #10 ARE NOT ACCEPTABLE. NO CALCIUM CARBONATE OR SOLICATING SAND SUBSTITUTIONS ARE ACCEPTABLE. NO "ROCK DUST" CAN BE USED FOR SAND.
PEAT	ASH CONTENT: <15% PH RANGE: 5.2 TO 4.9 LOOSE BULK DENSITY: 0.12 TO 0.15 G/CC	N/A	THE MATERIAL MUST BE REDD-SOGE HEMIC PEAT, SHREDED, UNCOMPACTED, UNIFORM, AND CLEAN.
LEAF COMPOST	N/A	N/A	N/A
UNDERDRAIN GRAVEL	AASHTO-M-43	0.375" TO 1.50"	DOUBLE WASHED NO. 57 STONE, SEE GRADATION CHART
GEOTEXTILE FABRIC (IF REQUIRED)	ASTM-D-4833 (PUNCTURE STRENGTH--125 LB.) ASTM-D-4632 (TENSILE STRENGTH--300 LB.)	0.08" THICK EQUIVALENT OPENING SIZE OF #80 SIEVE	MUST MAINTAIN 75 GPM PER SQ. FT. FLOW RATE. NOTE: A 4" PEA GRAVEL LAYER MAY BE SUBSTITUTED FOR GEOTEXTILES MEANT TO SUBSTITUTE SAND FILTER LAYERS. SEE INFILTRATION TRENCH GENERAL NOTE 3.
IMPERMEABLE LINER (IF REQUIRED)	ASTM-D-4833 (THICKNESS) ASTM-D-412 (TENSILE STRENGTH 1,100 LB. ELONGATION 200%) ASTM-D-624 (TEAR RESISTANCE - 150 LB./IN.) ASTM-D-471 (WATER ADSORPTION: +8 TO -2% MASS)	30 MIL THICKNESS	LINER TO BE ULTRAVIOLET RESISTANT. A GEOTEXTILE FABRIC SHOULD BE USED TO PROTECT THE LINER FROM PUNCTURE.
UNDERDRAIN PIPING	F 758, TYPE PS 28 OR AASHTO-M-278	4" - 6" RIGID SCH. 40 PVC OR SDR335	3" PERFO. @ 3" ON CENTER, 3 HOLES PER FOOT. SEE DRAIN PIPE PERFORATION DETAIL. MINIMUM OF 3" OF GRAVEL OVER PIPES. NOT NECESSARY UNDERNEATH PIPES. SEE INFILTRATION TRENCH GENERAL NOTE 10.
CONCRETE (CAST-IN-PLACE)	MSHA STANDARDS AND SPECS SECTION 602, MIX NO. 3, F'c = 3500 PSI. NOMINAL WEIGHT, AIR EXTRACTED; REINFORCING TO MEET ASTM-615-60	N/A	ON SITE TESTING OF POWER-IN-PLACE CONCRETE REQUIRED; 28 DAY STRENGTH AND SLUMP TEST; ALL CONCRETE DESIGN (CAST-IN-PLACE OR PIPE-CAST) NOT USING PREVIOUSLY APPROVED STATE OR LOCAL STANDARDS REQUIRES DESIGN DRAWINGS SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND.
CONCRETE (PRECAST)	PER PRE-CAST MANUFACTURER	N/A	SEE ABOVE NOTE
NON-REBAR STEEL	ASTM A-36	N/A	STRUCTURAL STEEL TO BE HOT-DIPPED GALVANIZED ASTM-A-123

REVISIONS

NO.	DATE	DESCRIPTION

APPROVALS

DESIGNER	CHECKER	DATE

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APPLIED PHYSICS LABORATORY
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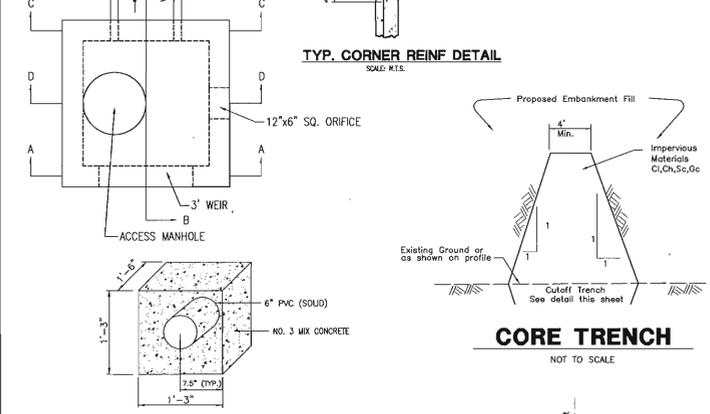
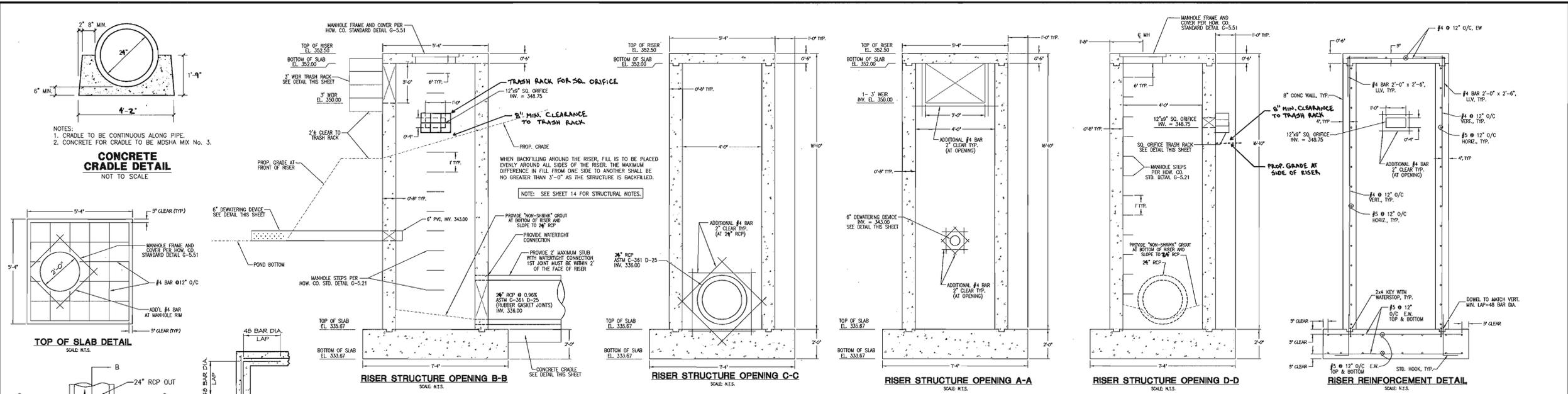
SWM PLAN 1

JOB NO.: 13685
SDP-11
 1-17-05 SHEET: 11 OF 22

SCALE: 1" = 40'

DES: KKB CHECK: TCN DATE: 01-17-05

SDP-05-42



DEWATERING DEVICE ANCHOR
 HOT TO SCALE

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.

James E. Loeck 1/18/05
 SIGNATURE OF DEVELOPER DATE
 JAMES E. LOECK, CHIEF ENGINEER OF PLANT FACILITIES
 JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY

BY THE ENGINEER
 I 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 HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

Thomas C. Neugebauer 1-17-05
 SIGNATURE OF ENGINEER DATE
 THOMAS C. NEUGEBAUER, P.E. MD LIC.#29203

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 1/26/05
 U.S.D.A.-NATURAL RESOURCES CONSERVATION SERVICE DATE

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

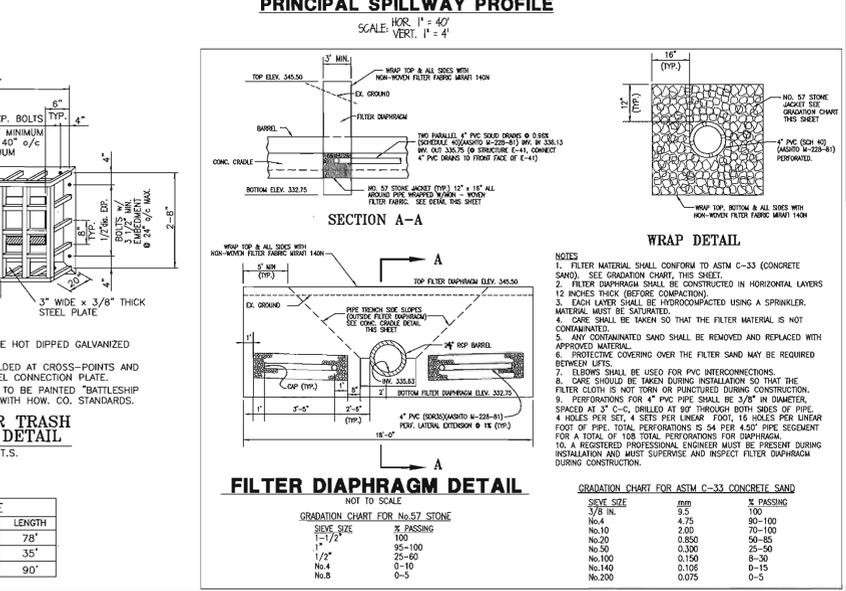
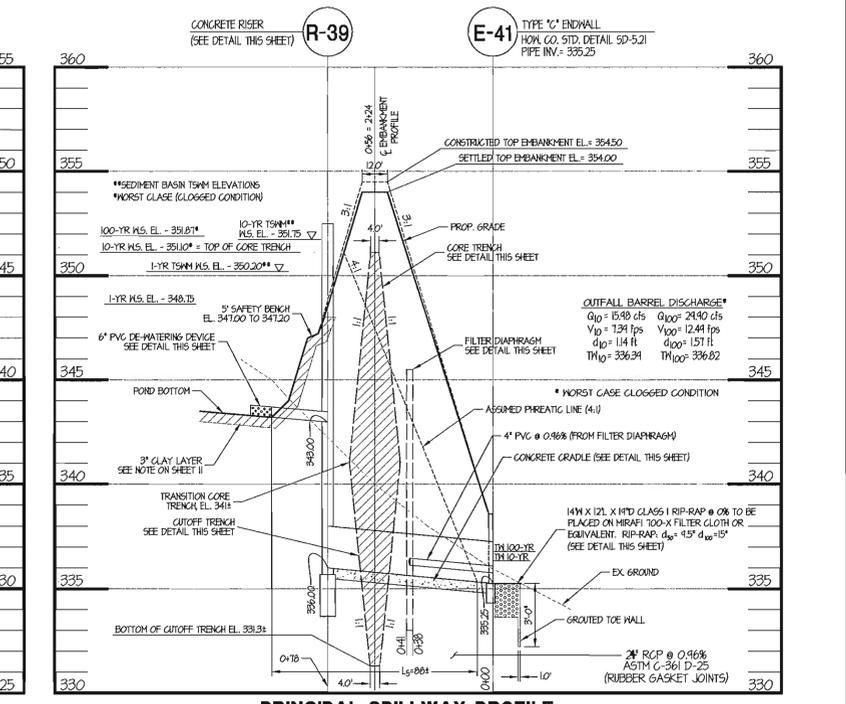
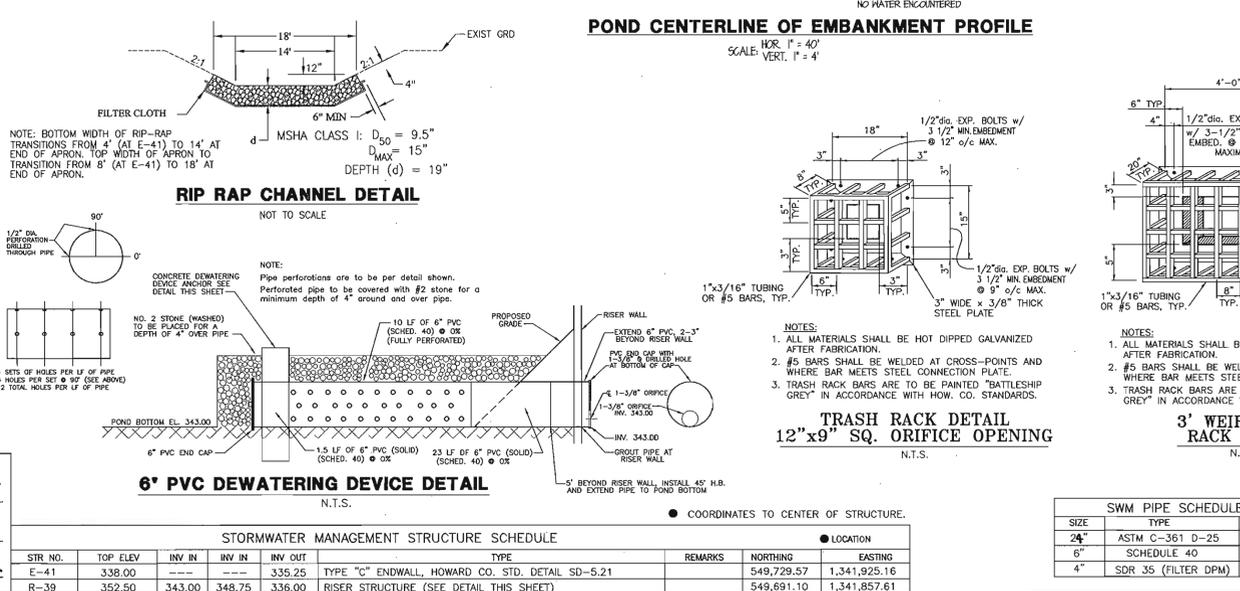
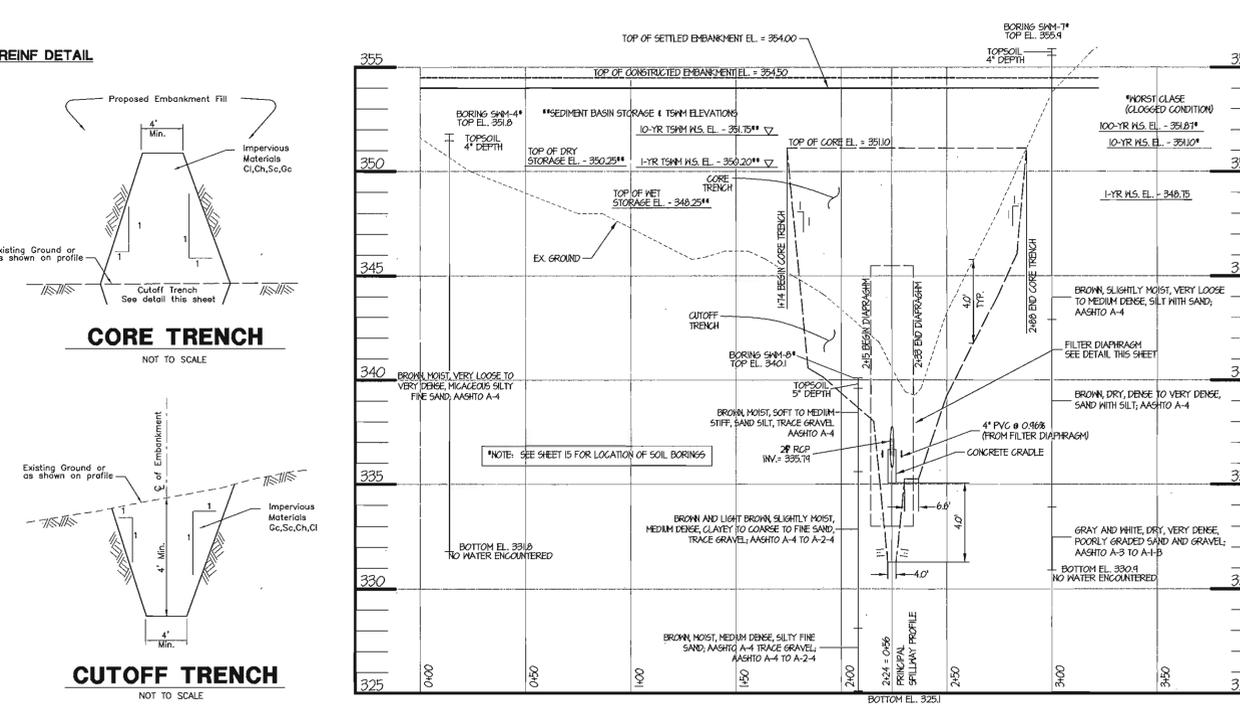
Shawn A. Cullen 1/26/05
 HOWARD SOIL CONSERVATION DISTRICT DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Mike DeMunn 1/21/05
 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK DATE

Chris Hamant 2/1/05
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Shawn A. Cullen 2/1/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING DATE



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SWM PLAN 2

JOB NO.: 13685

STATE OF MARYLAND

 JAMES C. NEUGEBAUER
 PROFESSIONAL ENGINEER
 1-17-05 SHEET: 12 OF 22

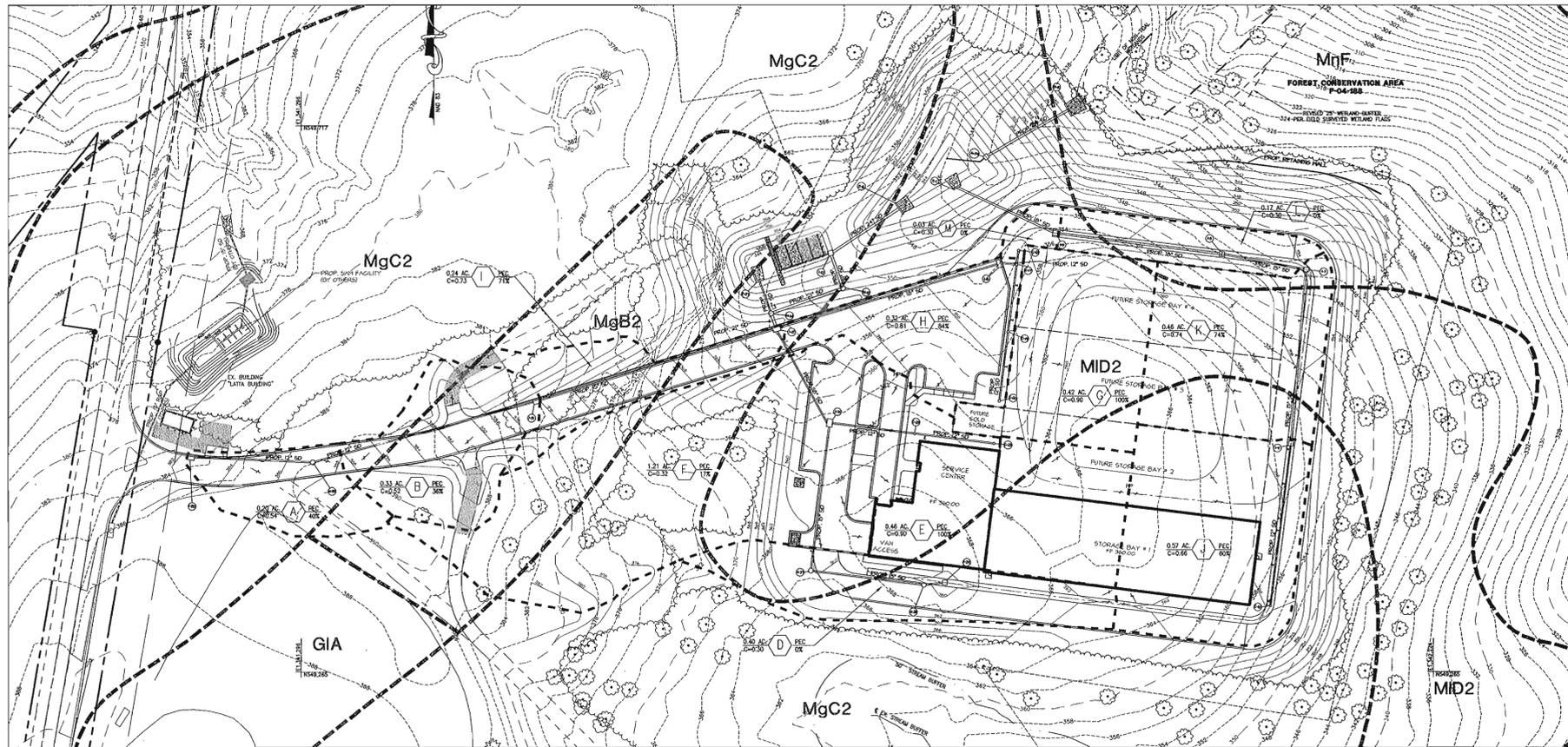
SCALE: 1" = 40'

DES: KKB CHECK: TCN DATE: 01-17-05

SDP-05-42

LEGEND

- EX. TREE LINE
- EX. PROPERTY LINE
- EX. PAVEMENT
- EX. BUILDING
- EX. EASEMENT
- EX. CURB
- EX. STORM DRAIN
- EX. WETLAND BUFFER
- EX. STREAM BUFFER
- EX. 2' CONTOUR
- EX. 10' CONTOUR
- EX. FOREST CONSERVATION AREA
- PROP. RIP RAP
- PROP. LIMIT OF DISTURBANCE
- PROP. STORM DRAIN
- PROP. STORM DRAIN INLET
- PROP. CURB
- PROP. TURF FOR FIRELANE
- PROP. CENTERLINE OF DRAINAGE SWALE
- PROP. FUTURE BUILDING
- PROP. BUILDING
- MgB2 SOIL TYPE
- 0.16 AC. (23%) PEC (C FACTOR) 44% (X IMPERVIOUS)
- STORM DRAIN DRAINAGE DIVIDE
- PR. CONDITION DRAINAGE DIVIDE
- TIME OF CONCENTRATION PATH
- SOIL TYPE DIVIDE



STORM DRAIN DRAINAGE AREA MAP

SCALE: 1"=60'

SUMMARY OF PROP. FACILITY

DESIGN STORM	Proposed Facility Inflow (cfs)	Proposed Facility Discharge (cfs)	Facility Water Surface Elevation (ft)	Facility Storage Volume (acre-ft)
1 year	6.60	0.12	348.75	0.294
5 year	17.03	3.58	350.01	0.447
10 year*	23.50	15.98	351.10	0.348
100 year*	39.25	29.90	351.87	0.491

*WORST CASE CLOGGED CONDITION
 Drainage Area 6.57 acres
 Impervious Area 2.73 acres

SWM HYDROLOGIC DATA-PROPOSED CONDITION

TR-55 HYDROLOGIC DATA	TIME OF CONCENTRATION PATH
DRAINAGE AREA: 6.57 AC.	A-B 48' SHEET FLOW AT 4% GRASS, DENSE
RCN: 76	B-C 16' SHEET FLOW AT 25% GRASS, DENSE
SOIL TYPE: 'B'	C-D 28' SHALLOW CONC. FLOW AT 2% PAVED
AREA LAWN: 3.84 AC.	D-E 55' OF OPEN CHANNEL FLOW AT 8 FPS
AREA IMPERVIOUS: 2.73 AC.	TIME OF CONCENTRATION: 0.14 HR
AREA WOODS: 0.00 AC.	

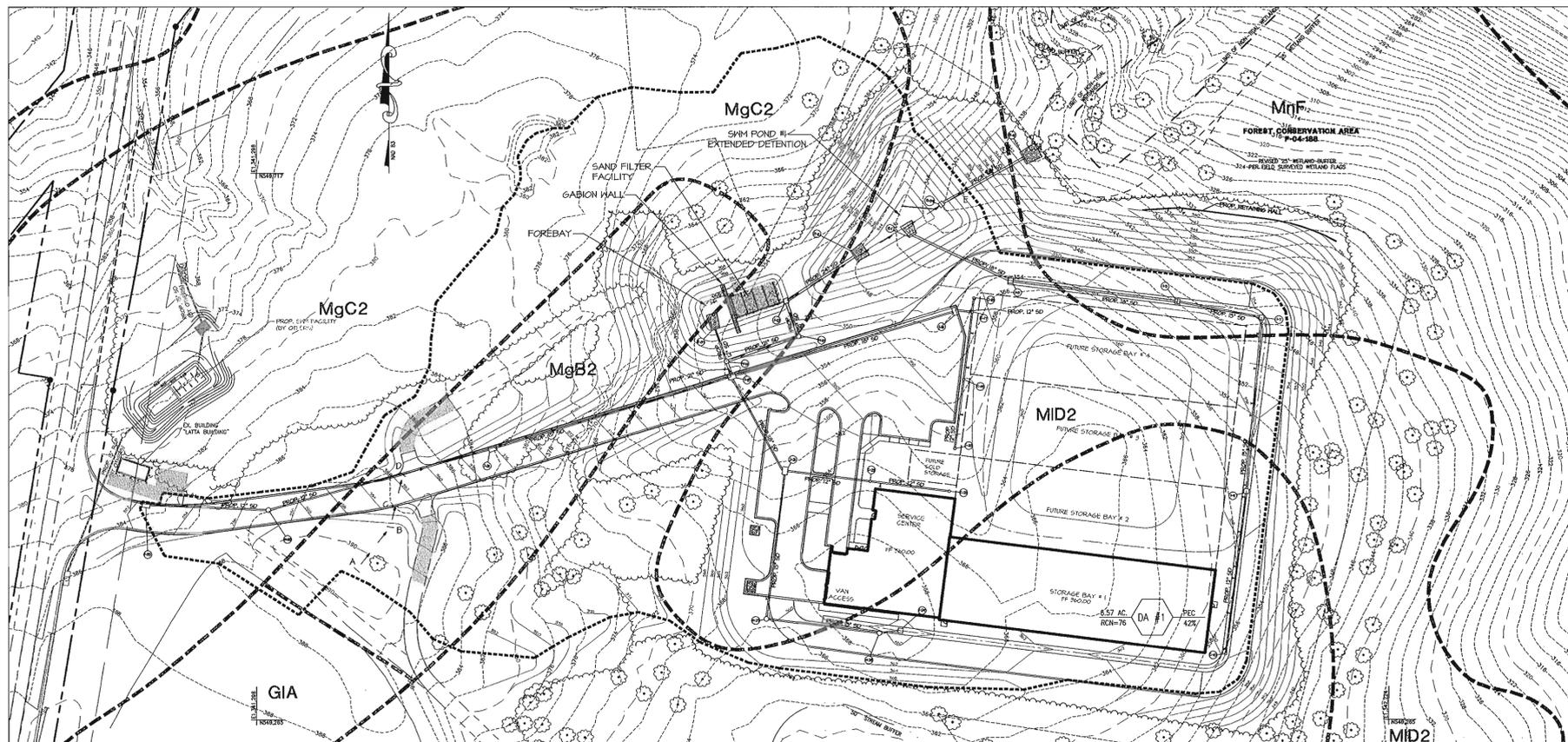
GENERAL SWM STORAGE REQUIREMENTS

STEP	REQUIREMENT	VOLUME REQUIRED (cc.-ft.)	NOTES
1	WATER QUALITY VOLUME (WqV)	0.2321 cc.-ft.	0.177 cc.-ft. PROVIDED BY SAND FILTER 0.081 cc.-ft. PROV. BY RECHARGE TRENCH
2	RECHARGE VOLUME (Rev)	0.0604 cc.-ft.	0.081 cc.-ft. PROVIDED BY RECHARGE TRENCH LOCATED UNDER SAND FILTER
3	CHANNEL PROTECTION VOLUME (CpV)	0.2714 cc.-ft. 0.15 cfs RELEASE RATE	RELEASE RATE=0.12 cfs @ WSEL=348.75 0.294 cc.-ft. PROVIDED @ WSEL=348.75
4	OVERBANK FLOOD PROTECTION VOLUME (Op)	N/A	10.14 cfs @ WSEL=350.69 15.98 cfs @ WSEL=351.10
5	EXTREME FLOOD PROTECTION VOLUME (O)	PROVIDE SAFE PASSAGE OF THE 100-YR EVENT IN FINAL DESIGN	28.55 cfs @ WSEL=351.79 29.90 cfs @ WSEL=351.87

*** NORMAL POND ROUTING
 ** WORST CASE (CLOGGED) POND ROUTING

SOILS LEGEND

SYMBOL	NAME/DESCRIPTION	SOIL TYPE
GIA	GLENELG LOAM, 0-3% SLOPES	B
MgB2	MANOR GRAVEL LOAM, 3%-8% SLOPES, MODERATELY ERODED	B
MgC2	MANOR GRAVEL LOAM, 8%-15% SLOPES, MODERATELY ERODED	B
MID2	MANOR GRAVEL LOAM, 15%-25% SLOPES, MODERATELY ERODED	B
MnF	MANOR VERY STONY LOAM, 25%-60% SLOPES	B



SWM DRAINAGE AREA MAP

SCALE: 1"=60'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 CHIEF, DEVELOPMENT ENGINEERING DIVISION
 CHIEF, DIVISION OF LAND DEVELOPMENT
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING

1/21/05
 2/4/05
 2/5/05

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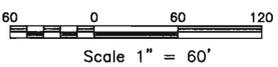


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Scale 1" = 60'



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DRAINAGE AREA MAP



JOB NO.: 13685

SDP-13

1-7-05 SHEET: 13 OF 22

SCALE: 1" = 60'

DES: KKB CHECK: TCN DATE: 01-17-05

SDP-05-42

MD-378 STORMWATER MANAGEMENT CONSTRUCTION SPECIFICATIONS

I. SITE PREPARATION

AREAS DESIGNATED FOR BORROW AREAS, EMBANKMENT, AND STRUCTURAL WORKS SHALL BE CLEARED, GRUBBED AND STRIPPED TO TOPSOIL. ALL TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED. CHANNEL BANKS SHALL BE SLOPED TO NO STEEPER THAN 1:1. ALL TREES SHALL BE CLEARED AND GRUBBED WITHIN 15 FEET OF THE TOE OF THE EMBANKMENT. AREAS TO BE COVERED BY THE RESERVOIR WILL BE CLEARED OF ALL TREES, BRUSH, LOGS, FENCES, RUBBISH AND OTHER OBJECTIONABLE MATERIAL UNLESS OTHERWISE DESIGNATED ON THE PLANS. TREES, BRUSH, AND STUMPS SHALL BE CUT APPROXIMATELY LEVEL WITH THE GROUND SURFACE FOR DRY STORMWATER MANAGEMENT. A SHOULDER OF A 25-FOOT RADIUS AROUND THE INLET STRUCTURE SHALL BE CLEARED. ALL CLEARED AND GRUBBED MATERIAL SHALL BE DISPOSED OF OUTSIDE AND BELOW THE LIMITS OF THE DAM AND RESERVOIR AS DIRECTED BY THE OWNER OR HIS REPRESENTATIVE. WHEN SPECIFIED, A SUFFICIENT QUANTITY OF TOPSOIL WILL BE STOCKPILED IN A SUITABLE LOCATION FOR USE ON THE EMBANKMENT AND OTHER DESIGNATED AREAS.

II. EARTH FILL MATERIAL

THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED DESIGNATED BORROW AREAS. IT SHALL BE FREE OF ROOTS, STUMPS, WOOD, RUBBISH, STONES GREATER THAN 6" FROZEN OR OTHER OBJECTIONABLE MATERIALS. FILL MATERIAL FOR THE CENTER OF THE EMBANKMENT, AND CUT OFF TRENCH SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION GC, SC, CH OR CL AND MUST HAVE AT LEAST 30% PASSING THE #200 SIEVE. CONSIDERATION MAY BE GIVEN TO THE USE OF OTHER MATERIALS IN THE EMBANKMENT IF DESIGNED BY A GEOTECHNICAL ENGINEER. SUCH SPECIAL DESIGNS MUST HAVE CONSTRUCTION SUPERVISED BY A GEOTECHNICAL ENGINEER. MATERIALS USED IN THE OUTER SHELL OF THE EMBANKMENT MUST HAVE THE CAPABILITY TO SUPPORT VEGETATION OF THE QUALITY REQUIRED TO PREVENT EROSION OF THE EMBANKMENT.

B. PLACEMENT

AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. FILL MATERIALS SHALL BE PLACED IN MAXIMUM 8 INCH THICK (BEFORE COMPACTION) LAYERS WHICH ARE TO BE CONTINUOUS OVER THE ENTIRE LENGTH OF THE FILL. THE MOST PERMEABLE BORROW MATERIAL SHALL BE PLACED IN THE DOWNSTREAM PORTIONS OF THE EMBANKMENT. THE FRONTAL SPILLWAY MUST BE INSTALLED CONCURRENTLY WITH FILL PLACEMENT AND NOT EXCAVATED INTO THE EMBANKMENT.

C. COMPACTION

THE MOVEMENT OF THE HAULING AND SPREADING EQUIPMENT OVER THE FILL SHALL BE CONTROLLED SO THAT THE ENTIRE SURFACE OF EACH LIFT SHALL BE TRAVERSED BY NOT LESS THAN ONE TREAD TRACK OR HEAVY EQUIPMENT OR COMPACTION SHALL BE ACHIEVED BY A MINIMUM OF FOUR COMBINED PASSES OF A SHEEPSFOOT RUBBER TIED OR VIBRATORY ROLLER. FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SUCH THAT THE REQUIRED DEGREE OF COMPACTION WILL BE OBTAINED WITH THE EQUIPMENT USED. THE FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SO THAT IF FORMED INTO A BALL IT WILL NOT CRUMBLE WHEN WET. THE WATER CONTENT SHALL BE DETERMINED BY THE REVIEWING AGENCY. THE MINIMUM REQUIRED DENSITY SHALL NOT BE LESS THAN 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN +/- 2% OF THE OPTIMUM. EACH LAYER OF FILL SHALL BE COMPACTED AS NECESSARY TO OBTAIN THAT DENSITY AND IS TO BE CERTIFIED BY THE ENGINEER AT THE TIME OF CONSTRUCTION. ALL COMPACTION IS TO BE DETERMINED BY ASHTO METHOD T-99 (STANDARD PROCTOR).

III. CUT OFF TRENCH

THE CUTOFF TRENCH SHALL BE EXCAVATED INTO IMPERVIOUS MATERIAL ALONG OR PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE BOTTOM WIDTH OF THE TRENCH SHALL BE GOVERNED BY THE EQUIPMENT USED FOR EXCAVATION WITH THE MINIMUM WIDTH BEING FOUR FEET. THE DEPTH SHALL BE AT LEAST FOUR FEET BELOW EXISTING GRADE OR AS SHOWN ON THE PLANS. THE SIDE SLOPES OF THE TRENCH SHALL BE 1 TO 1 OR FLATTER. THE BACKFILL SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY.

IV. EMBANKMENT CORE

THE CORE SHALL BE PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE TOP WIDTH OF THE CORE SHALL BE A MINIMUM OF FOUR FEET. THE HEIGHT SHALL EXTEND UP TO AT LEAST THE 10 YEAR WATER ELEVATION OR AS SHOWN ON THE PLANS. THE SIDE SLOPES SHALL BE 1 TO 1 OR FLATTER. THE CORE SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY. IN ADDITION, THE CORE SHALL BE PLACED CONCURRENTLY WITH THE OUTER SHELL OF THE EMBANKMENT.

V. STRUCTURE BACKFILL

BACKFILL ADJACENT TO PIPES OR STRUCTURES SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE ADJOINING FILL. THE FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN 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 ANY CIRCUMSTANCES SHALL EQUIPMENT BE OVER ANY PART OF A CONCRETE STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE. STRUCTURE BACKFILL MAY BE FLOWABLE FILL MEETING THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 311.3 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" (MEASURED PERPENDICULAR TO THE OUTSIDE OF THE PIPE) OF FLOWABLE FILL SHALL BE UNDER (BEDDING), OVER AND ON THE SIDES OF THE PIPE. IT ONLY NEEDS TO EXTEND UP TO THE SPRING LINE FOR ROBO CONDUITS. AVERAGE SLUMP OF THE FILL SHALL BE 7" TO ASSURE FLOWABILITY OF THE MATERIAL. ADEQUATE MEASURES SHALL BE TAKEN (SAND BAGS, ETC.) TO PREVENT FLOATING THE PIPE. WHEN USING FLOWABLE FILL, ALL METAL PIPE SHALL BE BITUMINOUS COATED. ANY ADJOINING SOIL FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL SHALL COMPLETELY FILL ALL VOIDS ADJACENT TO THE FLOWABLE FILL ZONE. 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 ANY CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE. BACKFILL MATERIAL OUTSIDE THE STRUCTURAL BACKFILL (FLOWABLE FILL) ZONE SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE CORE OF THE EMBANKMENT OR OTHER EMBANKMENT MATERIALS.

VI. PIPE CONDUITS

ALL PIPES SHALL BE CIRCULAR IN CROSS SECTION.

A. CORRUGATED METAL PIPE

1. MATERIALS - POLYMER COATED STEEL PIPE - STEEL PIPES WITH POLYMERIC COATINGS SHALL HAVE A MINIMUM COATING THICKNESS OF .01 INCH (0.254 MM) ON BOTH SIDES OF THE PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF ASHTO SPECIFICATIONS M-245 & M-246 WITH WATER TIGHT COUPLING BANDS OR FLANGES. MATERIALS - ALUMINUM COATED STEEL PIPE - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF ASHTO SPECIFICATION M-274 WITH WATER TIGHT COUPLING BANDS OR FLANGES. ALUMINUM COATED STEEL PIPE WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT THE NEED FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF ASHTO SPECIFICATION M-190 TYPE A. ANY ALUMINUM COATING DAMAGED OR OTHERWISE REMOVED SHALL BE REPLACED WITH COLD APPLIED BITUMINOUS COATING COM-POND ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT. MATERIALS - ALUMINUM PIPE - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF ASHTO SPECIFICATION M-196 OR M-211 WITH WATER TIGHT COUPLING BANDS OR FLANGES. ALUMINUM PIPE WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF ASHTO SPECIFICATION M-190 TYPE A. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR 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.

2. COUPLING BANDS, ANTI-SEEP COLLARS, END SECTIONS, ETC., MUST BE COMPOSED OF THE SAME MATERIAL AND COATINGS AS THE PIPE. METALS MUST BE INSULATED FROM DISSIMILAR MATERIALS WITH USE OF RUBBER OR PLASTIC INSULATING MATERIALS AT LEAST 24 MILS IN THICKNESS.

3. CONNECTIONS - ALL CONNECTIONS WITH PIPES MUST BE COMPLETELY WATER TIGHT. THE DRAIN PIPE OR BARREL CONNECTION TO THE RISER SHALL BE WELDED ALL AROUND WHEN THE PIPE AND RISER ARE METAL. ANTI-SEEP COLLARS SHALL BE CONNECTED TO THE PIPE IN SUCH A MANNER AS TO BE COMPLETELY WATER TIGHT. DIMPLE BANDS ARE NOT CONSIDERED TO BE WATER TIGHT. ALL CONNECTIONS SHALL USE A RUBBER OR NEOPRENE GASKET WHEN JOINING PIPE SECTIONS. THE END OF EACH PIPE SHALL BE RE-ROLLED AN ADEQUATE NUMBER OF CORRUGATIONS TO ACCOMMODATE THE BANDING. THE FOLLOWING TYPE CONNECTIONS ARE ACCEPTABLE FOR PIPES LESS THAN 24 INCHES IN DIAMETER: FLANGES ON BOTH ENDS OF THE PIPE WITH A CIRCULAR 3/8 INCH CLOSED CELL NEOPRENE GASKET, PRE-PUNCHED TO THE FLANGE BOLT OR CIRCLE, SANDWICHED BETWEEN ADJACENT FLANGES; A 12-INCH WIDE STANDARD LAP TYPE BAND WITH 12-INCH WIDE BY 3/8-INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET; AND A 12-INCH WIDE HUGGER TYPE BAND WITH O-RING GASKETS HAVING A MINIMUM DIAMETER OF 1/2 INCH GREATER THAN THE CORRUGATION DEPTH. PIPES 24 INCHES IN DIAMETER AND LARGER SHALL BE CONNECTED BY A 24 INCH LONG ANNUAL CORRUGATED BAND USING A MINIMUM OF 4 (FOUR) RODS AND LUGS, 2 ON EACH CORNER OF THE PIPE. A 24-INCH WIDE BY 3/8-INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET WILL BE INSTALLED WITH 12 INCHES ON THE END OF EACH PIPE. FLANGED JOINTS WITH 3/8 INCH CLOSED CELL GASKETS THE FULL WIDTH OF THE FLANGE IS ALSO ACCEPTABLE. HELICALLY CORRUGATED PIPE SHALL HAVE EITHER CONTINUOUSLY WELDED SEAMS OR HAVE LOCK SEAMS WITH INTERNAL CALKING OR A NEOPRENE BEAD.

4. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH. WHERE ROCK OR SOFT SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

5. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

6. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

B. REINFORCED CONCRETE PIPE

1. MATERIALS - REINFORCED CONCRETE PIPE SHALL HAVE BELL AND SPIGOT JOINTS WITH RUBBER GASKETS AND SHALL EQUAL OR EXCEED ASTM C-361.

2. BEDDING - REINFORCED CONCRETE PIPE CONDUITS SHALL BE LAID IN A CONCRETE BEDDING/CRADE FOR THEIR ENTIRE LENGTH. THIS BEDDING/CRADE SHALL CONSIST OF HIGH SLUMP CONCRETE PLACED UNDER THE PIPE AND UP THE SIDES OF THE PIPE AT LEAST 50% OF ITS OUTSIDE DIAMETER WITH A MINIMUM THICKNESS OF 8 INCHES. WHERE A CONCRETE CRADE IS NOT NEEDED FOR STRUCTURAL REASONS, FLOWABLE FILL MAY BE USED AS DESCRIBED IN THE "STRUCTURE BACKFILL" SECTION OF THIS STANDARD. GRAVEL BEDDING IS NOT PERMITTED.

3. LAYING PIPE - BELL AND SPIGOT PIPE SHALL BE PLACED WITH THE BELL END UPSTREAM. JOINTS SHALL BE MADE IN ACCORDANCE WITH RECOMMENDATIONS OF THE MANUFACTURER. THE MATERIAL AFTER THE JOINTS ARE SEALED FOR THE ENTIRE LENGTH, THE BEDDING SHALL BE PLACED SO THAT ALL SPACES UNDER THE PIPE ARE FILLED. CARE SHALL BE EXERCISED TO PREVENT ANY DEVIATION FROM THE ORIGINAL LINE AND GRADE OF THE PIPE. THE FIRST JOINT MUST BE LOCATED WITHIN 4 FEET FROM THE RISER.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

C. PLASTIC PIPE

1. MATERIALS - PVC PIPE SHALL BE PVC-1120 OR PVC-1220 CONFORMING TO ASTM D-1785 OR ASTM D-2241. CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) PIPE, COUPLINGS AND FITTINGS SHALL CONFORM TO THE FOLLOWING: 4" 10" INCH PIPE SHALL MEET THE REQUIREMENTS OF ASHTO M252 TYPE S, AND 12" THROUGH 24" INCH SHALL MEET THE REQUIREMENTS OF ASHTO M294 TYPE S.

C. PLASTIC PIPE (CONTINUED)

2. JOINTS AND CONNECTIONS TO ANTI-SEEP COLLARS SHALL BE COMPLETELY WATER TIGHT.

3. BEDDING - THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH. WHERE ROCK OR SOFT SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE DRAWINGS.

VII. DRAINAGE DIAPHRAGMS

WHEN A DRAINAGE DIAPHRAGM IS USED, A REGISTERED PROFESSIONAL ENGINEER WILL SUPERVISE THE DESIGN AND CONSTRUCTION INSPECTION.

VIII. CONCRETE STRUCTURES

A. CONCRETE SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 414, MIX NO. 3.

B. REINFORCEMENT - REINFORCEMENT SHALL MEET THE MINIMUM REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 416 (REINFORCEMENT FOR CONCRETE STRUCTURES); SECTION 908 (REINFORCING STEEL - GRADE 60, WIRE ROPE AND WIRE FABRIC), AND SECTION 909.02 (STEEL FOR MISCELLANEOUS USE).

IX. ROCK RIPRAP

ROCK RIPRAP SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 311. GEOTEXTILE SHALL BE PLACED UNDER ALL RIPRAP AND SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 921.09, CLASS C.

X. CARE OF WATER DURING CONSTRUCTION

ALL WORK ON PERMANENT STRUCTURES SHALL BE CARRIED OUT IN AREAS FREE FROM WATER. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL TEMPORARY DIKES, LEVEES, COFFERDAMS, DRAINAGE CHANNELS, AND STREAM DIVERSIONS NECESSARY TO PROTECT THE AREAS TO BE OCCUPIED BY THE PERMANENT WORKS. THE CONTRACTOR SHALL ALSO FURNISH, INSTALL, OPERATE, AND MAINTAIN ALL NECESSARY PUMPING AND OTHER EQUIPMENT REQUIRED FOR REMOVAL OF WATER FROM VARIOUS PARTS OF THE WORK AND FOR MAINTAINING THE EXCAVATIONS, FOUNDATION, AND OTHER PARTS OF THE WORK FREE FROM WATER AS REQUIRED OR DIRECTED BY THE ENGINEER FOR CONSTRUCTING EACH PART OF THE WORK. AFTER HAVING SERVED THEIR PURPOSE, ALL TEMPORARY PROTECTIVE WORKS SHALL BE REMOVED OR LEVELED AND GRADED TO THE EXTENT REQUIRED TO PREVENT OBSTRUCTION IN ANY DEGREE. WHATSOEVER OF THE FLOW OF WATER TO THE SPILLWAY OR OUTLET WORKS AND SO AS NOT TO INTERFERE IN ANY WAY WITH THE OPERATION OR MAINTENANCE OF THE STRUCTURE. STREAM DIVERSIONS SHALL BE MAINTAINED UNTIL THE FULL FLOW CAN BE PASSED THROUGH THE PERMANENT WORKS. THE REMOVAL OF WATER FROM THE REQUIRED EXCAVATION AND THE FOUNDATION SHALL BE ACCOMPLISHED IN A MANNER AND TO THE EXTENT THAT WILL MAINTAIN STABILITY OF THE EXCAVATED SLOPES AND BOTTOM REQUIRED EXCAVATIONS AND WILL ALLOW SATISFACTORY PERFORMANCE OF ALL CONSTRUCTION OPERATIONS. DURING THE PLACING AND COMPACTING OF MATERIAL IN REQUIRED EXCAVATIONS, THE WATER LEVEL AT THE LOCATIONS BEING REFILLED SHALL BE MAINTAINED BELOW THE BOTTOM OF THE EXCAVATION AT SUCH LOCATIONS WHICH MAY REQUIRE DRAINING THE WATER SUMPS FROM WHICH THE WATER SHALL BE PUMPED.

XI. STABILIZATION

ALL BORROW AREAS SHALL BE GRADED TO PROVIDE PROPER DRAINAGE AND LEFT IN A SLIGHTLY CONDITION. ALL EXPOSED SURFACES OF THE EMBANKMENT, SPILLWAY, SPOIL AND BORROW AREAS, AND BERMS SHALL BE STABILIZED BY SEEDING, LIMING, FERTILIZING AND MULCHING IN ACCORDANCE WITH THE NATURAL RESOURCES CONSERVATION SERVICE STANDARDS AND SPECIFICATIONS FOR CRITICAL AREA PLANTING (MD-342) OR AS SHOWN ON THE ACCOMPANYING DRAWINGS.

A. SOD

1. SPECIFICATIONS - SOD SHALL BE "K-31" TALL FESCUE OR KENTUCKY BLUEGRASS/RED FESCUE MIXTURE OR APPROVED EQUAL CLASS OF TURFGRASS SOD SHALL BE MARYLAND OR VIRGINIA STATE CERTIFIED OR APPROVED SOD.

2. SITE PREPARATION - WHERE SOIL IS ACIDIC OR COMPOSED OF HEAVY CLAYS, GROUND LIMESTONE SHALL BE SPREAD AT THE RATE OF 100 LBS./1000 SQ.FT. IN ALL SOILS 5-10-5 FERTILIZER OR APPROVED EQUAL SHALL BE APPLIED AT THE RATE OF 30 LBS./1000 SQ.FT. FERTILIZER SHALL BE UNIFORMLY APPLIED AND MIXED INTO THE TOP 3" OF SOIL WITH THE REQUIRED LIME. SLOW RELEASE NITROGEN AT THE RATE OF 3.5 LBS./1000 SQ. FT. SHALL BE APPLIED TO THE PREPARED SOIL IMMEDIATELY PRIOR TO SOD INSTALLATION. THIS MATERIAL SHALL BE APPROXIMATELY ONE-THIRD IMMEDIATELY AVAILABLE AND TWO-THIRDS WATER INSOLUBLE NITROGEN. UREA FORMALDEHYDE (UF) AND ISOBUTYLDIENE (IBDU) MEETS THESE STANDARDS.

3. SOD INSTALLATION - THE FIRST ROW OF SOD SHALL BE LAID IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACE PARALLEL TO AND TIGHTLY WEDGED AGAINST EACH OTHER. LATERAL JOINTS SHALL BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. JOINTS SHALL BE CUTTED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE AIR DRYING OF THE ROOTS. ON SLOPING AREAS WHERE EROSION MAY BE A PROBLEM, SOD SHALL BE LAID WITH LONG EDGES PARALLEL TO THE CONTOUR AND WITH STAGGERED JOINTS. SECURE THE SOD BY TAMPING AND PRECING OR OTHER APPROVED METHODS. AS SEEDING IS COMPLETED IN ANY ONE SECTION, THE ENTIRE AREA SHALL BE ROLLED OR TAMPED TO INSURE SOLID CONTACT OF ROOTS WITH THE SOIL SURFACE. SOD SHALL BE WATERED IMMEDIATELY AFTER ROLLING OR TAMPING UNTIL THE UNDERSIDE OF THE NEW SOD PAD AND SOLID SURFACE BELOW THE SOD ARE THOROUGHLY WET. THE OPERATION OF LAYING, TAMPING AND IRRIGATING FOR ANY PIECE OF SOD SHALL BE COMPLETED WITHIN EIGHT HOURS.

B. PERMANENT SEEDING

ALL DISTURBED AREAS SHALL BE STABILIZED AS FOLLOWS:

1. SEEDBED PREPARATION - LOOSEN UPPER 3 INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING.

2. SOIL AMENDMENTS - APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS./1000 SQ. FT.), 600 LBS. PER ACRE 10-10-10 FERTILIZER (14 LBS./1000 SQ. FT.) AND 400 LBS. PER ACRE OF 30-0-0 UREAFORM FERTILIZER (92 LBS./1000 SQ. FT.) HARROW OR DISC LIME AND FERTILIZER INTO UPPER THREE INCHES OF SOIL. AT TIME OF SEEDING, APPLY 400 LBS PER ACRE (92 LBS./1000 SQ. FT.) OF 30-0-0 UREAFORM FERTILIZER AND 500 LBS. PER ACRE (111.5 LBS./1000 SQ. FT.) OF 10-10-10 FERTILIZER.

3. SEEDING - FOR THE PERIOD MARCH 1 THROUGH APRIL 30 SEED WITH 40 LBS. PER ACRE KENTUCKY 31 TALL FESCUE AND 15 LBS. PER ACRE INOCULATED CROWNVECH. FOR THE PERIOD MAY 1 THROUGH JULY 31 SEED WITH 60 LBS. PER ACRE KENTUCKY 31 TALL FESCUE AND 2 LBS. PER ACRE INOCULATED WEEPING LOVEGRASS. FOR THE PERIOD OF AUGUST 1 THROUGH OCTOBER 15 SEED WITH 40 LBS. PER ACRE KENTUCKY 31 TALL FESCUE AND 20 LBS. PER ACRE INOCULATED INTERSECT SERICEA (ESPEDEZA) DURING THE PERIOD OF OCTOBER 16 THROUGH FEBRUARY 28, PROTECT SITE BY: OPTION (1) - 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING. OPTION (2) - USE SOD. OPTION (3) - SEED WITH 60 LBS. PER ACRE KENTUCKY 31 TALL FESCUE AND MULCH WITH 348 GALLONS PER ACRE OF WEEPING LOVEGRASS FOR THE PERIOD OF MAY 1 THROUGH FEBRUARY 28, INOCULATED CROWNVECH SHALL BE APPLIED DURING THE SUBSEQUENT PERIOD OF MARCH 1 THROUGH APRIL 30 AT THE RATE OF 15 LBS. PER ACRE.

4. MULCHING - APPLY 1.5 TO 2 TONS PER ACRE OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING 218 GALLONS PER ACRE OF EMULSIFIED ASPHALT ON FLAT AREAS, ON SLOPE 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE FOR ANCHORING.

5. MAINTENANCE - INSPECT ALL SEEDED AREAS AND MAKE NEEDED REPAIRS, REPLACEMENTS AND RESEEDING.

C. TEMPORARY SEEDING

1. SEEDBED PREPARATION - LOOSEN UPPER 3 INCHES OF SOIL BY DISCING, RAKING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING.

2. SOIL AMENDMENTS - APPLY 600 LBS. PER ACRE OF 10-10-10 FERTILIZER, WHERE SOIL IS ACIDIC OR COMPOSED OF HEAVY CLAYS, GROUND LIMESTONE SHALL BE APPLIED AT THE RATE OF 2 TONS PER ACRE (92 LBS./1000 SQ.FT.).

3. SEEDING - FOR PERIODS MARCH 1 THROUGH APRIL 30, AND FROM AUGUST 15 THROUGH NOVEMBER 15, SEED WITH 2.5 BUSHELS PER ACRE ANNUAL WHEAT. FROM APRIL 31 THROUGH AUGUST 14, SEED WITH 3 LBS. PER ACRE OF WEEPING LOVEGRASS. FOR THE PERIOD NOVEMBER 16 THROUGH FEBRUARY 28, PROTECT SITE BY APPLYING 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING OR USE SOD.

4. MULCHING - SAME AS PERMANENT SEEDING.

X. EROSION AND SEDIMENT CONTROL

CONSTRUCTION OPERATIONS WILL BE CARRIED OUT IN SUCH A MANNER THAT EROSION WILL BE CONTROLLED AND WATER AND SEDIMENT CONTROL MEASURES, STATE AND LOCAL LAWS CONCERNING POLLUTION ABATEMENT WILL BE FOLLOWED. CONSTRUCTION PLANS SHALL DETAIL EROSION AND SEDIMENT CONTROL MEASURES.

XI. FENCING

FENCING SHALL BE 42" HIGH CHAIN LINK FENCE CONSTRUCTED IN ACCORDANCE WITH THE LATEST MARYLAND STATE HIGHWAY ADMINISTRATION STANDARD DETAILS 615.02 AND 615.03. THE SPECIFICATIONS FOR A 6" X 6" FENCE SHALL BE USED. SUBSTITUTING 42" FABRIC AND 6" X 8" LINE POSTS. GATE SHALL BE CONSTRUCTED IN ACCORDANCE WITH STATE HIGHWAY ADMINISTRATION STANDARD DETAIL 692.01 WITH 42" FABRIC. FABRIC FOR FENCE AND GATE SHALL CONFORM TO ASHTO DESIGNATION M8L74. DARK VINYL COATING IS REQUIRED FOR THE FENCE. POSTS AND WIRE FABRIC IN ACCORDANCE WITH THE LANDFILL PERMANENT ADOPTED BY RESOLUTION 56-90, OCTOBER 1, 1990.

XII. FILTER CLOTH

1. FILTER CLOTH TO BE MIRAFI 140N OR APPROVED EQUAL.

XIII. GABIONS

1. GABIONS TO BE PVC COATED. SEE HOWARD COUNTY STANDARD SPECIFICATIONS AND DETAILS.

2. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 5 WORKING DAYS PRIOR TO STARTING ANY WORK SHOWN ON THESE PLANS SO THAT STORMWATER MANAGEMENT POND MAY BE INSPECTED DURING CONSTRUCTION.

XIV. REFERENCES

- UNLESS OTHERWISE NOTED, ALL MATERIALS AND CONSTRUCTION PRACTICES SHALL CONFORM TO THE FOLLOWING:
- "STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION" OF THE HOWARD COUNTY, MARYLAND, DEPARTMENT OF PUBLIC WORKS, AS AMENDED.
 - "STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS", 1993, OF THE MARYLAND STATE HIGHWAY ADMINISTRATION, AS AMENDED.
 - "STANDARD AND SPECIFICATIONS FOR PONDS" OF THE SOIL CONSERVATION SERVICE OF MARYLAND (MD-378), JANUARY 2000 AND AS AMENDED.
 - "REVISED STORMWATER MANAGEMENT POLICY," REVISED SEPTEMBER 11, 1984, HOWARD COUNTY MARYLAND.

OPERATION, MAINTENANCE AND INSPECTION

INSPECTION OF THE POND(S) SHOWN HEREON SHALL BE PERFORMED AT LEAST ANNUALLY, IN ACCORDANCE WITH THE CHECKLIST AND REQUIREMENTS CONTAINED WITHIN USDA SCS "STANDARDS AND SPECIFICATIONS FOR PONDS" (MD-378) AND THE LATEST EDITIONS OF THE SCS "STANDARDS AND SPECIFICATIONS FOR PONDS". THE SUCCESSORS OWNERS AND THEIR SUCCESSORS 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 INDICATIONS OF DISTRESS SUCH AS EXCESSIVE SEEPAGE, TURBID SEEPAGE, SLIDING OR SLUMPING.

STRUCTURAL NOTES

- BUILDING CODES
 - ALL CONSTRUCTION SHALL CONFORM WITH THE 2000 INTERNATIONAL BUILDING CODE AND ALL SUBSEQUENT SUPPLEMENTS.
 - IN ADDITION, ALL CONSTRUCTION SHALL CONFORM WITH THE GOVERNING LOCAL BUILDING CODE.
- DESIGN LOADS
 - A MINIMUM DESIGN DEAD LOADING FOR ALL FRAMING IS BASED ON THE CONSTRUCTION MATERIALS SHOWN ON THE DRAWINGS AND INDICATED IN THE SPECIFICATIONS.
- MISCELLANEOUS
 - THE CONTRACTOR SHALL REVIEW CIVIL DRAWINGS PREPARED BY MORRIS & RITCHEY, INC., DATED 7/20/04 FOR LOCATION AND DIMENSION OF CHASES, INSERTS, OPENINGS, SLEEVES, DEPRESSIONS AND OTHER PRODUCT REQUIREMENTS WHICH IMPACT THE STRUCTURAL COMPONENTS.
 - THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS SHOWN ON THE CONTRACT DRAWINGS BEFORE PROCEEDING WITH CONSTRUCTION. ALL DISCREPANCIES AND OMISSIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.
 - THE CONTRACTOR SHALL NOT SUBMIT REPRODUCTIONS OF THE STRUCTURAL CONTRACT DOCUMENTS AS SHOP DRAWINGS.
 - SCALES SHOWN ON THE STRUCTURAL CONTRACT DRAWINGS ARE FOR GENERAL INFORMATION ONLY. DIMENSIONAL INFORMATION SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS.
- FOUNDATION
 - ALL FOUNDATIONS HAVE BEEN DESIGNED FOR AN ASSUMED NET ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF. THE ALLOWABLE SOIL BEARING PRESSURE SHALL BE FIELD VERIFIED BY A REGISTERED GEOTECHNICAL ENGINEER AND APPROVED PRIOR TO PLACING FOUNDATIONS. SHOULD THE ACTUAL SOIL BEARING PRESSURE BE LESS THAN 2500 PSF, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER.
 - ALL FILL PLACED UNDER FOUNDATIONS SHALL BE COMPACTED TO A DRY DENSITY OF AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 698.
 - ALL EXCAVATION AND BACKFILLING OPERATIONS WITHIN THE BUILDING BUILDING FOOTPRINT, INCLUDING ALL COMPACTION TESTS AND INSPECTIONS, SHALL BE DONE UNDER THE DIRECTION AND SUPERVISION OF A REGISTERED GEOTECHNICAL ENGINEER. CONTRACTOR SHALL BACKFILL AROUND PERIMETER OF RISER AT AN EVEN RATE SO AS NOT TO CAUSE AN OVERTURNING MOMENT.
 - THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ALL FOUNDATION AND SOIL CONDITIONS WHICH DIFFER FROM THOSE ANTICIPATED OR INDICATED IN THE CONTRACT DOCUMENTS.
 - ALL EXISTING SOIL CONTAINING GRAVEL, CONSTRUCTION OR DEMOLITION DEBRIS, ORGANIC SUBSTANCES, OR OTHER FOREIGN OBJECTS SHALL BE REMOVED FROM THE REGION WITHIN THE FOOTPRINT OF THE STRUCTURE.
 - ALL CONCRETE MIX DESIGNS, INCLUDING CEMENT CONTENT, WATER CEMENT RATIO, FINE AND COARSE AGGREGATE CONTENT AND ALL ADMIXTURES, SHALL BE IN ACCORDANCE WITH THE FOLLOWING:
 - ALL CONCRETE CONSTRUCTION SHALL CONFORM TO THE "SPECIFICATIONS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES (ACI 308)"; AND TO THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318).
 - IN ADDITION TO THE ABOVE, ALL CONCRETE WORK SHALL CONFORM TO THE FOLLOWING:
 - RECOMMENDED PRACTICE FOR HOT WEATHER CONCRETING (ACI 305).
 - RECOMMENDED PRACTICE FOR COLD WEATHER CONCRETING (ACI 306).
 - RECOMMENDED PRACTICE FOR CONCRETE FORMWORK (ACI 347).
 - ALL CONCRETE, UNLESS NOTED OTHERWISE, SHALL BE STONE AGGREGATE CONCRETE HAVING A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI. ALL CONCRETE EXPOSED TO WEATHER SHALL BE 4" ± 1% NO ADMIXTURES HAVE AN AIR ENTRAINMENT OF 6 CONTAINING CALCIUM CHLORIDE SHALL BE PERMITTED. MAXIMUM AGGREGATE SIZE SHALL BE 3/4", WATER/CEMENT RATIO SHALL BE 0.45, MAXIMUM SLUMP SHALL BE 4", 3" FOR SLABS ON GRADE. ALL CONCRETE, EXCEPT FOOTINGS, SHALL CONTAIN A WATER REDUCING ADMIXTURE. PORTLAND CEMENT SHALL CONFORM TO ASTM C 150 AND NORMAL WEIGHT AGGREGATES SHALL CONFORM TO ASTM C 33.
 - ALL REINFORCING BARS SHALL BE NEW BILLET STEEL CONFORMING TO ASTM A 615 GRADE 60. ALL WELDED WIRE FABRIC (W.W.F.) SHALL CONFORM TO ASTM A 185. LAP ALL REINFORCING BARS A MINIMUM OF 48 BAR DIAMETERS AND ALL W.W.F. A MINIMUM OF TWO FULL GRIDS, UNLESS OTHERWISE INDICATED.
 - ALL REINFORCING SHALL BE DETAILED, FABRICATED AND PLACED IN ACCORDANCE WITH THE CRS "MANUAL OF STANDARD PRACTICE", ACI 315" DETAILS AND DETAILING OF CONCRETE REINFORCEMENT", ACI SP 66 "DETAILING MANUAL".
 - ALL CONCRETE MIX DESIGNS, INCLUDING CEMENT CONTENT, WATER CEMENT RATIO, FINE AND COARSE AGGREGATE CONTENT AND ALL ADMIXTURES, SHALL BE REVIEWED BY ENGINEER PRIOR TO PLACING FIRST CONCRETE.
 - ALL CONCRETE SHALL BE SAMPLED AND TESTED BY THE TESTING AGENCY. THE CONTRACTOR SHALL NOTIFY THE TESTING AGENCY 48 HOURS PRIOR TO THE PLACING OF ANY CONCRETE.
 - GROUND BLAST FURNACE SLAG MAY BE USED TO REPLACE UP TO 50 PERCENT OF THE PORTLAND CEMENT IN A CONCRETE MIX, AND FLY ASH OR POZZOLAN MAY BE USED TO REPLACE UP TO 25 PERCENT OF PORTLAND CEMENT, SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER AND SHALL CONFORM TO ASTM C 898.
 - MINIMUM COVER FOR ALL REINFORCING SHALL BE AS FOLLOWS UNLESS OTHERWISE INDICATED:
 - FOUNDATIONS: 2 INCHES
 - WALLS: 2 INCHES
 - THE GENERAL CONTRACTOR SHALL SUBMIT PLANS SHOWING ALL PENETRATIONS THROUGH THE FRAMED CONCRETE SLABS. THE OPENINGS SHALL BE ACCURATELY LOCATED AND DIMENSIONED.
 - RETAINING WALLS
 - RISER WALLS HAVE BEEN DESIGNED WITH BACKFILL MATERIAL HAVING THE FOLLOWING CHARACTERISTICS:

G _{max}	= 130.0 PCF
K _p	= 0.40
K _q	= 2.25
 - RISER HAS BEEN DESIGNED FOR THE FOLLOWING MINIMUM FACTORS OF SAFETY:

OVERTURNING	2.0
SLIDING	2.0
BOWING	1.2
 - ALL RISER WALLS SHALL BE BRACED AND SHORED AS REQUIRED DURING BACKFILLING. BOTH SUPPORTING ELEMENTS SHALL BE IN PLACE AND DEVELOPING FULL REQUIRED STRENGTH PRIOR TO BACK FILLING OF WALLS SUPPORTED AT TOP AND BOTTOM.

CONSTRUCTION INSPECTION SCHEDULE

DETENTION AND RETENTION STRUCTURES

- INSPECTIONS SHALL BE CONDUCTED BY THE AS-BUILT CERTIFYING ENGINEER:
- UPON THE COMPLETION OF EXCAVATION TO SUB-FOUNDATION AND WHEN REQUIRED, AND UPON THE INSTALLATION OF STRUCTURAL SUPPORTS OR REINFORCEMENT FOR STRUCTURES, INCLUDING BUT NOT LIMITED TO:
 - CORE TRENCHES FOR STRUCTURAL EMBANKMENT.
 - INLET OR OUTLET STRUCTURES AND ANTI-SEEP STRUCTURES.
 - WATER-TIGHT CONNECTIONS ON PIPES.
 - TRENCHES FOR ENCLOSED STORM DRAIN FACILITIES.
 - UTILITY CROSSINGS OF EMBANKMENT.
 - DURING THE PLACEMENT OF STRUCTURAL FILL AND CONCRETE, AND INSTALLATION OF PIPING AND CATCH BASINS.
 - DURING BACKFILL OF FOUNDATIONS AND TRENCHES.
 - DURING EMBANKMENT CONSTRUCTION.
 - UPON COMPLETION OF FINAL GRADING AND ESTABLISHMENT OF PERMANENT STABILIZATION.

MAINTENANCE & REPAIR SCHEDULE

MAINTENANCE AND REPAIR SHALL BE CONDUCTED IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REQUIREMENTS. IN GENERAL, THE PRACTICES CONTAINED IN THE "MAINTENANCE AND REPAIR" CHAPTER OF THE "MARYLAND DAM SAFETY MANUAL", DNR-WRA 1988, SHOULD BE FOLLOWED AND CONDUCTED UNDER THE SUPERVISION OF A QUALIFIED PROFESSIONAL ENGINEER FAMILIAR WITH DAM CONSTRUCTION, OPERATION, MAINTENANCE, AND REPAIR. IN ADDITION, THE MD-378 DAM INSPECTION CHECKLIST MAY BE USED AS A GUIDE FOR MAINTENANCE AND INSPECTION. AT A MINIMUM, THE STORMWATER MANAGEMENT FACILITY SHALL BE INSPECTED BI-ANNUALLY FOR THE FOLLOWING ITEMS.

- CONDITION OF EMBANKMENT
- CONDITION OF VEGETATIVE COVER
- CONDITION OF FENCES AND MAINTENANCE ACCESS ROAD.
- CONDITION OF POND RESERVOIR STORAGE AREAS.
- CONDITION OF POND RESERVOIR STORAGE AREA.

GEOTECHNICAL NOTES & RECOMMENDATIONS

- PER MD-378 SPECIFICATIONS, SOILS USED FOR CUTOFF TRENCH CONSTRUCTION SHALL MEET USCS CLASSIFICATION CL (LOW PLASTICITY CLAY), CH (HIGH PLASTICITY CLAY), SC (CLAYEY SAND), OR GC (CLAYEY GRAVEL).
- MATERIALS USED FOR BACKFILL OF PIPE OUTFALL SHOULD BE SIMILAR TO THOSE USED FOR THE CUTOFF TRENCH.
- ALTHOUGH SUBSURFACE EXPLORATIONS INDICATE THAT NO SUITABLE CUTOFF TRENCH MATERIAL EXISTS ON SITE, TEST PIT EXPLORATION MAY BE PERFORMED

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The preliminary finished floor elevation of the proposed Processing Area Building and Storage Bay is 318.5 feet above MSL. Based upon the aforementioned plan, cuts up to 11 feet and fills up to 13 feet will be required to establish final grades in the area of the building. Cuts up to 10 feet will be required to establish final grades in the roadway and cut up to 6 feet and fill up to 2 feet will be required to establish final grades for the SWM ponds. The current grading scheme includes 20:1-V cut and fill slopes on the order of 10 and 20 feet height, respectively. The cut slopes are proposed in the southwest portion of the site. The fill slopes are proposed in the eastern and northern portion of the site. GTA understands that MRA is considering flattening the cut and fill slopes to 3H:1V to enhance stability of the slopes.

SITE GEOLOGY

The *Geologic Map of Maryland* (1998) and the *Geologic Map of Howard County* (1993) were reviewed to identify site geology. The site is situated in the Eastern Piedmont Physiographic Province. The Piedmont is characterized by metamorphic or igneous rock formations. Typical Piedmont rocks weather into a saprolite of variable thickness, underlain by less weathered and thus relatively sound rock. More specifically, the site is mapped within the Skyville Formation of the Liberty Complex, near the contact of the Oella Formation. The Skyville Formation is composed predominantly of fine to medium grained, light to medium gray, locally garniferous, muscovite-biotite-plagioclase-quartz gneiss and fels, which can be deceptively granitic-like in appearance. This formation can extend to depths of 5,500 feet or more. Quartz veins generally weather at a slower rate, and may be encountered as boulders "floating" within more weathered materials. Please see the referenced geologic publications for more details.

SUBSURFACE EXPLORATION

The field exploration consisted of drilling 16 Standard Penetration Test (SPT) borings, designated as B-1 through B-5, R-1 through R-3, and SWM-1 through SWM-6, in the areas of proposed development. The test borings were drilled during May 28 through June 2, 2004, to depths of approximately 15 to 30 feet below the existing ground surface, by using an ATV-mounted CME-550 drill rig. Borings were drilled in the proposed building, roadway, and the SWM areas. The borings were staked by MRA. The approximate location of the borings is

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indicated on Figure No. 2, *Exploration Location Plan*, included in Appendix A. Elevations indicated on the boring logs were provided by MRA based on an instrumented survey.

Standard Penetration Testing was performed in the borings, with soil sampler obtained at approximately 2 1/4 foot intervals in the upper 10 feet and then at 5-foot intervals thereafter. Standard Penetration Testing involves driving a 2-inch O.D., 1 1/8 inch I.D. split-spoon sampler with a 140-pound hammer free-falling 30 inches. The SPT-N-value, given as blows per foot (BPF), is defined as the total number of blows required to drive the sampler 6 to 18 inches. Samples retrieved from the borings were returned to GTA's laboratory for visual classification by laboratory personnel and limited laboratory testing. Descriptions as provided on the logs are visual, supplemented by available laboratory test results.

In-situ borhole infiltration testing was performed at test locations SWM-1, SWM-4, and SWM-6, at a depth ranging from 5 to 8 feet below existing surface grade. The infiltration test consists of measuring the drop in water level within a solid 5-inch PVC pipe for a period of 4 hours subsequent to a 24-hour pre-soak. The PVC pipe was set in a hole drilled within five feet of the referenced boring location.

SUBSURFACE CONDITIONS

The borings confirmed the underlying geologic formation as the Skyville Formation. Topsoil was encountered at 15 of the 16 boring locations and ranged from 2 to 5 inches in thickness. A two foot thick surficial layer of black organic silt soil was encountered in Boring B-1. Underlying the surficial topsoil layer, the test borings typically encountered residual soils predominantly micaceous, and sand, with varying amounts of clay and rock fragments. Clay contents were generally higher in the near surface soils and the soils were more granular and coarser with depth. Refer to the boring logs included in Appendix B for detailed information.

The soils encountered in the upper levels of the test borings were predominantly fine-grained silts and clays, with varying percentages of sand and rock fragments. These soils were visually classified as USCS Sandy Silt (ML), Sandy Clay (CL), Clayey Sand (SC), and Silt

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Sand (SM). Below the near-surface soils, the test borings encountered predominantly coarse-grained materials classified as USCS Silty Sand (SM), Poorly Graded Sand (SP), and locally Poorly Graded Gravel (GP).

SPT-N-values for the granular materials ranged from 2 to 50/3 blows per foot (BPF). The lower N-values were generally observed in plastic soils indicating soft consistency. The observed N-values indicate that the density of the native soils varies significantly with depth and across the site. Relatively dense and very dense are present in matrix of loose to medium dense soils. The difference in the observed density of the soils is likely due to differential weathering and mineral composition of the soil layers. Auger refusal was not encountered in any of the explorations.

Based on information provided by JHU personnel, GTA understands that organic materials (tree stumps, leaves, etc.) and asphalt millings have been deposited in the western portion of the site. The fill materials may be as deep as 25 feet or more. GTA did not encounter such materials in the borings. The presence of organic materials within the fill soils of the subject property represents a potential to generate methane and other gases, which are commonly referred to as landfill gas (LFG). Methane and other LFGs are generally associated with bacteriological decomposition or volatilization of organic waste or compounds. In fill materials, methane gas may be generated by the anaerobic decomposition of buried organic materials and may accumulate in the void spaces of the soil and fill materials. When generated, methane and other LFGs can then migrate through the subsurface. The presence and accumulation of methane gas within the improvements (including buildings, basements, footing excavations, utility trenches, etc.) can represent an explosion hazard. A field exploration and monitoring program is recommended to assess the presence and levels of methane and other landfill gases. Further research and evaluation is also needed to establish the limits of the fill area and to assess its implications for the proposed construction. Depending upon the finalized site development plans and available information, additional explorations may be required to verify the limits of the existing fill.

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Groundwater was observed during drilling in Test Boring SWM-6 at a depth of 12.5 feet below the existing ground surface. Groundwater was not encountered in the remaining borings during drilling or to cave in depths 24-hours after completion of the borings. The bore hole cave-in depths ranged from 6.5 to 17 feet. Groundwater levels can be expected to fluctuate significantly with seasonal changes and perched or trapped groundwater may be encountered at shallower depths, especially within granular soils overlying less permeable soils and/or dense weathered/unweathered rock.

LABORATORY TESTING

Selected samples obtained from the borings were tested for grain-size analysis, Atterberg Limits, moisture-density relationships, and natural moisture contents. Selected samples were tested for natural (in-situ) moisture content. The natural moisture content of the tested samples ranged from 4.0 to 45.0 percent. Moisture content of the near surface and clayey soils were generally high and generally low for denser and coarser granular soils. The moisture content of the tested samples was predominantly in the range of 11 to 25 percent.

The grain-size analysis and Atterberg Limits testing was performed to determine the Unified Soil Classification System (USCS) designation for the soil. USCS classifications provide information regarding soil behavior beneath pavement and foundation systems. The results of testing are as follows:

SUMMARY OF LABORATORY TESTING

BORING NO.	DEPTH (ft)	USCS CLASSIFICATION	LL %	PI %
B-1	13.5-15.0	Silty Sand (SM)	NP	NP
B-4	8.5-10.0	Silty Sand (SM)	NP	NP
R-1	13-30.0	Silty Sand (SM)	NP	NP
SWM-1	8.5-15.0	Silty Sand (SM)	NP	NP
SWM-6	5.0-5.5	Silty Sand (SM)	NP	NP

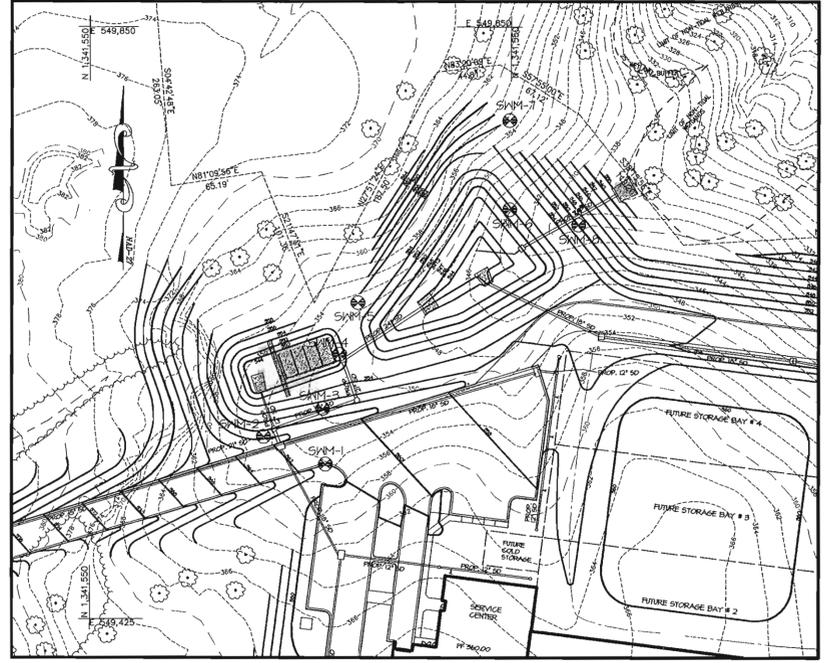
Note: LL = Liquid Limit, PI = Plastic Limit, NP = Non-plastic

Two bulk, near-surface samples, obtained from Boring R-1 and Boring SWM-3, were tested for moisture-density relationships in accordance. The test results are summarized below.

SUMMARY OF MOISTURE-DENSITY DATA

Boring No.	Depth (ft)	Test Method	Maximum Dry Density (pcf)	Optimum Moisture (%)	Natural Moisture (%)
R-1	1 to 6	Moisture Density (MD)	123.7	11.0	14.5
SWM-3	1 to 6	Standard Proctor (SP)	113.7	14.5	16.7

A California Bearing Ratio (CBR) test was performed upon the bulk sample of USCS SM soil from Boring R-1, 1 to 6 feet depth. The CBR is used in evaluating the suitability of soils for roadway support. Results of this testing indicate that a CBR value of 6.2 to 95 percent of the Modified Proctor (ASTM D-1557) may be assigned to the soils present at this location. Refer to the laboratory data sheets included in Appendix C for more details.



SOIL BORING LOCATION PLAN
SCALE: 1" = 60'

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Material Requirements

GTA understands that Maryland Specification 378 (MD 378) governs design and construction of the good facilities. MD 378 specifies that soils for use in cutoff trench construction meet USCS Classification CL (low plasticity clay), CH (high plasticity clay), SC (clayey sand), or GC (clayey gravel). Furthermore, GTA recommends that similar materials be used for backfill adjacent to the outfall structure. The use of the fine-grained plastic material adjacent to the pipe should decrease the potential for embankment failure induced by "piping" erosion processes. Use of a filter diaphragm should be considered in lieu of anti-seepage collars.

GTA's exploration identified soils generally classified as USCS SM, SC, CL and SP-GP. Based on the boring data, materials suitable for cutoff trench construction will not likely be available from on-site sources. Therefore, borrow of suitable clay materials from off-site will likely be required for cutoff trench construction. Off-site borrow sources meeting the required classifications should be identified prior to mass grading. All cover trench material should meet the classifications required by MD 378, and be approved by GTA prior to placement as fill.

MD 378 specifies that all of the referenced soil classifications suitable for cutoff trench construction are also suitable for embankment construction. The native USCS SM and SC soils present in the majority of borings are also deemed suitable, and should be readily available on site. GTA recommends that the most plastic native materials available be used for embankment construction. GTA should evaluate embankment soils during the pond construction phase.

Basin Excavation and Embankment Construction

Excavation to achieve the proposed basin bottom elevations will be required for both the SWM facilities. Based on boring data, standard stripping techniques should be suitable for excavation of the proposed ponds. If localized rock is encountered, ripping, jacking, or other mechanical means may be required to expose basin or outfall inverts. Those means are not anticipated to be required on a widespread basis. Groundwater was observed only in Boring SWM-6 located in the proposed extended detention basin at a depth of 12.5 feet. Groundwater is not expected to be a significant concern for the construction of the proposed SWM facilities. However, perched groundwater may be encountered locally and may require dewatering.

