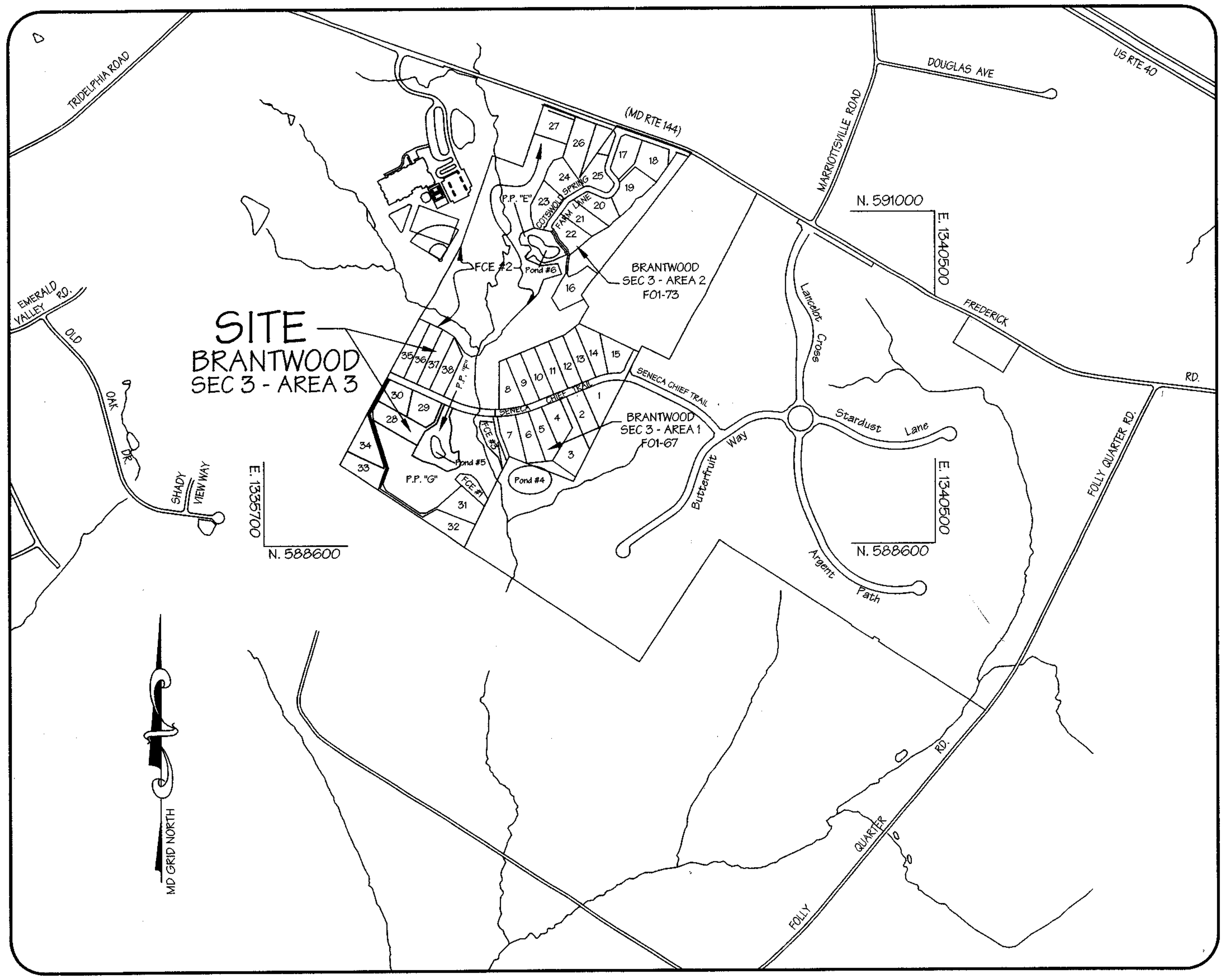
SHEET INDEX

Sheet Number	Description
1	Cover Sheet
2	Plan & Profile - Seneca Chief Trail 18+05 thru 26+19.40
3	Road Details
4	Storm Drain Profiles
5	Drainage Area Map
6	Drainage Area Map
7	Phase1 / Grading and Soil Erosion & Sediment Control Plan
8	Phase 2 / Grading and Soil Erosion & Sediment Control Plan
9	Phase 2 / Grading and Soil Erosion & Sediment Control Plan
10	Grading and Soil Erosion & Sediment Control Plan - Details
11	Grading and Soil Erosion & Sediment Control Plan - Details
12	Pond Construction Notes / Soil Borings
13	Basin/Pond #5 Construction Details
14	Ultimate Pond #5 Plan View & Details
15	Landscape & Street Tree Planting Plan
16	Landscape & Street Tree Planting Plan
17	Landscape & Street Tree Planting Plan Details & Notes
18	Contech - Culvert Details and Specifications
19	Contech - Culvert Details and Specifications
20	Contech - Culvert Details and Specifications
21	Contech - Culvert Details and Specifications
22	Contech - Culvert Details and Specifications



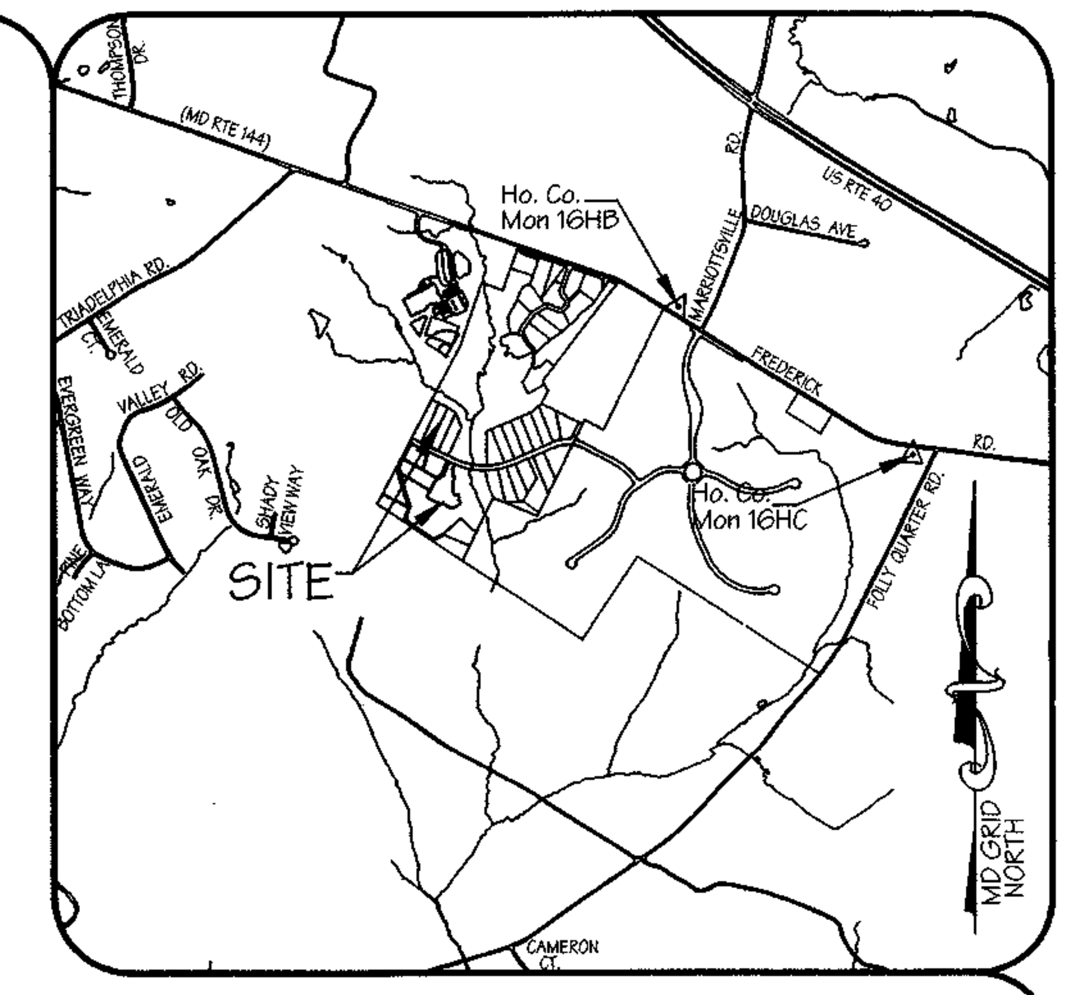
LOCATION MAP

Scale: 1" = 600'

BENCHMARKS

Howard County Monument # 16HC
Elevation: 449.451
Description: Concrete Monument 0.2' below surface. South side MD 144, 0.1 Mile West Folly Quarter Road

Howard County Monument # 16HB
Elevation: 540.658
Description: Concrete Monument flush with surface. 21.9' South of centerline MD 144, 147.5' West of Marriotsville Road



VICINITY MAP

Scale: 1" = 2000'

F01-67 FOREST CONSERVATION AREA TABULATIONS

	GROSS AREA	FLOODPLAIN AREA	NET CREDITED AREA
FCE#1	0.5226 Ac.±	0 Ac.	0.5226 Ac.±
FCE#2	16.5477 Ac.±	4.4377 Ac.±	12.1100 Ac.±
FCE#3	0.4686 Ac.±	0 Ac.	0.4686 Ac±
	17.5389 Ac.±	4.4377 Ac.±	13.1012 Ac.±