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Subsurface Utilities

The natural soils are considered suitable for support of below grade utilities. Based upon the results of the borings, GTA anticipates that the excavations may be accomplished using standard utility construction equipment throughout the majority of the site. However, localized zones of very dense weathered/unweathered rock may be encountered. Such materials will require increased excavation. Due to the potential for collapse of unsupported excavation in granular soils, the utility contractor should be prepared to provide adequate earth support systems during utility construction. Dewatering through the use of "bump and pump" techniques may be required in some areas, especially if utility installation occurs during the wet season.

Composition of the soils to the degree specified in the *Site Overlay* section of this report may require that the soils be moisture conditioned prior to placement and compaction within the trench. If the excavated materials are wet of the optimum moisture content, they should be spread in thin layers and aerated by discing to within 2 to 4 percentage points of the optimum moisture. If soils are not dried, suitable borrow material will need to be imported from other areas of the site for utility trench backfill. Settlement and instability are likely if the on-site soils are used as backfill at moisture levels more than 4 percentage points above optimum.

Surface and Subsurface Drainage

Final grades should be carefully established to provide adequate surface drainage away from the foundations. A minimum grade of 3 percent in lawn and landscape areas is recommended to direct surface waters from proposed construction.

Based on the soil borings, groundwater was encountered only in Boring SWM-6 at a depth of 12.5 feet. Therefore, groundwater is not expected to greatly affect construction. However, there is a potential for perched or trapped groundwater to be encountered in localized portions of the site, particularly within the granular soils underlain by denser materials. In such areas, dewatering may be required to ensure adequate construction.

Stormwater Management

GTA was requested to evaluate the feasibility of infiltration water quality techniques at three of the boring locations. Guidelines adopted by the Maryland Department of Environment (MDE) recommend a vertical buffer of 2 to 4 feet between the infiltration layer and groundwater or rock. In addition, the minimum acceptable average infiltration rate as indicated by the borehole permeability test is 0.5 inch per hour. The following table provides a summary of conditions at each of the locations evaluated.

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Infiltration Techniques

GTA was requested to evaluate the feasibility of infiltration water quality techniques at three of the boring locations. Guidelines adopted by the Maryland Department of Environment (MDE) recommend a vertical buffer of 2 to 4 feet between the infiltration layer and groundwater or rock. In addition, the minimum acceptable average infiltration rate as indicated by the borehole permeability test is 0.5 inch per hour. The following table provides a summary of conditions at each of the locations evaluated.

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INFILTRATION TEST RESULTS

Boring No.	Average Infiltration Rate (in/hr)	Comments
SWM-1	8.3	Infiltration rate greater than 0.5 inches/hour at 8.0 feet. Infiltration techniques are considered suitable.
SWM-4	25.5	Infiltration rate greater than 0.5 inches/hour at 5.0 feet. Infiltration techniques are considered suitable.
SWM-6	8.3	Infiltration rate greater than 0.5 inches/hour at 5.0 feet. Infiltration techniques are considered suitable.

Fills for cutoff trench and embankment construction should be placed in eight-inch loose lifts, and compacted to at least 95 percent of the maximum dry density in accordance with the Standard Proctor, ASTM D-998. Fills around the outfall works should be placed in 4-inch lifts and compacted to the same standard with hand equipment. Based on laboratory analysis, on-site soils are likely to be wet of the optimum moisture for compaction, and moisture conditioning may be required. Compactive effort should be monitored with in-place density testing as performed by a qualified representative under the direction of a professional engineer.

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Proposed slopes should be designed in accordance with MD 378. Prior to the placement of compacted fill or the construction of the outfall cradle and structures, areas supporting proposed embankments and structures should be stripped and grubbed to remove all vegetal and other organic matter. After stripping, the subgrade should be proofrolled as directed by a geotechnical engineer or his qualified representative. Unsuitable soils identified by proofrolling should be removed from subgrade. No fills should be placed or foundations constructed until the subgrade is approved by the geotechnical engineer.

The site will consist of two SWM facilities. A foreray and sand filter are located to the west and an extended detention pond is to be located to the north of the proposed buildings and will be essentially excavated. The extended detention basin will be constructed by excavation the basin and placing fills for embankments. The cuts and fills for the extended detention pond are expected to be up to 10 to 12 feet.

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The relatively high infiltration rates are due to the pervious nature of the granular residual soils. Based on the results of field and laboratory testing, infiltration stormwater management techniques are considered feasible at the locations tested.

Stormwater Management Facilities

The site will consist of two SWM facilities. A foreray and sand filter are located to the west and an extended detention pond is to be located to the north of the proposed buildings and will be essentially excavated. The extended detention basin will be constructed by excavation the basin and placing fills for embankments. The cuts and fills for the extended detention pond are expected to be up to 10 to 12 feet.

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LOG OF BORING NO. SWM-01 **Sheet 1 of 1**

PROJECT: JHU Libraries Services Center
PROJECT NO: 048510
PROJECT LOCATION: Howard County, Maryland
DATE STARTED: May 28, 2004
DATE COMPLETED: May 28, 2004
GEOLOGIST: Planning
CHECKED BY: P. Panfili

DEPTH (ft)	USCS CLASSIFICATION	DESCRIPTION	REMARKS
1.00 to 1.11	SM	Topsoil	
1.11 to 1.22	SM	Brown, moist, very heavy to very dense, micaceous silty clay SAND.	Topsoil 3 in.
1.22 to 1.33	SM	ASHTO: A-4	No water encountered while drilling.
1.33 to 1.44	SM	ASHTO: A-4	
1.44 to 1.55	SM	ASHTO: A-4	
1.55 to 1.66	SM	ASHTO: A-4	
1.66 to 1.77	SM	ASHTO: A-4	
1.77 to 1.88	SM	ASHTO: A-4	
1.88 to 1.99	SM	ASHTO: A-4	
1.99 to 2.10	SM	ASHTO: A-4	
2.10 to 2.21	SM	ASHTO: A-4	
2.21 to 2.32	SM	ASHTO: A-4	
2.32 to 2.43	SM	ASHTO: A-4	
2.43 to 2.54	SM	ASHTO: A-4	
2.54 to 2.65	SM	ASHTO: A-4	
2.65 to 2.76	SM	ASHTO: A-4	
2.76 to 2.87	SM	ASHTO: A-4	
2.87 to 2.98	SM	ASHTO: A-4	
2.98 to 3.09	SM	ASHTO: A-4	
3.09 to 3.20	SM	ASHTO: A-4	
3.20 to 3.31	SM	ASHTO: A-4	
3.31 to 3.42	SM	ASHTO: A-4	
3.42 to 3.53	SM	ASHTO: A-4	
3.53 to 3.64	SM	ASHTO: A-4	
3.64 to 3.75	SM	ASHTO: A-4	
3.75 to 3.86	SM	ASHTO: A-4	
3.86 to 3.97	SM	ASHTO: A-4	
3.97 to 4.08	SM	ASHTO: A-4	
4.08 to 4.19	SM	ASHTO: A-4	
4.19 to 4.30	SM	ASHTO: A-4	
4.30 to 4.41	SM	ASHTO: A-4	
4.41 to 4.52	SM	ASHTO: A-4	
4.52 to 4.63	SM	ASHTO: A-4	
4.63 to 4.74	SM	ASHTO: A-4	
4.74 to 4.85	SM	ASHTO: A-4	
4.85 to 4.96	SM	ASHTO: A-4	
4.96 to 5.07	SM	ASHTO: A-4	
5.07 to 5.18	SM	ASHTO: A-4	
5.18 to 5.29	SM	ASHTO: A-4	
5.29 to 5.40	SM	ASHTO: A-4	
5.40 to 5.51	SM	ASHTO: A-4	
5.51 to 5.62	SM	ASHTO: A-4	
5.62 to 5.73	SM	ASHTO: A-4	
5.73 to 5.84	SM	ASHTO: A-4	
5.84 to 5.95	SM	ASHTO: A-4	
5.95 to 6.06	SM	ASHTO: A-4	
6.06 to 6.17	SM	ASHTO: A-4	
6.17 to 6.28	SM	ASHTO: A-4	
6.28 to 6.39	SM	ASHTO: A-4	
6.39 to 6.50	SM	ASHTO: A-4	
6.50 to 6.61	SM	ASHTO: A-4	
6.61 to 6.72	SM	ASHTO: A-4	
6.72 to 6.83	SM	ASHTO: A-4	
6.83 to 6.94	SM	ASHTO: A-4	
6.94 to 7.05	SM	ASHTO: A-4	
7.05 to 7.16	SM	ASHTO: A-4	
7.16 to 7.27	SM	ASHTO: A-4	
7.27 to 7.38	SM	ASHTO: A-4	
7.38 to 7.49	SM	ASHTO: A-4	
7.49 to 7.60	SM	ASHTO: A-4	
7.60 to 7.71	SM	ASHTO: A-4	
7.71 to 7.82	SM	ASHTO: A-4	
7.82 to 7.93	SM	ASHTO: A-4	
7.93 to 8.04	SM	ASHTO: A-4	
8.04 to 8.15	SM	ASHTO: A-4	
8.15 to 8.26	SM	ASHTO: A-4	
8.26 to 8.37	SM	ASHTO: A-4	
8.37 to 8.48	SM	ASHTO: A-4	
8.48 to 8.59	SM	ASHTO: A-4	
8.59 to 8.70	SM	ASHTO: A-4	
8.70 to 8.81	SM	ASHTO: A-4	
8.81 to 8.92	SM	ASHTO: A-4	
8.92 to 9.03	SM	ASHTO: A-4	
9.03 to 9.14	SM	ASHTO: A-4	
9.14 to 9.25	SM	ASHTO: A-4	
9.25 to 9.36	SM	ASHTO: A-4	
9.36 to 9.47	SM	ASHTO: A-4	
9.47 to 9.58	SM	ASHTO: A-4	
9.58 to 9.69	SM	ASHTO: A-4	
9.69 to 9.80	SM	ASHTO: A-4	
9.80 to 9.91	SM	ASHTO: A-4	
9.91 to 10.02	SM	ASHTO: A-4	
10.02 to 10.13	SM	ASHTO: A-4	
10.13 to 10.24	SM	ASHTO: A-4	
10.24 to 10.35	SM	ASHTO: A-4	
10.35 to 10.46	SM	ASHTO: A-4	
10.46 to 10.57	SM	ASHTO: A-4	
10.57 to 10.68	SM	ASHTO: A-4	
10.68 to 10.79	SM	ASHTO: A-4	
10.79 to 10.90	SM	ASHTO: A-4	
10.90 to 11.01	SM	ASHTO: A-4	
11.01 to 11.12	SM	ASHTO: A-4	
11.12 to 11.23	SM	ASHTO: A-4	
11.23 to 11.34	SM	ASHTO: A-4	
11.34 to 11.45	SM	ASHTO: A-4	
11.45 to 11.56	SM	ASHTO: A-4	
11.56 to 11.67	SM	ASHTO: A-4	
11.67 to 11.78	SM	ASHTO: A-4	
11.78 to 11.89	SM	ASHTO: A-4	
11.89 to 12.00	SM	ASHTO: A-4	
12.00 to 12.11	SM	ASHTO: A-4	
12.11 to 12.22	SM	ASHTO: A-4	
12.22 to 12.33	SM	ASHTO: A-4	
12.33 to 12.44	SM	ASHTO: A-4	
12.44 to 12.55	SM	ASHTO: A-4	
12.55 to 12.66	SM	ASHTO: A-4	
12.66 to 12.77	SM	ASHTO: A-4	
12.77 to 12.88	SM	ASHTO: A-4	
12.88 to 12.99	SM	ASHTO: A-4	
12.99 to 13.10	SM	ASHTO: A-4	
13.10 to 13.21	SM	ASHTO: A-4	
13.21 to 13.32	SM	ASHTO: A-4	
13.32 to 13.43	SM	ASHTO: A-4	
13.43 to 13.54	SM	ASHTO: A-4	
13.54 to 13.65	SM	ASHTO: A-4	
13.65 to 13.76	SM	ASHTO: A-4	
13.76 to 13.87	SM	ASHTO: A-4	
13.87 to 13.98	SM	ASHTO: A-4	
13.98 to 14.09	SM	ASHTO: A-4	
14.09 to 14.20	SM	ASHTO: A-4	
14.20 to 14.31	SM	ASHTO: A-4	
14.31 to 14.42	SM	ASHTO: A-4	
14.42 to 14.53	SM	ASHTO: A-4	
14.53 to 14.64	SM	ASHTO: A-4	
14.64 to 14.75	SM	ASHTO: A-4	
14.75 to 14.86	SM	ASHTO: A-4	
14.86 to 14.97	SM	ASHTO: A-4	
14.97 to 15.08	SM	ASHTO: A-4	
15.08 to 15.19	SM	ASHTO: A-4	
15.19 to 15.30	SM	ASHTO: A-4	
15.30 to 15.41	SM	ASHTO: A-4	
15.41 to 15.52	SM	ASHTO: A-4	
15.52 to 15.63	SM	ASHTO: A-4	
15.63 to 15.74	SM	ASHTO: A-4	
15.74 to 15.85	SM	ASHTO: A-4	
15.85 to 15.96	SM	ASHTO: A-4	
15.96 to 16.07	SM	ASHTO: A-4	
16.07 to 16.18	SM	ASHTO: A-4	

LEGEND

- EX. PROPERTY LINE
- EX. PAVEMENT
- EX. BUILDING
- EX. EASEMENT
- EX. CURB
- EX. STORM DRAIN
- EX. GAS
- EX. SANITARY F.M.
- EX. WATER
- EX. CONDUIT
- EX. WETLAND BUFFER
- EX. STREAM BUFFER
- EX. 2' CONTOUR
- EX. 10' CONTOUR
- PROP. SILT FENCE
- PROP. SUPER SILT FENCE
- PROP. RIP RAP
- PROP. LIMIT OF DISTURBANCE
- PROP. TREE LINE
- PROP. EARTH DIKE

AREAS OF CONCENTRATED FLOW ARE TO BE STABILIZED WITH EROSION CONTROL MATTING (ECM). SEE DETAIL ON ESC DETAIL SHEET.

SEQUENCE OF CONSTRUCTION

- | | | | |
|---|---------|---|----------|
| 1. OBTAIN ALL NECESSARY PERMITS. CONTACT THE HOWARD COUNTY OFFICE OF INSPECTIONS AT LEAST 48 HOURS PRIOR TO BEGINNING ANY WORK. | 1 DAY | 6. BEGIN BUILDING CONSTRUCTION AND RETAINING WALL CONSTRUCTION. | 120 DAYS |
| 2. CLEAR AND GRUB FOR INSTALLATION OF SEDIMENT CONTROLS ONLY. | 5 DAYS | 7. INSTALL PAVING, STORM DRAIN, AND UTILITY SERVICES. | 30 DAYS |
| 3. INSTALL PERIMETER SEDIMENT AND EROSION CONTROL DEVICES BELOW PROPOSED SWM POND/SEDIMENT BASIN. | 5 DAYS | 8. FINAL GRADE SITE AND PROVIDE PERMANENT STABILIZATION. | 15 DAYS |
| 4. INSTALL SWM FACILITY PER SWM PLAN AND DETAILS. MODIFY SWM RISER STRUCTURE PER DETAILS SHOWN ON SEDIMENT CONTROL DETAIL SHEET (FACTORY WILL SERVE AS A SEDIMENT BASIN DURING CONSTRUCTION). | 20 DAYS | 9. INSTALL SAND FILTER PER SWM PLAN. | 10 DAYS |
| 5. WITH GRADING INSPECTOR'S APPROVAL, CLEAR AND GRUB AREAS FOR GRADING, BEGIN GRADING FOR BUILDING, DRIVE, AISLES, & PARKING AREAS. PROVIDE TEMPORARY STABILIZATION AS REQUIRED. | 30 DAYS | 10. WITH THE SEDIMENT CONTROL INSPECTOR'S APPROVAL, CONVERT SEDIMENT BASIN TO SWM FACILITY. | 10 DAYS |
| | | 11. PERMANENTLY STABILIZE ANY REMAINING DISTURBED AREAS. | 5 DAYS |
| | | 12. WITH THE SEDIMENT CONTROL INSPECTOR'S APPROVAL, REMOVE ALL REMAINING SEDIMENT CONTROLS AND STABILIZE ANY REMAINING DISTURBED AREAS. | 2 DAYS |

BASIN/STORM DRAIN INSTALLATION SEQUENCE

- 1- CONSTRUCT STORM DRAIN SYSTEM BEGINNING AT M-13. INSTALL 55' +/- OF TEMP. 21" HDPE FROM BASIN BOTTOM TO M-13 TO SERVE AS TEMP. SD OUTFALL. INV. @ BASIN BOTTOM = 347.3 +/-
- 2- AT M-14 INSTALL TEMP. BULKHEAD IN PLACE OF OUTGOING 12" RCP TO SAND FILTER.
- 3- PRIOR TO SAND FILTER INSTALLATION, DEWATER BASIN AND CONSTRUCT EMBANKMENT ACROSS BASIN BOTTOM TO SEPARATE SAND FILTER WORK AREA FROM BASIN. SEE GRADING FOR SAND FILTER AREA ON SWM PLANS.
- 4- UPON COMPLETION OF SAND FILTER, BEGIN BASIN CONVERSION TO FINAL SWM FACILITY. REMOVE TEMP. HDPE PIPE AND INSTALL STORM DRAIN SYSTEM FROM M-13 TO E-11.
- 5- ONCE ALL UPSTREAM AREA HAVE BEEN STABILIZED, REMOVE TEMP. BULKHEAD AT M-14 AND INSTALL STORM DRAIN SYSTEM FROM M-14 TO E-7.

SEDIMENT BASIN SUMMARY TABLE

EXISTING DRAINAGE AREA	4.93 ACRES
PROPOSED DRAINAGE AREA	6.57 ACRES
NET STORAGE VOLUME REQ'D = 6.57 X 1800	11826 C.F.
DRY STORAGE VOLUME REQ'D = 6.57 X 1800	11826 C.F.
TOTAL VOLUME REQUIRED	23652 C.F.
TOTAL VOLUME PROVIDED	5259 C.F.
NET STORAGE VOLUME PROVIDED	12225 C.F.
DRY STORAGE VOLUME PROVIDED	15314 C.F.
NET STORAGE DEPTH	5.25 FT.
DRY STORAGE DEPTH	2.50 FT.
CLEANOUT ELEVATION	347.00
MINIMUM RISER CREST ELEVATION	348.25
PROVIDED RISER CREST ELEVATION	344.03
EMBANKMENT ELEVATION	350.25
DRAW-DOWN DEVICE	354.00
OUTFALL BARREL TYPE	6" PVC (4" ORIFICE)
1-YR PRE-DEVELOPMENT SITE DISCHARGE	1.00 CFS
1-YR POST-DEVELOPMENT SITE DISCHARGE	1416 CFS
1-YR POST-DEVELOPMENT BASIN DISCHARGE	112 CFS
1-YR STORM WATER SURFACE ELEVATION	350.20
10-YR STORM WATER SURFACE ELEVATION	351.75

BY THE DEVELOPER

I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN, 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 ALSO AUTHORIZE ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.

James E. Leach 1/18/05
 SIGNATURE OF DEVELOPER DATE
 JAMES E. LOESCH, CHIEF ENGINEER OF PLANT FACILITIES
 JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY

BY THE ENGINEER

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

Thomas C. Neugebauer, P.E. 1-17-05
 SIGNATURE OF ENGINEER DATE
 THOMAS C. NEUGEBAUER, P.E. MD LICENSE #29203

REVIEWED FOR HOWARD S.C.D. AND METERS TECHNICAL REQUIREMENTS.

Jim Myrles 1/26/05
 U.S.D.A. NATURAL RESOURCES CONSERVATION SERVICE DATE

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

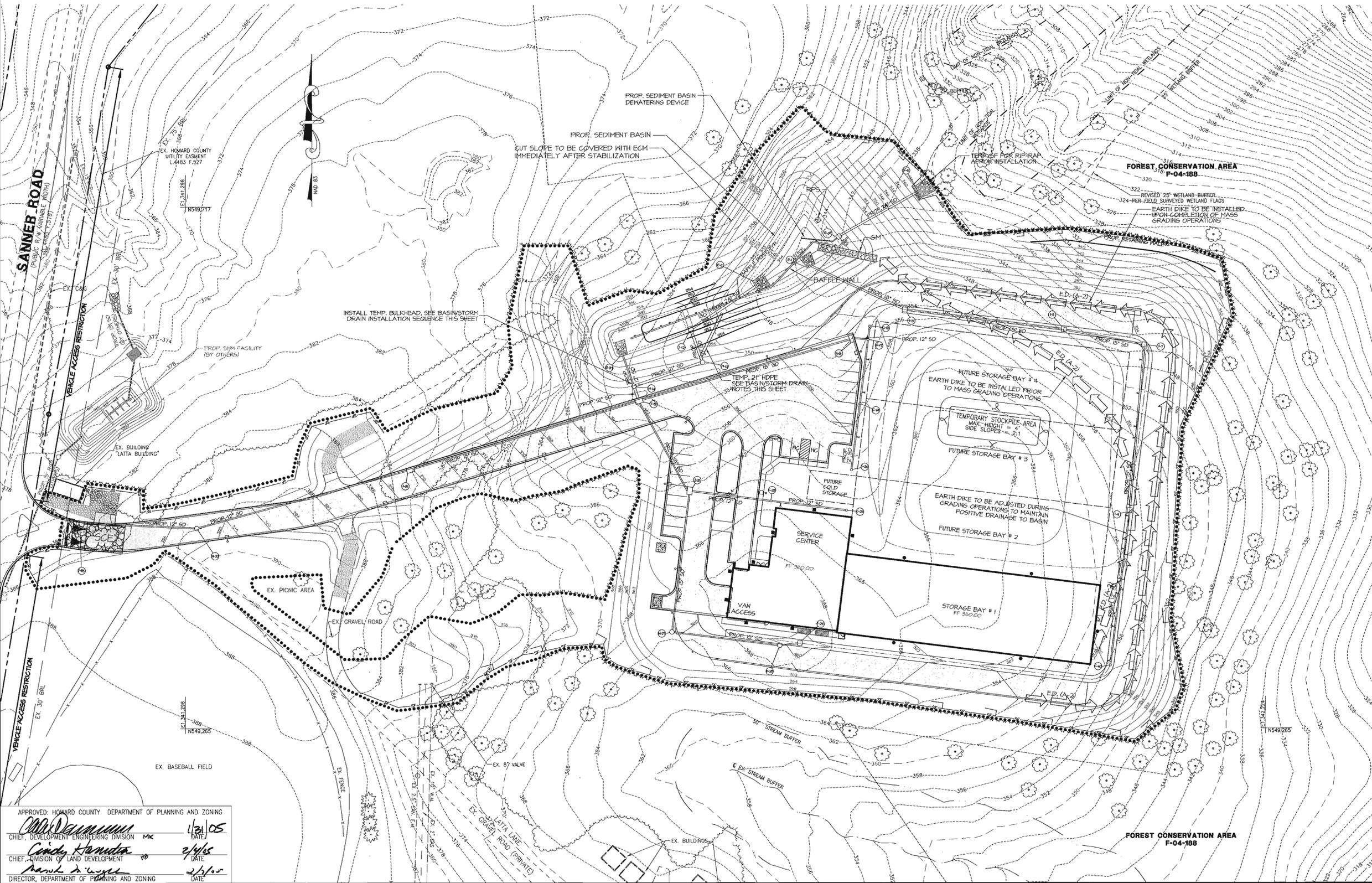
James E. Leach 1/26/05
 HOWARD S.C.D. DATE

REVISIONS

NO.	DESCRIPTION	DATE

APPROVALS

PROJECT	DATE



THE JOHNS HOPKINS UNIVERSITY
APPLIED PHYSICS LABORATORY
 JOHNS HOPKINS ROAD
 LAUREL, MARYLAND 20723-6099
 TAX MAP 41, GRID 16, PARCEL 1
 FIFTH (5TH) ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND

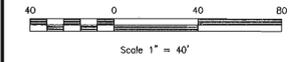
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GRAPHIC SCALE



MORRIS & RITCHIE ASSOCIATES, INC.
 ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
 14280 PARK CENTER DRIVE, SUITE A
 LAUREL, MARYLAND 20707
 (410) 782-9782 or (301) 776-1860
 FAX (410) 782-7395

SEDIMENT CONTROL PLAN

JOBS NO.: 13685

 **SDP-16**

1-17-05 SHEET: 16 OF 22

SCALE: 1" = 40'

DES: BCC CHECK: TCN DATE: 01-17-05

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chad DeWitt 1/21/05
 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK DATE

Candy Hamilton 2/1/05
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

David A. Wynn 2/1/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING DATE

VEGETATIVE STABILIZATION

PERMANENT AND TEMPORARY REGRADING, SODDING AND MULCHING

REMOVING TOPSOIL, DISTURBANCE OF VEGETATION, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN SEVEN CALENDAR DAYS FOR THE SURFACE OF ALL PERMITS EXCEPT DRAINAGE, DITCHES, DROPPED PERIMETER SLOPES, AND ALL SLOPES GREATER THAN 3:1 HORIZONTAL TO 1 VERTICAL (3:1) AND FOURTEEN DAYS FOR ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.

I. PERMANENT SEEDING

A. SOIL TEST: LIME FERTILIZATION WILL BE APPLIED PER SOIL TEST RESULTS FOR THE SITES GREATER THAN 2 ACRES. SOIL TESTS SHOULD BE CONDUCTED AT 10-16 INCH DEPTH OF INITIAL BROOM CRACKING OR AS RECOMMENDED BY THE SEDIMENT CONTROL INSPECTOR. RATES AND ANALYSES WILL BE PROVIDED TO THE GRADING INSPECTOR AS WELL AS THE CONTRACTOR.

B. OCCURRENCE OF ACID SALT SOILS (GRAVY BLACK COLOR) WILL REQUIRE COVERING WITH A MINIMUM OF 12 INCHES OF CLEAN SOIL WITH 8 INCHES MINIMUM COVERING OF TOP SOIL. NO STOODING OF MATERIAL IS ALLOWED. SOIL TESTS SHOULD BE DONE BEFORE AND AFTER A 6-WEEK INCUBATION PERIOD TO ALLOW OXIDATION OF SULFATES.

C. THE MINIMUM SOIL CONDITIONS REQUIRED FOR PERMANENT VEGETATIVE ESTABLISHMENT ARE:

- SOIL PH SHALL VARY BETWEEN 6.0 AND 7.0.
- SOLUBLE SALTS SHALL BE LESS THAN 500 PARTS PER MILLION (PPM).
- THE SOIL SHALL BE LESS THAN 40% SAND ENOUGH TO HOLD A MODERATE AMOUNT OF MOISTURE. A SOIL WITH 10% SAND WILL NOT BE ACCEPTABLE.
- SOIL SHALL CONTAIN 1.5% MINIMUM ORGANIC MATTER BY WEIGHT.
- SOIL MUST CONTAIN SUFFICIENT PORE SPACE TO PERMIT ADEQUATE ROOT PENETRATION.
- IF THESE CONDITIONS CANNOT BE MET BY SOILS ON SITE, ADDITIONAL TOPSOIL IS REQUIRED IN ACCORDANCE WITH SECTION 21 STANDARDS AND SPECIFICATIONS FOR TOPSOIL OR AMENDMENTS MADE AS RECOMMENDED BY A CERTIFIED AGRONOMIST.

D. SEED PREPARATION: AREA TO BE SEEDING SHALL BE LOOSE AND FINABLE TO A DEPTH OF AT LEAST 3 INCHES. THE TOP LAYER SHALL BE LOOSELY BY HAND, DOING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING OCCURS. FOR SITES LESS THAN 5 ACRES, APPLY 100 POUNDS DRYWEIGHT LIME/STONE AND 21 POUNDS OF 10-10-10 FERTILIZER PER 1,000 SQUARE FEET. HARDWOOD OR DISK LIME AND FERTILIZER INTO THE SOIL TO A DEPTH OF AT LEAST 3 INCHES OR FLATTER THAN 3:1.

E. SEEDING: APPLYING 5-6 POUNDS PER 1,000 SQUARE FEET OF TALL FESCUE BETWEEN FEBRUARY 1 AND APRIL 30 OR RYEGRASS JUST IN AND OCTOBER 31. APPLY SEED UNIFORMLY ON A MOIST FIRM SEEDBED WITH A CYLINDER SPREADER, COUNTERPART SPREADER OR HYDROSEED (SLURRY INCLUDES SEEDS AND FERTILIZER, RECOMMENDED AT 200 POUNDS PER ACRE). MAXIMUM SEED DEPTH SHOULD BE 1/2 INCH IN CLAYEY SOILS AND 3/8 INCH IN SANDY SOILS WHEN USING OTHER THAN THE HYDROSEED METHOD. RYEGRASS SEEDS SHOULD BE PLANTED WITH A SEEDER. LIME AND FERTILIZER IS FIRSTLY ESTABLISHED. IF OTHER SEED MIXES ARE TO BE USED, SELECT FROM TABLE 25, ENTITLED "PERMANENT SEEDING FOR LOW MAINTENANCE AREAS" FROM THE CURRENT STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL. MIXES SUITABLE FOR THIS ARE 1, 3, AND 5-7. MIXES 5-7 ARE SUITABLE FOR NON-HIGHWAY SITUATIONS.

F. MULCHING: MULCH SHALL BE APPLIED TO ALL SEEDING AREAS IMMEDIATELY AFTER SEEDING. DURING THE PERIOD WHEN SEEDING IS NOT PERMITTED, MULCH SHALL BE APPLIED IMMEDIATELY AFTER GRADING.

G. MULCH SHALL BE UNLIMITED, UNCOMPRESSED, SMALL CHAIN STRAW APPLIED AT A RATE OF 2 TONS PER ACRE OR 20 POUNDS PER 1,000 SQUARE FEET (2 BALES). IF A MULCH-ANCHORING TOOL IS USED, APPLY 2.5 TONS PER ACRE. MULCH MATERIALS SHALL BE RELATIVELY FREE OF ALL KINDS OF WEEDS AND SHALL BE COMPLETELY FREE OF PROHIBITED WEEDS. STRAW MULCH UNIFORM, MECHANICALLY OR BY HAND, TO A DEPTH OF 1-2 INCHES.

H. SECONDARY STRAW MULCH: STRAW MULCH SHALL BE SECURED IMMEDIATELY FOLLOWING MULCH APPLICATION TO MINIMIZE MOVEMENT BY WIND OR WATER. THE FOLLOWING METHODS ARE PERMITTED:

- USE A MULCH-ANCHORING TOOL WHICH IS DESIGNED TO PUNCH AND ANCHOR MULCH INTO THE SOIL SURFACE TO A MINIMUM DEPTH OF 2 INCHES. THIS IS THE MOST EFFECTIVE METHOD FOR SECURING MULCH. HOWEVER, IF IT LIMITED TO RELAY FILL AREAS WHERE EQUIPMENT CAN OPERATE SAFELY.
- MULCH COULDS FIBER MAY BE USED FOR ANCHORING STRAW. APPLY THE FIBER UNDER AT A NET DRY WEIGHT OF 750 POUNDS PER ACRE. APPLY WITH WATER. USE 30 POUNDS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.
- LIQUID BINDERS MAY BE USED. APPLY AT HIGHER RATES AT THE EDGES, WHERE WIND CATCHES AND APPEAR. UNIFORM AFTER BINDER APPLICATION. BINDERS LISTED IN THE 1994 STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. APPROVED EQUAL SHALL BE APPLIED AT RATES RECOMMENDED BY THE MANUFACTURER.
- LIGHTWEIGHT PLASTIC NETTING MAY BE USED TO SECURE MULCH. THE NETTING WILL BE STAPLED TO THE GROUND ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

II. TEMPORARY SEEDING

A. LIME: 100 POUNDS OF DOLOMITE LIMESTONE PER 1,000 SQUARE FEET.

FERTILIZER: 15 POUNDS OF 10-10-10 PER 1,000 SQUARE FEET.

SEED: PERENNIAL RYE-0.2 POUNDS PER 1,000 SQUARE FEET (FEBRUARY 1 THROUGH APRIL 30 OR AUGUST 1 THROUGH NOVEMBER 1).

MULCH: 0-0.2 POUNDS PER 1,000 SQUARE FEET (MAY 1 THROUGH AUGUST 15).

III. FILL

NO FILLS MAY BE PLACED ON FROZEN GROUND. ALL FILLS TO BE PLACED IN APPROXIMATELY HORIZONTAL LAYERS EACH LAYER HAVING ADEQUATE THICKNESS OF NOT MORE THAN 8 INCHES. ALL FILL MATERIALS SHALL BE CLASSIFIED TYPE 2 OR 3 PER AASHTO. ALL FILL MATERIALS SHALL BE COMPACTED TO 90% DENSITY. COMPACTED TO BE DETERMINED BY ASTM D-1557-87 (MODIFIED PROCTOR). ALL FILL WITHIN THE BUILDING AREA IS TO BE COMPACTED TO A MINIMUM OF 92% DENSITY. THE NORMAL SOIL PREPARATION METHODS PREVIOUSLY MENTIONED. FILL FOR POND FOUNDATIONS SHALL BE COMPACTED AS PER MD-29 CONSTRUCTION SPECIFICATIONS. ALL OTHER FILLS SHALL BE COMPACTED SUFFICIENTLY SO AS TO BE STABLE AND PREVENT DRAINAGE AND SLIPAGE.

IV. PERMANENT SOO

INSTALLATION OF SOO SHOULD FOLLOW PERMANENT SEEDING DATES. SEEDING PREPARATION FOR SOO SHALL BE AS DESCRIBED ABOVE. PERMANENT SOO'S TO BE 3 TO 4 FEET DEEP. STATE APPROVED SOO LIME AND FERTILIZER PER PERMANENT SEEDING SPECIFICATIONS AND LIGHTLY SPRAYED SOO PRIOR TO LAYING DOWN THE SOO ON THE CONTAINMENT WITH ALL ENDS TIGHTLY ABUTTING. SOO'S ARE TO BE SLOPED BETWEEN ROWS. WATER AND SOIL OR TANK SOO TO BE INSTALLED WITH THE SAME SLOPES AS THE SLOPES OF THE SITES. AS SHOWN, ARE TO BE PERMANENTLY SLOPED OR PROTECTED WITH AN APPROVED EROSION CONTROL METHOD. SOO'S ARE TO BE INSTALLED WITH THE SAME SLOPES AS THE SLOPES OF THE SITES. SOO SHALL NOT BE TRANSPORTED WHEN MOISTURE CONTENT (BY WEIGHT) OR EXTREME TEMPERATURE MAY BE ADVERSELY AFFECTED ITS SURVIVAL. IN THE ABSENCE OF ACCURATE RECORDS, REGULATION SHOULD BE OBSERVED TO ENSURE ESTABLISHMENT OF SOO.

V. SEDIMENT CONTROL PLANS FOR MINING OPERATIONS MUST INCLUDE THE FOLLOWING SEEDING DATES AND MIXTURES:

FOR SEEDING DATES OF:

FEBRUARY 1 THROUGH APRIL 30 AND AUGUST 15 THROUGH OCTOBER 31, LIME SEED MIXTURE OF TALL FESCUE AT THE RATE OF 2 TONS PER ACRE AND 20 POUNDS PER 1,000 SQUARE FEET AT THE MINIMUM RATE OF 0.50 POUNDS PER 1,000 SQUARE FEET.

VI. TOPSOIL SHALL BE APPLIED AS PER THE STANDARD AND SPECIFICATIONS FOR TOPSOIL FROM THE CURRENT MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.

NOTE: USE OF THIS INFORMATION PRELUDE MEETING ALL OF THE REQUIREMENT OF THE CURRENT MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.

NOTE: PROJECTS WITHIN 1/2 MILES OF THE BAY AREA WILL NEED TO ACHIEVE TO MARYLAND ANATOMY ADMINISTRATOR'S SEEDING SPECIFICATION RESTRICTIONS.

STANDARDS AND SPECIFICATION FOR TOPSOIL

DEFINITION

PLACEMENT OF TOPSOIL OVER A PREPARED SURFACE PRIOR TO ESTABLISHMENT OF PERMANENT VEGETATION.

PURPOSE

TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETATIVE GROWTH. SOILS OF EROSION CONTROL AND VEGETATIVE ESTABLISHMENT ON THESE AREAS WHERE THE EXISTING LAND SURFACE IS TO BE RESHAPED BY GRADING ACCORDING TO PLAN.

DESIGN CRITERIA

THE GRADING PLAN SHOULD BE BASED UPON THE INCORPORATION OF BUILDING DESIGNS AND STREET LAYOUTS THAT FIT AND UTILIZE EXISTING TOPOGRAPHY AND DESIRABLE NATURAL SURROUNDINGS TO AVOID EXTREME GRADE ADJUSTMENTS. INFORMATION SUBMITTED MUST PROVIDE SUFFICIENT TOPOGRAPHIC SURVEYS AND SOIL INVESTIGATIONS TO DETERMINE LIMITATIONS THAT MAY OCCUR ON THE GRADING AND OPERATION RELATED TO SLOPE STABILITY, EFFECT ON ADJACENT PROPERTIES AND DRAINAGE PATTERNS, MEASURES FOR DRAINAGE AND WATER REMOVAL AND VEGETATIVE TREATMENT, ETC.

MANY COUNTIES HAVE REGULATIONS AND DESIGN PROCEDURES ALREADY ESTABLISHED FOR LAND GRADING AND CUT/FILL SLOPES. WHERE THESE REQUIREMENTS EXIST, THEY SHALL BE FOLLOWED. THE PLAN MUST SHOW EXISTING AND PROPOSED CONTOURS OF THE AREAS TO BE GRADED. THE PLAN SHALL ALSO INCLUDE PRACTICES FOR EROSION CONTROL, SOLE STABILIZATION, SOLE DISPOSAL OF RUNOFF WATER AND GRADING, SUCH AS MATERIALS, LINE DITCHES, REVERSE SLOPE BENCHES (INCLUDING GRADE AND CROSS SECTION), GRADE STABILIZATION STRUCTURES, RETAINING WALLS AND SURFACE SUBSURFACE DRAINAGE. THE PLAN SHALL ALSO INCLUDE PRACTICES FOR THESE PRACTICES. THE FOLLOWING SHALL BE INCORPORATED INTO THE PLAN:

- PROVISIONS SHALL BE MADE TO SAFELY CONDUIT SURFACE RUNOFF TO STABLE WATER COURSES TO INSURE THAT SURFACE RUNOFF WILL NOT CAUSE EROSION OR DAMAGE TO ADJACENT AREAS.
- CUT AND FILL SLOPES THAT ARE TO BE STABILIZED WITH GRASSES SHALL NOT BE STEEPER THAN 2:1. (WHERE THE SLOPE IS TO BE MOVED THE SLOPE SHOULD BE NO STEEPER THAN 2:1). 4:1 OR GREATER BENCHES OF SAFETY FACTORS RELATED TO MOVING STEEP SLOPES) SLOPES EXCEEDING 2:1 SHALL BE STABILIZED WITH GRASSES AND MULCHING. CONSIDERATIONS THAT SHALL BE ADEQUATELY SHOWN ON THE PLAN.
- REVERSE BENCHES SHALL BE PROVIDED WHENEVER THE VERTICAL INCLINE (HEIGHT) OF ANY 2:1 SLOPE EXCEEDS 20 FEET FOR 24 SLOPES OF 2:1 OR MORE. BENCHES SHALL BE 2 FEET AND FOR 4:1 TO 40 FEET. BENCHES SHALL BE LOCATED TO PROTECT THE WATER TO A STABLE OUTLET. SOILS, SEEPS, AND OTHER SUBSURFACE DRAINAGE SHALL BE TAKEN INTO CONSIDERATION WHEN DESIGNING BENCHES.
- BENCHES SHALL BE A MINIMUM OF SIX FEET WIDE TO PROVIDE FOR EASE OF MAINTENANCE.
- THE FACE OF SLOPE SHALL BE PROTECTED BY SPECIAL EROSION CONTROL MATERIALS, TO INCLUDE, BUT NOT LIMITED TO: APPROVED VEGETATIVE STABILIZATION PRACTICES (SEE SECTION 6), RIP-RAP OR OTHER APPROVED STABILIZATION METHODS.
- CUT SLOPES OCCURRING IN RIPABLE ROCK SHALL BE SEPARATED AS SHOWN ON THE FOLLOWING DIAGRAM. THESE SEPARATIONS SHALL BE CONSTRUCTED ON THE CONTOUR AND WILL HAVE STEPS ON THE SLOPE RATIO OR ON THE CUT SLOPE. THE NORMAL SLOPE LINE IS 1:1. THESE STEPS WILL WEATHER AND ACT TO HOLD MOISTURE, LIME, FERTILIZER AND SEEDS THERE, PRODUCING A MUCH QUICKER AND LONGER LIVED VEGETATIVE COVER AND BETTER SOLE STABILIZATION. COVERING SHALL BE DIVERTED FROM THE TOP OF ALL SEPARATED CUT SLOPES AND CARRIED TO A SUITABLE OUTLET.
- SUBSURFACE DRAINAGE SHALL BE PROVIDED WHERE NECESSARY TO INTERCEPT SEepage THAT WOULD OTHERWISE ADVERSELY AFFECT SOLE STABILITY OR CREATE EXCESSIVELY HIGH SITE CONDITIONS.
- SLOPES SHALL NOT BE CREATED SO CLOSE TO PROPERTY LINES AS TO ENDANGER ADJACENT PROPERTIES UNLESS ADEQUATELY PROTECTED BY SPECIAL PRACTICES AGAINST SEEDMATERIAL EROSION, SURFACE, SETTLEMENT, SUBSURFACE OR OTHER RELATED DAMAGES.
- FILL MATERIAL SHALL BE FREE OF BRUSH, RUBBISH, ROCKS, LOGS, STUMPS, BUILDING DEBRIS, AND OTHER OBSTACLES TO ROOT PENETRATION. THE NORMAL SLOPE RATIO OVER TWO (2) INCHES IN DIAMETER WHERE COMPACTED BY OTHER EQUIPMENT. PROZEN MATERIAL SHALL NOT BE PLACED IN THE FILL. NOOR SHALL THE FILL MATERIAL BE PLACED ON A FROZEN FOUNDATION.
- STOCKPILES, BORROW AREAS AND SPOIL SHALL BE SHOWN ON THE PLANS AND SHALL BE SUBJECT TO THE PROVISIONS OF THIS STANDARD AND SPECIFICATIONS.
- ALL DISTURBED AREAS SHALL BE STABILIZED STRUCTURALLY OR VEGETATIVELY IN COMPLIANCE WITH 20.0 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION.

CONSTRUCTION AND MATERIAL SPECIFICATIONS

- TOPSOIL SALVAGED FROM THE EXISTING SITE MAY BE USED PROVIDED THAT IT MEETS STANDARDS AS SET FORTH IN THESE SPECIFICATIONS. TYPICALLY, THE DEPTH OF SOIL SALVAGED TO BE SALVAGED FOR A GIVEN SOIL TYPE SHALL BE DETERMINED BY REPRESENTATIVE SOIL PROFILE SECTION IN THE SOIL SURVEY PUBLISHED BY USDA-SOCS IN COOPERATION WITH MARYLAND AGRICULTURAL EXPERIMENTAL STATION.
- TOPSOIL SPECIFICATIONS-SOIL TO BE USED AS TOPSOIL MUST MEET THE FOLLOWING:
 - TOPSOIL SHALL BE A LOAM, SANDY LOAM, CLAY LOAM, SANDY CLAY LOAM, LOAM SAND. OTHER SOILS MAY BE USED IF RECOMMENDED BY AN AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY. REPRESENTATIVE SOIL PROFILE SECTION IN THE SOIL SURVEY PUBLISHED BY USDA-SOCS IN COOPERATION WITH MARYLAND AGRICULTURAL EXPERIMENTAL STATION.
 - REVERSE BENCHES SHALL BE PROVIDED WHENEVER THE VERTICAL INCLINE (HEIGHT) OF ANY 2:1 SLOPE EXCEEDS 20 FEET FOR 24 SLOPES OF 2:1 OR MORE. BENCHES SHALL BE 2 FEET AND FOR 4:1 TO 40 FEET. BENCHES SHALL BE LOCATED TO PROTECT THE WATER TO A STABLE OUTLET. SOILS, SEEPS, AND OTHER SUBSURFACE DRAINAGE SHALL BE TAKEN INTO CONSIDERATION WHEN DESIGNING BENCHES.
 - WHERE THE SUBSOIL IS EITHER HIGHLY ACIDIC OR COMPOSED OF HEAVY CLAYS, GROUND LIMESTONE SHALL BE APPLIED AT THE RATE OF 4-8 TONS PER ACRE (200-400 POUNDS PER 1,000 SQ. FT.) PRIOR TO THE PLACEMENT OF TOPSOIL. LIME SHALL BE DISTRIBUTED UNIFORMLY OVER DESIGNATED AREAS AND WORKED INTO THE SOIL BY CONSTRUCTION WITH TILLAGE OPERATIONS AS DESCRIBED IN THE FOLLOWING PROCEDURES.
 - FOR SITE HAVING DISTURBED AREAS UNDER 5 ACRES
 - PLACE TOPSOIL (AS REQUIRED) AND APPLY SOIL AMENDMENTS AS SPECIFIED IN 20.0 VEGETATIVE STABILIZATION SECTION - VEGETATIVE METHODS AND MATERIALS.
 - GRASSES ON THE AREAS TO BE TOPSOILED, WHICH HAVE BEEN PREVIOUSLY ESTABLISHED, SHALL BE MAINTAINED, ALBEIT 4"-8" IN HEIGHT.
 - TOPSOIL SHALL BE UNIFORMLY DISTRIBUTED IN A 4"-8" LAYER AND LOOSELY COMPACTED TO A MINIMUM THICKNESS OF 4". SPREADING SHALL BE PERFORMED IN SUCH A MANNER THAT SOODING OR SEEDING CAN PROCEED WITH A MINIMUM OF ADDITIONAL SOIL PREPARATION AND TILLAGE. ANY DISCONTINUITIES IN THE SURFACE RESULTING FROM TOPSOILING OR OTHER OPERATIONS SHALL BE CORRECTED IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
 - TOPSOIL SHALL NOT BE PLACED WHILE THE TOPSOIL OR SUBSOIL IS IN A FROZEN OR MOIST CONDITION. WHEN THE SUBSOIL IS EXCESSIVELY WET OR IN A CONDITION THAT MAY OTHERWISE BE DETERMINED TO PROPER GRADING AND SEEDING PREPARATION.
- ALTERNATIVE FOR PERMANENT SEEDING- INSTEAD OF APPLYING THE FULL AMOUNTS OF LIME AND COMMERICAL FERTILIZER, COMPOSTED SLUDGE AND AMENDMENTS MAY BE APPLIED AS SPECIFIED BELOW.
 - COMPOSTED SLUDGE SHALL BE SUPPLIED BY, OR OBTAINED FROM, A PERSON OR PERSONS THAT ARE PERMITTED (AT THE TIME OF ACQUISITION OF THE COMPOST) BY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT UNDER COMAR 26.04.06.
 - COMPOSTED SLUDGE SHALL CONTAIN AT LEAST 1 PERCENT NITROGEN, 1.5 PERCENT PHOSPHORUS, AND 0.2 PERCENT POTASSIUM AND HAVE A pH OF 7.0 TO 8.0. IF COMPOSTED SLUDGE DOES NOT MEET THESE REQUIREMENTS, THE APPROPRIATE CONSTITUENTS MUST BE ADDED TO MEET THE REQUIREMENTS PRIOR TO USE.
 - COMPOSTED SLUDGE SHALL BE APPLIED AT A RATE OF 1 TON/1,000 SQ. FT.
 - COMPOSTED SLUDGE SHALL BE AMENDED WITH A POTASSIUM FERTILIZER APPLIED AT THE RATE OF 1/2 TON/1,000 SQ. FT. AND 1/2 THE NORMAL LIME APPLICATION RATE.

REFERENCES: CHEMISTICAL SPECIFICATIONS SOIL PREPARATION AND SODDING. MD-W-1. PUB. #1. COOPERATIVE EXTENSION SERVICE. MARYLAND AND VIRGINIA POLYTECHNIC INSTITUTE. REVISED 1973.

STANDARDS AND SPECIFICATIONS FOR LAND GRADING

DEFINITION

RESHAPING OF THE EXISTING LAND SURFACE IN ACCORDANCE WITH A PLAN AS DETERMINED BY ENGINEERING SURVEY AND LAYOUT.

PURPOSE

THE PURPOSE OF A LAND GRADING SPECIFICATION IS TO PROVIDE FOR EROSION CONTROL AND VEGETATIVE ESTABLISHMENT ON THESE AREAS WHERE THE EXISTING LAND SURFACE IS TO BE RESHAPED BY GRADING ACCORDING TO PLAN.

DESIGN CRITERIA

THE GRADING PLAN SHOULD BE BASED UPON THE INCORPORATION OF BUILDING DESIGNS AND STREET LAYOUTS THAT FIT AND UTILIZE EXISTING TOPOGRAPHY AND DESIRABLE NATURAL SURROUNDINGS TO AVOID EXTREME GRADE ADJUSTMENTS. INFORMATION SUBMITTED MUST PROVIDE SUFFICIENT TOPOGRAPHIC SURVEYS AND SOIL INVESTIGATIONS TO DETERMINE LIMITATIONS THAT MAY OCCUR ON THE GRADING AND OPERATION RELATED TO SLOPE STABILITY, EFFECT ON ADJACENT PROPERTIES AND DRAINAGE PATTERNS, MEASURES FOR DRAINAGE AND WATER REMOVAL AND VEGETATIVE TREATMENT, ETC.

MANY COUNTIES HAVE REGULATIONS AND DESIGN PROCEDURES ALREADY ESTABLISHED FOR LAND GRADING AND CUT/FILL SLOPES. WHERE THESE REQUIREMENTS EXIST, THEY SHALL BE FOLLOWED. THE PLAN MUST SHOW EXISTING AND PROPOSED CONTOURS OF THE AREAS TO BE GRADED. THE PLAN SHALL ALSO INCLUDE PRACTICES FOR EROSION CONTROL, SOLE STABILIZATION, SOLE DISPOSAL OF RUNOFF WATER AND GRADING, SUCH AS MATERIALS, LINE DITCHES, REVERSE SLOPE BENCHES (INCLUDING GRADE AND CROSS SECTION), GRADE STABILIZATION STRUCTURES, RETAINING WALLS AND SURFACE SUBSURFACE DRAINAGE. THE PLAN SHALL ALSO INCLUDE PRACTICES FOR THESE PRACTICES. THE FOLLOWING SHALL BE INCORPORATED INTO THE PLAN:

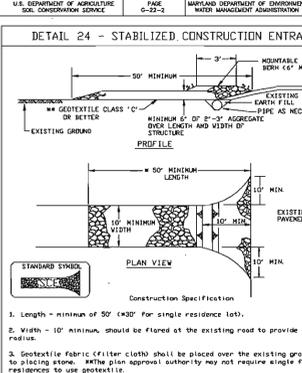
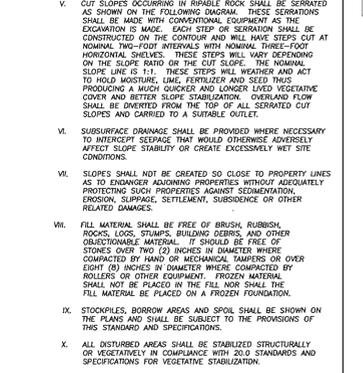
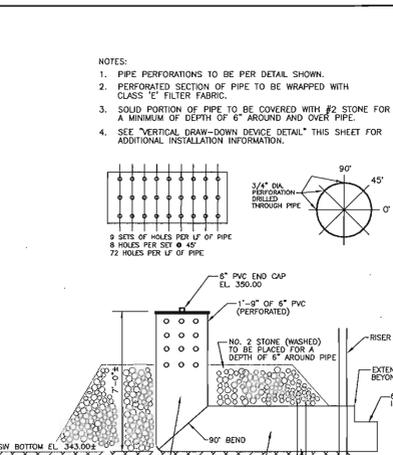
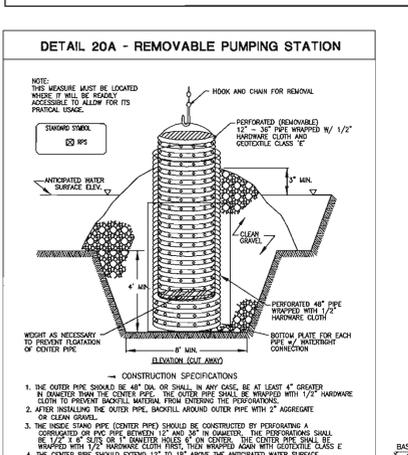
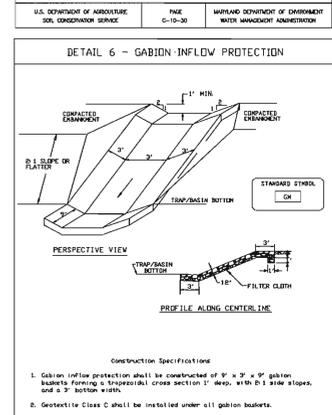
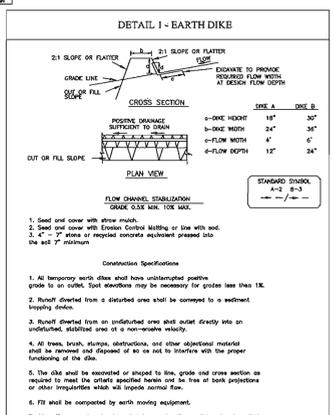
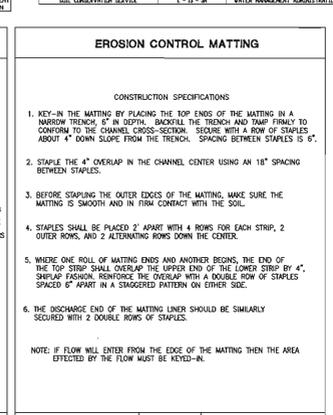
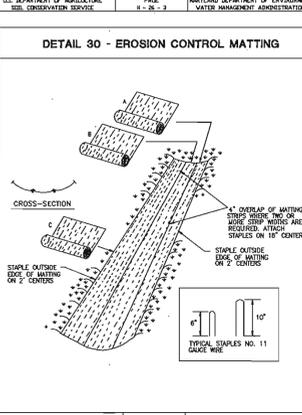
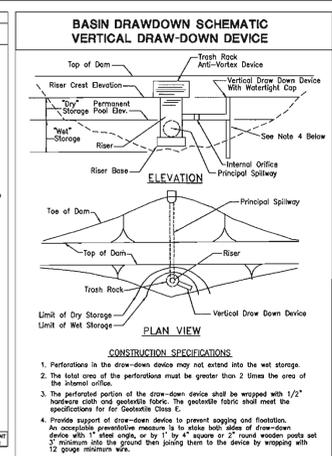
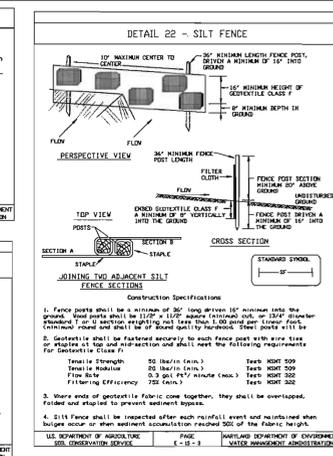
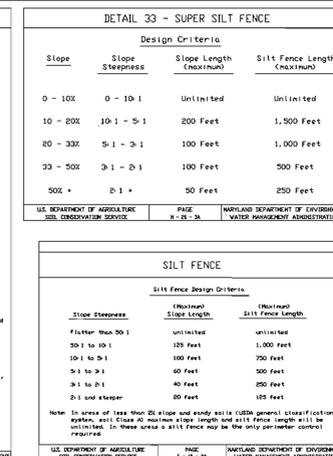
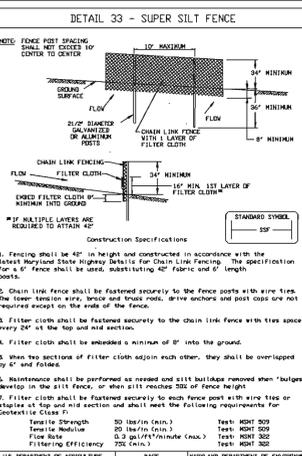
- PROVISIONS SHALL BE MADE TO SAFELY CONDUIT SURFACE RUNOFF TO STABLE WATER COURSES TO INSURE THAT SURFACE RUNOFF WILL NOT CAUSE EROSION OR DAMAGE TO ADJACENT AREAS.
- CUT AND FILL SLOPES THAT ARE TO BE STABILIZED WITH GRASSES SHALL NOT BE STEEPER THAN 2:1. (WHERE THE SLOPE IS TO BE MOVED THE SLOPE SHOULD BE NO STEEPER THAN 2:1). 4:1 OR GREATER BENCHES OF SAFETY FACTORS RELATED TO MOVING STEEP SLOPES) SLOPES EXCEEDING 2:1 SHALL BE STABILIZED WITH GRASSES AND MULCHING. CONSIDERATIONS THAT SHALL BE ADEQUATELY SHOWN ON THE PLAN.
- REVERSE BENCHES SHALL BE PROVIDED WHENEVER THE VERTICAL INCLINE (HEIGHT) OF ANY 2:1 SLOPE EXCEEDS 20 FEET FOR 24 SLOPES OF 2:1 OR MORE. BENCHES SHALL BE 2 FEET AND FOR 4:1 TO 40 FEET. BENCHES SHALL BE LOCATED TO PROTECT THE WATER TO A STABLE OUTLET. SOILS, SEEPS, AND OTHER SUBSURFACE DRAINAGE SHALL BE TAKEN INTO CONSIDERATION WHEN DESIGNING BENCHES.
- BENCHES SHALL BE A MINIMUM OF SIX FEET WIDE TO PROVIDE FOR EASE OF MAINTENANCE.
- THE FACE OF SLOPE SHALL BE PROTECTED BY SPECIAL EROSION CONTROL MATERIALS, TO INCLUDE, BUT NOT LIMITED TO: APPROVED VEGETATIVE STABILIZATION PRACTICES (SEE SECTION 6), RIP-RAP OR OTHER APPROVED STABILIZATION METHODS.
- CUT SLOPES OCCURRING IN RIPABLE ROCK SHALL BE SEPARATED AS SHOWN ON THE FOLLOWING DIAGRAM. THESE SEPARATIONS SHALL BE CONSTRUCTED ON THE CONTOUR AND WILL HAVE STEPS ON THE SLOPE RATIO OR ON THE CUT SLOPE. THE NORMAL SLOPE LINE IS 1:1. THESE STEPS WILL WEATHER AND ACT TO HOLD MOISTURE, LIME, FERTILIZER AND SEEDS THERE, PRODUCING A MUCH QUICKER AND LONGER LIVED VEGETATIVE COVER AND BETTER SOLE STABILIZATION. COVERING SHALL BE DIVERTED FROM THE TOP OF ALL SEPARATED CUT SLOPES AND CARRIED TO A SUITABLE OUTLET.
- SUBSURFACE DRAINAGE SHALL BE PROVIDED WHERE NECESSARY TO INTERCEPT SEepage THAT WOULD OTHERWISE ADVERSELY AFFECT SOLE STABILITY OR CREATE EXCESSIVELY HIGH SITE CONDITIONS.
- SLOPES SHALL NOT BE CREATED SO CLOSE TO PROPERTY LINES AS TO ENDANGER ADJACENT PROPERTIES UNLESS ADEQUATELY PROTECTED BY SPECIAL PRACTICES AGAINST SEEDMATERIAL EROSION, SURFACE, SETTLEMENT, SUBSURFACE OR OTHER RELATED DAMAGES.
- FILL MATERIAL SHALL BE FREE OF BRUSH, RUBBISH, ROCKS, LOGS, STUMPS, BUILDING DEBRIS, AND OTHER OBSTACLES TO ROOT PENETRATION. THE NORMAL SLOPE RATIO OVER TWO (2) INCHES IN DIAMETER WHERE COMPACTED BY OTHER EQUIPMENT. PROZEN MATERIAL SHALL NOT BE PLACED IN THE FILL. NOOR SHALL THE FILL MATERIAL BE PLACED ON A FROZEN FOUNDATION.
- STOCKPILES, BORROW AREAS AND SPOIL SHALL BE SHOWN ON THE PLANS AND SHALL BE SUBJECT TO THE PROVISIONS OF THIS STANDARD AND SPECIFICATIONS.
- ALL DISTURBED AREAS SHALL BE STABILIZED STRUCTURALLY OR VEGETATIVELY IN COMPLIANCE WITH 20.0 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION.

CONSTRUCTION SPECIFICATIONS

- Fencing shall be 40" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 4" fence shall be used, substituting 4" fabric and 4" length posts.
- Chain Link Fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, brace and fence rods, drive anchors and post caps are not required except on the ends of the fence.
- Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and end sections.
- Filter cloth shall be embedded a minimum of 6" into the ground.
- When two sections of filter cloth adjoin each other, they shall be overlapped by 4" and fastened.
- Maintenance shall be performed as needed and silt buildup removed when "balding" develops in the silt fence, or when silt reaches 20% of the height of the filter cloth.
- Filter cloth shall be replaced when it is found to be damaged or when it is found to be clogged with debris. The filter cloth shall be replaced with a new section of filter cloth of the same type and shall meet the following requirements for Geotextile Fabric:

Filter Cloth Strength	50 lbs/in (min.)	Test: MDOT 509
Filter Cloth Permeability	0.1 in (min.)	Test: MDOT 509
Filter Cloth Tensile Strength	0.3 in (min.) (max.)	Test: MDOT 509
Filter Cloth Efficiency	95%	Test: MDOT 509

U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, PAGE 8-22-3, MARYLAND DEPARTMENT OF ENVIRONMENT, WATER MANAGEMENT ADMINISTRATION, PAGE 1-13-3.



SCHEDULE A
PERIMETER LANDSCAPE EDGE

CATEGORY	ADJACENT TO ROADWAYS	ADJACENT TO PERIMETER PROPERTIES
LANDSCAPE TYPE- NON-RESIDENTIAL	B	A
LINEAR FEET OF ROADWAY FRONTAGE/ PERIMETER	260'±30' DRIVEWAY 230'	2424' *
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	YES 165'	YES 2424'
CREDIT FOR HALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO
NUMBER OF PLANTS REQUIRED SHADE TREES 150 EVERGREEN TREES 1/40 SHRUBS	65 LF. 1 SHADE TREE 2 EVERGREENS	N/A INTERNAL PROPERTY LINES
NUMBER OF PLANTS PROVIDED SHADE TREES EVERGREEN TREES OTHER TREES (2:1 SUBSTITUTION) SHRUBS (0:1 SUBSTITUTION) DESCRIBE PLANT SUBSTITUTION CREDITS BELOW IF NEEDED	1 SHADE TREE 2 EVERGREENS PLACED IN ALTERNATE LOCATIONS (SEE NOTE BELOW)	N/A

* 2424 L.F. OF INTERNAL PROPERTY BOUNDARIES AND EXISTING SCREENED SANNER ROAD DO NOT GENERATE A PLANTING REQUIREMENT. THE 1 SHADE TREE AND 2 EVERGREEN TREES HAVE BEEN PROVIDED ELSEWHERE ON THE SITE DUE TO EXISTING TELECOMMUNICATIONS BUILDING AND EXISTING SCREENING OF BASEBALL FIELD, ALONG SANNER ROAD FRONTAGE.

LEGEND

- EX. PROPERTY LINE
- EX. PAVEMENT
- EX. BUILDING
- EX. EASEMENT
- EX. CURB
- EX. STORM DRAIN
- EX. GAS
- EX. SANITARY F.M.
- EX. WATER
- EX. CONDUIT
- EX. WETLAND BUFFER
- EX. STREAM BUFFER
- EX. 2' CONTOUR
- EX. 10' CONTOUR
- EX. FOREST CONSERVATION AREA

- PROP. CURB
- PROP. TURF FOR FIRELANE
- PROP. FUTURE BUILDING
- PROP. BUILDING

- Canopy Tree
- Flowering Tree
- Evergreen Tree
- Shrubs

- Lighting symbols (see det 19 for details)

Schedule D Stormwater Management Area Landscaping

Linear Feet of Perimeter	645 (341 Credit for existing vegetation)
Credit for existing Vegetation (No, yes and %)	341 L.F. Yes, 60 % Preserved Vegetation
Credit for Other Landscaping (No, yes and %)	No
Number of Trees Required Shade Trees 1/50 LF Evergreen Trees 1/40 LF	13 Shade Trees (5 required due to ex. veg.) 16 Evergreen Trees (6 required due to ex. veg.)
Number of Trees Provided Shade Trees Flowering 4 Evergreen Trees (2:1 ratio) Shrubs (10:1 substitution ratio)	6 Shade Trees 4 Flowering 4 Evergreen Trees 30 Shrubs

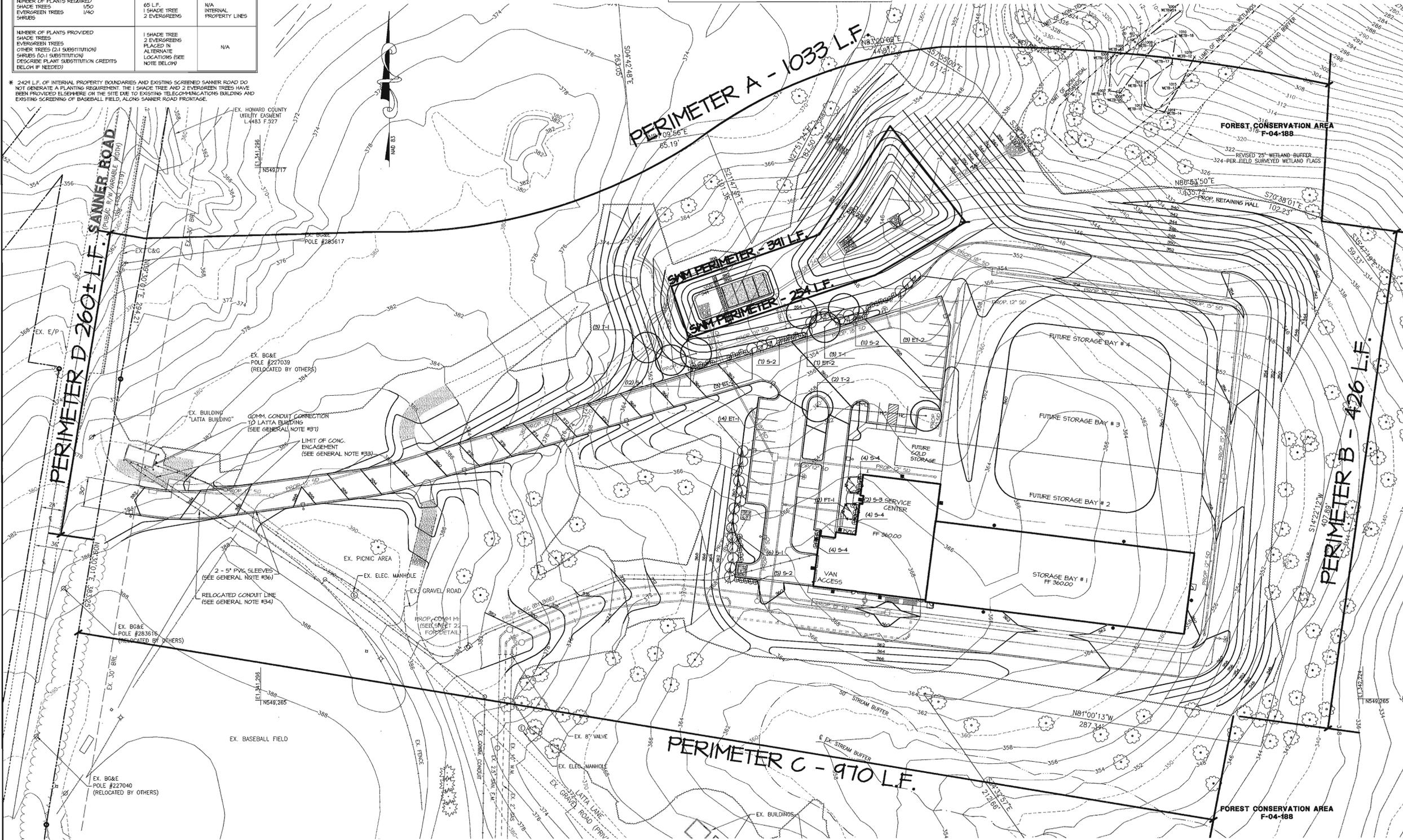
PLANT SCHEDULE

Canopy Trees					
Key	Quantity	Botanical Name / Common Name	Size	Root	Remarks
T-1	6	Myrica asplenica Black Gum	4" cal. min.	B & B	
T-2	2	Platanus occidentalis American Sycamore	4" cal. min.	B & B	

Flowering Trees					
Key	Quantity	Botanical Name / Common Name	Size	Root	Remarks
FT-1	2	Lagerstromia indica Crape Myrtle	8" hgt. min.	B & B	Multi-stem specimen

Evergreen Trees					
Key	Quantity	Botanical Name / Common Name	Size	Root	Remarks
ET-1	14	Cupressus floridensis Leyland Cypress	6'-7'	B & B	Uniform sizes
ET-2	13	Pinus thunbergiana Japanese Black Pine	7'-8'	B & B	

Shrubs					
Key	Quantity	Botanical Name / Common Name	Size	Root	Remarks
S-1	18	Clethra alnifolia Summersweet Clethra	24"-36"	B & B	
S-2	23	Ilex glabra 'Compacta' Dwarf Holly	24"-36"	B & B	
S-3	2	Vaccinium angustifolium Late Lowbush Blueberry	24"-36"	B & B	
S-4	12	Viburnum cerasifolium Koreanopice Viburnum	36" min. hgt.	B & B	



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 [Signature] 1/21/05
 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK
 [Signature] 2/4/05
 CHIEF, DIVISION OF LAND DEVELOPMENT WB
 [Signature] 2/4/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING DATE

SCHEDULE 'B' PARKING LOT INTERNAL LANDSCAPING

NUMBER OF PARKING SPACES	PLANTS REQUIRED	PLANTS PROVIDED
22	1:20 = 1 SHADE TREE	2 SHADE TREES

REVISIONS

NO.	DATE	DESCRIPTION

APPROVALS

NO.	DATE	NAME	TITLE

THE JOHNS HOPKINS UNIVERSITY
APPLIED PHYSICS LABORATORY
 JOHNS HOPKINS ROAD
 LAUREL, MARYLAND 20723-6099
 TAX MAP 41, GRID 16, PARCEL 1
 FIFTH (5TH) ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND

THE JOHNS HOPKINS UNIVERSITY

 LIBRARIES SERVICE CENTER

JHU/APL INTERNAL USE
 THIS DATA SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS RFP OR IN THE CASE OF A CONTRACT AWARD, TO PERFORM THE WORK REQUIRED HEREUNDER, WITHOUT THE EXPRESS WRITTEN CONSENT OF JHU/APL.
 GRAPHIC SCALE



MORRIS & RITCHIE ASSOCIATES, INC.
 ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
 14280 PARK CENTER DRIVE, SUITE A
 LAUREL, MARYLAND 20707
 (410) 782-9782 or (410) 776-1680
 FAX (410) 782-7395

LIGHTING AND LANDSCAPING PLAN

	JOB NO.: 13685
	SHEET: 18 OF 22

SCALE: 1"= 40'
 DES: LFB CHECK: DWM DATE: 01-17-05

PLANTING SPECIFICATIONS

PART 1 GENERAL:

1.01 DESCRIPTION:

- A. Work consists of all labor, materials, equipment and services necessary for and incidental to the execution and completion of the FINAL LANDSCAPE PLAN as indicated on the Drawings and specified herein.
- B. Includes:
 1. Layout.
 2. Fertilizing, protection and planting materials.
 3. Preparation, planting operations, mulching and staking.
 4. Maintenance.

1.02 REFERENCES AND QUALITY ASSURANCE:

- A. Landscape Contractors Association MD-DC-VA (LCA), Landscape Specification Guidelines, latest edition except where suggested by specific requirements herein.
- B. American Association of Nurserymen (A.A.N.): American Standard for Nursery Stock, A.A.N.S. 200.1, latest edition.
- C. Nomenclature: In accordance with Hortus Third, latest edition, by the staff of the L. H. Bailey Hortorium, Cornell University.
- D. Federal Specification: Q-P-1666 as applicable to Peat Moss.
- E. National Arborist Association, Standard for Pruning of Shade Trees, Guying of Shade Trees, Fertilizing Shade and Ornamental Trees and Pesticides Application Operations, latest edition.
- F. Maryland Department of Transportation, State Highway Administration (SHA) Standard Specifications for Construction and Materials, October 1993, as amended to date. Delete references to "Measurement and Payment".

1.03 STANDARD OF COMPARISON:

- A. When requested by the Owner's Representative, the Contractor shall obtain approval of a "standard" of comparison, prior to the delivery of plant material to the site.
 1. Contact the Owner's Representative to schedule an inspection for approval of the "standards" for plant material to be installed at the project site.
 2. "Standards" shall be assembled at the project site for review and approval, or at the Contractor's principal business location, as determined by the Owner's Representative. Approved "standards" may be placed at the project site.

1.04 SUBMITTALS:

- A. Source: Notify the Owner's Representative, in writing, of the source of all material at least ten (10) working days prior to delivery at the project site.
- B. Samples and Certifications:
 1. If requested, a much sample shall be provided at the site for approval by the Owner's Representative (1 C.F. minimum).
 2. Submit certification of peat moss compliance with referenced specifications.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Store plants that cannot be planted within 8 hours in a sheltered place. Water and maintain as required until planted.
- B. Transport and handle plants so that foliage and roots are protected from breakage, sun and wind. Tops or roots of plants allowed to dry out or which have been damaged or disturbed root systems may be rejected.
- C. B & B (balled and burlapped) plants: Firm, natural balls of soil, with size and depth of ball in accordance with A.A.N. Standards.

1.06 QUANTITIES AND SUBSTITUTIONS:

- A. Quantities of plant material are based upon the plant lists shown on the Drawings.
- B. Substitutions
 1. Bidders shall notify the Owner's Representative if specified plants are not available from sources within 100 miles of the project site, giving the names of all sources contacted.
 2. If an acceptable source cannot be located for the specified plants, the Owner's Representative will select a substitute and notify the Bidders of the approved substitution for the Bid to be based upon, or provide a source for the originally specified plant.
 3. Substituted plants shall be of the same size and condition as the original plant specified.

1.07 PROJECT CONDITIONS:

- A. Planting Season:
 1. Primary planting season: September 15 to May 15.
 2. Other periods with written approval from the Owner's Representative.
- B. Existing Conditions: Notify Miss UH914 (1-800-257-7777), and the Owner's Representative prior to planting operations. Verify the location of underground utilities.

1.08 DEFINITIONS:

- A. Diameter at Breast Height (DBH): The diameter of a tree measured at a point on the trunk 4.5 feet above the ground.
- B. Initial Acceptance: Occurs when all plant material is in place in accordance with the specifications and approved by the Owner's Representative.
- C. Maintenance Period: From initial acceptance of the plantings, and continuing thereafter for a period of 12 months.
- D. Owner's Representative: The Landscape Architect or other Qualified Professional designated by the Owner or Developer of the Project.
- E. Retention: The deliberate holding and protecting of existing trees, shrubs or herbaceous plants on the site.
- F. Specimen Tree: A tree which exists on the project site prior to construction or planting having a 30 inch or greater DBH, or tree having 75 percent or more of the diameter of the current state or county champion tree of that same species.
- G. Start of Planting: Installation of plant material into excavated pits or beds.
- H. Final Acceptance: Occurs after Contractor has completed all outstanding items, as determined by the Owner's Representative, at the end of the maintenance period.

1.09 SURVIVAL REQUIREMENT AND REPLACEMENTS:

- A. The minimum survival rate shall be 100 percent of the total number of trees and shrubs planted at the end of the 12-month maintenance period.
- B. Replacement materials shall be the same size as the original plant material taking into account any growth that has occurred since original installation.
- C. Methods of installation shall be identical to the original.

1.10 PENALTY FOR VIOLATION:

- A. Immediately following the completion of construction and installation of the plantings, the owner or owner's representative will be notified for an inspection of the entire project site.
 1. If, upon Final Acceptance Inspection, trees and other vegetation designated as retention plant material are found to be damaged or dead due to mechanical intrusion or related construction activities associated with the landscape contractors installation and maintenance of the said plan, then replacement equivalent will be required.

PART 2 PRODUCTS:

2.01 PLANTS:

- A. Plant materials shall meet or exceed the requirements of A.A.N. standards, or as amended herein.
- B. Plants shall be typical of the species and variety, and have a normal habit of growth with well established root systems.
- C. Sound, healthy, vigorous, free from plant diseases, insect pests or their eggs and without suckers or evidence of suckering.
- D. Trees and shrubs shall be freshly dug and nursery grown. They shall have been grown under climatic conditions similar to those in the locality of the project or properly acclimated to conditions of the project locality.
- E. Plants cut back from larger sizes or pruned prior to delivery will not be accepted. All container grown plants shall be well rooted & established in the container in which they are sold.
- F. Measurements: The caliper of deciduous trees (except seedlings and whips) shall be measured 6 inches above ground level for trees up to and including 4 inch caliper and 12 inches above ground level for material larger than 4 inch caliper. Seedlings and whips shall be measured at the root collar.

2.02 DECIDUOUS SHADE TREES:

- A. Single straight leader, well branched, and symmetrical, without suckers or evidence of suckering, according to their normal habit.
- B. Trees planted within five (5) feet of pedestrian ways, parking lots or roads shall be free from branches up to eight (8) feet in height from finish grade.

2.03 EVERGREENS:

- Sheared evergreen plant material shall not be acceptable.

2.04 SHRUBS:

- At least 75% of the individual branches or cones of a shrub shall be to the height specified.

2.05 HERBICIDES:

- A. Contact herbicide shall be "Round-up" or approved equal.
- B. Pre-emergence herbicide shall be "Snapshot" or approved equal.

2.06 TOPSOIL FOR AMENDING EXISTING SOIL:

- A. General Requirements (only where required by details on the Drawings):
 1. Natural, friable silt loam topsoil which is free of subsoil, clay lumps, stones, stumps, roots or similar objects larger than 1-inch.
 2. Free of brush, objectionable weeds and filler or other substances which is harmful to plant growth.
- B. In accordance with M.S.H.A. Item 920.01.02 for Fertilized Topsoil if borrow topsoil is required from an off-site location.

2.07 FERTILIZER FOR POST PLANTING:

- A. 5-10-5 (Plant food by minimum percentages):

(N)	5
(P2O2)	10
(K2O)	5
- B. Fertilizer shall be slow release over a minimum 3 year period. Fertilizer shall be delivered to the site with formulas attached.

2.08 PEAT MOSS:

- Baled sphagnum peat moss, Type I-A, conforming to Federal Specification Q-P-1666.

2.09 MULCH:

- A. Mulch shall be the following as indicated on the Drawings.
 1. Shredded hardwood.
 2. Pine Straw.
- B. Mulch shall have been prepared within the last four (4) months.

2.10 WATER:

Potable; if not available at the site from a public water supply, the Contractor shall provide water at no additional cost to the Owner.

2.11 ANTI-TRANSPARENT:

Shall be the following or approved equal:
 Will-Pruf
 Will-Pruf Products Inc.
 P. O. Box 469
 Essex, CT 06425
 (203) 767-7033
 or approved equal.