TOTAL SURETY REQUIRED = $ 57.068.00

GENERAL NOTES

1. All aspects of the project are in conformance with the latest standards and specifications of Howard County Design Manual Vol. IV and MSHA standards & specifications unless waivers have been approved.
2. The contractor shall notify the Department of Public Works/Bureau of Engineering/Construction Inspection at (410) 313-1880 at least five (5) working days prior to the start of work.
3. The contractor shall notify "Miss Utility" at 1-800-257-7777 at least forty-eight (48) hours prior to any excavation work.
4. Project Background:
   - Location: Ellicott City, Maryland
   - Tax Map: Map 16
   - Tax Map Parcels: P/O 172
   - Grid: 21
   - Zoning: RC - DEO (Rural Conservation - Density Exchange Option) per 10/18/93 Comprehensive Zoning Plan.
   - Election District: 3 rd
   - Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, F 99-140 , WP 00-55, P00-03, P00-04, F01-67, F01-73
5. Traffic control devices, markings, and signing shall be in accordance with the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). All street and regulatory signs shall be in place prior to the placement of any asphalt.
6. Any damage caused by the contractor to existing public right-of-way, existing paving, existing curb and gutter, existing utilities, etc. shall be corrected at the contractors expense.
7. The existing utilities shown hereon are located from field surveys and construction drawings of record. The approximate location of existing utilities are shown for the contractors information and convenience. The contractor shall locate existing utilities to his own satisfaction and well in advance of any construction activities. Additionally, the contractor shall take all necessary precautions to protect all existing utilities and maintain uninterrupted service.
8. The topography shown hereon is compiled from Howard County Aerial Photogrammetry and proposed grades from the F 01-67 submission. In areas where site improvements are planned, to include road construction and stormwater management facilities, the topography was field run by LDE, Inc in September, 1999 and July 2000.
9. Horizontal and vertical datum's are related to the Maryland State Plane Coordinate System as projected from Howard County geodetic control station Nos. 16HC and 16HB (NAD 83).
10. The property shown hereon is based on a field run boundary survey performed by LDE, Inc. dated February 1999.
11. The proposed Water and Sewer systems to be private well and septic. The property is not located within the Metropolitan District.
12. All private use-in-common driveways shall meet the following specifications:
    - Width --12'(14' serving more than one residence)
    - Surface -- 6" of compacted crusher run base w/tar and chip coating (1-1/2"min.)
    - Geometry -- Max. 15% grade, max. 10% grade change and min. 45' turning radius
    - Structures (culverts/bridges) -- capable of supporting 25 gross tons (H25 loading)
    - Drainage Elements -- capable of safely passing 100-year flood with no more than 1 foot depth over driveway surface
    - Maintenance -- sufficient to insure all weather use
13. All hydraulic data is for the 10-year storm unless otherwise noted.
14. See sheet 7 for construction sequence ***for Phase 1. See Sheet 8 for Construction Sequence for Phase 2.***
15. 95% compaction in all fill areas shall be determined by AASHTO T-180.
16. The Floodplain Study has been revisited as part of this Final Plan submission as a result of the conditions of approval of the P00-03 Preliminary Plan. An Impact Study has been completed for the section of stream common to the Con Span Bridge as part of this Final Plan Submission.
17. The Wetland Delineation was completed by Dennis LaBare, M.S., & Associates, 1999.
18. The Traffic Studies titled "Transportation Analysis for Brantwood Sections 3 and 4" dated November 1998 & "Revised Transportation Analysis for Brantwood Sections 3 & 4, dated February 22, 1999 were approved under the S 99-09 Sketch Plan submission.
19. The Geotechnical Report was completed by Hillis Carnes Engineering Associates, Inc. dated July 12, 1999 and approved under P00-03.
20. Water Quality Stormwater management will be met in:
    -Pond #5 on Preservation Parcel "F" by Retention
    Water Quantity management will be met in Pond #5 above the Water Quality water surface level
    Public Pond #5 shall be jointly maintained by Howard County and Brantwood Community Association, Inc. The responsibilities of the H.O.A should be completed in accordance with the Operation & Maintenance Schedules on sheet 14.
21. Street Light placement and the type of fixture and pole selected shall be in accordance with the Howard County Design Manual; Volume III (1993) and as modified by "Guidelines for street lights in Residential Developments (June 1993)." A minimum spacing of 20' shall be maintained between any street light and any tree.
22. This plan is subject to WP 99-55. On 3/23/99, the Planning Director approved the request to waive Section 16.116 (a) to allow grading and removal of vegetative cover within 25 feet of a wetland and 75 feet of a stream for the purpose of a road crossing (Seneca Chief Trail) and a driveway crossing to serve two residential lots. The Director's approval is subject to conditions.
23. This plan is subject to WP 00-55. On 1/28/00, the Planning Director approved the request to waive Section 16.116(a), to allow grading and removal of vegetative cover within 25 feet of a wetland and 75 feet of a stream for the purpose of a road crossing for Seneca Chief Trail. The Director's approval is subject to conditions. The planning director denied the request to waive Section 16.119(f)(1) for a new use-in-common access point for 2 lots from Maryland Route 144 (a limited access Minor Arterial roadway classification).
24. Existing / (hatched) These areas designate a private sewage easement of 10,000 square feet as required by the Maryland State Department of the Environment for individual sewage disposal. (COMAR 26.04.03) Improvements of any nature in this area are restricted until public sewage is available. These easements shall become null and void upon connection to a public sewage system. The county Health Officer shall have the authority to grant variances for encroachments into the private sewage easement. Recordation of a modified sewage easement shall not be necessary.
25. Forest Conservation obligations for Brantwood - Sections 3/1, 3/2 and 3/3 (P 00-03 & P 00-04) have been met per the Retention Easements shown on the Brantwood 3/1 (F 01-67) Final Plan submission. ***(See FCE Computations - this sheet).***
26. Per Section 104(F) of the Howard County, Maryland - Zoning Regulations; Cluster Subdivision consists of cluster lots & "Preserved" areas. When owned by the Homeowners Association "Preservation Parcels" take the place of typical " Open Space" Requirements.
27. Financial Surety for the required landscaping has been posted as part of the Department of Public Works - Developer's Agreement in the amount of **$31,050**
28. Tree Protection Fence or Blaze Orange Fence shall be placed around the perimeter of the sewage disposal easement prior to any construction of road or lot improvements to insure that placement of fill material upon the easement area will not occur.
29. 401 Permit # [redacted] , exp.
    404 Permit # [redacted] , exp.
    Tracking # 200161633

ROAD & STORM DRAIN CONSTRUCTION PLANS

BRANTWOOD

Section Three - Area Three

3rd Election District - Howard County, Maryland

By	Date	No.	Description

REVISIONS

F:\Land Projects R2\BRANTWOOD\dwg\Section 33\section33.dwg COVER SHEET

APPROVED: DEPARTMENT OF PLANNING AND ZONING

[signature] 8/24/01
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

[signature] 9/6/01
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

[signature] for 8/16/01
Chief, Bureau of Highways — DATE

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

[signature] 8/7/01
NATURAL RESOURCE CONSERVATION SERVICE — DATE

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

[signature] 8/7/01
HOWARD SOIL CONSERVATION DISTRICT — DATE

ENGINEER'S CERTIFICATE

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

Bruce D. [signature] 7/24/01
SIGNATURE OF ENGINEER — DATE

DEVELOPER'S CERTIFICATE

"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.

[signature] 11/2/00
SIGNATURE OF DEVELOPER — DATE

[seal: STATE OF MARYLAND PROFESSIONAL ENGINEER] 7/24/01

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

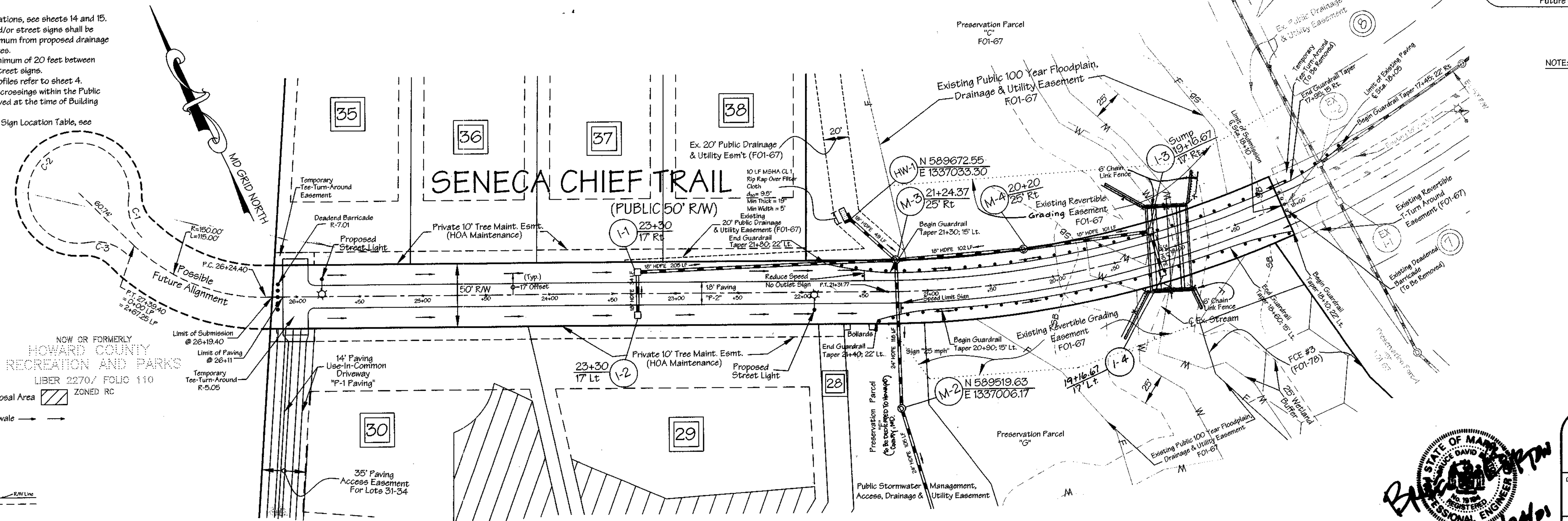
LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED: EDS	Cover Sheet **BRANTWOOD** Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcel 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03, P 00-04, F 01-67, F 01-73	SCALE: As Shown
DRAWN: JLM KBW STB		DRAWING: 1 of 22
CHECKED: BDB		JOB NO.: 98-040.6
DATE: 7/ 2001	DEVELOPER: BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO.: F01-78

STREET LIGHT TABLE

Street Name	Symbol	℄ Station	Offset	Lamp Type	Fixture Type	Pole Type
Seneca Chief Trail	•—☼	25+80	14 RT	150 W HPS VAPOR	PENDANT FUTURE (CUT OFF)	30' BRONZE FIBERGLASS - 12' ARM
Seneca Chief Trail	•—☼	21+90	14 LT	150 W HPS VAPOR	PENDANT FUTURE (CUT OFF)	30' BRONZE FIBERGLASS - 12' ARM

NOTES:
1. For street tree locations, see sheets 14 and 15.
2. All street trees and/or street signs shall be located 5 feet minimum from proposed drainage and utility structures.
3. There shall be a minimum of 20 feet between street lights and street signs.
4. For storm drain profiles refer to sheet 4.
5. All future driveway crossings within the Public R/W shall be Approved at the time of Building Permit.
6. For Traffic Control Sign Location Table, see sheet 3.



LEGEND:
- Proposed Sewage Disposal Area
- Drainage Flow and ℄ Swale
- Prop. Lot Nos. 2
- Ex. Lot Nos. 25
- BRL
- Tree Maint. Esmt. (R/W Line)
- Guard Rail
- Chain Link Fence

PAVING LEGEND:
- P-1 Paving Section (Howard County) — P-1 Paving
- P-2 Paving Section (Howard County) — P-2 Paving
- Existing Paving F01-67

PLAN
1"=50'

CENTERLINE CURVE DATA

Name & Station	Radius	Delta	Length	Tangent	Chord Bearing & Dist.
Seneca Chief Trail - 14+93.94 - 21+31.77	775.00'	47° 09'16"	637.83'	338.22'	N88° 36'30"W - 619.97'
Seneca Chief Trail- 18+05 - 21+31.77	775.00'	24° 09'28"	326.77'	165.85'	N77°06'36"W - 324.35'
Future C-1	35.00'	54°04'45"	33.04'	17.86'	N05° 56'06"E - 31.82'
Future C-2	40.00'	288°09'30"	201.17'	28.98'	S68° 53'44"W - 46.93'
Future C-3	35.00'	54°04'45"	33.04'	17.86'	S48° 08'39"E - 31.82'

℄ Station	Northing	Easting
PC 14+93.94	589592.7863	1337655.4170
PT 21+31.77	589607.8423	1337035.6250
L.O.P. 26+11	589810.1392	1336601.1789
L.O.S. 26+19.40	589813.6864	1336593.5611

NOTE: Further Contech Culvert Details, Refer to Sheets 18-22.

APPROVED: Department of Planning & Zoning

[signature] 9/6/01
Chief, Division of Land Development JA

[signature] 8/24/01
Chief, Development Engineering Division

APPROVED: Department of Public Works for Storm Drainage Systems and Roads

[signature] 8/16/01
Chief, Bureau of Highways

OWNERS:
Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

[Seal: State of Maryland, Bruce David Burton, Professional Engineer, No. 19164, Registered] 7/24/01

By	Date	No.	Description

REVISIONS

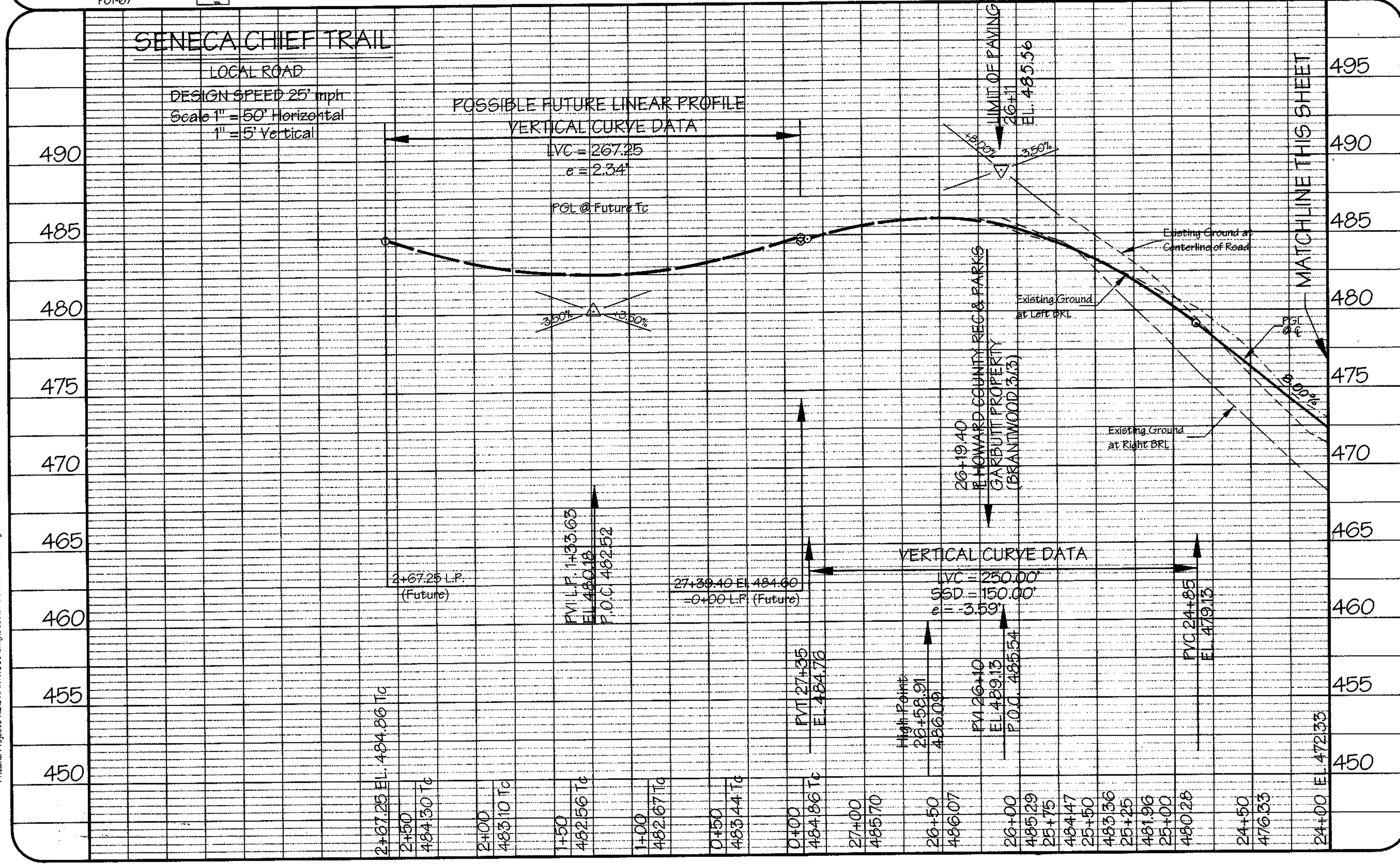
LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301 596-3424 (410) 715-9540 (Fax)

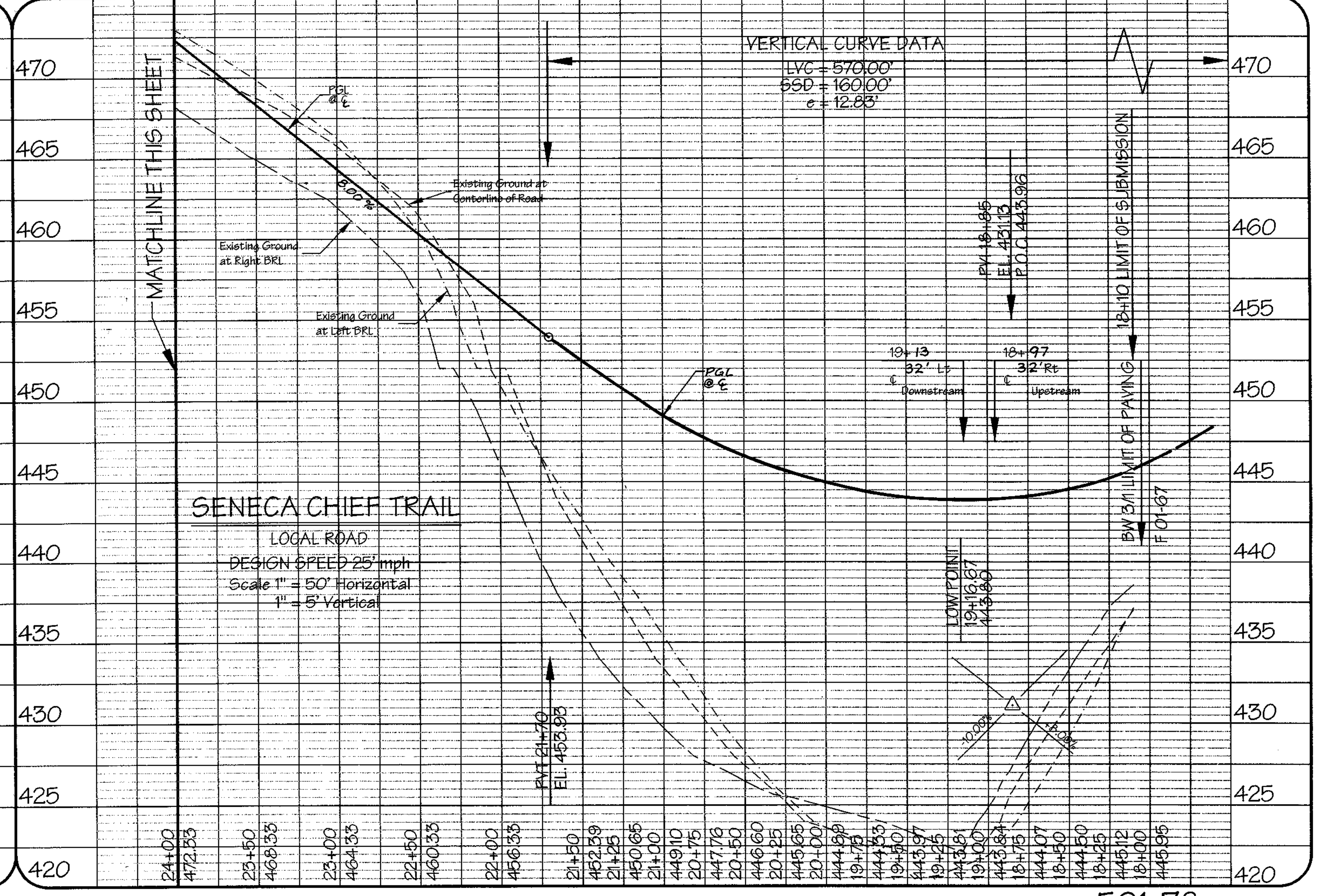
Plan & Profile
Seneca Chief Trail 18+05 thru 26+19.40

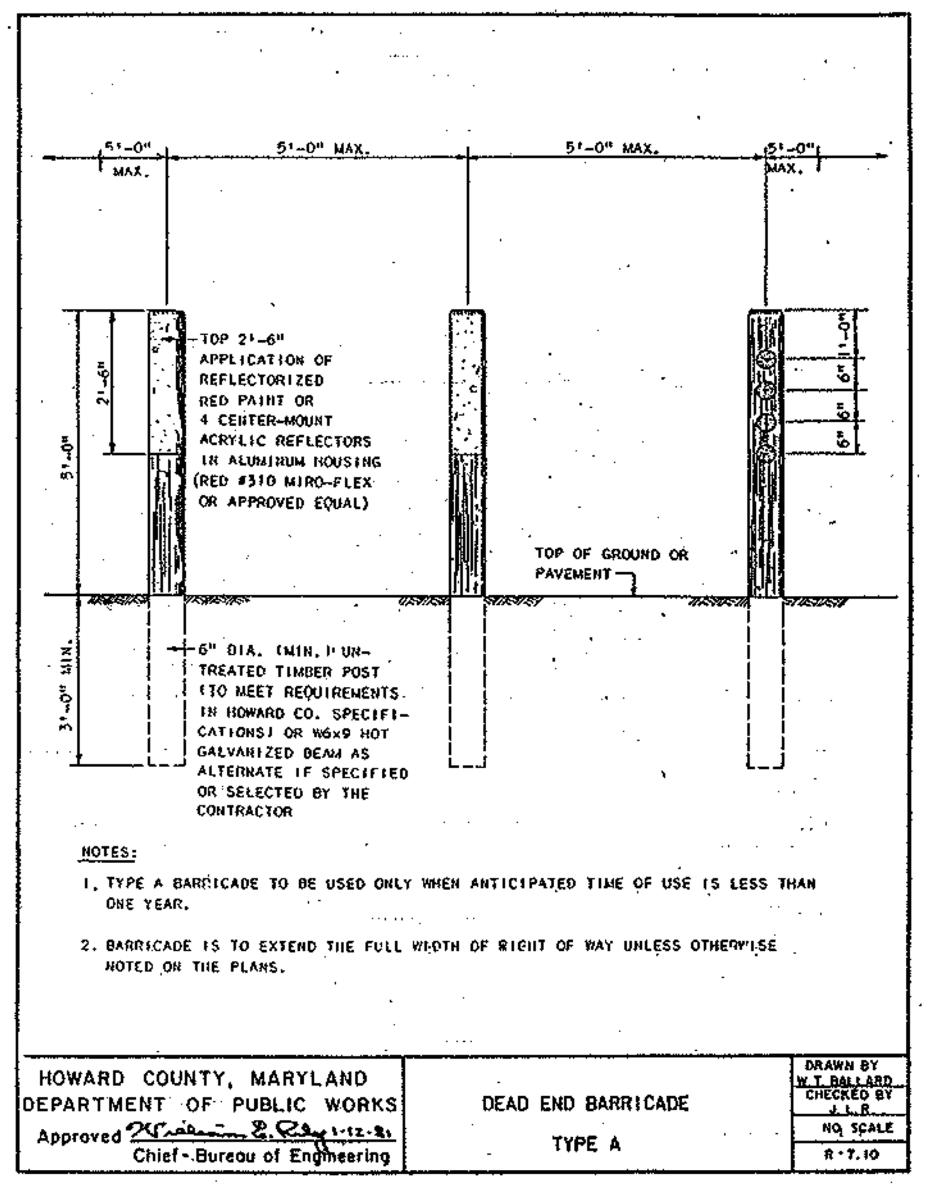
BRANTWOOD
Section Three - Area Three
Lots 28-38 & Preservation Parcels "F" & "G"
A Resubdivision of Brantwood - Section 3 Area 1
Buildable Bulk Parcel "C"
Tax Map No. 16 - Grid No. 21 - Parcel 172
3rd Election District - Howard County, Maryland
Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03, F 01-67, F 01-73

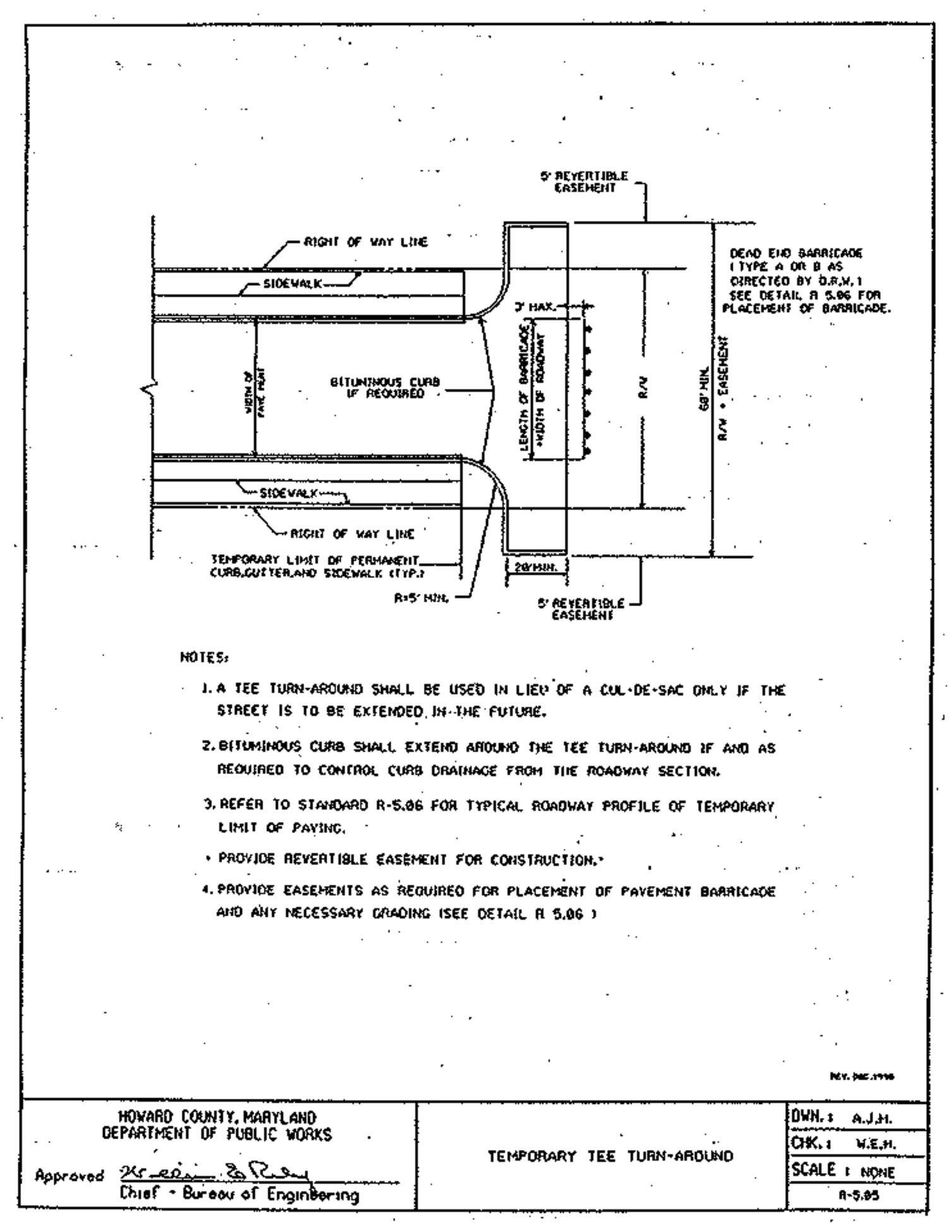
Developer: BRANTWOOD, LLC, 8835-P Columbia 100 Parkway, Columbia, Maryland 21045, (410) 730-0810