2.12 ACCESSORIES:

- A. Tree guying:
 1. Stakes: 2 inch x 2 inch rough sawn oak stakes, notched to hold wire, length as required to secure the tree.
 2. Wire: Galvanized steel wire, doubled.
 3. Sleeves: Nylon reinforced green vinyl hose.
- B. Tree shelters, netting and stakes: Extruded twin-walled polypropylene with ultra-violet stabilizer and anti-erosion film as manufactured by:
 - 1. Tubex
P.O. Box 7097
Saint Paul, MN 55107
(612) 228-0535
or approved equal.

PART 3 EXECUTION:

3.01 INITIAL INSPECTIONS:

- A. Pre-construction meeting:
 1. Prior to the beginning of any clearing, grading or disturbance of the site, a meeting at the project site shall be held with the Contractor and Owner's Representative.
 2. The following items, and others as deemed necessary, will be reviewed as applicable to the Project:
 - a) Staked limits of required retention areas and protection fencing, proposed limits of clearing and grubbing, and the proposed location of sediment control devices, and the sequence of operations.
 - b) Staking and flagging shall be completed by the Contractor prior to the pre-construction meeting.
 - c) Designated adjustments to the proposed limits and locations of items reviewed in the field during the pre-construction meeting shall be incorporated prior to beginning construction.

3.02 PREPARATION:

- A. Tree protection fencing, signage and other pre-construction activities noted on the Drawings for retention areas shall be installed prior to any on-site clearing or grading operations.
- B. Additional temporary, and permanent fencing, shall be installed in conjunction with or prior to planting operations as shown on the Drawings.
- C. Plant Locations: As shown on the Drawings, to dimensions if shown, or as detailed if not specified otherwise. Locations subject to review by the Owner's Representative prior to planting.
- D. Utilities: The Contractor shall locate existing and proposed utilities prior to excavation of planting holes.
 1. If a conflict is identified between the location of utilities and proposed planting locations, the Owner's Representative shall establish an alternate location for plants as required to avoid the conflict.
 2. Bidders shall notify the Owner's Representative of potential conflicts identified prior to submission of a Bid.

3.03 EXCAVATION:

- A. Unexcavated: Excavate and remove surplus materials encountered, without additional cost to the Owner. Retain only sufficient soil to form soil walls as shown on the Drawings. Disposal of surplus material may be on-site if approved by the Owner's Representative.

3.04 PLANTING PROCEDURES:

- A. Do not plant when ground is frozen or excessively wet.
- B. Set plants straight and plumb and at such a level that, after settlement the first lateral root to flush with the adjacent ground surface.
- C. When B&B or container plants are set, planting soil shall be carefully tamped around the base of the balls to prevent voids. All burrs, rope, wires, etc., shall be removed from the tops of balls. Plastic/nylon cards or cloth shall not be left in place on balled materials.
- D. Backfill plants and tamp to two-thirds depth of pit and thoroughly water before bringing backfill up to proper grade. Thoroughly water the plant again after the soil well has been completely formed in-place.
- E. Wells Around Trees and Shrubs: After planting is complete, form a soil well around designated plants, extending to the outer limit of the plant pit in accordance with the planting details shown on the Drawings.
- F. Designated Planting Beds: All vegetative growth shall be removed to a sufficient depth to insure a weed-free bed. Till the existing soil to a depth of 8-inches throughout the designated bed areas. The edge of all planting beds shall be cut vertically and the soil recessed within 1 foot of the bed edge so that the mulch is flush with adjacent grade when the installation has been completed.

3.05 MULCHING:

- A. Points and beds shall receive a 2 to 4 inch cover of mulch. Mulch shall be installed within 8 hours after planting has been completed.
- B. Mulch, surrounding planting areas, shall provide a uniform and contiguous surface, and space between and ground on plant material, buildings and paved areas.

3.06 STAKING, WRAPPING AND GUYING:

- A. Stake trees, which require staking as shown on the Drawings, during the same day as planting.
 1. Guying shall be in accordance with the Details.
 2. Stakes shall be securely driven in ground and plants guyed to provide and maintain adequate support.

3.07 PRUNING AND ANTI-TRANSPARENT APPLICATION:

- A. Pruning: Any broken or damaged branches shall be removed. Damage, removal or pruning of tree leaders shall be cause for rejection.
- B. Anti-transparent: Deciduous plants, installed from May 1st to September 15th, shall receive application in accordance with the manufacturer's recommendations.

3.08 POST-PLANTING FERTILIZATION:

- A. Notify Owner's Representative prior to fertilizing operations.
 1. Approximately 1 year after planting, but prior to the maintenance agreement's expiration, the Contractor shall fertilize all plant material. Plant foliage shall be completely dry at the time of application. Fertilizer adhering to plant foliage after application shall be removed. Water thoroughly after application.
 2. Rate of application shall be in accordance with the fertilizer manufacturer's recommendations or the following:
 1. Shrubs: 4 pounds of 5-10-5 per 100 square feet.
 2. Trees: 2 pounds of 5-10-5 per inch caliper distributed uniformly in planting well.

3.09 CLEAN-UP:

- A. Excess and waste materials shall be removed from the site before or upon completion of planting operations, or daily if required by the Owner's Representative.
- B. Repair turf areas and other existing conditions damaged during planting operations, including regrading, seeding and mulching to the satisfaction of the Owner's Representative.

3.10 WARRANTY:

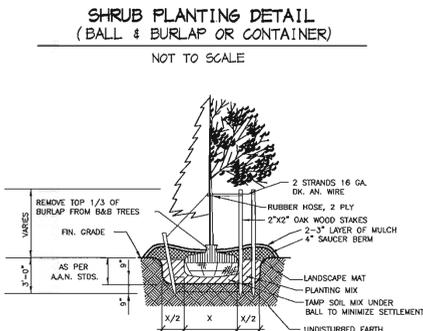
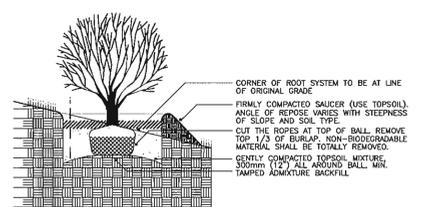
- A. Contractor shall warrant all plant material for a period of one (1) full year after the date of substantial completion against defects, unsatisfactory growth, disease or death.

3.11 MAINTENANCE:

- A. Contractor shall inspect and provide necessary services throughout the 12-month maintenance period.
 1. Watering as required for local conditions.
 2. Inspection for pests and diseases shall be performed a minimum of two (2) times within the initial year, after spring leaf-out and at mid-summer, or more frequently if necessary to control problems.
 3. Weeding and removal of invasive plants shall be performed a minimum of four (4) times per year, during the first two weeks of the months of May, June, July and August.
 4. Plant material shall be re-mulched, just prior to the maintenance agreement's expiration, with a minimum 1-inch depth of new mulch.
 5. Fencing, signs, stakes and guys shall be lighter, repaired or replaced as necessary throughout the maintenance period in accordance with original details and installation requirements. Ensure trees to remain plumb and upright.

3.12 ACCEPTANCE:

- A. Contractor shall contact the Owner at least ten working days in advance to schedule acceptance inspection(s).



SHADE, FLOWERING OR EVERGREEN TREE PLANTING DETAIL
NOT TO SCALE

GENERAL NOTES:

- 1. NO SUBSTITUTIONS OF PLANT MATERIAL SHALL BE PERMITTED WITHOUT WRITTEN AUTHORIZATION OF THE LANDSCAPE ARCHITECT AND/OR HOWARD COUNTY PLANNING AND ZONING. THIS SHALL APPLY TO SUBSTITUTIONS OF SPECIES, SIZE, QUANTITY, AND LOCATION.
- 2. TREES SHALL BE LOCATED A MINIMUM OF 5' FROM SEWER/WATER CONNECTIONS. CONTRACTOR SHALL BE LIABLE FOR DAMAGE TO ANY AND ALL PUBLIC AND PRIVATE UTILITIES, WATER AND SEWER LINES.
- 3. CONTRACTOR SHALL SLIGHTLY ADJUST PLANT LOCATIONS IN THE FIELD AS NECESSARY TO BE CLEAR OF DRAINAGE SWALES AND UTILITIES. FINISHED PLANTING BEDS SHALL BE GRADED SO AS NOT TO IMPEDE DRAINAGE AWAY FROM BUILDINGS.
- 4. SEEDED AREAS THAT WASH OUT MUST BE FILLED AND GRADED AS NECESSARY AND THE RESEDED. SOME TYPE OF ANCHORING METHOD SHOULD THEN BE USED TO HOLD SEED AND MULCH IN PLACE. THIS IS ESPECIALLY IMPORTANT AROUND WATER COURSES, IN SWALES AND AREAS OF CONCENTRATED FLOWS, AND ON SLOPES.
- 5. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL.
- 6. FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING MUST BE POSTED AS PART OF THE DPW DEVELOPERS AGREEMENT IN THE AMOUNT OF \$ 3,300,000. (7 SHADE TREES @ \$300.00 ea., 6 EVERGREEN @ \$150.00 ea.)

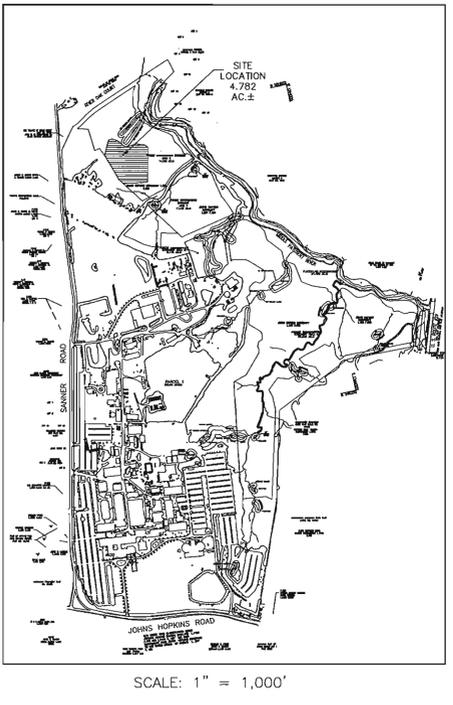
REVISIONS	

APPROVALS	
REQUESTER	
PLANT FACILITIES CHIEF	
DESIGNER	
CODE COMPLIANCE REVIEW	
TSC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTOR'S OFFICE	
COORDINATOR	
SENIOR LEADER	

THE JOHNS HOPKINS UNIVERSITY
APPLIED PHYSICS LABORATORY
 JOHNS HOPKINS ROAD
 LAUREL, MARYLAND 20723-6099
 TAX MAP 41, GRID 16, PARCEL 1
 FIFTH (5TH) ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND

THE JOHNS HOPKINS UNIVERSITY
LIBRARIES SERVICE CENTER

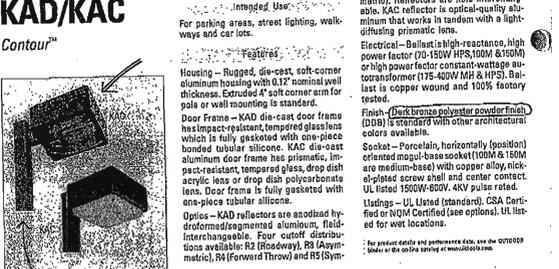
JHU/APL INTERNAL USE
 THIS DATA SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS RFP OR IN, THE CASE OF A CONTRACT AWARD, TO PERFORM THE WORK REQUIRED HEREUNDER, WITHOUT THE EXPRESS WRITTEN CONSENT OF JHU/APL.
 GRAPHIC SCALE



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 DATE: 1/21/05
 CHIEF, DEVELOPMENT ENGINEERING DIVISION
 DATE: 2/1/05
 CHIEF, DIVISION OF LAND DEVELOPMENT
 DATE: 2/1/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING

LIGHTING SPECIFICATIONS

08/23/2004 12:26 7172279552
 Arm-Mounted Drop or Flat Lens Cutoff POLE MOUNTED
 KAD/KAC Contour

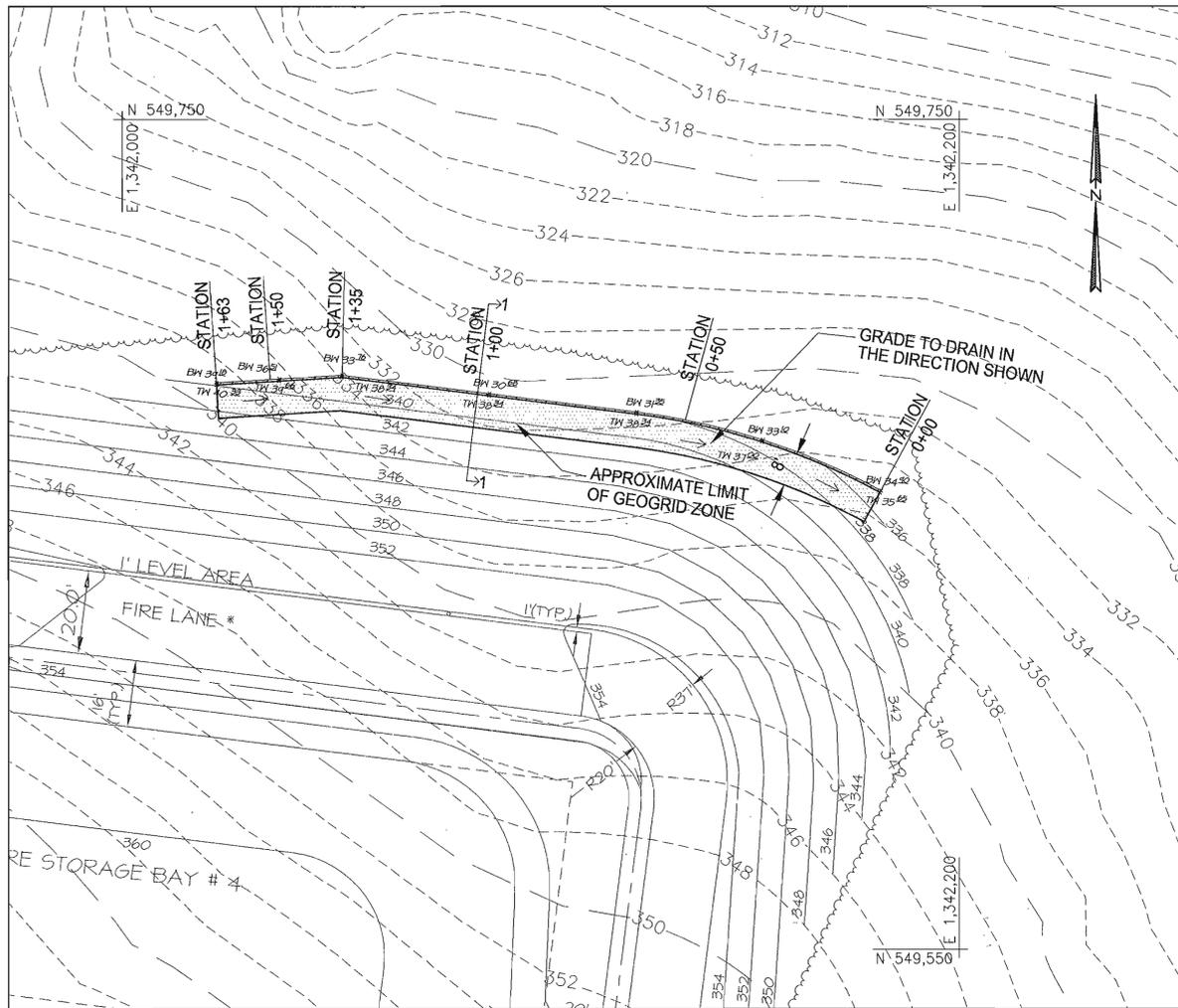


Ordering Information

25 FT. SQUARE ALUM. POLE

High Pressure Sodium	KAD	KAC
KAD 25S	KAD 100M	KAC 100M
KAD 100S	KAD 150M	KAC 150M
KAD 150S	KAD 200M	KAC 200M
KAD 200S	KAD 250M	KAC 250M
KAD 250S	KAD 300M	KAC 300M
KAD 300S	KAD 350M	KAC 350M
KAD 350S	KAD 400M	KAC 400M
KAD 400S	KAD 450M	KAC 450M
KAD 450S	KAD 500M	KAC 500M
KAD 500S	KAD 550M	KAC 550M
KAD 550S	KAD 600M	KAC 600M

Notes:
 1. Mount on 25' pole with 30" dia. base.
 2. Constructive height is 25' 30" to 25' 36" (to top of pole).
 3. Pole height is 25' 30" to 25' 36" (to top of pole).
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 72. Pole height is 25' 30" to 25' 36" (to top of pole).<



RETAINING WALL LOCATION PLAN

SCALE: 1" = 20'

The location plan was adopted from the "Johns Hopkins University, Libraries Service Center, Grading Plan", prepared by Morris & Ritchie Associates, Inc., dated July 20, 2004.

SEGMENTAL RETAINING WALL SPECIFICATIONS

PART 1 - GENERAL

- 1.1 Work includes furnishing and installing segmental retaining wall units, geogrid reinforcement, wall fill, and backfill to the lines and grades shown on the construction drawings and as specified herein. The contract also includes the furnishing and installing of all appurtenant materials, equipment, and labor required for construction of the geogrid reinforced, segmental retaining wall. All existing and proposed construction and site grading information was referenced from the Johns Hopkins, Libraries Service Center, Grading Plan, prepared by Morris & Ritchie Associates, Inc. dated July 20, 2004.
- 1.2 REFERENCE STANDARDS
 - A. ASTM C90-75 (1981 rev) - Hollow Load Bearing Masonry Units
 - B. ASTM C140-75 (1981 rev) - Sampling and Testing Concrete Masonry Units
 - C. ASTM C145-75 (1981 rev) - Solid Load Bearing Concrete Masonry Units
 - D. Geosynthetic Research Institute (GRI), GRI-GG4 - Determination of Long Term Design Strength of Geogrids.
 - E. ASTM D 638 - Test Method for Tensile Properties of Plastic
 - F. ASTM D 1248 - Specification of Polyethylene Plastics Molding and Extrusion Materials
 - G. ASTM D 4218 - Test Method for Carbon Black Content in Polyethylene Compounds by the Muffle Furnace Technique
 - H. ASTM D 3034 - Specification for Polyvinyl Chloride (PVC) Pipe
 - I. ASTM C 1372 - Specifications for Segmental Retaining Wall Units
- 1.3 DELIVERY, STORAGE AND HANDLING
 - A. Contractor should check the materials upon delivery to assure that proper material has been received.
 - B. Contractor should prevent excessive mud, wet cement, epoxy, and like materials which may offend themselves, from coming in contact with the materials.
 - C. Geogrids should be stored above -20 degrees F.
 - D. Contractor should protect the materials from damage. Damaged material should not be incorporated into the reinforced retaining wall.
- 1.4 SUBMITTALS/CERTIFICATION

The contractor shall submit a Manufacturer's certification prior to the start of the work, that the retaining wall system components meet the requirements of ASTM C 1372 and other requirements specified herein. This certification should be provided to the geotechnical engineer for review and approval prior to wall construction.

PART 2 - PRODUCTS

- 2.1 DEFINITIONS
 - A. Geogrid is a high density polyethylene, polyester, or polypropylene grid, specifically fabricated for use as a soil reinforcement.
 - B. Concrete retaining wall units are as detailed on the drawings and as specified herein.
 - C. Geosynthetic Drainage Composites are polyethylene net structure with non-woven geotextiles bonded to both sides.
 - D. Erosion Control Blankets consist of a web of polyolefin fibers securely bounded by polyolefin threads between two high strength polyolefin nets.
 - E. Backfill is the soil which is used as fill for the reinforced soil mass.
 - F. Foundation soil is the in-situ soil or controlled compacted fill placed below the bottom of the retaining wall and geogrid zone.
- 2.2 MATERIALS

The contractor should submit manufacturer's catalog and samples of the proposed materials for approval by the project geotechnical engineer a minimum of seven days before the start of construction. Materials should be transported to the site only after approval of the proposed materials by the project geotechnical engineer.

- A. Concrete Units
 1. Masonry units should be Keystone Standard II Retaining Wall Units. Substitution of other concrete units may be allowed with the prior approval of the Geotechnical Engineer.
 2. Concrete wall units should have a minimum 28 day compressive strength of 3000 psi, in accordance with ASTM C-90. The concrete should have adequate freeze/thaw protection with a maximum moisture absorption of 8 percent.
 3. Modular concrete materials shall conform to the requirements of ASTM C 1372 - Standard Specifications for Segmental Retaining Wall Units.
 4. The units shall pass 100 freeze/thaw cycles in water with less than 1% weight loss in accordance with ASTM C 1372.
 5. Exterior dimensions may vary. Units are required to have a minimum of one square foot of face area each.
 6. Units should have angled sides and be capable of attaining concave and convex alignment curves in accordance with manufacturer's recommendations.
 7. Units should be interlocked with non-corrosive reinforced fiberglass pins.
 8. Units should be interlocked as to provide a maximum of 1 inch of setback per block, where required.
- B. Leveling Pad

Material for leveling pad/footing should consist of compacted free-draining coarse aggregates meeting the requirements of ASTM #57 Stone or Graded Aggregate Base (GAB) per Maryland State Highway Administration Standard Specifications for Construction and Materials. A minimum of 6 inches deep and 30 inches wide compacted leveling pad is required.
- C. Fiberglass Connecting Pins
 1. Thermoset isophthalic polyester resin pultruded fiberglass reinforcement rods, a minimum one-half inch in diameter.
 2. Pins should have a minimum flexural strength of 128,000 psi and short beam shear of 6400 psi.
 3. For substitute concrete units, use of other compatible connector systems may be allowed with the prior approval of the geotechnical engineer.
- D. Geogrid

Geogrid should be Miragrid O7XT, or equivalent as approved by the geotechnical engineer. The geogrid should have an allowable strength of 1970 pounds per foot. The allowable strength is defined as the Ultimate Strength divided by reduction factors for creep, durability, installation damage and an overall factor of safety.
- E. Reinforced Backfill

Reinforced backfill soils should be non-plastic, controlled fill meeting the requirements of AASHTO A-2-4, or more granular. Based on the available subsurface information, suitable materials may be available from on-site excavations. However, segregation and stockpiling of suitable materials will be required. If adequate quantities of this material are not available on-site, imported backfill should meet the above requirements and should be approved by the geotechnical engineer.
- F. Controlled Fill

Controlled Fill soils to be placed outside the Reinforced Backfill area and where specified should consist of on-site or borrow soils meeting the requirements of AASHTO A-4 or more granular. All fill materials proposed to be placed behind the reinforced backfill should be placed as controlled fill compacted to 95 percent of maximum dry density in accordance with the Standard Proctor, ASTM D-698.
- G. Low-Permeability Soil

Low-permeability soils to be placed at the top of the wall where specified should consist of sandy, silty or clayey soils meeting the requirements of ML, CL, SM, or SC with a minimum of 25% passing the #200 sieve.
- H. Drainage Pipe

The drainage pipes should be perforated or slotted PVC pipe manufactured in accordance with ASTM D-3034.
- I. Filter Fabric

Filter Fabric should be non-woven, polypropylene geotextile, 140 N manufactured by Nicolon Mirafi Group or approved equivalent.
- J. Erosion Control Blanket

Erosion Control Blanket should be Tensor TB 1000 manufactured by the Tensor Corporation or approved equivalent.
- K. Drainage Composite

The Drainage GeoComposite should be DC4200 Geotextile manufactured by Evergreen Technologies, Inc. or approved equivalent.

PART 3 - EXECUTION

- A. Excavation
 1. The contractor should excavate to the lines and grades shown on the construction drawings. Under no circumstances should the excavation lines and grades be exceeded, except with owner's approval. The contractor should protect the excavation from sloughing by placing a membrane over the face of the excavation.
 2. Prior to retaining wall construction and the placement of fill, all topsoil should be stripped and removed from the site.
 3. Excavations should be sloped or otherwise supported in accordance with Occupation Safety and Health Administration (OSHA) and other local and state regulations.
- B. Foundation Subgrade Preparation
 1. Foundation soil should be excavated as required for installation of leveling pad, geogrid and other elements and as shown on the construction drawings.
 2. Foundation soil should be examined by the Engineer to assure that the actual foundation soil strength meets or exceeds assumed design strength. Soils not meeting required strength should be removed and replaced with controlled, compacted material.
 3. Over-excavated areas should be filled with select and approved material and compacted to 95 percent of maximum dry density in accordance with the Standard Proctor, ASTM D-698.
 4. Allowable bearing pressure for natural and controlled, compacted fill soils should be as specified in Part 5.
 5. The exposed foundation subgrade should be proofrolled with a loaded dump truck. Any soft or unstable areas identified during proofrolling should be overexcavated and backfilled with Controlled Fill.
 6. Any fills required to establish sloping surfaces in front of the walls should consist of Controlled Fill and should be placed, compacted and field tested in accordance with the requirements specified herein.
- C. Leveling Pad
 1. The leveling pad should be placed as shown on the construction drawings with a minimum thickness of 6 inches.
 2. Leveling pad materials should be installed upon undisturbed in-situ soils or controlled, compacted backfill.
 3. Leveling Pad should be prepared to insure complete contact of retaining wall unit with base. Gaps should not be allowed.
- D. Unit Installation
 1. First course of concrete wall units should be placed on the leveling pad. The units should be checked for level and alignment. The first course is the most important to provide accurate and acceptable results.
 2. Insure that units are in full contact with base.
 3. Units are placed side by side for full length of wall alignment. Alignment may be done by means of a string line or offset from base line.
 4. Install fiberglass connecting pin.
 5. Lay up each course insuring that the connecting pins are inserted through front slot of the unit, and into the receiving slot in the course beneath. Repeat procedure to the extent of wall height.
 6. At the end of each course where the wall changes elevation, units should be turned into the backfill. Units should be laid as to create the minimum radius possible. Unless otherwise shown on the drawings, a minimum of one unit should be installed into the grade. Only the front face of the units should be visible from the side of the wall.
 7. Convex and concave curves should be made using compoc units or by trimming the Standard II units as required in accordance with manufacturer's recommendations.
 8. Cap units should be installed and bonded with construction adhesive or epoxy cement as required by manufacturer.
 9. Contractor should provide positive drainage for the back of the retaining wall during construction.
- E. Geogrid Installation
 1. All utilities in the vicinity of any retaining wall or geogrid reinforcement must be installed and properly backfilled prior to placing the geogrid soil reinforcement or constructing the wall.
 2. The geogrid soil reinforcement should be laid horizontally on compacted backfill, connected to the concrete wall units. Hook grid over the fiberglass connecting pin, pull taut, and anchor before backfill is placed on the geogrid.
 3. Stack in the geogrid at the wall unit connections should be removed in a manner, and to such a degree, as approved by the Engineer.
 4. Geogrid should be laid at the proper elevation and orientation as shown on the construction drawings or as directed by the Engineer.
 5. Correct orientation (roll direction) of the geogrid should be verified by the Contractor.
 6. Geogrid should be secured in-place with staples, pins, sand bags, or backfill as required by fill properties, fill placement procedures, or weather conditions, or as directed by the Engineer.
 7. Overlaps
 - a. Uniaxial geogrid does not need to be overlapped in the across the roll direction, except to contain the fill at the slope face when wrap-around facing is used. Uniaxial grid should be overlapped 48" in the rolled direction.
 - b. A layer of soil a minimum of 4 inches in thickness should be spread between uniaxial geogrid layers in the area to be overlapped, or as directed.
- F. Fill Placement
 1. Wall backfill material should be placed in no more than 8-inch lifts and compacted to 95 percent of the Standard Proctor (ASTM D-698).
 2. Backfill should be placed, spread, and compacted in such a manner that minimizes the development of wrinkles in and/or movement of the geogrid.
 3. Only hand-operated compaction equipment should be allowed within 4 feet of the wall face.
 4. Backfill should be placed from the wall outward to insure that the geogrid remains taut.
 5. Tracked construction equipment should not be operated behind or above the wall.
 6. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds, less than 10 MPH. Sudden braking and sharp turning should be avoided.
 7. Place filter fabric between the unit core fill and the reinforced backfill as shown on plans. The filter fabric should be embedded a minimum of two feet into the reinforced fill.
 8. The finished sloping surface on the toe side of retaining walls should be protected by installing the permanent erosion control blanket and seeding in accordance with project requirements.
- G. DRAINAGE
 1. Drainage fill should be placed behind the wall to the limits shown. The drainage fill should be a minimum of 12-inches thick. The drainage fill should be ASTM #57 stone. The drainage fill should be wrapped in filter fabric (Mirafi 140N or equal) as shown on the drawings.
 2. Positive drainage should be maintained during and after construction. Soils within the reinforced zone that become wet during construction should be dried to optimum moisture or removed.
 3. Install the perforated drainage pipes and lateral drainage pipes incrementally along with the installation of concrete units and placement of fill.

PART 4 - CONSTRUCTION OBSERVATION AND TESTING

- A. Retaining walls should only be constructed under the observation of a Registered Professional Engineer and a certified (NICET, WACEL, or equivalent) soils technician.
- B. The required bearing pressure beneath the footing of the wall should be verified in the field by a certified soils technician. Testing documentation must be provided to the geotechnical engineer prior to the start of wall construction. The required test procedure shall be the Dynamic Cone Penetrometer (DCP) test ASTM STP-399.
- C. The suitability of fill material should be confirmed by the on-site soils technician.

PART 5 - DESIGN CRITERIA

1. Required minimum allowable foundation bearing pressure is 2,000 psf.
2. Design internal friction angle for reinforced soil = 30 degrees.
3. Design moist unit weight for reinforced soil = 125 pcf.
4. Retained soil internal friction angle = 30 degrees and cohesion = 0 psf.
5. Retained soil design moist unit weight = 125 pcf.
6. Foundation soil internal friction angle = 28 degrees and cohesion = 0 psf.
7. Foundation soil design moist unit weight = 120 pcf.
8. Retaining walls are not designed to resist hydrostatic pressure.

REVISIONS	

APPROVALS	

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APPLIED PHYSICS LABORATORY
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GRAPHIC SCALE



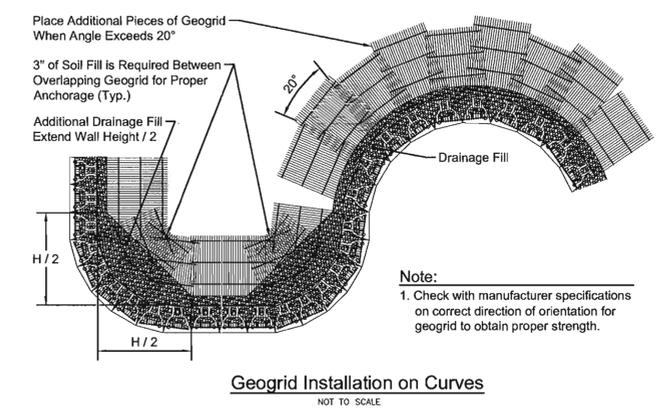
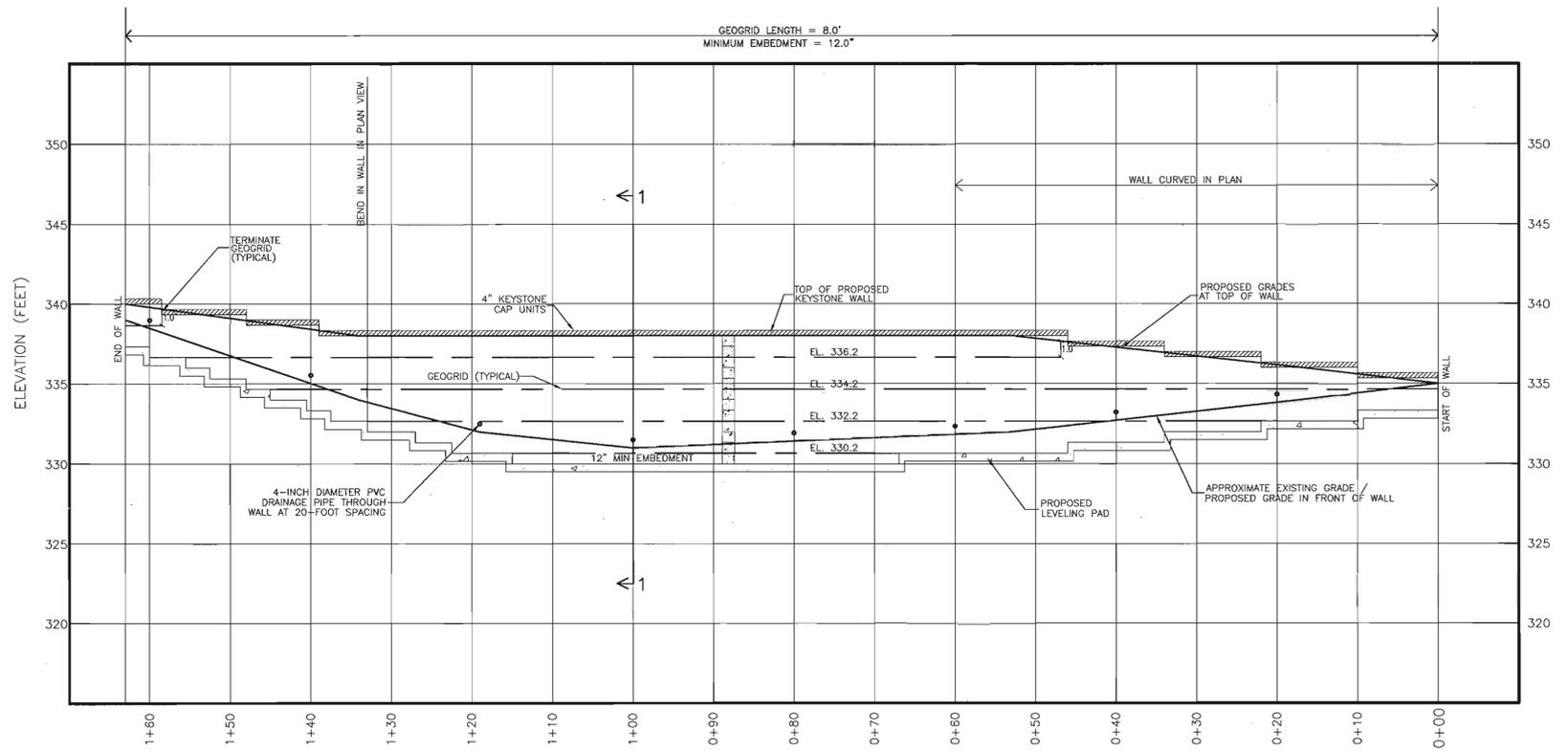
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 FAX (410) 792-7995

RETAINING WALL PLAN AND GENERAL NOTES

	JOB NO.: 13685
	SDP-20
1-17-05	SHEET: 20 OF 22
SCALE: AS SHOWN	
DES: SPL	CHECK: RPM DATE: 01-17-05

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Cheryl D. ... 1/31/05
 CHIEF, DEVELOPMENT ENGINEERING DIVISION
Cheryl D. ... 2/4/05
 CHIEF, DIVISION OF LAND DEVELOPMENT
Mark D. ... 2/3/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING

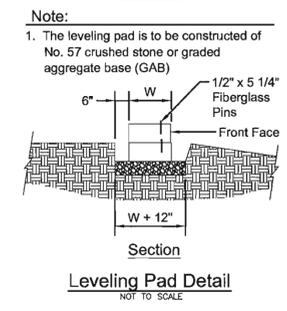
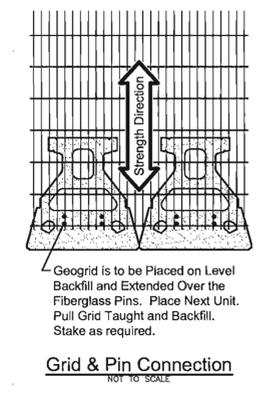
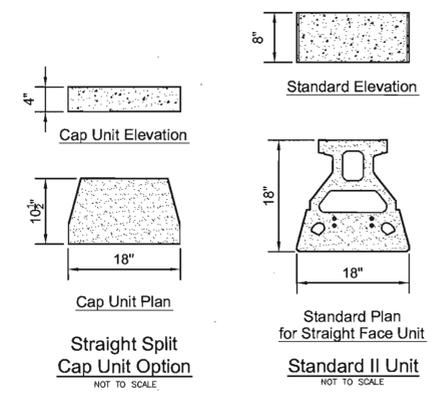
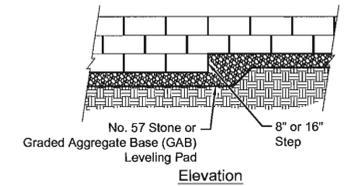
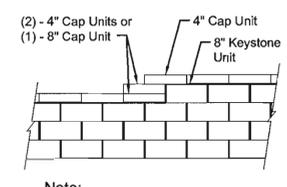
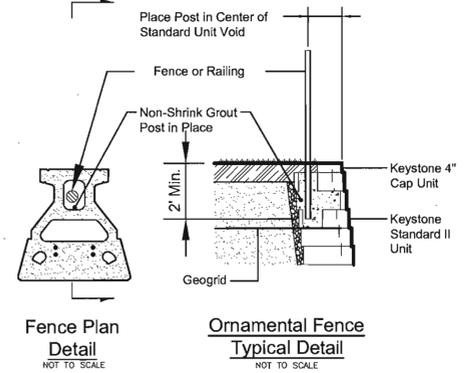
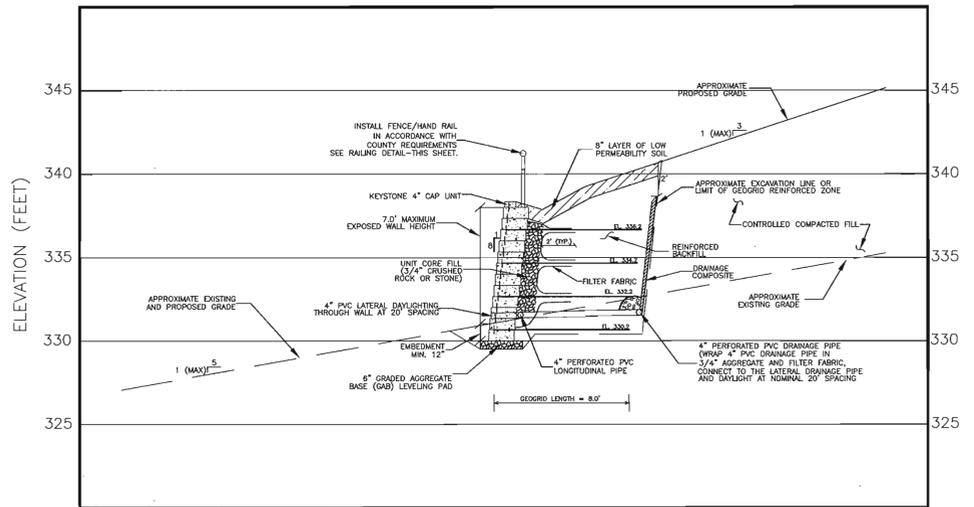
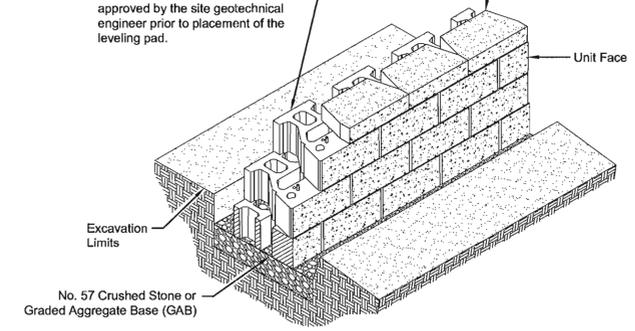
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 FAX (410) 792-7395



Base Leveling Pad Notes:

- The leveling pad is to be constructed of No. 57 crushed stone or GAB.
- The base foundation is to be approved by the site geotechnical engineer prior to placement of the leveling pad.