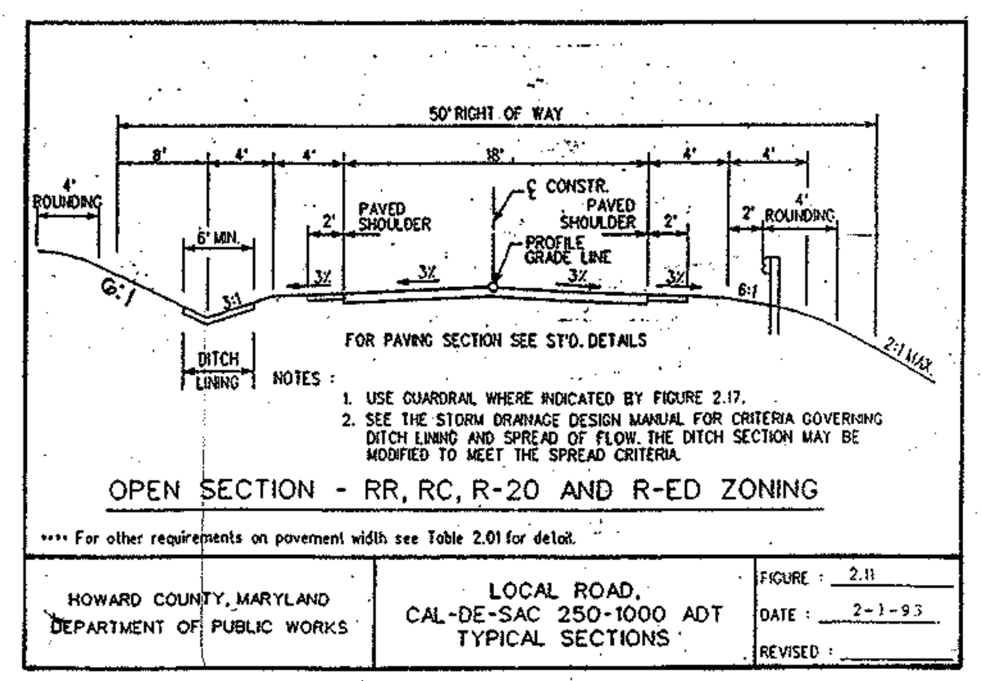
DESIGNED	DRAWN	CHECKED	DATE	SCALE	DRAWING	JOB NO.	FILE NO.
EDS	JLM	BDB	7/2001	AS SHOWN	2 of 22	98-040.6	F01-78



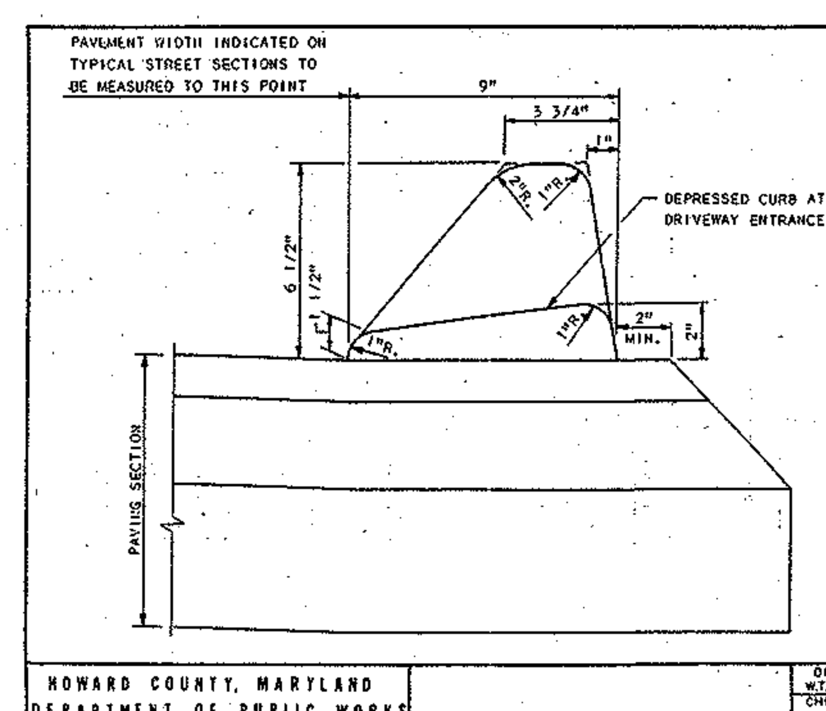


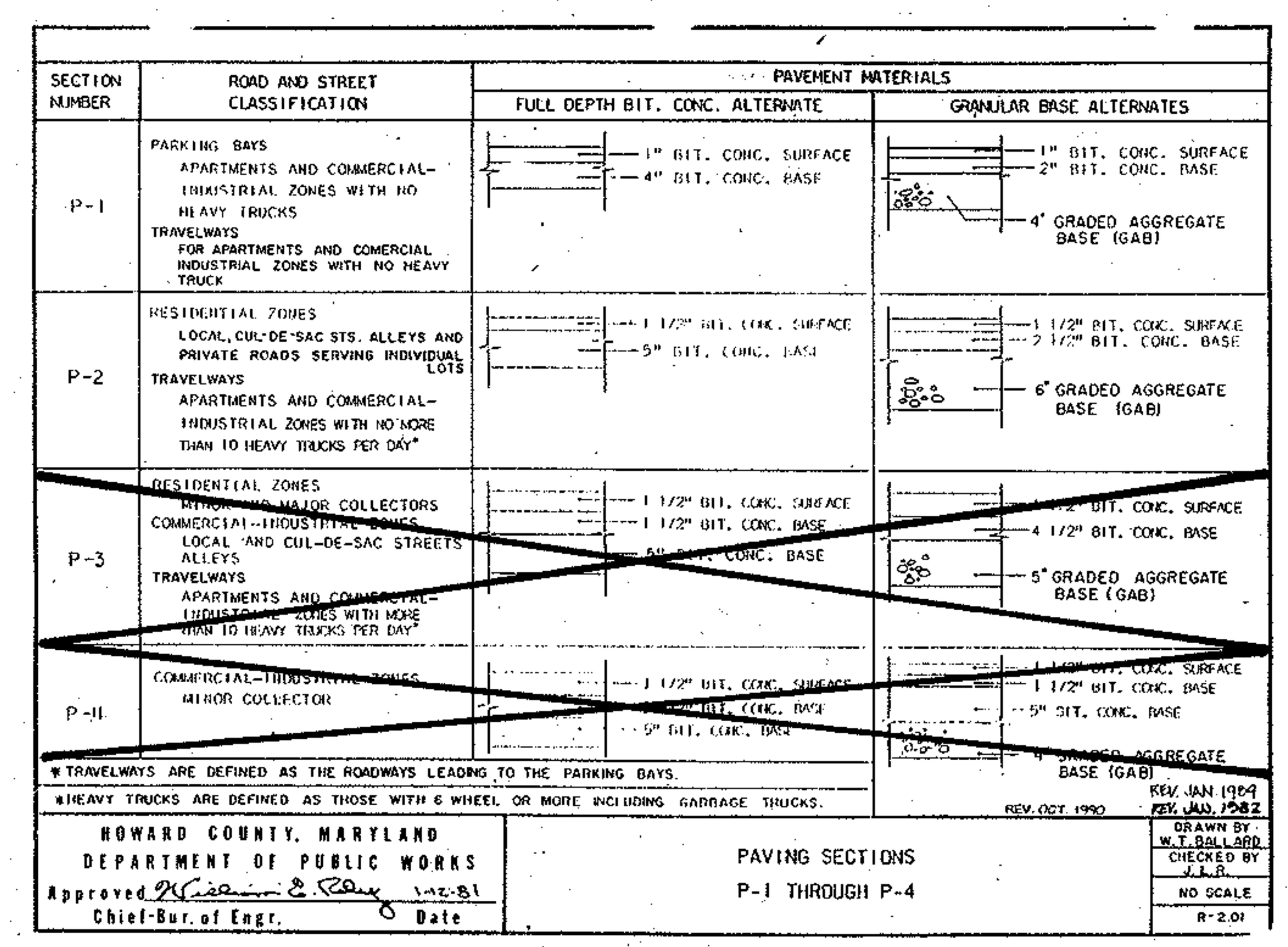


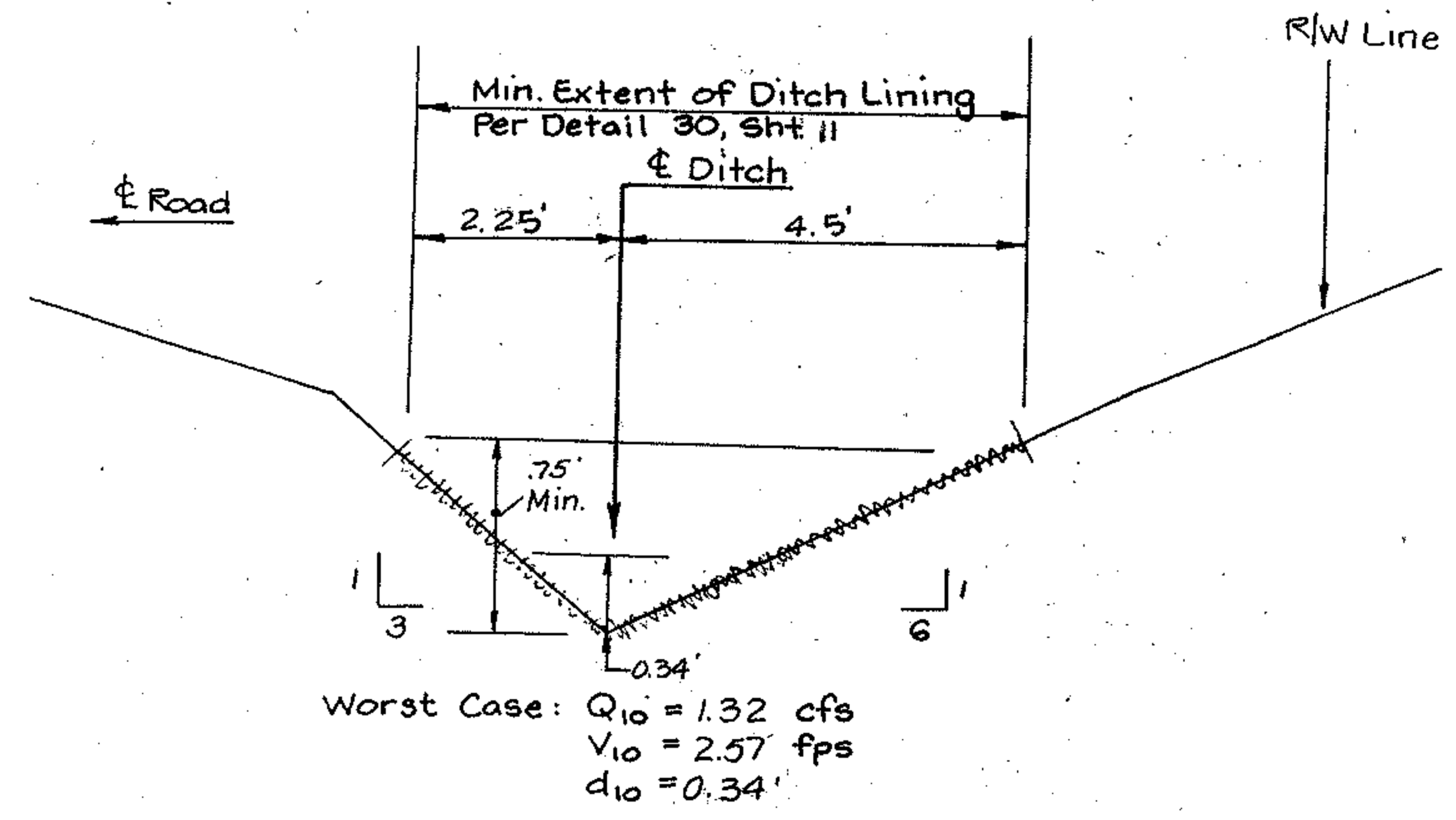




NOTE: Provide Erosion Control Matting per Detail 30, Sheet 10.