	Standard Unit	Cap Unit
Width:	18"	18"
Depth:	18"	10 1/2"
Height:	8"	4"
Weight:	108 lbs	50 lbs



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chad Hamilton MK 1/2/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

David Hamilton 2/4/05
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

David Hamilton 2/2/05
DIRECTOR, DEPARTMENT OF PLANNING AND ZONING DATE

GTA

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REQUESTER	
PLANNING DIVISION CHIEF	
CODE COMPLIANCE REVIEW	
TIC GROUP	
TIP GROUP	
SAFETY OFFICER	
ENGINEERING OFFICER	
COORDINATOR	
SENIOR LEADER	

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LAUREL, MARYLAND 20723-6099

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GRAPHIC SCALE	

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ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS

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FAX (410) 792-7395

RETAINING WALL PROFILE, TYPICAL SECTION AND DETAILS

STATE OF MARYLAND PROFESSIONAL ENGINEER

JOB NO.: 13685

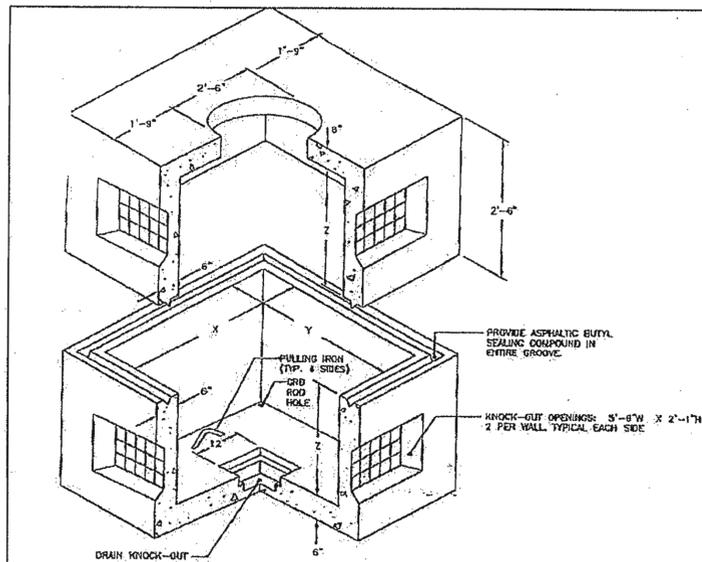
SDP-21

1-17-05 SHEET: 21 OF 22

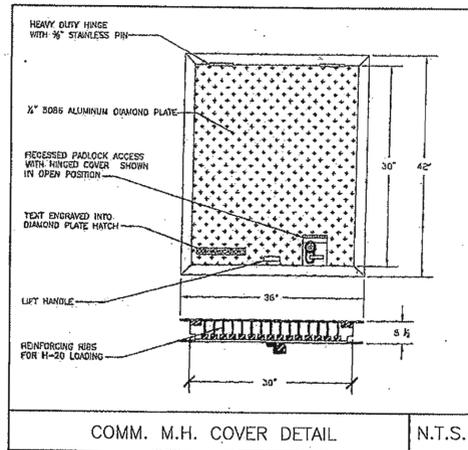
SCALE: AS SHOWN

DES: SPL CHECK: RPM DATE: 01-17-05

SDP-05-42



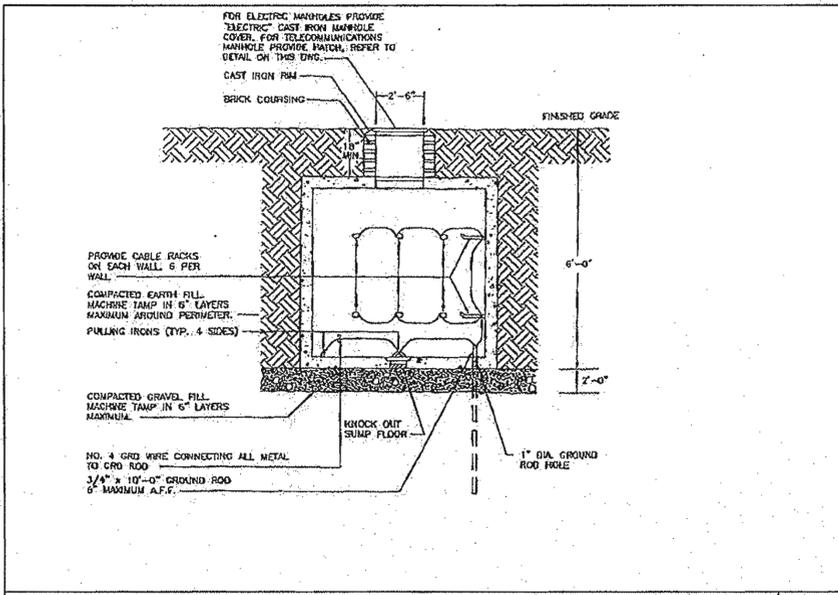
COMMUNICATIONS MANHOLE DETAIL # 1 N.T.S.



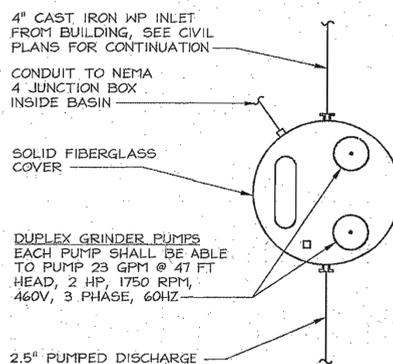
COMM. M.H. COVER DETAIL N.T.S.



FOR COMM. M.H. ONLY

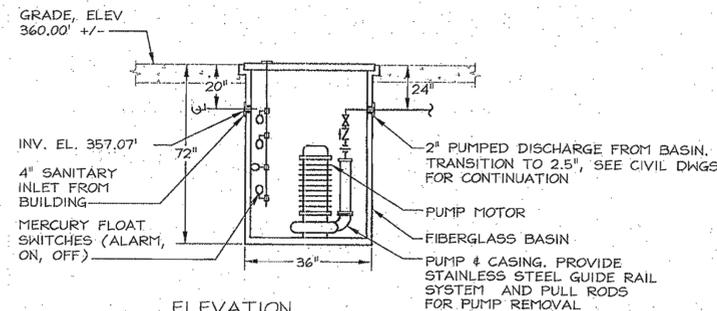


COMMUNICATIONS MANHOLE DETAIL # 2 N.T.S.



PLAN

NOTE: GRINDER PUMP SHALL BE PROVIDED AS A TURNKEY PRE-PACKAGED SYSTEM BY PENTAIR, WITH REMOTE CONTROL AND ALARM PANEL. PANEL SHALL BE MONITORED BY JOHNSON CONTROLS METASYS SYSTEM.



ELEVATION

DUPLIX SUBMERSIBLE GRINDER PUMP NOT TO SCALE

REVISIONS	

APPROVALS	
REQUESTER	
PLANT FACILITIES CHIEF	
DISCHIEF	
CODE COMPLIANCE REVIEW	
TSC GROUP	
TIP CHECK	
SAFETY OFFICER	
DIRECTOR'S OFFICE	
COORDINATOR	
SENIOR LEADER	

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GRAPHIC SCALE

Mullins
 Engineering Co., Inc.
 1257 ANNAPOLIS ROAD
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 410-519-0800
 FAX: 410-672-3977

MRA
 MORRIS & RITCHIE ASSOCIATES, INC.
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 14280 PARK CENTER DRIVE, SUITE A
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 (410) 782-8782 or (301) 778-1890
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GRINDER PUMP

JOB NO.: 13685

SDP-22

1-17-05 SHEET: 22 OF 22

SCALE: N.T.S.

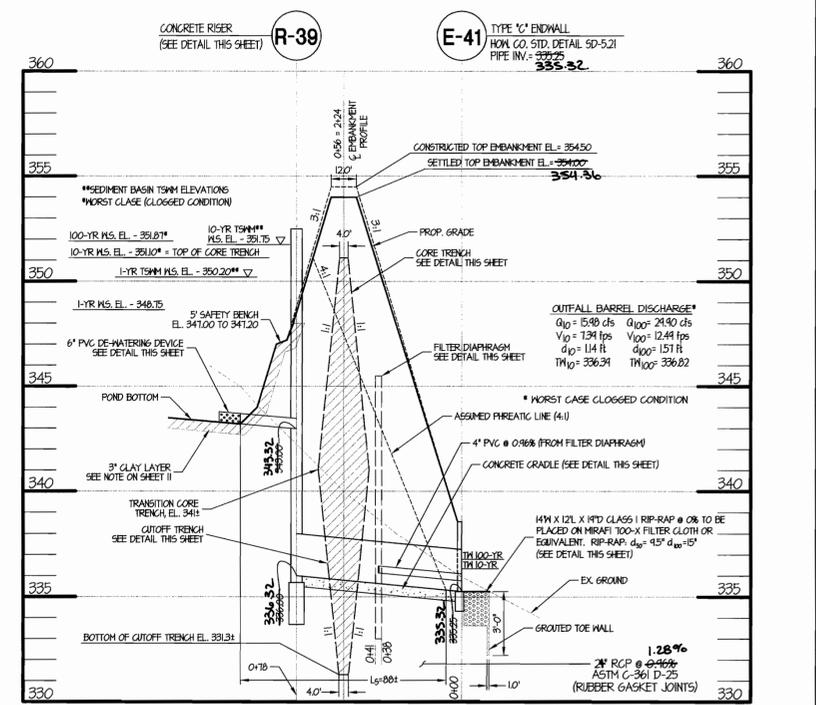
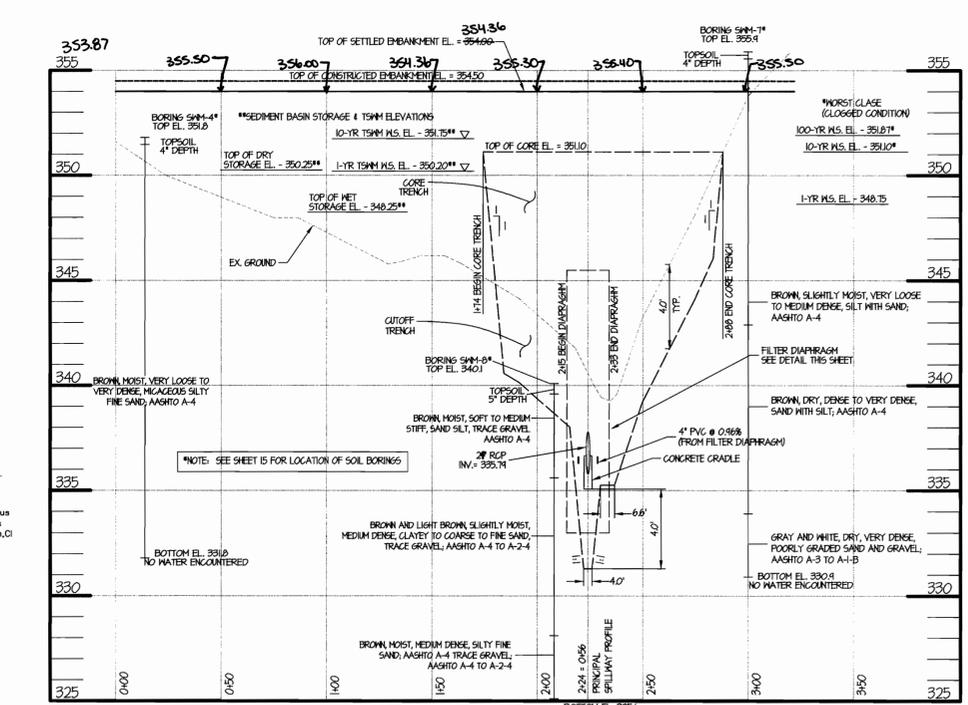
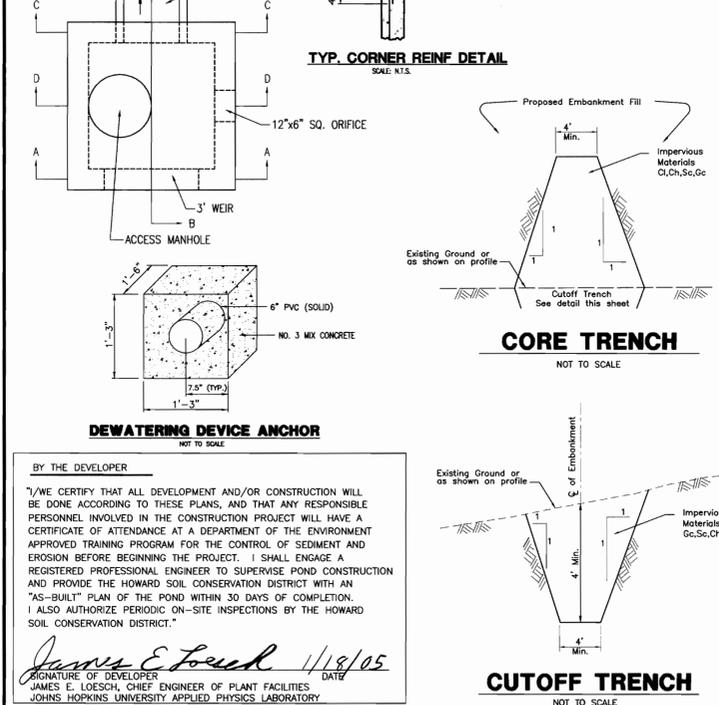
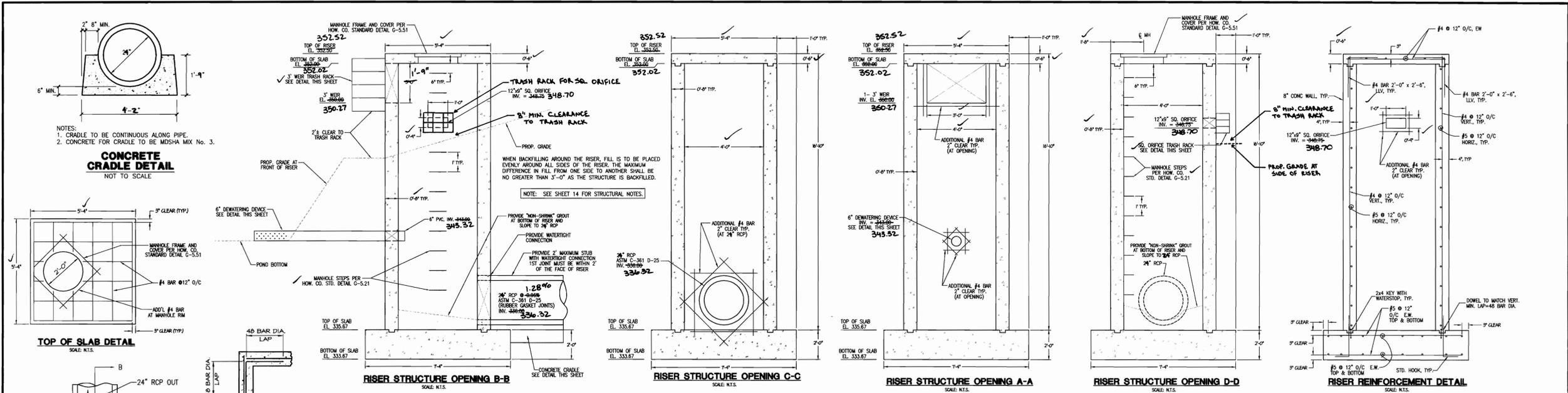
DES: AEM CHECK: AEM DATE: 01-17-05

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Mark D. Uygale MK 1/31/05
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Chris Hanover VBP 2/4/05
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Mark D. Uygale 2/2/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING DATE



BY THE DEVELOPER
I, JAMES E. LOESCH, 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.

James E. Loesch 1/18/05
SIGNATURE OF DEVELOPER DATE
JAMES E. LOESCH, CHIEF ENGINEER OF PLANT FACILITIES
JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY

BY THE ENGINEER
I 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 HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

Thomas C. Neugebauer, P.E. 1-17-05
SIGNATURE OF ENGINEER DATE
THOMAS C. NEUGEBAUER, P.E. MD LIC.#29203

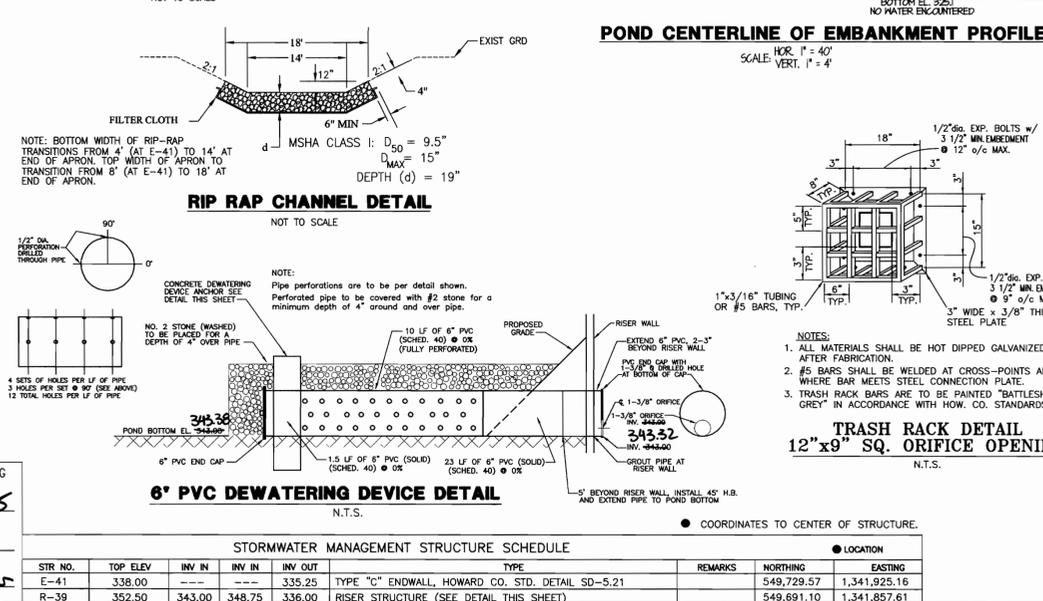
THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL.

Jim Hays 1/26/05
U.S.D.A.-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.

Paula A. 1/26/05
HOWARD SOIL CONSERVATION DISTRICT DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
CHIEF, DEVELOPMENT ENGINEERING DIVISION MK 1/21/05
Cindy Hamrick 2/4/05
CHIEF, DIVISION OF LAND DEVELOPMENT DATE
David A. 2/3/05
DIRECTOR, DEPARTMENT OF PLANNING AND ZONING DATE



STORMWATER MANAGEMENT STRUCTURE SCHEDULE

STR. NO.	TOP ELEV.	INV. IN.	INV. OUT.	TYPE	REMARKS	NORTHING	EASTING
E-41	338.00	---	335.25	TYPE "C" ENDWALL, HOWARD CO. STD. DETAIL SD-5.21		549,729.57	1,341,925.16
R-39	352.50	343.00	348.75	336.00	RISER STRUCTURE (SEE DETAIL THIS SHEET)	549,691.10	1,341,857.61

SWM PIPE SCHEDULE

SIZE	TYPE	LENGTH
24"	ASTM C-361 D-25	78'
6"	SCHEDULE 40	35'
4"	SDR 35 (FILTER DPM)	90'

GRADATION CHART FOR ASTM C-33 CONCRETE SAND

SIZE	% PASSING	NO. 10	NO. 20	NO. 40	NO. 60	NO. 100	NO. 200
3/8"	5.0	100	100	100	100	100	100
NO. 4	4.75	100	100	100	100	100	100
NO. 10	2.00	100	100	100	100	100	100
NO. 20	0.850	100	100	100	100	100	100
NO. 40	0.425	100	100	100	100	100	100
NO. 60	0.250	100	100	100	100	100	100
NO. 100	0.150	100	100	100	100	100	100
NO. 140	0.106	100	100	100	100	100	100
NO. 200	0.075	100	100	100	100	100	100

REVISIONS

NO.	DESCRIPTION	DATE
1	AS-BUILT INFO ADDED	03/06

APPROVALS

REQUESTER	DATE
PLANT FACILITIES DIVISION	
ENGINEERING	
CONSTRUCTION REVIEW	
TSC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTORS OFFICE	
COORDINATOR	
SENIOR DESIGNER	

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FAX (410) 782-7385

SWM PLAN 2
JOB NO.: 13685
SDP-12
SHEET: 12 OF 22
SCALE: 1" = 40'
DES: KKB CHECK: TCN DATE: 01-17-05

INFILTRATION TRENCH GENERAL NOTES AND SPECIFICATIONS

- AN INFILTRATION TRENCH MAY NOT RECEIVE RUN-OFF UNTIL THE ENTIRE CONTRIBUTING DRAINAGE AREA TO THE INFILTRATION TRENCH HAS RECEIVED FINAL STABILIZATION.
- HEAVY EQUIPMENT AND TRAFFIC SHALL BE RESTRICTED FROM TRAVELING OVER THE PROPOSED LOCATION OF THE INFILTRATION TRENCH TO MINIMIZE COMPACTION OF THE SOIL.
- EXCAVATE THE INFILTRATION TRENCH TO THE DESIGN DIMENSIONS. EXCAVATED MATERIALS SHALL BE PLACED AWAY FROM THE TRENCH SIDES TO ENHANCE TRENCH WALL STABILITY. LARGE TREE ROOTS MUST BE TRIMMED FLUSH WITH THE TRENCH SIDES IN ORDER TO PREVENT FABRIC PUNCTURING OR TEARING OF THE FILTER FABRIC DURING SUBSEQUENT INSTALLATION PROCEDURES. THE SIDE WALLS OF THE TRENCH SHALL BE ROUGHENED WHERE SHEARED AND SEALED BY HEAVY EQUIPMENT.
- A CLASS "C" GEOTEXTILE OR BETTER (SEE SECTION 24.0, MATERIAL SPECIFICATIONS, 1994 STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, MDE, 1994) SHALL INTERFACE BETWEEN THE TRENCH SIDE WALLS AND BETWEEN STONE RESERVOIR AND GRAVEL FILTER LAYERS. A PARTIAL LIST OF NON-WOVEN FABRICS THAT MEET THE CLASS "C" CRITERIA FOLLOWS. ANY ALTERNATIVE FILTER FABRIC MUST BE APPROVED BY THE PLAN APPROVAL AUTHORITY.
 - AMOCO 4552
 - GEOLON N70
 - WESTEC N07
 - CARTHAGE FX-80S
 - MIRAFI 180-N

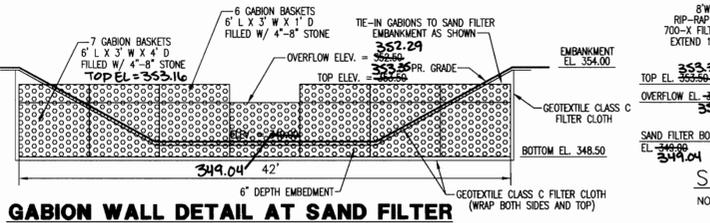
THE WIDTH OF GEOTEXTILE MUST INCLUDE SUFFICIENT MATERIAL TO CONFORM TO THE TRENCH PERMETER IRREGULARITIES AND FOR A 6-INCH MINIMUM TOP OVERLAP. THE FILTER FABRIC SHALL BE TUCKED UNDER THE SAND LAYER ON THE BOTTOM OF THE INFILTRATION TRENCH FOR A DISTANCE OF 6 TO 12 INCHES. STONES OR OTHER ANCHORING OBJECTS SHOULD BE PLACED ON THE FABRIC AT THE EDGE OF THE TRENCH TO KEEP THE TRENCH OPEN DURING WINDY PERIODS. WHEN OVERLAPS ARE REQUIRED BETWEEN ROLLS, THE UPHILL ROLL SHOULD LAP A MINIMUM OF 2 FEET OVER THE DOWNHILL ROLL IN ORDER TO PROVIDE A SINGLE EFFECT.

- IF A 6" SAND FILTER LAYER IS PLACED ON THE BOTTOM OF THE INFILTRATION TRENCH, THE SAND FOR THE FILTER LAYER SHALL BE WASHED AND MEET AASHTO-M-43, SIZE NO. 9 OR NO. 10. ANY ALTERNATIVE SAND GRADATION MUST BE APPROVED BY THE PLAN APPROVAL AUTHORITY.
- THE STONE AGGREGATE SHOULD BE PLACED IN A MAXIMUM LOOSE LIFT THICKNESS OF 12 INCHES. THE GRAVEL (ROUNDED "BANK RUN" GRAVEL IS PREFERRED) FOR THE INFILTRATION TRENCH SHALL BE WASHED AND MEET ONE OF THE FOLLOWING AASHTO-M-43, SIZE NO. 2 OR NO. 3.
- FOLLOWING THE STONE AGGREGATE PLACEMENT, THE FILTER FABRIC SHALL BE FOLDED OVER THE STONE AGGREGATE TO FORM A 6-INCH MINIMUM LONGITUDINAL LAP. THE DESIRED FILL SOIL OR STONE AGGREGATE SHALL BE PLACED OVER THE LAP AT SUFFICIENT INTERVALS TO MAINTAIN THE LAP DURING SUBSEQUENT BACKFILLING.
- CARE SHALL BE EXERCISED TO PREVENT NATURAL OR FILL SOILS FROM INTERMIXING WITH THE STONE AGGREGATE. ALL CONTAMINATED STONE AGGREGATE SHALL BE REMOVED AND REPLACED WITH UNCONTAMINATED STONE AGGREGATE.
- VOIDS MAY OCCUR BETWEEN FABRIC AND THE EXCAVATION SIDES SHALL BE AVOIDED. REMOVING BOULDERS OR OTHER OBSTACLES FROM THE TRENCH WALLS IS ONE SOURCE OF SUCH VOIDS. THEREFORE, NATURAL SOILS SHOULD BE PLACED IN THOSE VOIDS AT THE MOST CONVENIENT TIME DURING CONSTRUCTION TO ENSURE FABRIC CONFORMITY TO THE EXCAVATION SIDES.
- VERTICALLY EXCAVATED WALLS MAY BE DIFFICULT TO MAINTAIN IN AREAS WHERE SOIL MOISTURE IS HIGH OR WHERE SOFT COHESIVE OR COHESIONLESS SOILS ARE DOMINANT. THESE CONDITIONS MAY REQUIRE LAYING BACK OF THE SIDE SLOPES TO MAINTAIN STABILITY.
- PVC DISTRIBUTION PIPES SHALL BE SCHEDULE 40 AND MEET ASTM-D-1785. ALL FITTINGS SHALL MEET ASTM-D-2729. PERFORATIONS SHALL BE 3/8" IN DIAMETER. A PERFORATED PIPE SHALL BE PROVIDED ONLY WITHIN THE INFILTRATION TRENCH AND SHALL TERMINATE 1 FOOT SHORT OF THE INFILTRATION TRENCH WALL. THE END OF THE PVC PIPE SHALL BE CAPPED. NOTE: PVC PIPE WITH A WALL THICKNESS CLASSIFICATION OF SDR-35 MEETING ASTM-D-3034 IS AN ACCEPTABLE SUBSTITUTE FOR THE SCHEDULE 40 PIPE.
- THE OBSERVATION WELL IS TO CONSIST OF 6-INCH DIAMETER PERFORATED PVC SCHEDULE 40 PIPE (M278 OR F758, TYPE PS 28) WITH A CAP SET FLUSH TO FINAL PAVED SURFACE AND IS TO BE LOCATED NEAR THE LONGITUDINAL CENTER OF THE INFILTRATION TRENCH. THE PIPE SHALL HAVE A PLASTIC COLLAR WITH RISERS TO PREVENT ROTATION WHEN REMOVING THE CAP. THE SCREW TOP LID SHALL BE A CLEANOUT WITH A LOCKING MECHANISM OR SPECIAL BOLT TO DISCOURAGE VANDALISM. THE DEPTH TO THE INVERT SHALL BE MARKED ON THE LID. THE PIPE SHALL BE PLACED VERTICALLY WITHIN THE GRAVEL PORTION OF THE INFILTRATION TRENCH AND A CAP PROVIDED AT THE BOTTOM OF THE PIPE. THE BOTTOM OF THE CAP SHALL REST ON THE INFILTRATION TRENCH BOTTOM.
- CORRUGATED METAL DISTRIBUTION PIPES SHALL CONFORM TO AASHTO-M-36, AND SHALL BE ALUMINIZED IN ACCORDANCE WITH AASHTO-M-274. ALUMINIZED PIPE IN CONTACT WITH CONCRETE SHALL BE COATED WITH AN INERT COMPOUND CAPABLE OF PREVENTING THE DECELERIOUS EFFECT OF ALUMINUM ON THE CONCRETE. PERFORATED DISTRIBUTION PIPES SHALL CONFORM TO AASHTO-M-36, CLASS 2 AND SHALL BE PROVIDED ONLY WITHIN THE INFILTRATION TRENCH AND SHALL TERMINATE 1 FOOT SHORT OF THE INFILTRATION TRENCH WALL. AN ALUMINIZED METAL PLATE SHALL BE WELDED TO THE END OF THE PIPE.
- IF A DISTRIBUTION STRUCTURE WITH A WET WELL IS USED, A 4-INCH DRAIN PIPE SHALL BE PROVIDED AT OPPOSITE ENDS OF THE INFILTRATION TRENCH DISTRIBUTION STRUCTURE. TWO (2) CUBIC FEET OF POROUS BACKFILL MEETING AASHTO-M-43, SIZE NO. 57 SHALL BE PROVIDED AT EACH DRAIN.
- IF A DISTRIBUTION STRUCTURE IS USED, THE MANHOLE COVER SHALL BE BOLTED TO THE FRAME.

- SAND FILTER SPECIFICATIONS**
- MATERIAL SPECIFICATIONS FOR SAND FILTER
- THE ALLOWABLE MATERIALS FOR SAND FILTER CONSTRUCTION ARE DETAILED IN TABLE B.3.1. (SEE PAGE SDP-3)
- SAND FILTER TESTING SPECIFICATIONS
- UNDERGROUND SAND FILTERS, FACILITIES WITHIN SENSITIVE GROUNDWATER AQUIFERS, AND FILTERS DESIGNED TO SERVE URBAN HOT SPOTS ARE TO BE TESTED FOR WATER TIGHTNESS PRIOR TO PLACEMENT OF FILTER MEDIA. ENTRANCES AND EXITS SHOULD BE PLUGGED AND THE SYSTEM COMPLETELY FILLED WITH WATER TO DEMONSTRATE WATER TIGHTNESS. WATER TIGHTNESS MEANS NO LEAKAGE FOR A PERIOD OF 8 HOURS.
- ALL OVERFLOW WEIRS, MULTIPLE ORIFICES AND FLOW DISTRIBUTION SLOTS ARE TO BE FIELD-TESTED TO VERIFY ADEQUATE DISTRIBUTION OF FLOWS.
- SAND FILTER CONSTRUCTION SPECIFICATIONS
- PROVIDE SUFFICIENT MAINTENANCE ACCESS (I.E., 12-FOOT-WIDE ROAD WITH LEGALLY RECORDED EASEMENT). VEGETATED ACCESS SLOPES ARE TO BE MAXIMUM OF 10% GRADE WITH 2% SLOPES TO 25% ABSOLUTELY NO RUNOFF IS TO ENTER THE FILTER UNTIL ALL CONTRIBUTING DRAINAGE AREAS HAVE BEEN STABILIZED. SURFACE OR FILTER BED IS TO BE LEVEL.
- ALL UNDERGROUND SAND FILTERS SHOULD BE CLEARLY DELINEATED WITH SIGNS SO THAT THEY MAY BE LOCATED WHEN MAINTENANCE IS DUE. SURFACE SAND FILTERS MAY BE PLANTED WITH APPROPRIATE GRASSES. SEE APPENDIX A.
- "POCKET" SAND FILTERS (AND RESIDENTIAL BIORETENTION FACILITIES TREATING AREAS LARGER THAN AN ACRE) SHALL BE SIZED WITH A STONE "WINDOW" THAT COVERS APPROXIMATELY 10% OF THE FILTER AREA. THIS "WINDOW" SHALL BE FILLED PEA GRAVEL (3/4" INCH STONE).

- OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED SURFACE STORMWATER FILTRATION SYSTEMS**
- THE STORMWATER WETLAND FACILITY SHALL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHALL BE PERFORMED DURING WET WEATHER TO DETERMINE IF THE FACILITY IS FUNCTIONING PROPERLY.
 - THE TOP AND SIDE SLOPES OF THE EMBANKMENT SHALL BE MOWED A MINIMUM OF ONCE A YEAR, WHEN VEGETATION REACHES 18" IN HEIGHT OR AS NEEDED.
 - FILTERS THAT HAVE A GRASS COVER SHALL BE MOWED A MINIMUM OF 3 (THREE) TIMES PER GROWING SEASON TO MAINTAIN A MAXIMUM GRASS HEIGHT OF LESS THAN 12 INCHES.
 - DEBRIS AND LITTER SHALL BE REMOVED DURING REGULAR MOWING OPERATION AND AS NEEDED.
 - VISIBLE SIGNS OF EROSION IN THE FACILITY SHALL BE REPAIRED AS SOON AS IT IS NOTICED.
 - REMOVE SILT WHEN IT EXCEEDS 4 (FOUR) INCHES DEEP IN THE FOREBAY.
 - WHEN WATER PONDS ON THE SURFACE OF THE FILTER BED FOR MORE THAN 72 HOURS, THE TOP FEW INCHES OF DISCOLORED MATERIAL SHALL BE REPLACED WITH FRESH MATERIAL. PROPER CLEANING AND DISPOSAL OF THE REMOVED MATERIALS AND LIQUID MUST BE FOLLOWED BY THE OWNER.
 - A LOG BOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH FACILITY DRAINS.
 - THE MAINTENANCE LOG BOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
 - ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION SYSTEM HAVE BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.

- GRADATION CHART FOR ASTM C-33 CONCRETE SAND**
- | SEIVE SIZE | mm | % PASSING |
|------------|-------|-----------|
| 3/8 IN. | 9.5 | 100 |
| No.4 | 4.75 | 90-100 |
| No.10 | 2.00 | 70-100 |
| No.20 | 0.850 | 50-85 |
| No.50 | 0.300 | 25-50 |
| No.100 | 0.150 | 8-30 |
| No.140 | 0.106 | 0-15 |
| No.200 | 0.075 | 0-5 |
- GRADATION CHART FOR No.57 STONE**
- | SEIVE SIZE | % PASSING |
|------------|-----------|
| 1-1/2" | 100 |
| 1" | 95-100 |
| 1/2" | 25-60 |
| No.4 | 0-10 |
| No.8 | 0-5 |



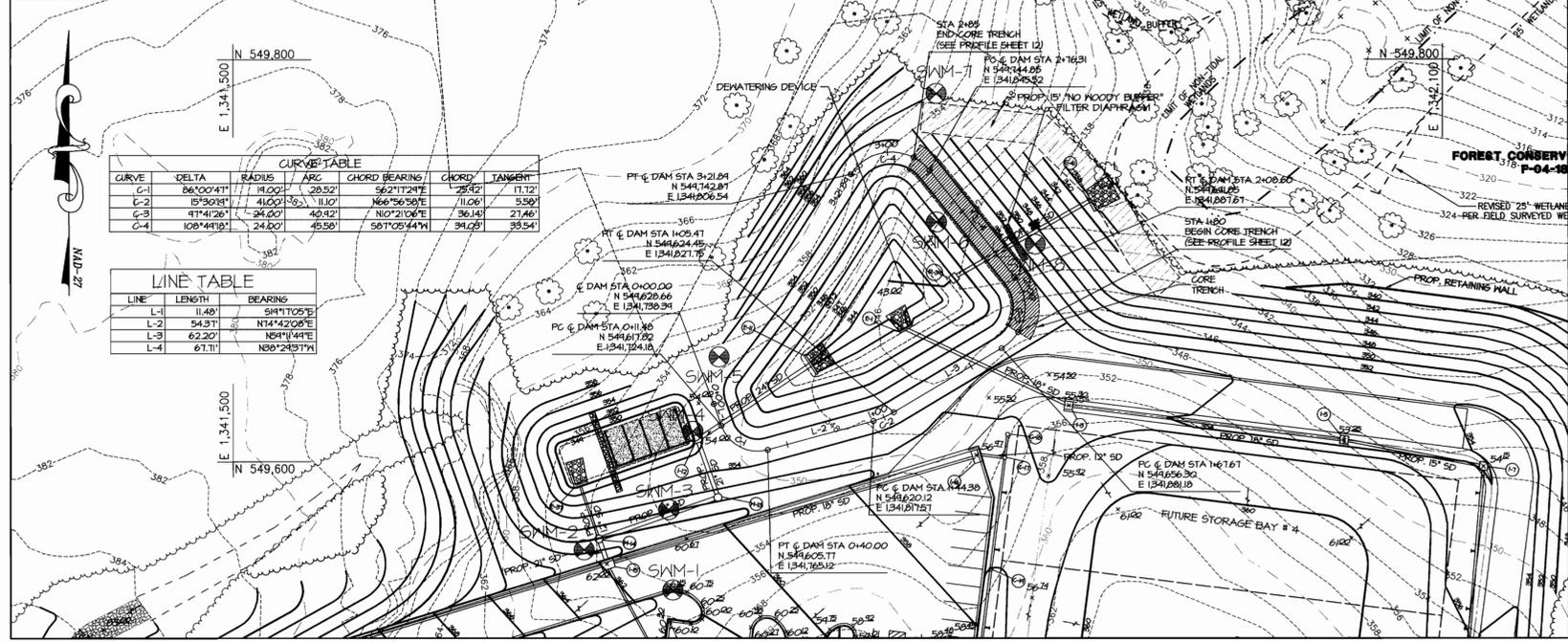
- INSTALLATION NOTES**
- GABION BASKETS SHALL BE CONSTRUCTED OF GALVANIZED US GAUGE 11 MESH WIRE OR APPROVED EQUIVALENT.
 - GABION INSTALLATION SHALL BE PERFORMED ACCORDING TO GABION MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.
 - TOP GABION BASKETS TO BE STAGGERED OVER BOTTOM BASKETS PER MANUFACTURER'S RECOMMENDATIONS.
 - TOP GABION BASKETS TO BE FASTENED TO BOTTOM BASKETS PER MANUFACTURER'S RECOMMENDATIONS.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chief, Development Engineering Division MK 1/31/05 DATE

Chief, Division of Land Development 2/4/05 DATE

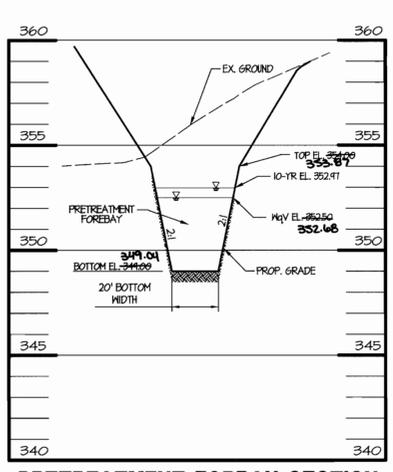
Director, Department of Planning and Zoning 2/2/05 DATE



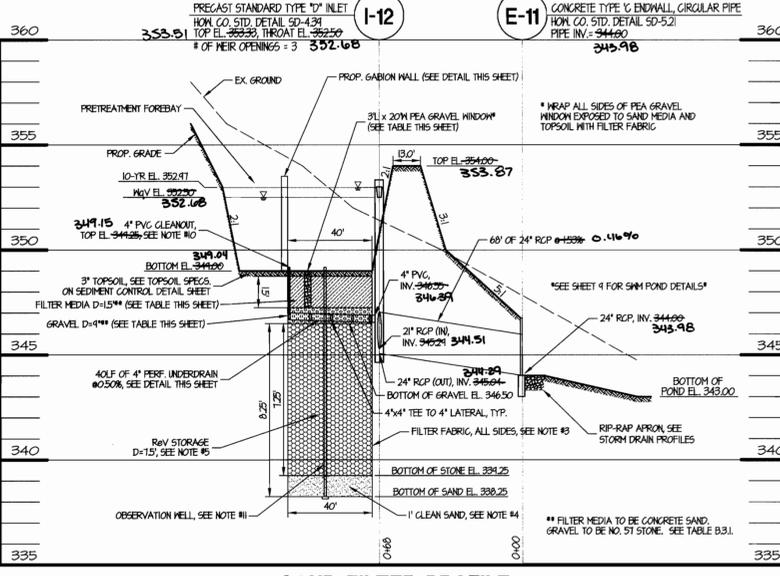
STORMWATER MANAGEMENT PLAN (PRIVATE FACILITY)

SCALE: 1" = 40'

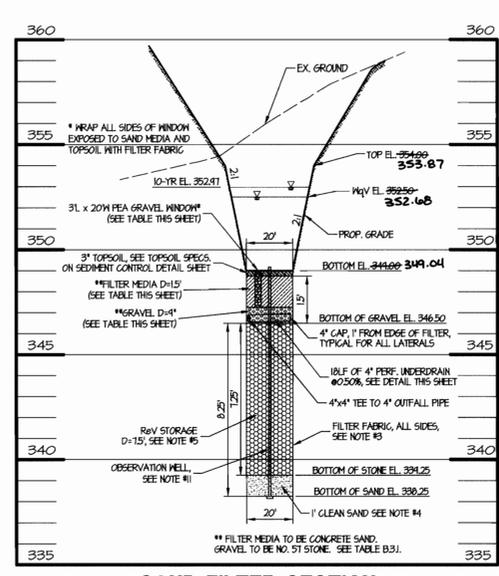
NOTE: POND BOTTOM FROM ELEVATION 348.00 & BELOW TO BE LINED WITH A 3" CLAY LINER, COVERED BY 3" OF TOPSOIL, SEED, & MULCH. CLAY MATERIAL TO MATCH THAT USED IN CORE TRENCH AND COMPACTED PER MD-378 NOTES SHOWN ON SHEET 14.