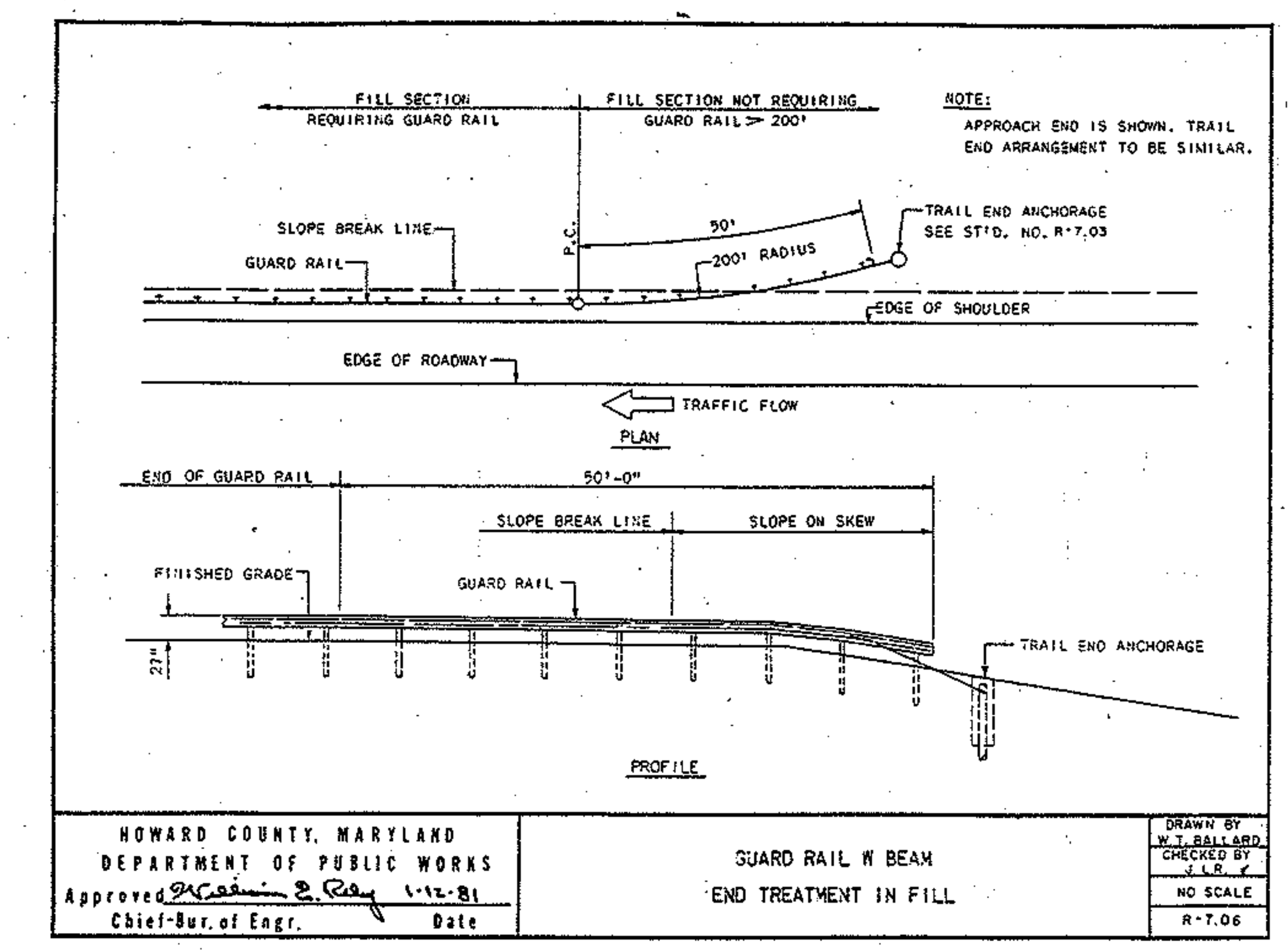


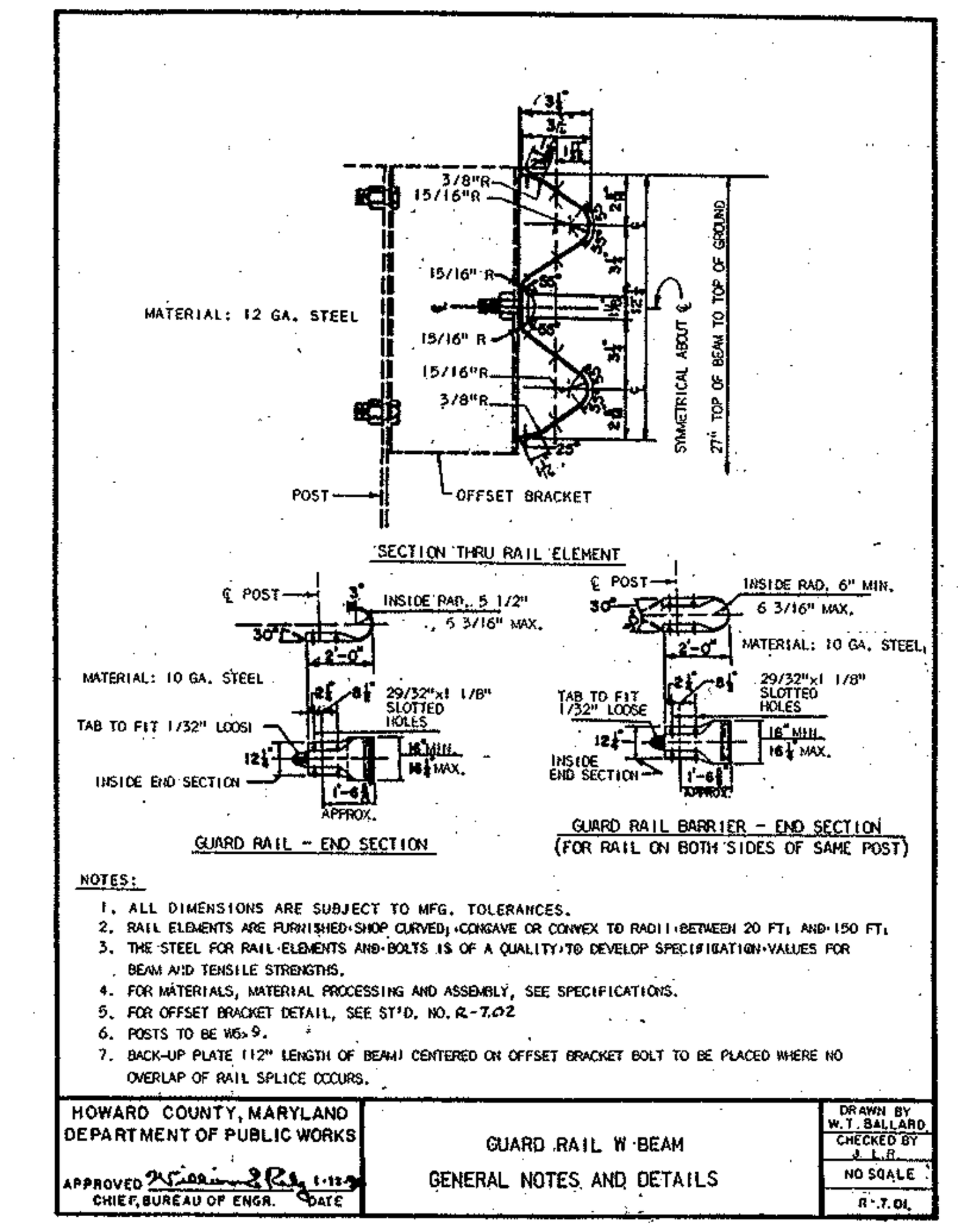


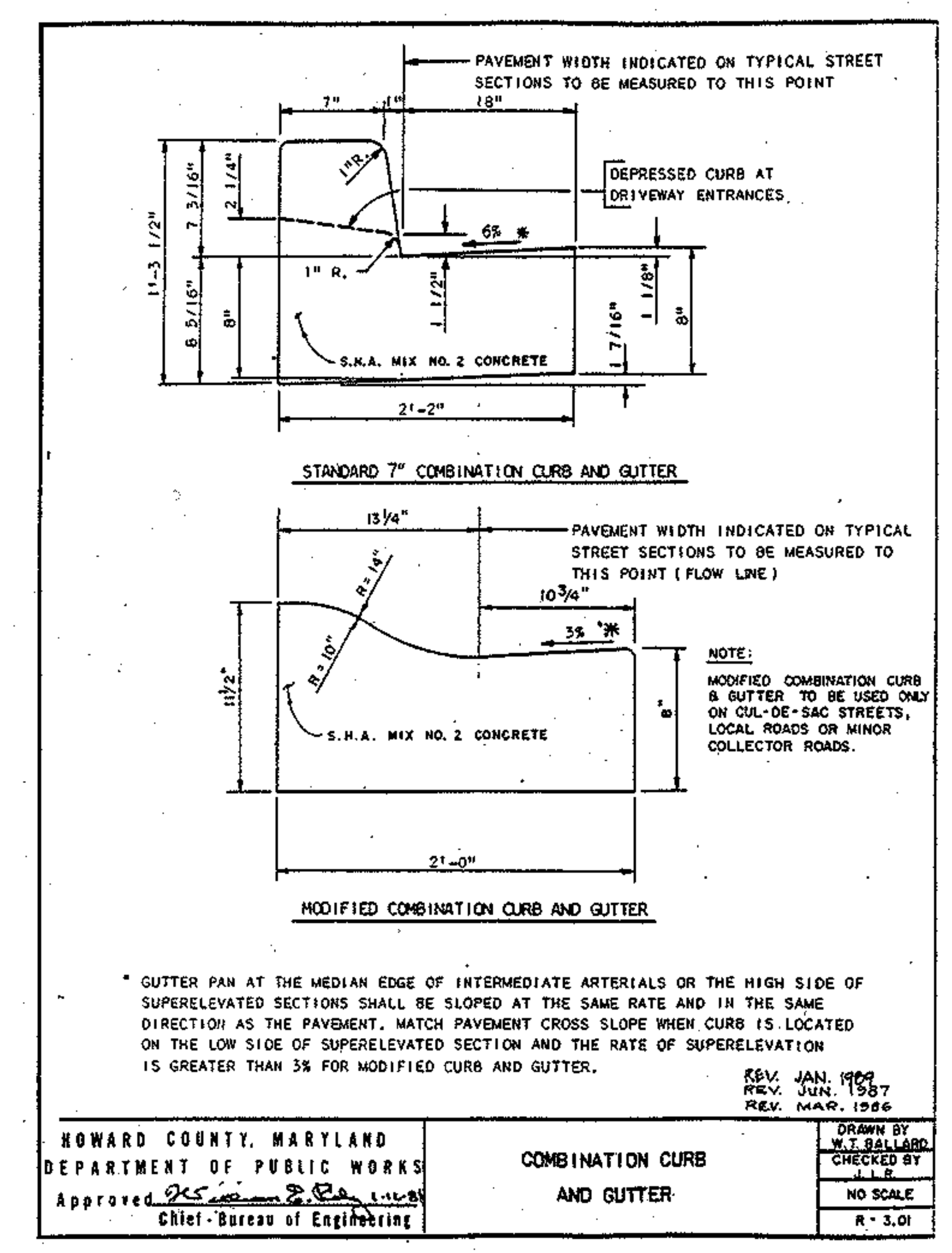


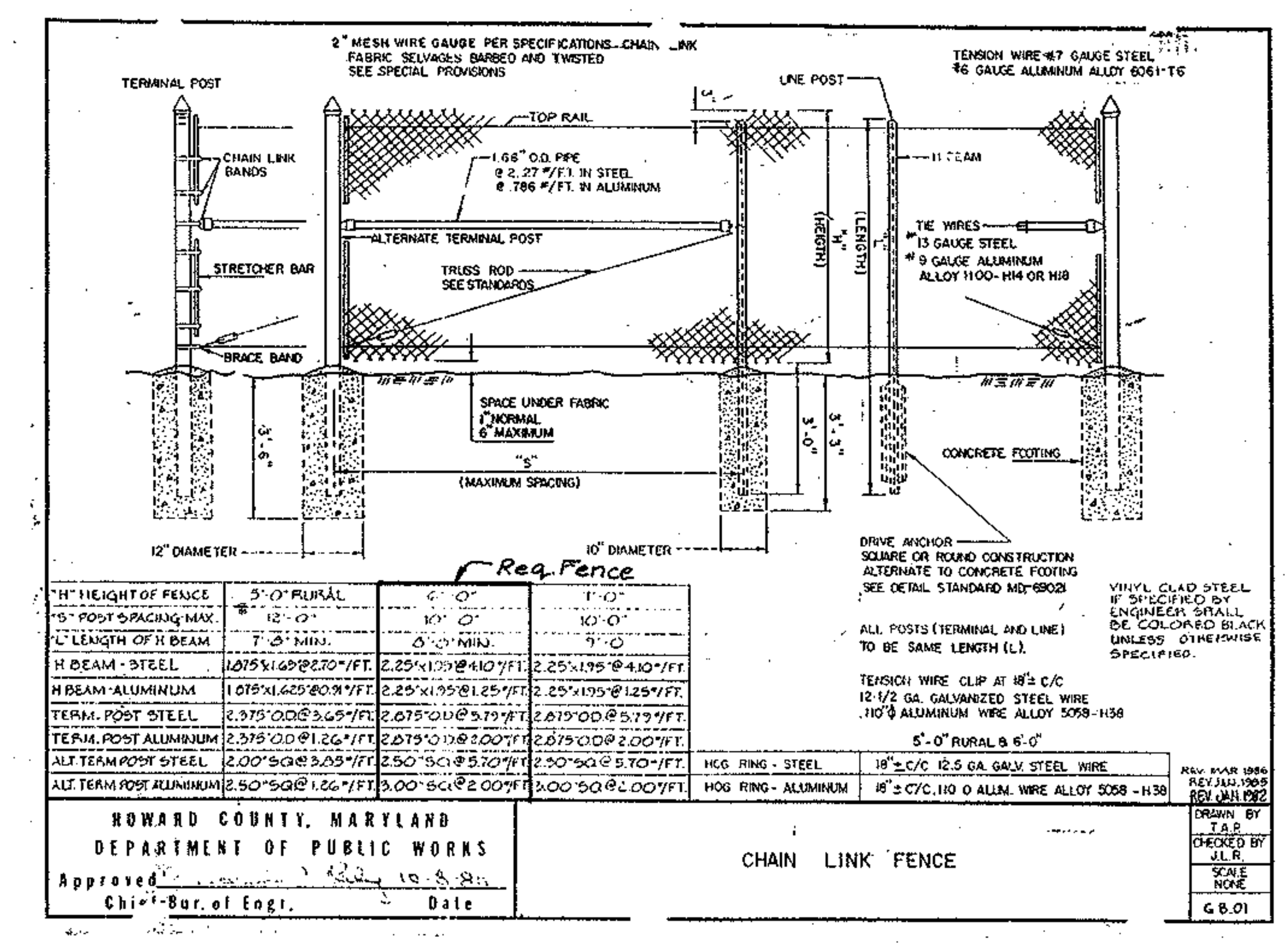
TYPICAL ROADSIDE DITCH

Not To Scale









Symbol	Street Name	℄ Station	Offset	Type
				TRAFFIC CONTROL SIGN LEGEND *Work Order#*
▶	Seneca Chief Trail	21+25	14'LT	R2-1,"Speed Limit 25"; 24"x30" Rectangle
▶	Seneca Chief Trail	21+50	14'RT	R2-5a,"Reduce Speed Ahead"; 24"x 30" Rectangle and
▶	Seneca Chief Trail			,"No Outlet" Sign;
─•─•─	Seneca Chief Trail			"Range of Address Sign"
				"End of Road" Markers

Road Name	Station to Station	Class	R/W	Design Speed	Paving Section
Seneca Chief Trail	18+05 - 26+11	Local Road	50	25	P-2

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

LDE	12/03	△	Remove Center Median Island Detail
By	Date	No.	Description

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 8/24/01 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT — 9/6/01 DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — 8/16/01 DATE

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

NATURAL RESOURCE CONSERVATION SERVICE — 8/7/01 DATE

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

HOWARD SOIL CONSERVATION DISTRICT — 8/7/01 DATE

ENGINEER'S CERTIFICATE

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

SIGNATURE OF ENGINEER — 7/24/01 DATE

DEVELOPER'S CERTIFICATE

"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.

SIGNATURE OF DEVELOPER — 11/3/00 DATE

STATE OF MARYLAND — BRUCE DAVID BURTON — REGISTERED PROFESSIONAL ENGINEER — 7/24/01

LDE, INC.

9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

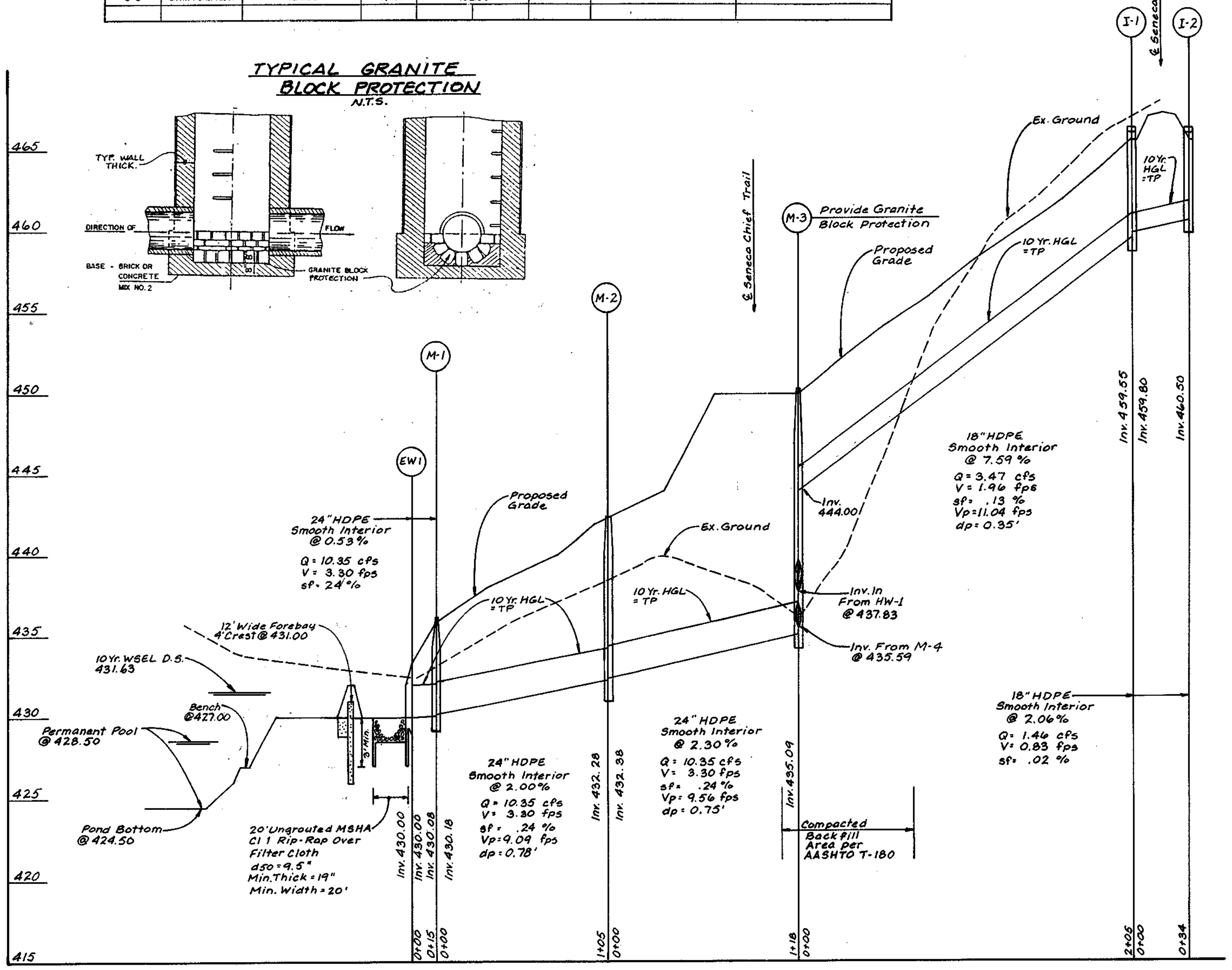
DESIGNED		SCALE
EDS	Road Details **BRANTWOOD** Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcels 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-	As Shown
DRAWN: JLM KBW		DRAWING: 3 of 22
CHECKED: BDB		JOB NO.: 98-040.6
DATE: 7/2001	DEVELOPER: BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO.: F01-78