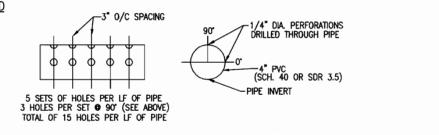
PRETREATMENT FOREBAY SECTION



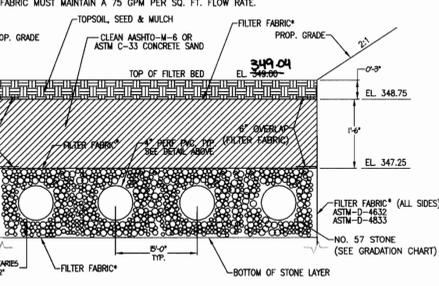
SAND FILTER PROFILE



SAND FILTER SECTION



DRAIN PIPE PERFORATION DETAIL



SAND FILTER FILTER BED DETAIL

TABLE B.3.1 MATERIAL SPECIFICATIONS FOR SAND FILTERS

MATERIAL	SPECIFICATION/TEST METHOD	SIZE	NOTES
PEA GRAVEL	AASHTO-M-43	0.25" - 0.50"	WASHED, RIVER RUN, ROUND DIAMETER
SAND	CLEAN AASHTO-M-6 OR ASTM-C-33 CONCRETE SAND, SEE GRADATION CHART	0.02" TO 0.04"	SAND SUBSTITUTIONS SUCH AS DUNALITE AND GRAYSTONE #10 ARE NOT ACCEPTABLE. NO CALCIUM CARBONATE OR POLYMERIC SAND SUBSTITUTIONS ARE ACCEPTABLE. NO "ROCK DUST" CAN BE USED FOR SAND.
PEAT	ASH CONTENT: <15% PH RANGE: 5.2 TO 4.9 LOOSE BULK DENSITY 0.12 TO 0.15 G/CC	N/A	THE MATERIAL MUST BE REDD-SIDE HOMO PEAT, SHREDED, UNCOMPACTED, UNIFORM, AND CLEAN.
LEAF COMPOST		N/A	
UNDERDRAIN GRAVEL	AASHTO-M-43	0.375" TO 1.50"	DOUBLE WASHED NO. 57 STONE. SEE GRADATION CHART
GEOTEXTILE FABRIC (IF REQUIRED)	ASTM-D-4833 (PUNCTURE STRENGTH-125 LB.) ASTM-D-4632 (TENSILE STRENGTH-300 LB.)	0.08" THICK EQUIVALENT OPENING SIZE OF #80 SIEVE	MUST MAINTAIN 75 GPM PER SQ. FT. FLOW RATE. NOTE: A 4" PEA GRAVEL LAYER MAY BE SUBSTITUTED FOR GEOTEXTILES NEAR TO "SEPARATE" SAND FILTER LAYERS. SEE INFILTRATION GENERAL NOTE 3.
IMPERMEABLE LINER (IF REQUIRED)	ASTM-D-4833 (THICKNESS) ASTM-D-412 (TENSILE STRENGTH 1,100 LB./INCH) ASTM-D-524 (TEAR RESISTANCE - 150 LB./IN.) ASTM-D-471 (WATER ADSORPTION: +8 TO -2% MASS)	30 MIL THICKNESS	LINER TO BE ULTRAVIOLET RESISTANT. A GEOTEXTILE FABRIC SHOULD BE USED TO PROTECT THE LINER FROM PUNCTURE.
UNDERDRAIN PIPING	F 758, TYPE PS 28 OR AASHTO-M-278	4"-6" RIGID SCH. 40 PVC OR SDR35	3/4" PERFORATION DETAIL: 12 HOLES PER ROW. SEE DRAIN PIPE PERFORATION DETAIL. INFILTRATION GENERAL NOTE 10.
CONCRETE (CAST-IN-PLACE)	MESA STANDARDS AND SPECS. SECTION 902 MIX NO. 3, FC = 3500 PSL. NORMAL WEIGHT, AIR ENTRAINED; REINFORCING TO MEET ASTM-615-60	N/A	ON SITE TESTING OF POURED-IN-PLACE CONCRETE REQUIRED: 28 DAY STRENGTH AND SLUMP TEST. ALL CONCRETE DESIGN (CAST-IN-PLACE OR PRE-CAST) NOT USING PREVIOUSLY APPROVED STATE OR LOCAL STANDARDS REQUIRES DESIGN DRAWINGS SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND.
CONCRETE (PRECAST)	PER PRE-CAST MANUFACTURER	N/A	SEE ABOVE NOTE
NON-REBAR STEEL	ASTM A-36	N/A	STRUCTURAL STEEL TO BE HOT-DIPPED GALVANIZED ASTM-A-123

REVISIONS

Asbuilt info ADDED	03/06

APPROVALS

PROJECT	
PLANT EXCITATION/DEPT	
CODE COMPLIANCE REVIEW	
TIC GROUP	
TIP GROUP	
SAFETY OFFICER	
DIRECTOR	
COORDINATOR	
SENIOR LEADER	

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GRAPHIC SCALE



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 (410) 792-9792 or (800) 776-1660
 FAX (410) 792-7985

SWM PLAN 1

JOB NO.: 13685

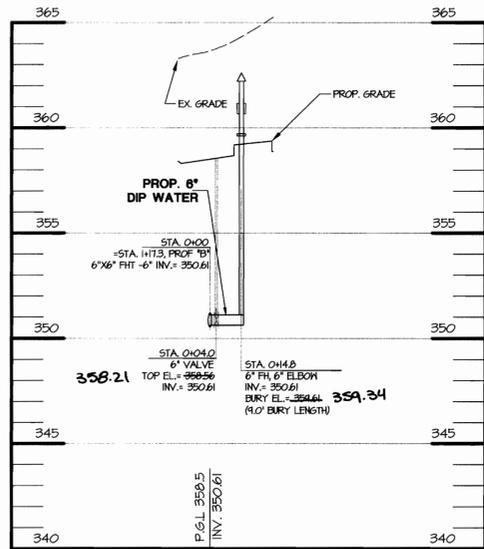
SDP-11

1-17-05 SHEET: 11 OF 22

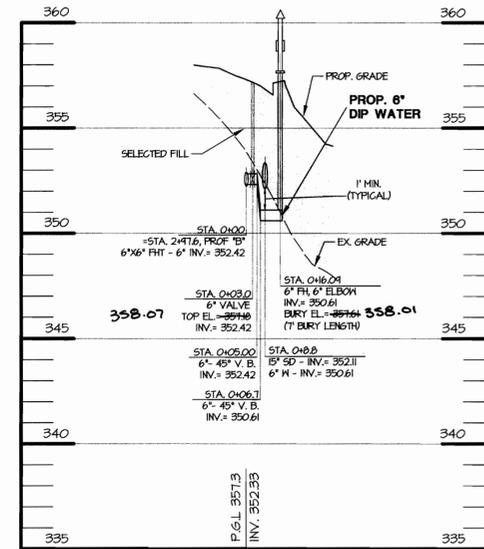
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DES: KKB CHECK: TCN DATE: 01-17-05

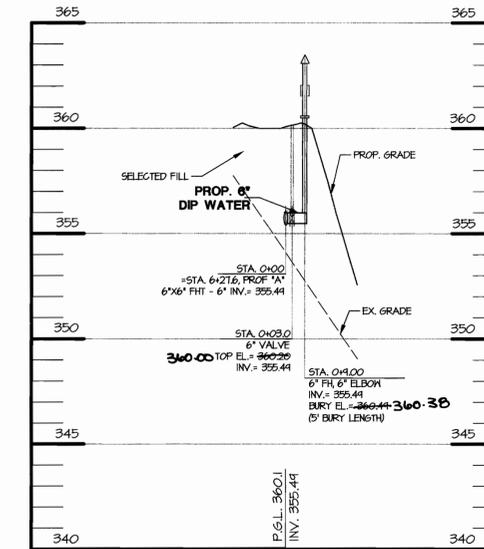
SDP-05-42



F.H. PROFILE 'A'
HOR. 1" = 40'
VERT. 1" = 4'



F.H. PROFILE 'B'
HOR. 1" = 40'
VERT. 1" = 4'



F.H. PROFILE 'C'
HOR. 1" = 40'
VERT. 1" = 4'

SANITARY PIPE SCHEDULE (PRIVATE)		
SIZE	TYPE	LENGTH
2.5"	PVC SDR 21	346 LF

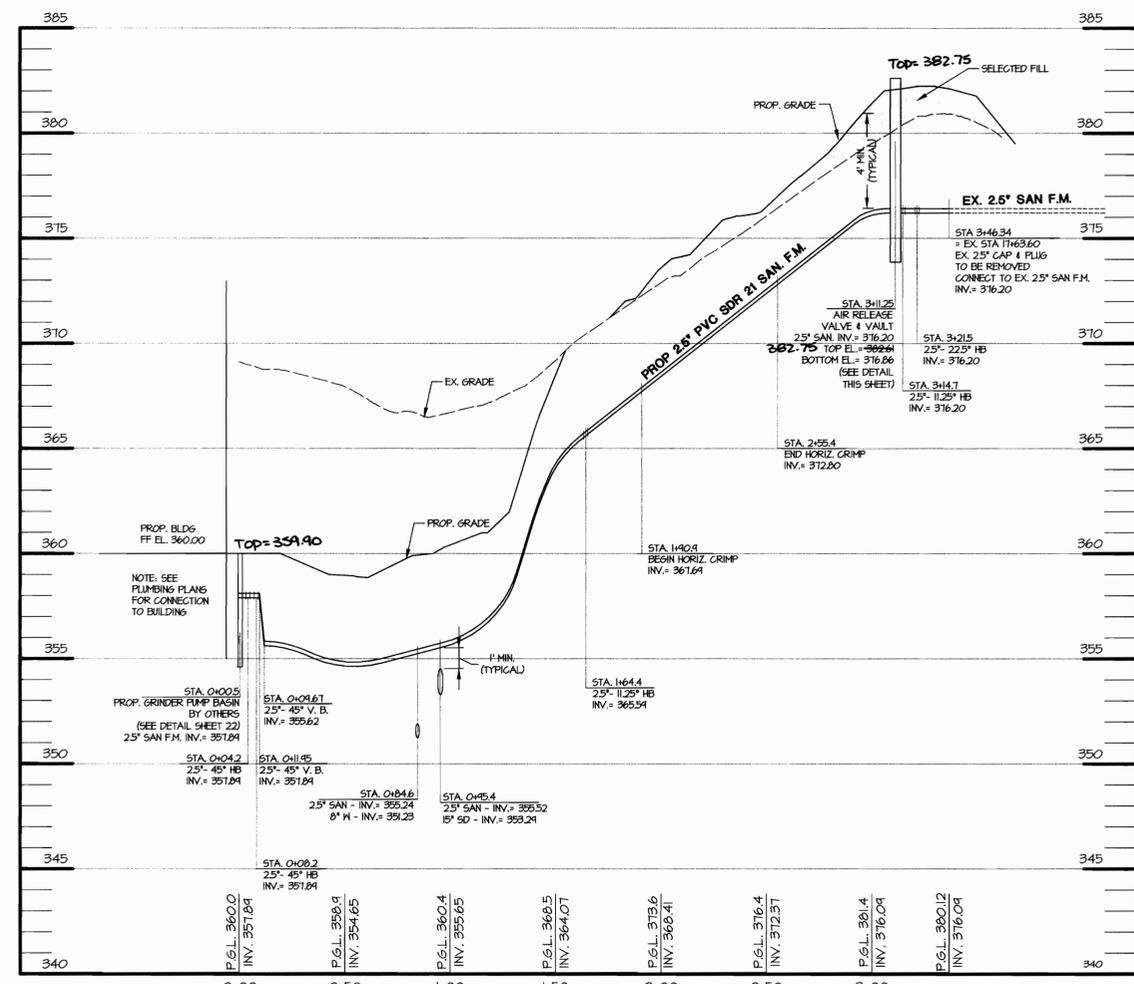
WATER PIPE SCHEDULE (PRIVATE)		
SIZE	TYPE	LENGTH
10"	CLASS 50 DIP	2 LF
8"	CLASS 50 DIP	403 LF
6"	CLASS 50 DIP	622 LF

SANITARY PIPE FITTINGS SCHEDULE (PRIVATE)	
TYPE	QUANTITY
2.5"-45" HB	2
2.5"-22.5" HB	1
2.5"-11.25" HB	2
2.5"-45" VB	2
AIR RELEASE VALVE & VAULT	1

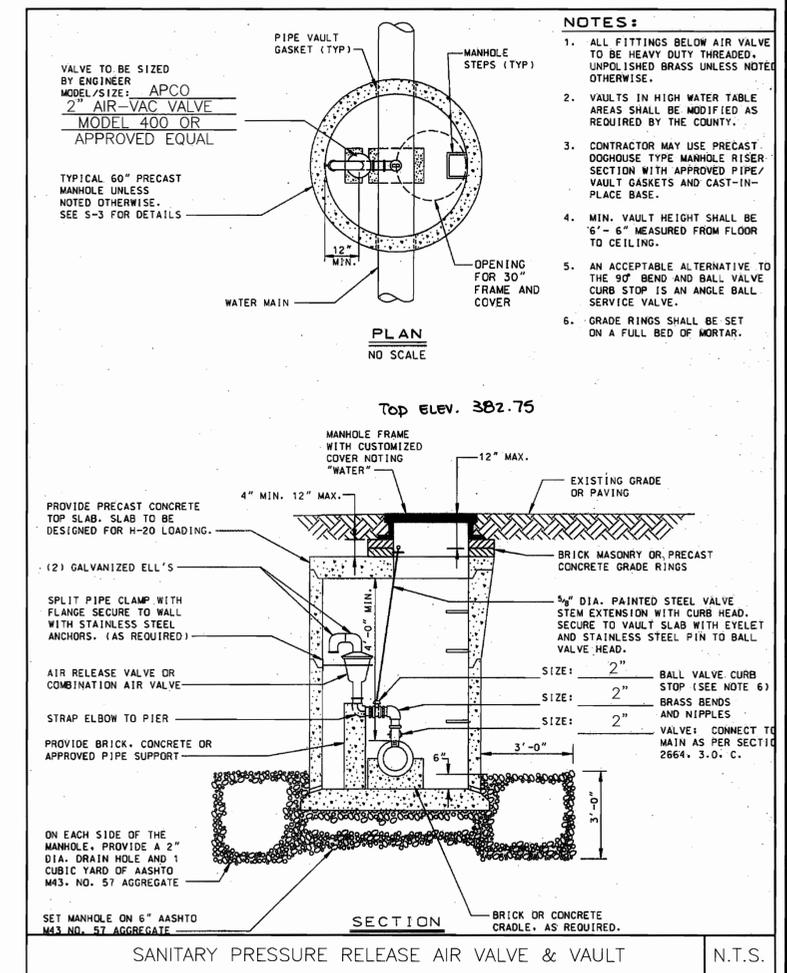
WATER PIPE FITTINGS SCHEDULE (PRIVATE)	
TYPE	QUANTITY
6" CAP & BUTTRESS	2
6" VALVE	3
8" VALVE	3
6" FIRE HYDRANTS	3
8"x8" TEE	2
6"x6" F.H.T.	3
8"-45" HB	2
8"-22.5" HB	1
8"-11.25" HB	2
6"-45" HB	2
6"-22.5" HB	1
6"-11.25" HB	1
6"-45" VB	2
10"x8" REDUCER	1
8"x6" REDUCER	2
AIR RELEASE VALVE & VAULT	1

COMPACTED SPECIFICATIONS FOR UTILITIES IN FILL
WHERE UTILITY PIPES ARE TO BE PLACED ON COMPACTED FILL, THE FOLLOWING APPLIES:
A. PRIOR TO PLACEMENT OF COMPACTED FILL, ANY SOFT OR OTHERWISE UNSUITABLE SOILS ENCOUNTERED AT THE EXISTING RAVINE BOTTOM OR SLOPE, SHALL BE UNDERCUT AND REMOVED FROM THE CONSTRUCTION AREA.
B. ACCEPTABLE COMPACTED FILL SHALL BE PLACED IN SIX INCH THICK LOOSE LIFTS AND COMPACTED TO AT LEAST 98 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY AASHTO METHOD T-180.
C. THE COMPACTED FILL SHALL BE BENCHED INTO THE EXISTING VIRGIN SLOPES WITH EACH LIFT PLACED TO A SMOOTH TRANSITION FROM VIRGIN TO FILL SOILS.

CONTROLLED AND COMPACTED FILL PER AASHTO T-180, TO BE CERTIFIED BY AN APPROVED ON-SITE GEOTECHNICAL ENGINEER



SANITARY F.M. PROFILE 'A'
HOR. 1" = 40'
VERT. 1" = 4'



REVISIONS		
As-built	info ADDED	03/06

APPROVALS	
REQUESTOR	
PLANNING/DESIGN/ENGINEER	
CODE COMPLIANCE REVIEW	
TIC GROUP	
TIP GROUP	
SAFETY OFFICER	
DIRECTOR	
OFFICE	
COORDINATOR	
SENIOR LEADER	

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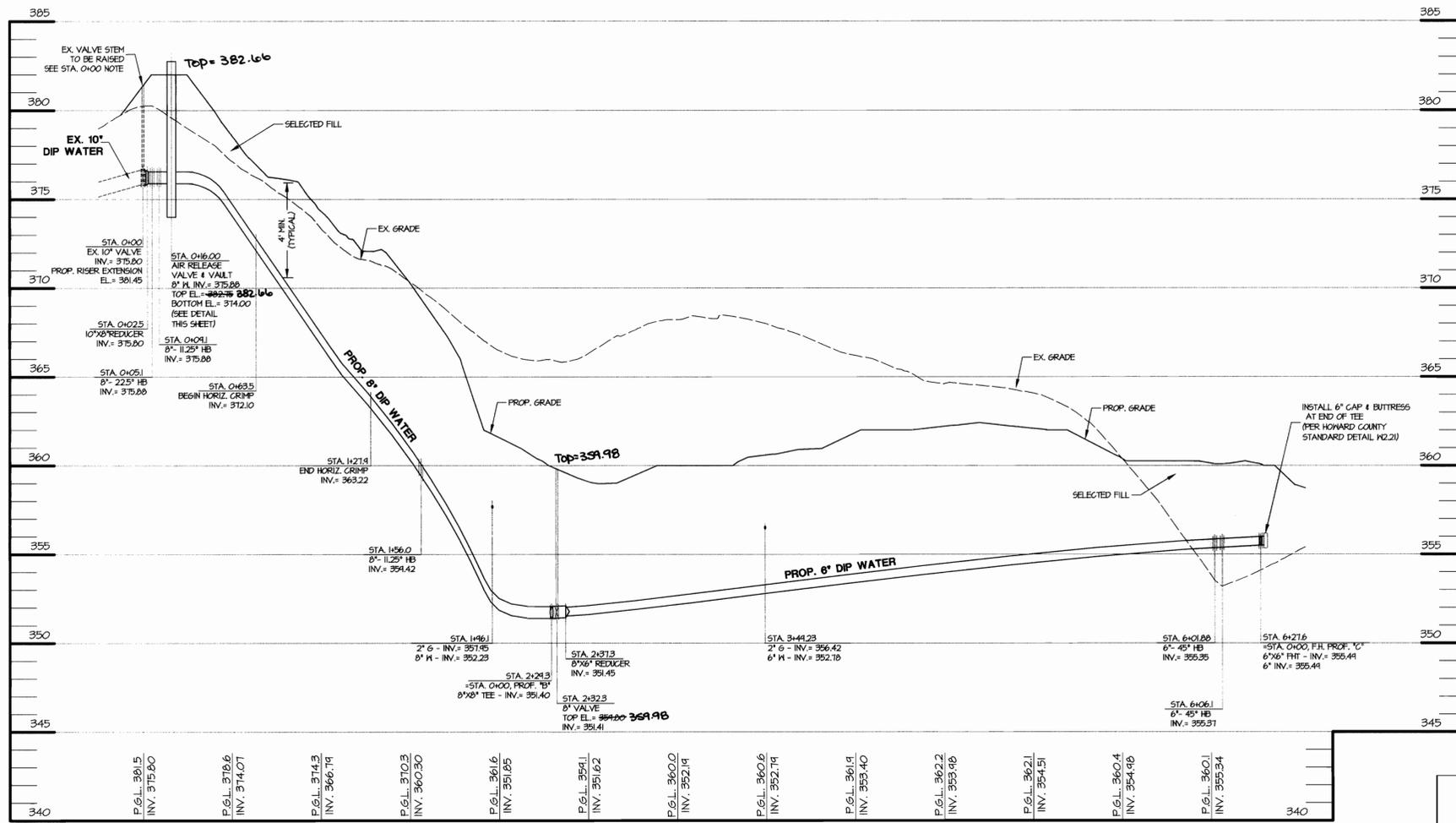
GRAPHIC SCALE

AS SHOWN

MRA
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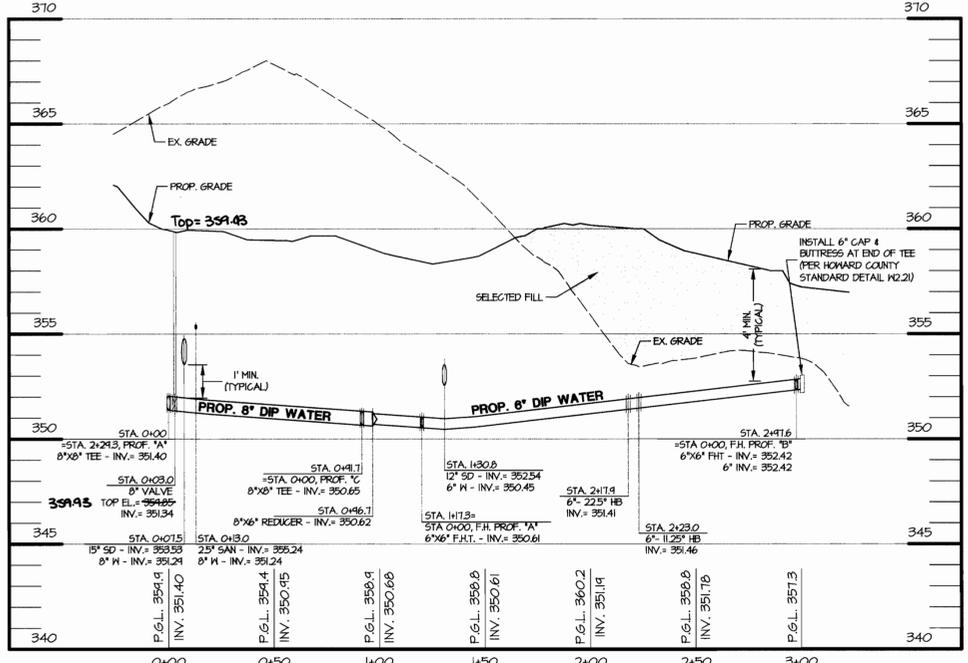
UTILITY PROFILES
JOB NO.: 13685
SDP-10
SHEET: 10 OF 22
SCALE: 1"= 40'
DES: LFB CHECK: TCN DATE: 01-17-05
SDP-05-42

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
CHIEF, DEVELOPMENT ENGINEERING DIVISION
CHIEF, DIVISION OF LAND DEVELOPMENT
DIRECTOR, DEPARTMENT OF PLANNING AND ZONING
DATE: 1/21/05
DATE: 2/16/05
DATE: 2/17/05



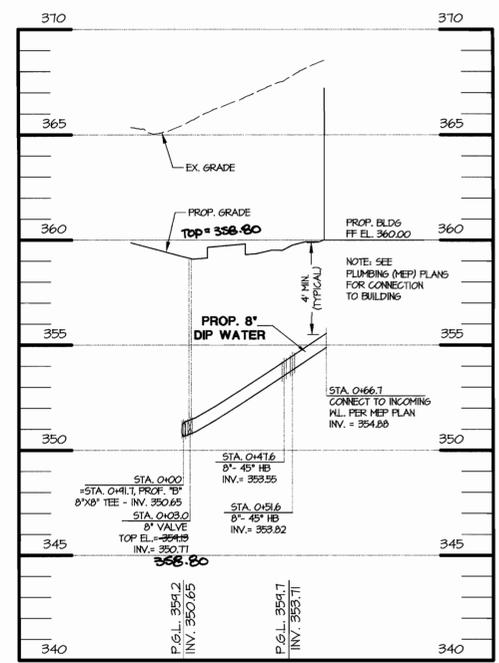
WATER PROFILE 'A'

HOR. 1" = 40'
VERT. 1" = 4'



WATER PROFILE 'B'

HOR. 1" = 40'
VERT. 1" = 4'



WATER PROFILE 'C'

HOR. 1" = 40'
VERT. 1" = 4'

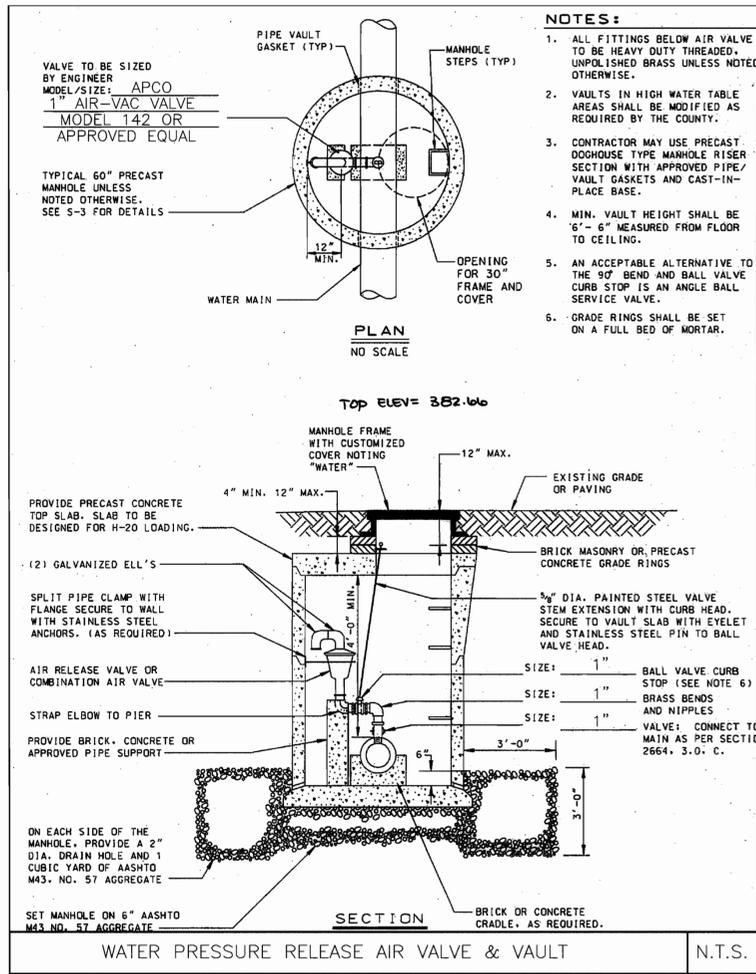
SEE SHEET 10 FOR WATER PIPE & FITTING SCHEDULES

COMPACTED SPECIFICATIONS FOR UTILITIES IN FILL

WHERE UTILITY PIPES ARE TO BE PLACED ON COMPACTED FILL, THE FOLLOWING APPLIES:

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- B. ACCEPTABLE COMPACTED FILL SHALL BE PLACED IN SIX INCH THICK LIFT LIFTS AND COMPACTED TO AT LEAST 98 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY A.A.S.H.T.O. METHOD T-180.
- C. THE COMPACTED FILL SHALL BE BENCHED INTO THE EXISTING VIRGIN SLOPES WITH EACH LIFT PLACED TO A SMOOTH TRANSITION FROM VIRGIN TO FILL SOILS.

CONTROLLED AND COMPACTED FILL PER AASHTO T-180, TO BE CERTIFIED BY AN APPROVED ON-SITE GEOTECHNICAL ENGINEER



NOTES:

1. ALL FITTINGS BELOW AIR VALVE TO BE HEAVY DUTY THREADED, UNPOLISHED BRASS UNLESS NOTED OTHERWISE.
2. VAULTS IN HIGH WATER TABLE AREAS SHALL BE MODIFIED AS REQUIRED BY THE COUNTY.
3. CONTRACTOR MAY USE PRECAST DOORHOUSE TYPE MANHOLE RISER SECTION WITH APPROVED PIPE/VAULT GASKETS AND CAST-IN-PLACE BASE.
4. MIN. VAULT HEIGHT SHALL BE 6'-6" MEASURED FROM FLOOR TO CEILING.
5. AN ACCEPTABLE ALTERNATIVE TO THE 90° BEND AND BALL VALVE CURB STOP IS AN ANGLE BALL SERVICE VALVE.
6. GRADE RINGS SHALL BE SET ON A FULL BED OF MORTAR.

WATER PRESSURE RELEASE AIR VALVE & VAULT N.T.S.

REVISIONS	
As-built info added	03/06

APPROVALS	
REQUESTER	
PLANT FACILITY/OWNER ENGINEER	
CODE COMPLIANCE REVIEW	
TIC GROUP	
TOP GROUP	
SAFETY OFFICER	
DIRECTORS OFFICE	
COORDINATOR	
SENIOR LEADER	

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GRAPHIC SCALE

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FAX (410) 782-7395

UTILITY PROFILES

	JOB NO.: 13685
	SDP-9
1-7-05	SHEET: 9 OF 22

SCALE: 1" = 40'

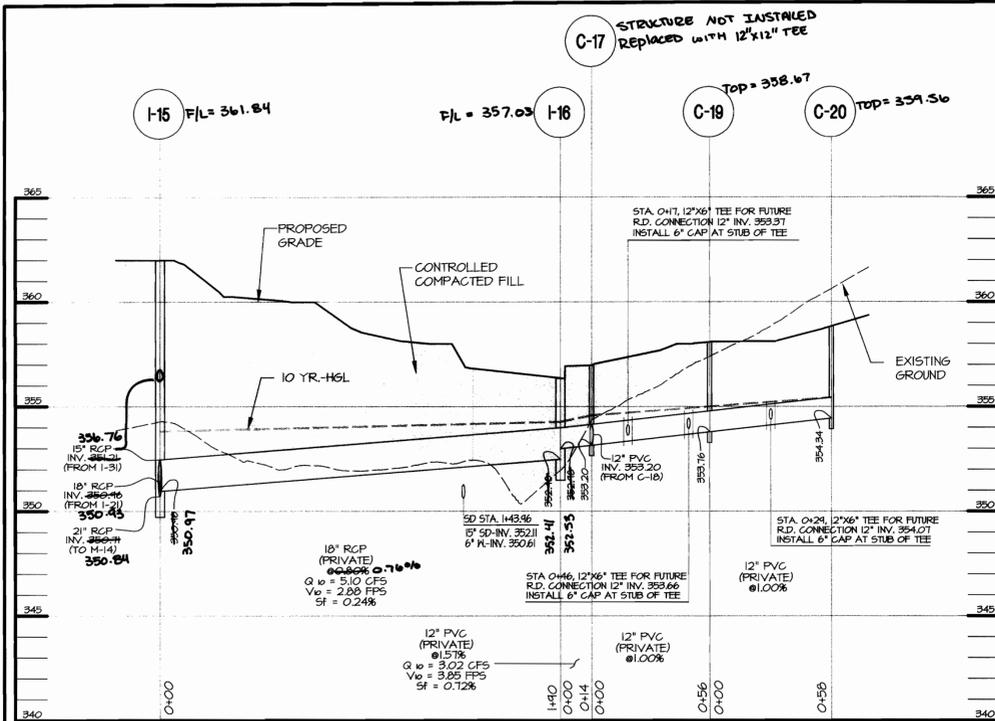
DES: LFB	CHECK: TCN	DATE: 01-17-05
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APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK 1/21/05

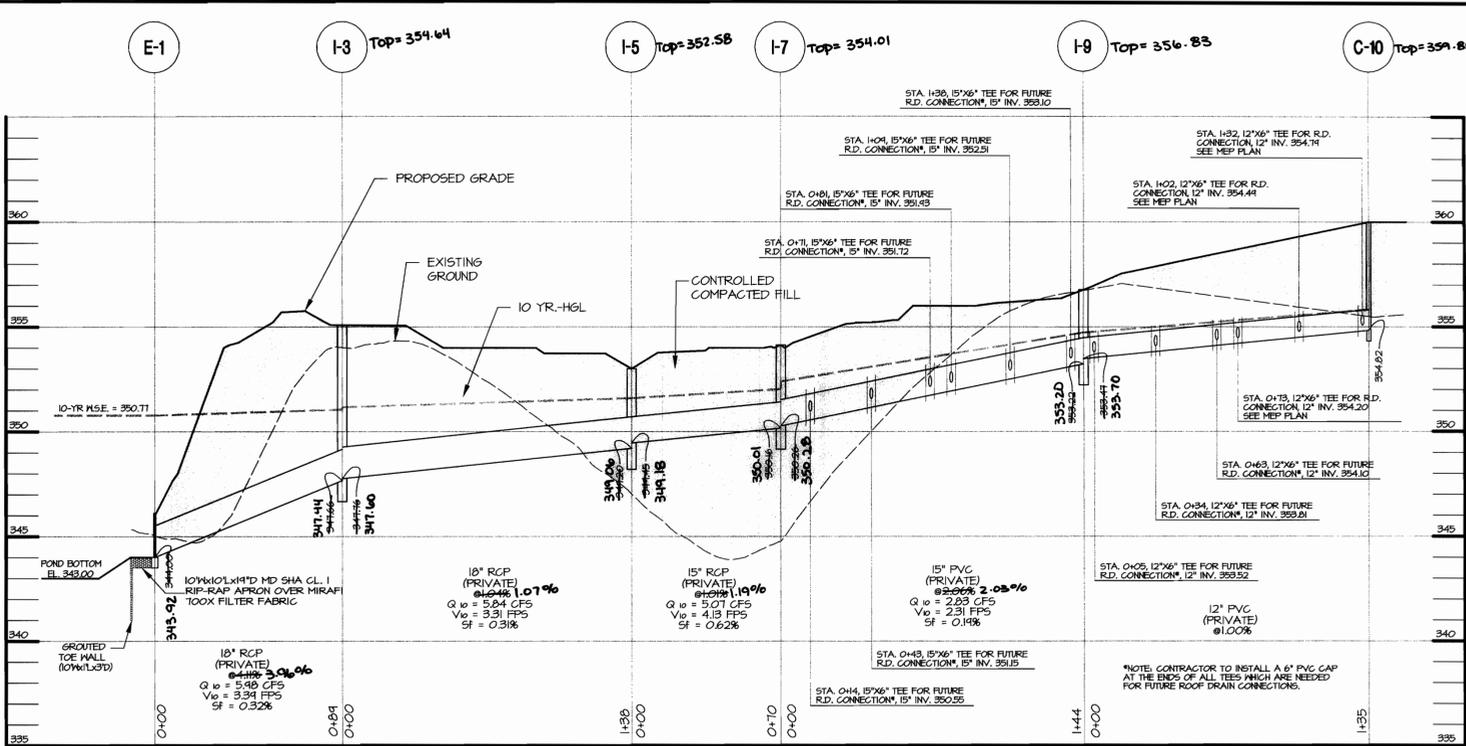
 CHIEF, DIVISION OF LAND DEVELOPMENT RP 2/4/05

 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING 2/3/05



STORM DRAIN PROFILE
I-15 TO C-20

HOR. 1" = 40'
VERT. 1" = 4'



STORM DRAIN PROFILE
E-1 TO I-9

HOR. 1" = 40'
VERT. 1" = 4'

CONTROLLED AND COMPACTED FILL PER AASHTO T-180, TO BE CERTIFIED BY AN APPROVED ON-SITE GEOTECHNICAL ENGINEER

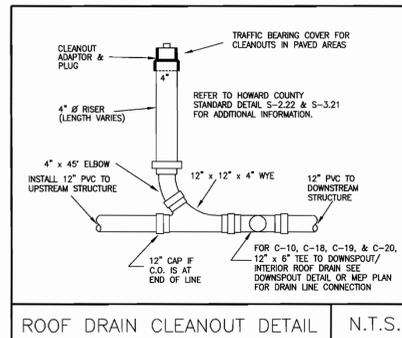
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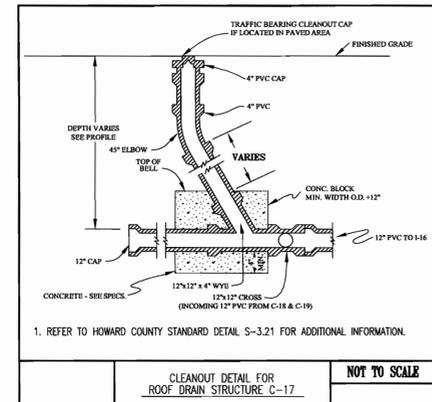
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SIZE	TYPE	LENGTH
12"	RCP, CL. IV	320 FT
15"	RCP, CL. IV	509 FT
18"	RCP, CL. IV	507 FT
21"	RCP, CL. IV	108 FT
24"	RCP, CL. IV	68 FT

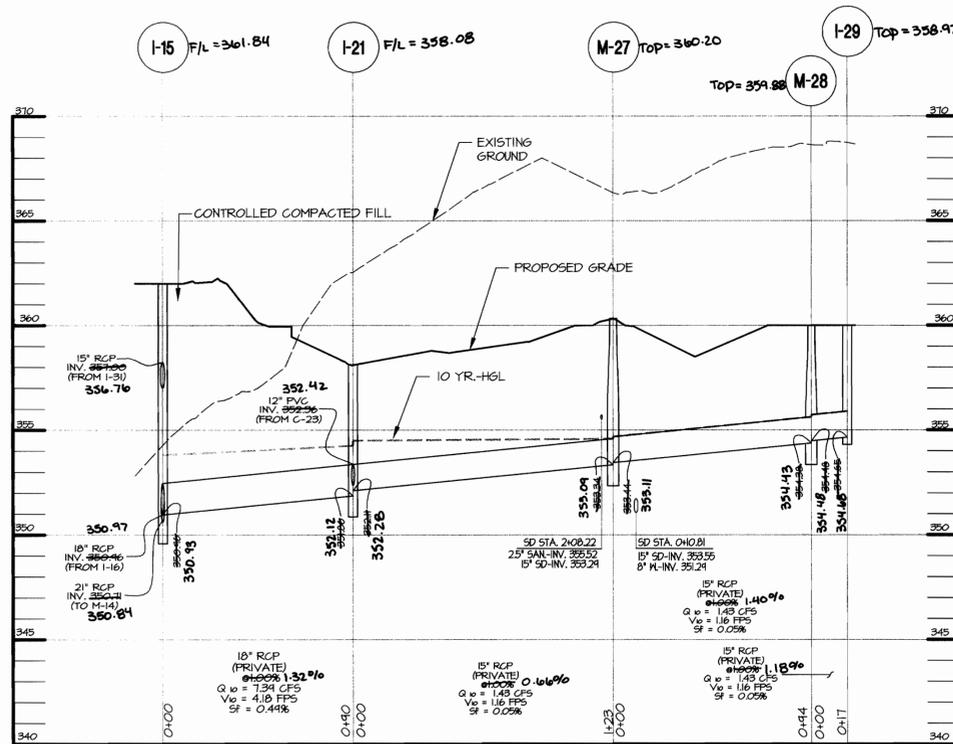
SIZE	TYPE	LENGTH
12"	PVC, SDR-35	411 FT
15"	PVC, SDR-35	144 FT



ROOF DRAIN CLEANOUT DETAIL N.T.S.

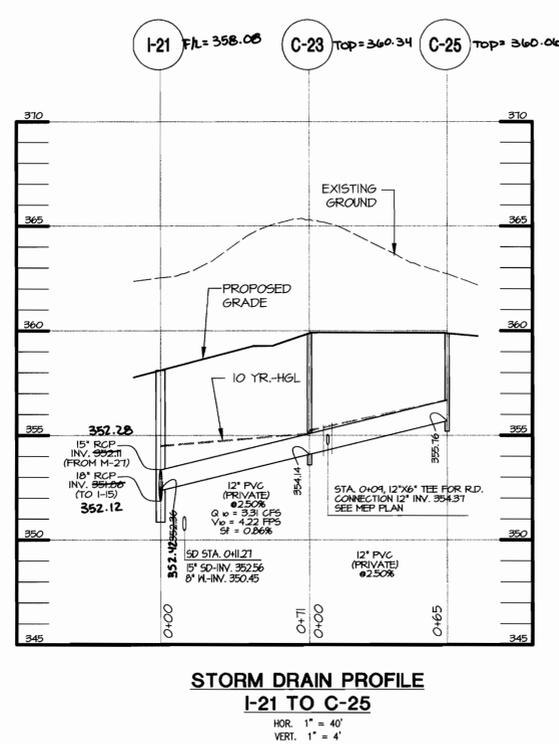


CLEANOUT DETAIL FOR ROOF DRAIN STRUCTURE C-17 NOT TO SCALE



STORM DRAIN PROFILE
I-15 TO I-29

HOR. 1" = 40'
VERT. 1" = 4'



STORM DRAIN PROFILE
I-21 TO C-25

HOR. 1" = 40'
VERT. 1" = 4'

• COORDINATES TO CENTER OF STRUCTURE AT FLOWLINE FOR DOUBLE WR & 'S' INLETS, CENTER OF STRUCTURE FOR SINGLE WR INLETS, 'D' INLET, MANHOLES & CLEANOUTS. TOP OF GRATE ELEVATION AT CENTER OF STRUCTURE AT FLOWLINE FOR DOUBLE WR & 'S' INLET. 'D' INLET, MANHOLE & CLEANOUT ELEVATIONS ARE AT CENTER OF RIM.

STR. NO.	TOP ELEV.	INV. IN.	INV. IN.	INV. IN.	INV. OUT.	TYPE	REMARKS	NORTHING	EASTING
E-1	355.30	347.76	---	---	347.66	SINGLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.37	549632.4081	1341909.2087	
I-5	353.25	349.45	---	---	349.20	SINGLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.37	549610.6484	1342050.9949	
I-7	354.15	350.26	---	---	350.16	SINGLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.37	549597.4991	1342107.8104	
I-9	356.91	353.47	---	---	353.22	SINGLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.37	549453.8610	1342120.0361	
I-12	353.33	345.29	346.55	---	345.04	PRECAST STANDARD TYPE 'D' INLET, HOWARD COUNTY STD. DETAIL SD-4.39	549611.3234	1341730.1633	
I-15	362.00	357.00	350.96	350.96	350.71	DOUBLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.35	549548.7066	1341685.7375	
I-16	356.97	352.98	---	---	352.48	DOUBLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.35	549602.7474	1341868.9965	
I-21	358.10	352.36	352.11	---	351.86	TYPE 'S' DOUBLE INLET, HOWARD COUNTY STD. DETAIL SD-4.23	549470.7770	1341729.2960	
I-29	359.40	---	---	---	354.65	SINGLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.37	549343.6306	1341752.4709	
I-31	377.82	371.82	---	---	371.57	DOUBLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.35	549489.2376	1341489.2441	
I-35	362.35	---	---	---	378.35	DOUBLE WR INLET, HOWARD COUNTY STD. DETAIL SD-4.35	549443.0112	1341203.3774	
M-13	358.00	347.92	---	---	347.82	STANDARD PRECAST MANHOLE, HOWARD COUNTY STD. DETAIL G-5.12	549582.0930	1341740.4056	
M-14	361.00	350.58	---	---	350.48	STANDARD PRECAST MANHOLE, HOWARD COUNTY STD. DETAIL G-5.12	549561.4424	1341681.3865	
M-27	360.35	353.44	---	---	353.34	STANDARD PRECAST MANHOLE, HOWARD COUNTY STD. DETAIL G-5.12	549348.4643	1341713.9534	
M-28	360.25	354.48	---	---	354.38	STANDARD PRECAST MANHOLE, HOWARD COUNTY STD. DETAIL G-5.12	549336.7840	1341806.6824	
M-33	367.00	377.35	---	---	377.25	STANDARD PRECAST MANHOLE, HOWARD COUNTY STD. DETAIL G-5.12	549438.5100	1341305.7072	
C-10	360.00	---	---	---	354.82	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	549319.6618	1342090.6772	
C-17	357.80	353.20	353.20	---	344.00	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	549666.1705	1341834.2355	
E-11	---	---	---	---	344.00	TYPE 'C' ENDWALL CIRCULAR PIPE, HOWARD COUNTY STD. DETAIL SD-5.21	549648.5005	1341787.0002	
E-37	---	---	---	---	349.00	TYPE 'E' HEADWALL CIRCULAR PIPE, HOWARD COUNTY STD. DETAIL SD-5.31	549588.9128	1341671.7747	
C-18	357.50	---	---	---	353.32	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	549613.5206	1341884.1629	
C-19	358.10	353.76	---	---	353.76	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	549546.3017	1341875.6960	
C-20	359.30	---	---	---	354.34	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	549489.0045	1341888.4787	
C-23	359.80	354.14	---	---	354.14	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	549462.0280	1341799.1943	
C-25	359.95	---	---	---	355.76	MODIFIED CLEANOUT, HO. CO. STD. DET. S-2.22, S-3.21 (SEE DETAIL SHEET)	549452.6585	1341864.0517	

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 [Signature] 1/21/05
 CHIEF DEVELOPMENT ENGINEERING DIVISION MK DATE
 [Signature] 2/16/05
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE
 [Signature] 2/17/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING DATE

REVISIONS		
Asbuilt info Added		03/06

APPROVALS	
INQUIRER	
PLANT FACILITIES DEPT. ENGINEER	
CODE COMPLIANCE REVIEW	
TIC GROUP	
TRF GROUP	
SAFETY OFFICER	
DIRECTOR'S OFFICE	
COORDINATOR	
SENIOR LEADER	

THE JOHNS HOPKINS UNIVERSITY
APPLIED PHYSICS LABORATORY
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 LAUREL, MARYLAND 20723-6099
 TAX MAP 41, GRID 16, PARCEL 1
 FIFTH (5TH) ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND

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GRAPHIC SCALE

AS SHOWN



MORRIS & RITCHIE ASSOCIATES, INC.
 ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
 14280 PARK CENTER DRIVE, SUITE A
 LAUREL, MARYLAND 20707
 (410) 792-0792 or (301) 792-1690
 FAX (410) 792-7395

STORM DRAIN PROFILES

JOHN OF MARYLAND
 STATE OF MARYLAND
 PROFESSIONAL ENGINEER
 1-17-05

JOB NO.: 13685
SDP-8
 SHEET: 8 OF 22

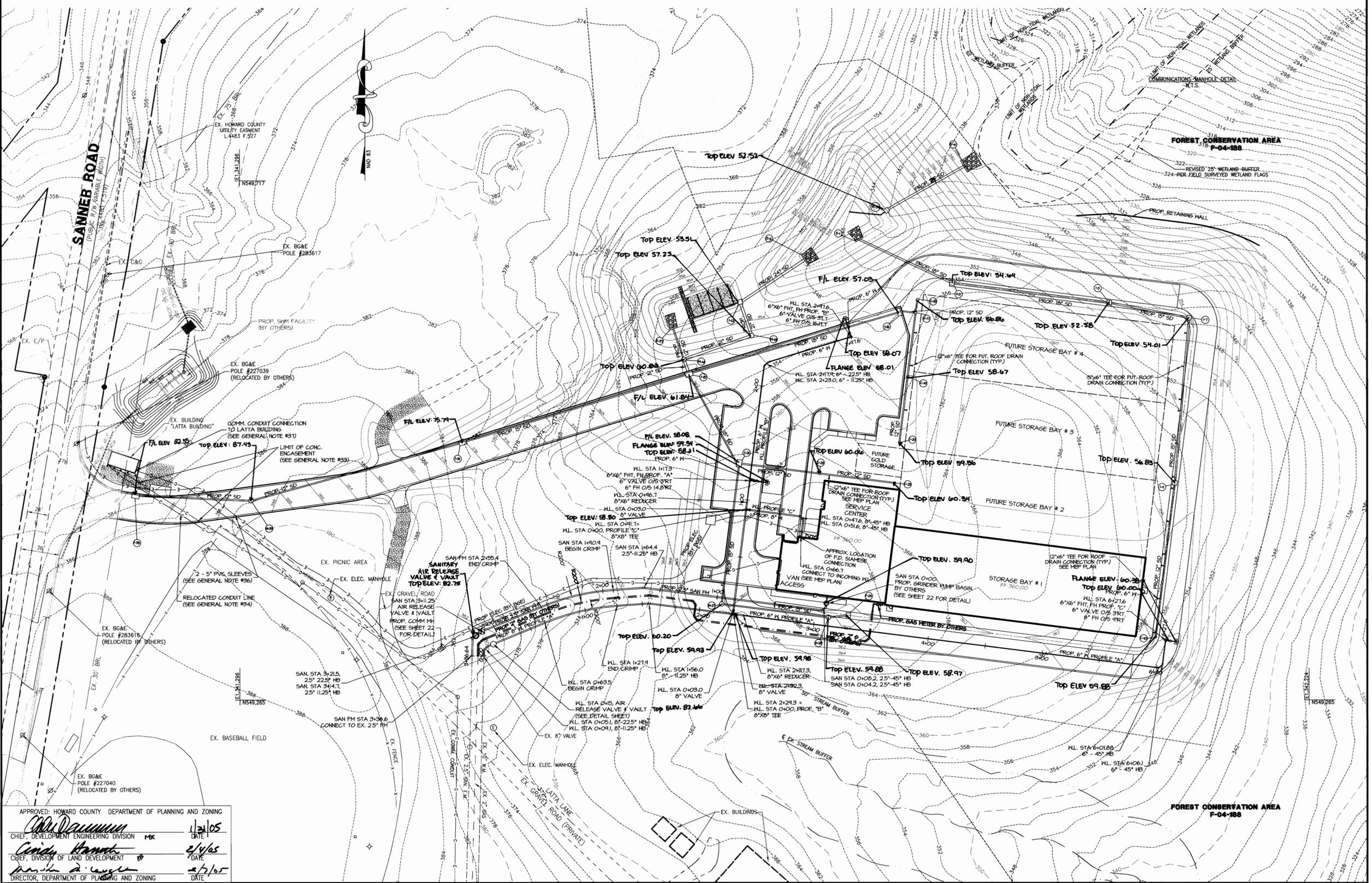
SCALE: 1" = 40'
 DES: BCC CHECK: TCN DATE: 01-17-05

LEGEND

- EX. TREE LINE
- EX. PROPERTY LINE
- EX. PAVEMENT
- EX. BUILDING
- EX. EASEMENT
- EX. CURB
- EX. STORM DRAIN
- EX. GAS
- EX. SANITARY F.M.
- EX. WATER
- EX. CONDUIT
- EX. WETLAND BUFFER
- EX. STREAM BUFFER
- EX. 2' CONTOUR
- EX. 10' CONTOUR
- EX. FOREST CONSERVATION #
- PROP. SUPER SILT FENCE
- PROP. RIP RAP
- PROP. LIMIT OF DISTURBANCE
- PROP. TREE LINE
- PROP. STORM DRAIN
- PROP. STORM DRAIN INLET
- PROP. ELECTRIC (BY OTHERS)
- PROP. GAS (BY OTHERS)
- PROP. SANITARY F.M.
- PROP. WATER
- PROP. FIRE HYDRANT
- PROP. WATER VALVE
- PROP. CURB
- PROP. CENTERLINE OF DRAINAGE SWALE
- PROP. FUTURE BUILDING
- PROP. BUILDING

NOTES

ALL SPOT ELEVATIONS +300'
 * SEE DETAIL SHEET (SDP-6)
 ** SEE ROAD IMP. PLANS ENTITLED "SANNER ROAD IMPROVEMENTS" BY AMT (SDP-05-43)
 SEE DETAIL SHEET FOR ALL SITE PAVEMENT, CURB & GUTTER, SIDEWALK, CONCRETE PADS AND MISC. SITE DETAILS.
 ASPHALT APRON SECTION TO MATCH ACCESS ROAD TYP. PAVEMENT SECTION



REVISIONS	
AS BUILT MFD ADDED	05/06

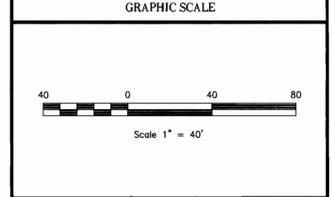
APPROVALS	
REQUESTER	
PLANT FACILITY/DEPT. ENGINEER	
CODE COMPLIANCE REVIEW	
TIC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTORS OFFICE	
COORDINATOR	
SENIOR LEADER	

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 TAX MAP 41, GRID 16, PARCEL 1
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 FAX (410) 782-7365

UTILITY PLAN

STATE OF MARYLAND
 NATIONAL ENGINEERING EXAMINERS BOARD

JOB NO.: 13685
SDP-5
 1-17-05 SHEET: 5 OF 22

SCALE: 1" = 40'

DES: LFB CHECK: TCN DATE: 01-17-05

SDP-05-42

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK 1/21/05

 CHIEF, DIVISION OF LAND DEVELOPMENT 2/4/05

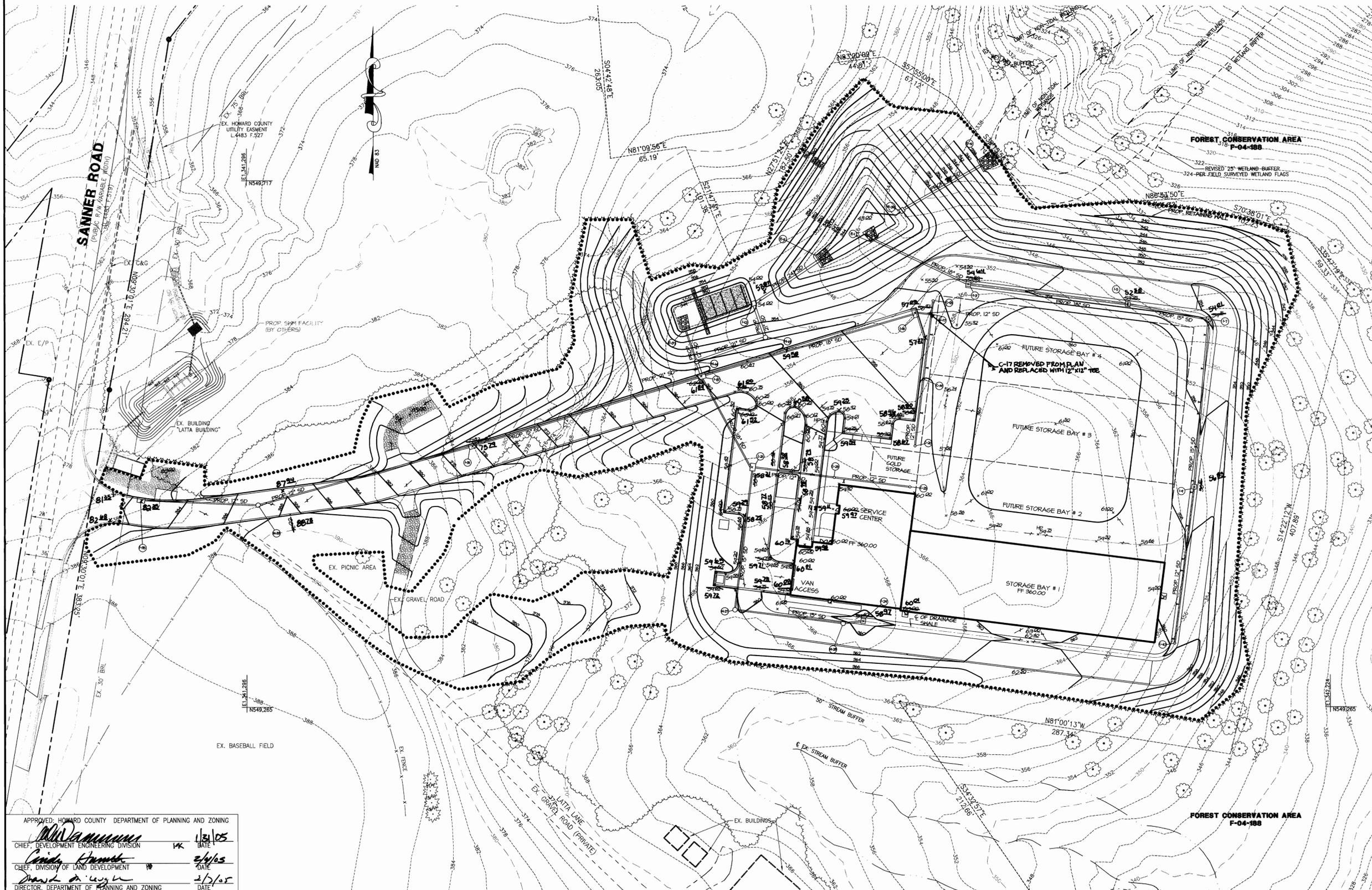
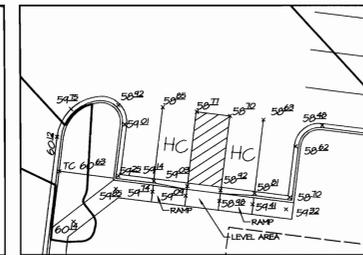
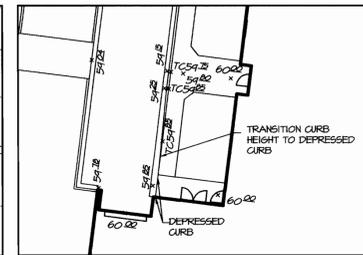
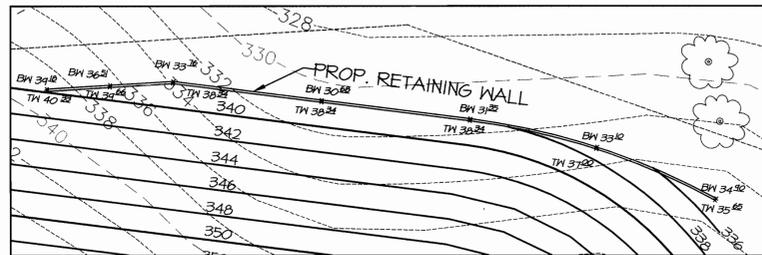
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING 2/5/05

LEGEND

- EX. TREE LINE
- EX. PROPERTY LINE
- EX. PAVEMENT
- EX. BUILDING
- EX. EASEMENT
- EX. CURB
- EX. STORM DRAIN
- EX. STORM DRAIN
- EX. WETLAND BUFFER
- EX. STREAM BUFFER
- EX. 2' CONTOUR
- EX. 10' CONTOUR
- EX. FOREST CONSERVATION AREA
- PROP. TREE LINE
- PROP. STORM DRAIN
- PROP. STORM DRAIN INLET
- PROP. CENTERLINE OF DRAINAGE
- PROP. FUTURE BUILDING
- PROP. BUILDING

NOTES

- ALL SPOT ELEVATIONS +300'
- * SEE DETAIL SHEET (SDP-6)
- (REV. CURB & GUTTER) (STD. CURB & GUTTER)
- ** SEE ROAD IMP. PLANS ENTITLED "SANNER ROAD IMPROVEMENTS" BY AMT (SDP-05-43)
- SEE DETAIL SHEET FOR ALL SITE PAVEMENT, CURB & GUTTER, SIDEWALK, CONCRETE PADS AND MISC. SITE DETAILS.
- ASPHALT APRON SECTION TO MATCH ACCESS ROAD TYP. PAVEMENT SECTION



REVISIONS		
ASBUILT	DATE	ADDED
	03/06	

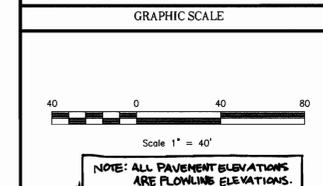
APPROVALS	
REQUESTER	
PLANNING FACILITIES DEPT. ENGINEER	
CODE COMPLIANCE REVIEW	
TIC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTOR'S OFFICE	
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MRA
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 LAUREL, MARYLAND 20707
 (410) 792-9792 or (800) 776-1890
 FAX (410) 792-7985

GRADING PLAN
 JOB NO.: 13685

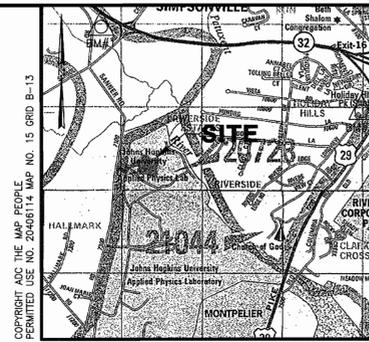
SDP-4
 SHEET: 4 OF 22
 SCALE: 1" = 40'
 DES: LFB CHECK: TCN DATE: 01-17-05
 SDP-05-42

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 1/31/05
 CHIEF, DEVELOPMENT ENGINEERING DIVISION
 2/4/05
 CHIEF, DIVISION OF LAND DEVELOPMENT
 2/5/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING

GENERAL NOTES

- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE.
- THE CONTRACTOR SHALL CONTACT THE CONSTRUCTION INSPECTION DIVISION 24 HOURS IN ADVANCE OF COMMENCEMENT OF WORK AT (410) 313-1880.
- THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AND JHU/APL PLANT FACILITIES OFFICE (443) 778-0167 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION BEING DONE.
- CONTRACTOR TO SCHEDULE PRECONSTRUCTION MEETING WITH HOWARD COUNTY, CONSTRUCTION INSPECTION DIVISION (410-313-1880) PRIOR TO STARTING CONSTRUCTION.
- TRAFFIC CONTROL DEVICES, MARKINGS AND SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). ALL STREET AND REGULATORY SIGNS SHALL BE IN PLACE PRIOR TO THE PLACEMENT OF ANY PAVING.
- THE LOCATION OF EXISTING UTILITIES AS SHOWN ON THIS PLAN ARE BASED ON FIELD LOCATIONS SUPPLEMENTED WITH EXISTING UTILITY DRAWINGS, AND SHOULD BE VERIFIED BY THE CONTRACTOR TO HIS SATISFACTION PRIOR TO CONSTRUCTION. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING UTILITIES, AND ANY DAMAGE DONE TO THEM DUE TO CONSTRUCTION ACTIVITY SHALL BE REPAIRED IMMEDIATELY AT HIS OWN EXPENSE.
- CONTRACTOR IS RESPONSIBLE FOR ALL SITE CONDITIONS, CONSTRUCTION REQUIREMENTS, AND SHALL CONFORM TO ALL STATE, FEDERAL, AND COUNTY CONSTRUCTION REGULATIONS. THE CONTRACTOR IS NOT RELIEVED OF RESPONSIBILITY SHOULD ANY REQUIRED ITEMS PERTAINING TO SITE CONSTRUCTION NOT BE INCLUDED ON THESE PLANS. CONTRACTOR IS RESPONSIBLE FOR ALL ITEMS NECESSARY TO COMPLETE THE SITE IMPROVEMENTS AS SHOWN ON THESE PLANS.
- ANY DAMAGE TO EXISTING UTILITIES, PAVEMENT, OR CURB AND GUTTER DUE TO CONSTRUCTION ACTIVITY OUTSIDE THE LIMITS OF DISTURBANCE IS TO BE REPLACED BY THE CONTRACTOR AT HIS OWN EXPENSE.
- WHERE NECESSARY, THE CONTRACTOR SHALL TEST PIT ALL EXISTING UTILITIES AT LEAST FIVE (5) DAYS PRIOR TO STARTING ANY WORK SHOWN ON THESE DRAWINGS.
- CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY PROPERTY MONUMENTS, MARKERS, SIGNS, LIGHTS, OR ANY OTHER EXISTING SITE FEATURES DISTURBED DURING CONSTRUCTION.
- ALL PLAN DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
- THE EXISTING TOPOGRAPHY IS TAKEN FROM FIELD RUN SURVEY WITH TWO FOOT CONTOUR INTERVALS PREPARED BY WHITMAN, REGARDT & ASSOCIATES, LP DATED JANUARY 2004. JHU APPLIED PHYSICS LAB AERIAL TOPOGRAPHY AND UTILITY INFORMATION SHOWN MAY NOT REFLECT CURRENT CONDITIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY CURRENT TOPOGRAPHY AND UTILITY INFORMATION TO HIS OWN SATISFACTION.
- THE SITE BOUNDARY, BEARINGS, AND COORDINATES SHOWN ARE BASED ON ELECTRONIC FILES OBTAINED FROM WHITMAN, REGARDT AND ASSOCIATES.
- ALL WORK SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE "1994 STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROLS" PUBLISHED JOINTLY BY THE WATER RESOURCES ADMINISTRATION, SOIL CONSERVATION SERVICE, AND STATE SOIL CONSERVATION COMMITTEE.
- THE COORDINATES SHOWN HEREON ARE BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM (NAD 83). JOHNS HOPKINS UNIVERSITY CONTROL STATIONS NOS. HOPKINS, 41E, G12, G7 AND G8 WERE USED FOR THIS PROJECT.

JOHNS HOPKINS APPLIED PHYSICS LABORATORY LIBRARIES SERVICE CENTER SITE DEVELOPMENT PLAN



VICINITY MAP
SCALE: 1" = 2000'

BENCHMARKS

- B.M.#1 - HOWARD COUNTY BENCHMARK 418B - EAST SIDE OF GULLFORD ROAD 1750' WEST OF PINDELL SCHOOL ROAD. N553,338.80 E1,340,517.48 ELEV. 370.395
- B.M.#2 - HOWARD COUNTY BENCHMARK 0057 - EAST SIDE OF LONGVIEW ROAD, SOUTH OF VISTA ROAD INTERSECTION. N650,835.21 E1,347,017.69 ELEV. 398.925

SHEET INDEX

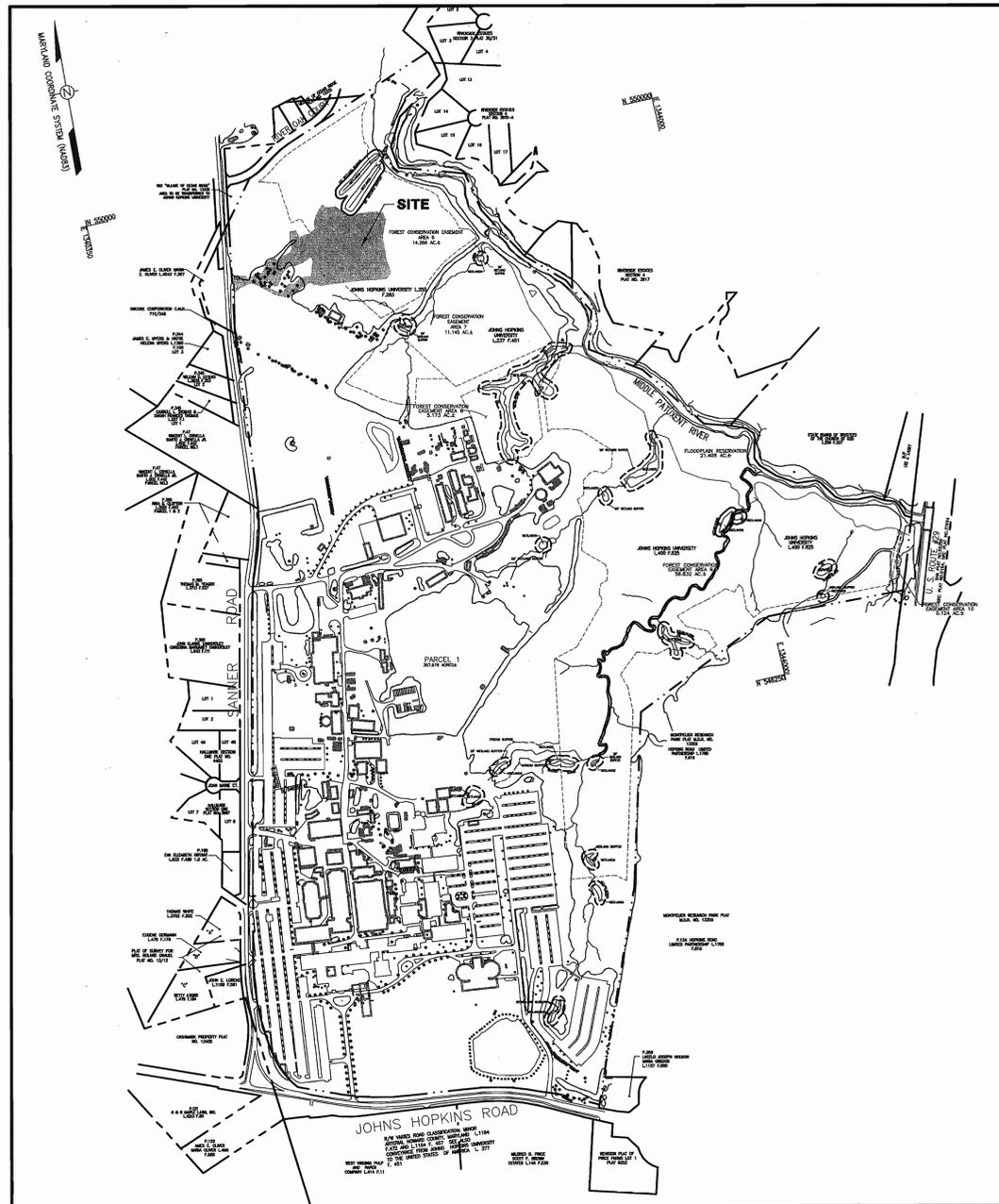
1	COVER SHEET
2	DEMOLITION PLAN
3	SITE LAYOUT PLAN
4	SITE GRADING PLAN
5	STORM DRAIN & UTILITY PLAN
6	SITE DETAILS
7	STORM DRAIN PROFILES
8	STORM DRAIN PROFILES
9	UTILITY PROFILES
10	UTILITY PROFILES
11	STORMWATER MANAGEMENT PLAN
12	STORMWATER MANAGEMENT PLAN
13	STORM DRAIN & SWM DRAINAGE AREA MAPS
14	MD 378 NOTES
15	GEOTECHNICAL REPORT
16	EROSION & SEDIMENT CONTROL PLAN
17	EROSION & SEDIMENT CONTROL DETAILS
18	LIGHTING & LANDSCAPING PLAN
19	LIGHTING & LANDSCAPING DETAILS
20	RETAINING WALL PLAN & GENERAL NOTES
21	RETAINING WALL PROFILE, TYPICAL SECTION & DETAILS
22	GRINDER PUMP DETAILS

BUILDING SQUARE FOOTAGE TABULATION

1. PROPOSED BUILDING COVERAGE = 23,055 S.F.
 2. FUTURE (ULTIMATE) BUILDING COVERAGE = 45,587 S.F.
 3. TOTAL (ULTIMATE) BUILDING COVERAGE = 68,622 S.F.
1. GROSS BUILDING SQUARE FOOTAGE = 38,206 S.F.
 2. FUTURE (ULTIMATE) BUILDING SQUARE FOOTAGE = 89,920 S.F.
 3. TOTAL (ULTIMATE) BUILDING SQUARE FOOTAGE = 128,126 S.F.

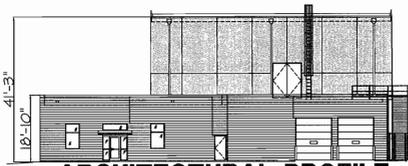
SITE ANALYSIS DATA CHART

- TOTAL PROJECT AREA: 361 ACRES +/-
- AREA OF PLAN SUBMISSION: 6.45 ACRES +/-
- LIMIT OF DISTURBANCE: 6.45 ACRES +/-
- PRESENT ZONING: PEC
- PROPOSED USE: LIBRARY BOOK STORAGE FACILITY JOHNS HOPKINS UNIVERSITY
- EXISTING NUMBER OF EMPLOYEES (JHU/APL CAMPUS): 3646
- PROPOSED NUMBER OF EMPLOYEES (PER THIS PLAN): 20
- TOTAL NUMBER OF EMPLOYEES (JHU/APL CAMPUS, INCL. THIS PLAN): 3666
- MAXIMUM NUMBER OF EMPLOYEES ALLOWED PER APFO STUDY PER F-02-40: 3937
- EXISTING MINIMUM NUMBER OF PARKING SPACES REQUIRED BY ZONING: 2953 (F-02-40)
- EXISTING ONSITE PARKING SPACES (JHU/APL CAMPUS): 4793 (SDP 04-76)
- PROPOSED PARKING SPACES (PER THIS PLAN): 22 (INCL. 4 HC SPACES)
- TOTAL NUMBER OF ONSITE PARKING SPACES (JHU/APL CAMPUS, INCL. THIS PLAN): 4815
- EXISTING BUILDING COVERAGE (JHU/APL CAMPUS): 21.1 ACRES (SDP-04-133)
- PROPOSED BUILDING COVERAGE* (PER THIS PLAN): 68,622 SF OR 1.6 ACRES ±
- TOTAL BUILDING COVERAGE* (JHU/APL CAMPUS, INCL. THIS PLAN): 22.7 ACRES, 6.3% OF TOTAL LOT AREA
*THE BUILDING COVERAGE INFORMATION INCLUDES THE FUTURE BUILDING AREA. SEE THE BUILDING SQUARE FOOTAGE TABULATION ON THIS SHEET.
- EXISTING GROSS FLOOR AREA COVERAGE (JHU/APL CAMPUS): 44.8 ACRES (SDP-04-133)
- PROPOSED GROSS FLOOR COVERAGE* (PER THIS PLAN): 128,126 SF OR 2.94 ACRES ±
- TOTAL GROSS FLOOR AREA COVERAGE* (JHU/APL CAMPUS, INCL. THIS PLAN): 47.74 ACRES, 13.2% OF TOTAL LOT AREA
*THE GROSS FLOOR AREA COVERAGE INFORMATION INCLUDES THE FUTURE BUILDING AREA. SEE THE BUILDING SQUARE FOOTAGE TABULATION ON THIS SHEET.
- CASE NUMBERS - APPLICABLE IMPROVEMENTS:
 F 02-40 - FOREST CONSERVATION, FLOODPLAIN, PUBLIC R/W
 F 04-188 - FOREST CONSERVATION AND WETLANDS
 SDP 04-35 - SWM BASIN G
 SDP 04-66 - BALL FIELD ENTRANCE AND PARKING LOTS
 SDP 04-76 - SERVICES AREA COMPLEX
 SDP 04-133 - BASIN C SWM FACILITIES & LAYDOWN AREA
 SDP 05-43 - SANNER ROAD IMPROVEMENTS
- SANITARY SEWER/ WATER SERVICE: PRIVATE ONSITE SYSTEM, PUBLIC CONNECTION
- EXISTING OPEN SPACE AREA (LOT AREA MINUS PARKING & BUILDINGS): 286 ACRES, 81.7% OF TOTAL LOT AREA (PROVIDED BY JHU APL)
- PROPOSED OPEN SPACE AREA: 283 ACRES, 78.4% OF TOTAL LOT AREA



OVERALL SITE MAP

SCALE: 1" = 500'



ARCHITECTURAL PROFILE

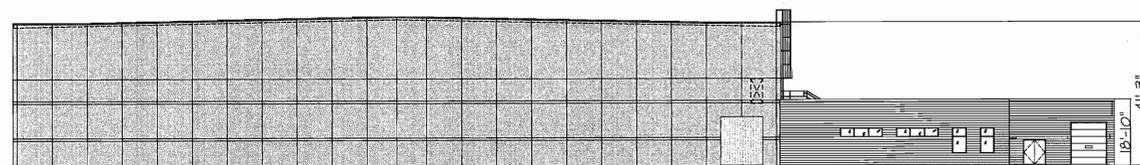
N.T.S.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[Signature] 1/21/05
 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK DATE

[Signature] 2/4/05
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[Signature] 1/3/05
 DIRECTOR, DEPARTMENT OF PLANNING AND ZONING DATE



ARCHITECTURAL PROFILE

N.T.S.

OPTION 3: PREVIOUSLY ADDRESSED (including Use of FC Bank)	FOREST CONSERVATION DATA SUMMARY
File Number: F-04-188	Project/Subdivision Name: JOHNS HOPKINS UNIVERSITY PROPERTY (APPLIED PHYSICS LABORATORY SITE)
Comment: Addressed by How. Co. Subdivision & Land Development Regulations, Sec. 16.1202.6(1)(i). See F-04-188 Plat # 17042 thru 17046.	

ADDRESS CHART

LOT/PARCEL NO.	STREET ADDRESS
289 / 1	11100 JOHNS HOPKINS ROAD LAUREL, MD 20723

OWNER:

THE JOHNS HOPKINS UNIVERSITY
 APPLIED PHYSICS LABORATORY
 11100 JOHNS HOPKINS ROAD
 LAUREL, MD 20723
 ATT: MR. JAMES LOSCH
 VOICE (443)778-5134
 FAX (443)778-6122

PERMIT INFORMATION CHART

SUBDIVISION NAME	SECTION/AREA	LOT/PARCEL NO.			
JOHNS HOPKINS UNIVERSITY PROPERTY (APPLIED PHYSICS LABORATORY SITE)	N/A	289 / 1			
PLAT # OR L/F	GRID #	ZONE	TAX MAP NO.	ELECT. DIST.	CENSUS TRACT
17042 - 17046	11	PEC	41	5TH	605102
WATER CODE:		SEWER CODE:			
E-21		6480000			

REVISIONS

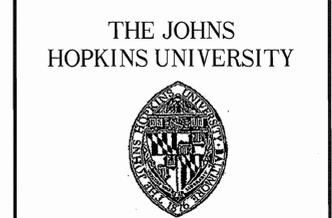
Asbuilt info added	03/06

APPROVALS

REGISTERED	
PLANNING/ENGINEERING	
CODE COMPLIANCE REVIEW	
TIC GROUP	
TEP GROUP	
UTILITY OFFICER	
DIRECTOR'S OFFICE	
CONTRACTOR	
SENIOR LEADER	

THE JOHNS HOPKINS UNIVERSITY
APPLIED PHYSICS LABORATORY
 JOHNS HOPKINS ROAD
 LAUREL, MARYLAND 20723-6099

TAX MAP 41, GRID 16, PARCEL 1
 FIFTH (5TH) ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND



LIBRARIES SERVICE CENTER

JHU/APL INTERNAL USE

THIS DATA SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS RFP OR IN THE CASE OF A CONTRACT AWARD, TO PERFORM THE WORK REQUIRED HEREUNDER, WITHOUT THE EXPRESS WRITTEN CONSENT OF JHU/APL.

GRAPHIC SCALE



MORRIS & RITCHE ASSOCIATES, INC.
 ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS

14280 PARK CENTER DRIVE, SUITE A
 LAUREL, MARYLAND 20707
 (410) 782-9792 or (301) 778-1690
 FAX (410) 782-7385

COVER SHEET

JOB NO.: 13685

SDP-1

SHEET: 1 OF 22

SCALE: AS SHOWN

DES: MP CHECK: TCN DATE: 01-17-05