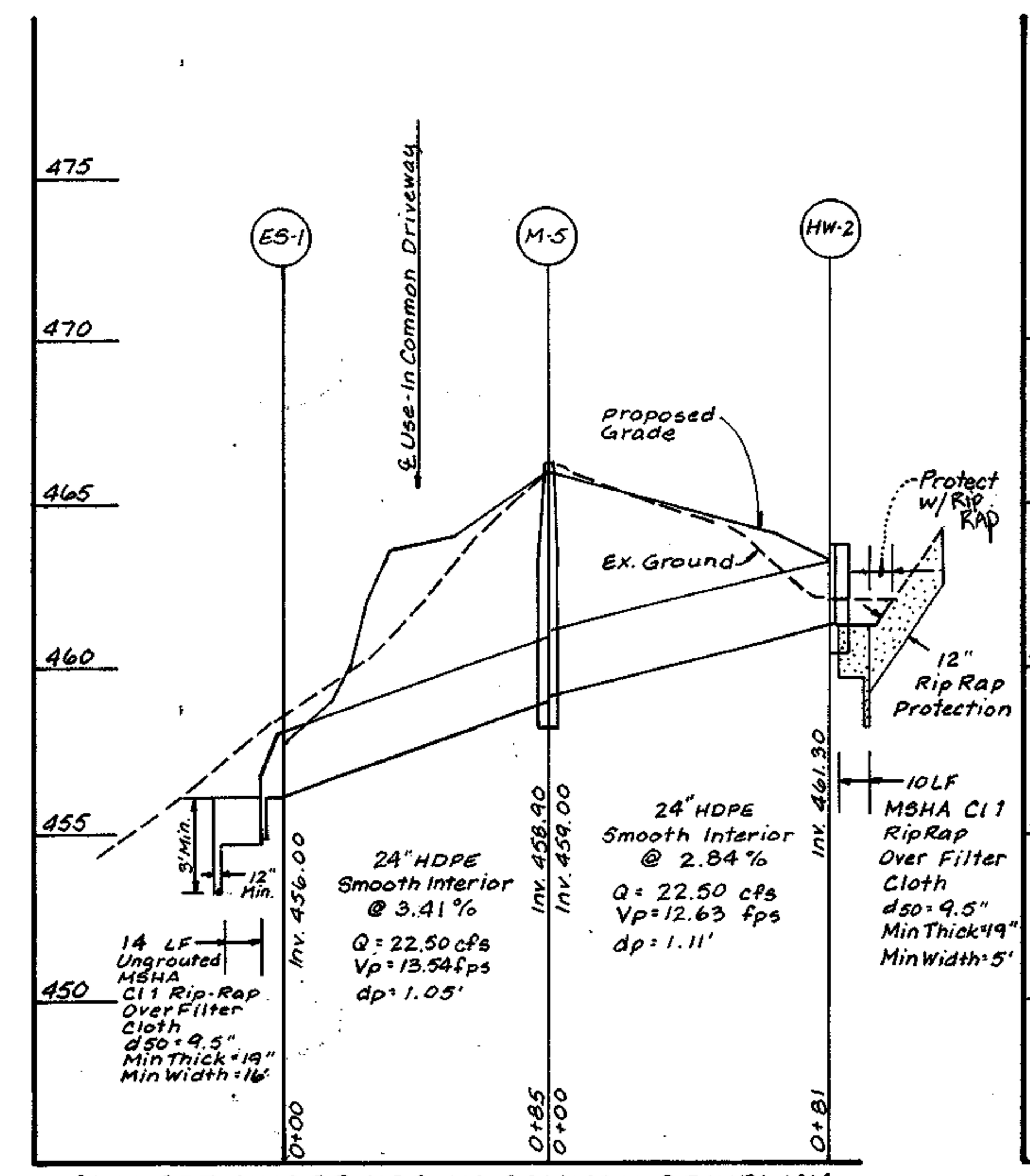
F01-78

STRUCTURE SCHEDULE

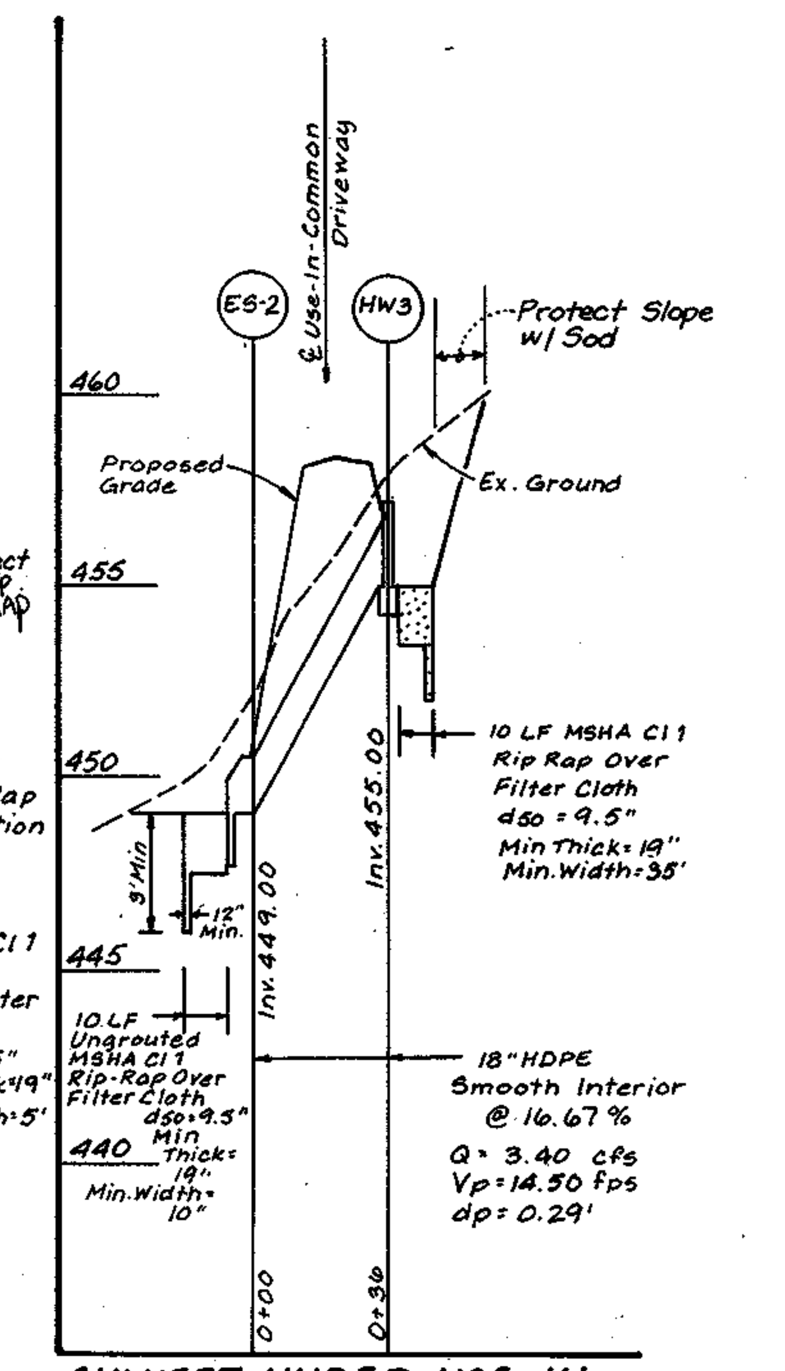
Inlet No.	Type	Inv. In	Inv. Out	MH Top or Top Slab Elev	Detail	Location	Remarks
I-1	"D"	459.80	459.55	465.85	SD 4.39	23+30 - 17' RT	Throat 3 Sides - No Weir Downhill Side
I-2	"D"	-	460.50	465.85	SD 4.39	23+30 - 17' LT	Throat 3 Sides - No Weir Downhill Side
I-3	"D"	437.82	437.72	442.91	SD 4.39	19+16.67 - 17' RT	Sump Inlet - Throat 4 Sides
I-4	"D"	-	438.50	442.91	SD 4.39	19+16.67 - 17' LT	Sump Inlet - Throat 4 Sides
HW-1	"E" Headwall	-	439.30	441.55	SD-5.31	N 589672.55 E 1337033.30	Coord @ Inside Cor. Face of Structure
HW-2	"E" Headwall	-	461.30	463.55	SD-5.31	N 589575.73 E 1336474.57	Coord @ Inside Cor. Face of Structure
HW-3	"C" Headwall	-	455.00	457.25	SD-5.21	N 589073.90 E 1336539.43	Coord @ End of Pipe
HW-4	"C" Headwall	-	442.00	444.25	SD-5.21	N 588885.32 E 1336701.86	Coord @ End of Pipe
M-1	Manhole	430.18	430.08	436.00	G 5.12	N 589415.75 E 1336990.87	
M-2	Manhole	432.38	432.28	443.00	G 5.12	N 589519.63 E 1337006.17	
M-3	Manhole	444.00/437.83/435.59	435.09	450.00	G 5.12	21+24.37 - 25' RT	
M-4	Manhole	436.61	436.71	444.70	G 5.12	20+20 - 25' RT	
M-5	Manhole	459.00	458.90	466.00	G 5.12	N 589505.13 E 1336435.88	
EW-1	"A" Headwall	430.00	430.00	433.50	SD-5.11	N 589401.88 E 1336985.15	Coord @ Face Structure D.S.
ES-1	End Section	456.00	456.00	457.50	SD-5.51	N 589462.51 E 1336509.42	Coord @ End of Pipe
ES-2	End Section	449.00	449.00	450.50	SD-5.51	N 589056.49 E 1336570.94	Coord @ End of Pipe
ES-3	End Section	441.00	441.00	442.50	SD-5.51	N 588902.01 E 1336712.88	Coord @ End of Pipe
EW-5	"A" Headwall	423.80	423.80	427.05	SD-5.11		Coord @ Face Structure D.S.
MH-6	Manhole	424.00	423.90	434.00	G 5.12		-
S-5	SWM Pond Riser	424.50	424.40	432.33	-		Coord @ Inside Box Face of Structure

TYPICAL GRANITE BLOCK PROTECTION
N.T.S.

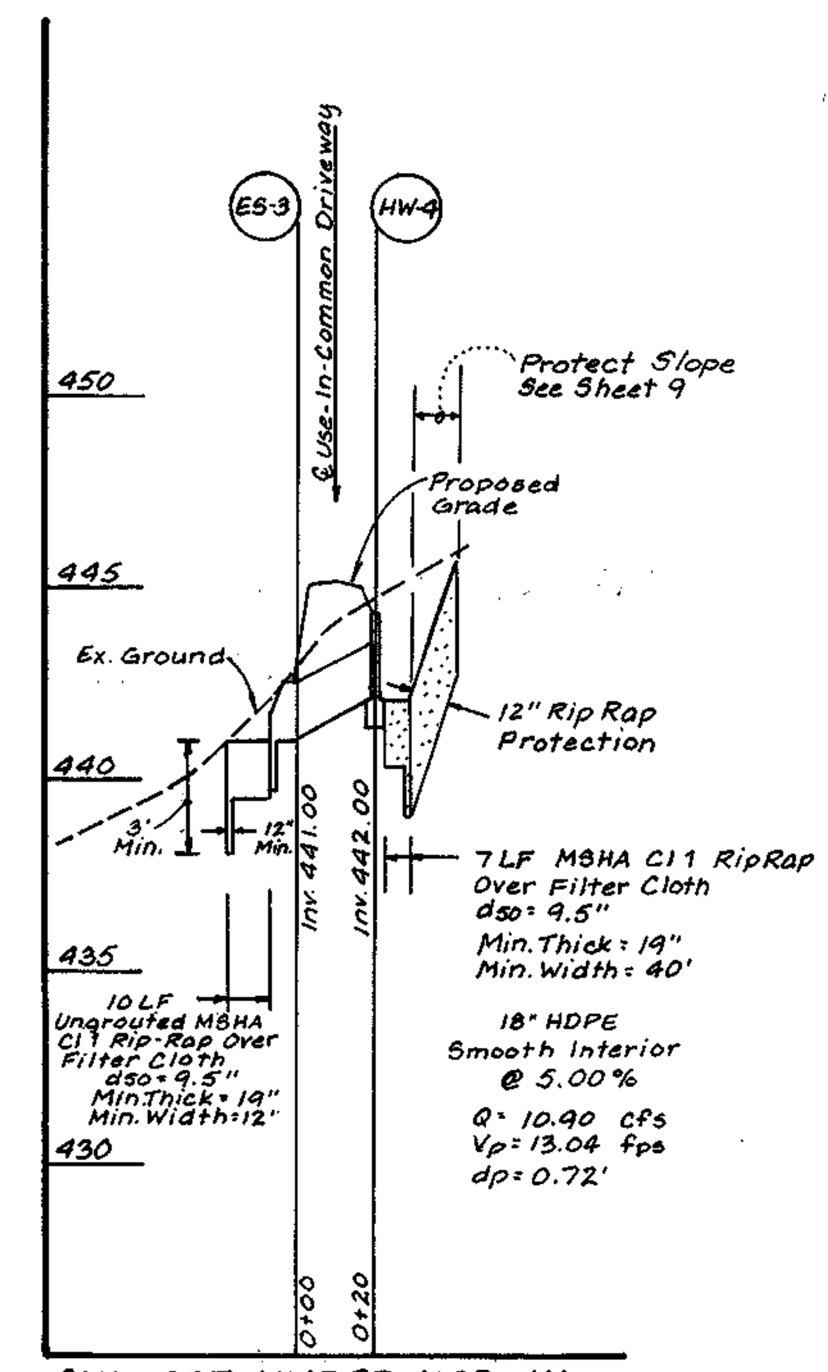




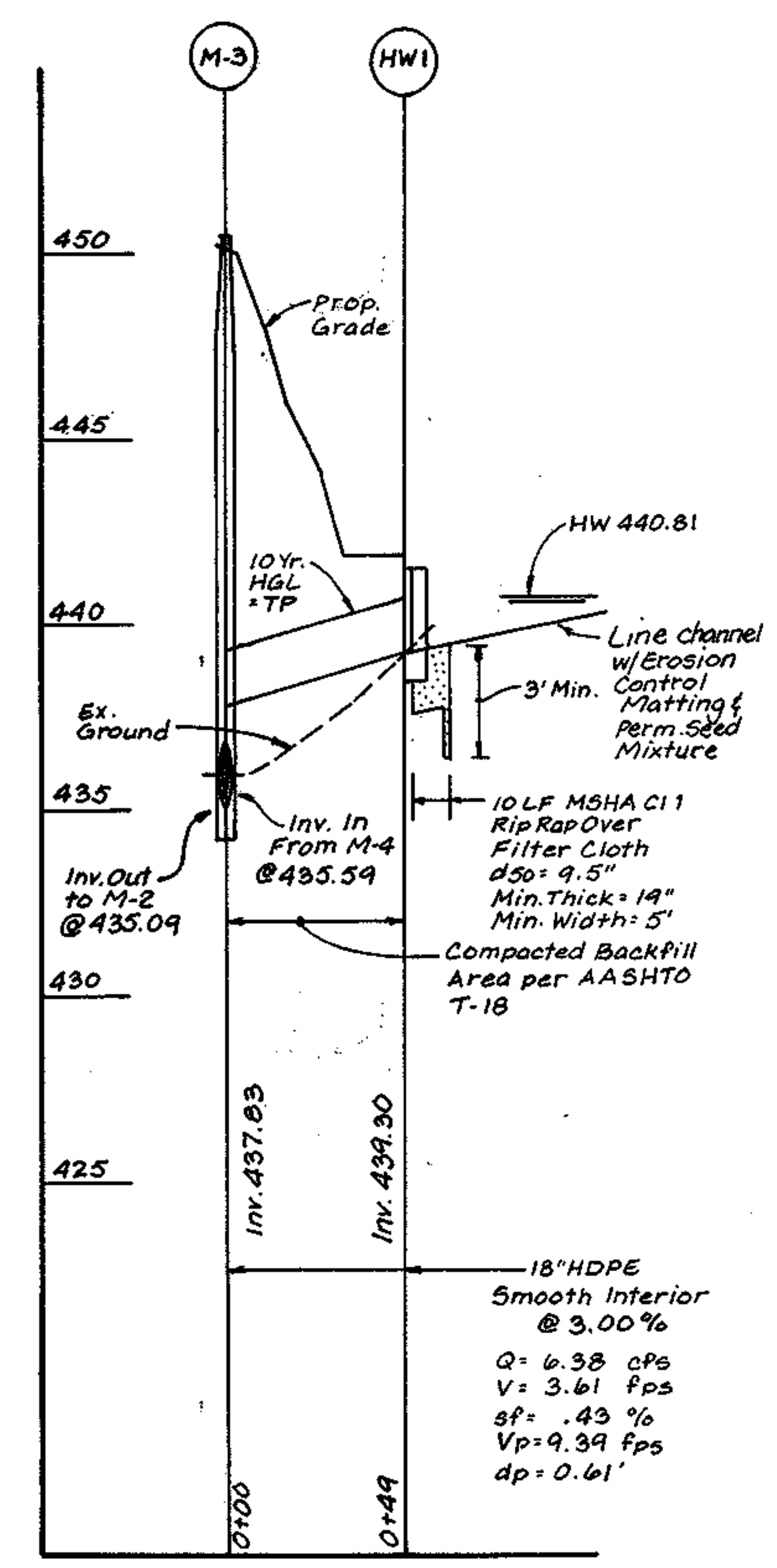
CULVERT UNDER USE-IN-COMMON DRIVEWAY NEAR LOTS 28 & 34

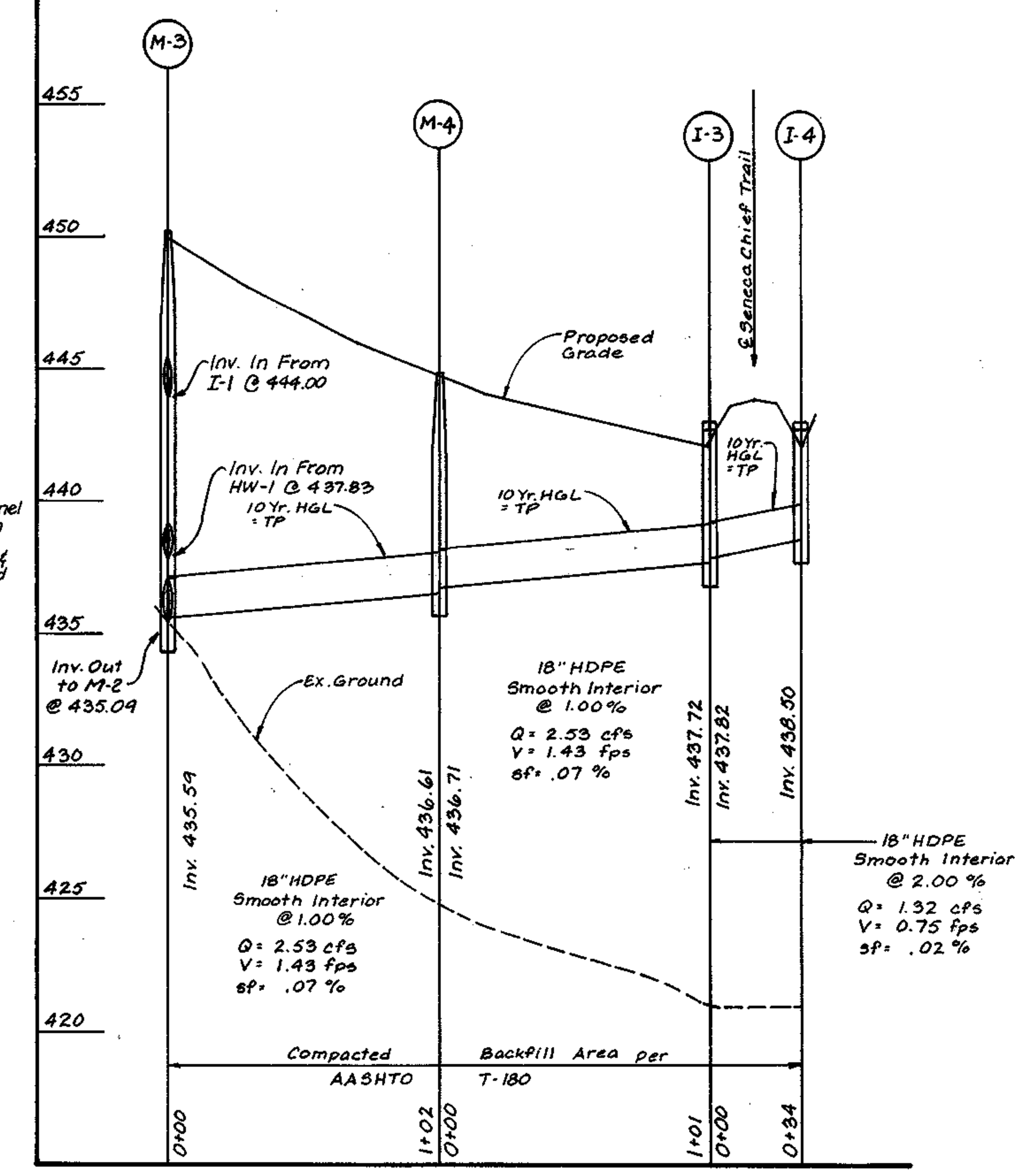


CULVERT UNDER USE-IN-COMMON DRIVEWAY NEAR LOT 33



CULVERT UNDER USE-IN-COMMON DRIVEWAY NEAR LOTS 31 & 32





OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

By	Date	No.	Description

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 9/6/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE

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

NATURAL RESOURCE CONSERVATION SERVICE — DATE 8/7/01

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

HOWARD SOIL CONSERVATION DISTRICT — DATE 8/7/01

ENGINEER'S CERTIFICATE

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

SIGNATURE OF ENGINEER — DATE 7/24/01

DEVELOPER'S CERTIFICATE

"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.

SIGNATURE OF DEVELOPER — DATE 11/9/00

7/24/01

PIPE SCHEDULE

Size	Class	Total Length *
18"	HDPE Smooth Interior	747
24"	HDPE Smooth Interior	238

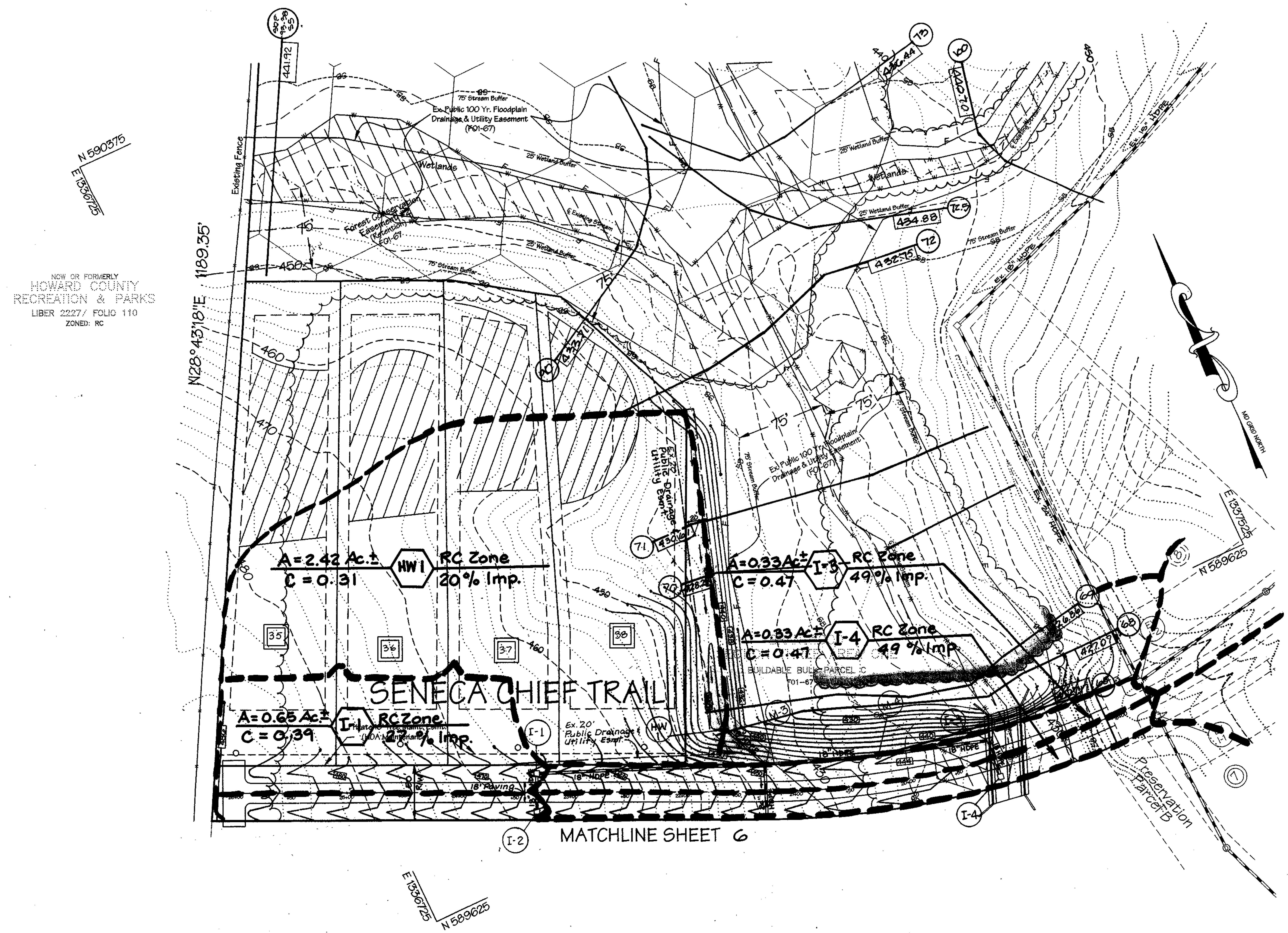
* The total length of pipe does not take into account the slope of the pipe. This total is for linear feet only.

LDE, INC.

9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED		SCALE
EDS	Storm Drain Profiles **BRANTWOOD** Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcels 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-	1" = 5' Vert. 1" = 50' Horiz.
DRAWN JLM STB		DRAWING 4 of 22
CHECKED BDB		JOB NO. 98-040.6
DATE 7/2001	DEVELOPER BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO. F01-78

F01-78



LEGEND

........522........	EX. 2FT. CONTOUR
——[522]——	PROP. 2FT. CONTOUR
– – –520– – –	EX. 10FT. CONTOUR
(hatched box)	PROP. SEPTIC AREA
(dotted hatched box)	EX. SEPTIC AREA
(scalloped line)	EX. TREES
(heavy scalloped line)	EX. TREES TO REMAIN
– · – · –	EX. ℄ STREAM
–SB– –SB– –SB–	75' FT. STREAM BUFFER
—W— —W— —W—	EX. NON-TIDAL WETLAND
– – – – –	25' FT. WETLAND BUFFER
–F– –F– –F–	100 YEAR FLOODPLAIN

Acreage / 'C' Factor — INLET No. — Zoning / % Impervious

Drainage Divide

NOTES:

1. THIS PLAN SHALL NOT BE USED FOR GRADING (SEE SHEET 7).
2. IF NO TIME OF CONCENTRATION (TC) IS SHOWN, 5 MIN. TC WAS USED.
3. CULVERT LOCATION IS SHOWN FOR INFORMATION ONLY, REFER TO SHEET 18.

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

By	Date	No.	Description

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

[signature] 8/24/01
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

[signature] 9/6/01
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

[signature] 8/16/01
Chief, Bureau of Highways — DATE

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

NATURAL RESOURCE CONSERVATION SERVICE — DATE

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

HOWARD SOIL CONSERVATION DISTRICT — DATE

ENGINEER'S CERTIFICATE

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

Bruce D. [signature] 7/24/01
SIGNATURE OF ENGINEER — DATE

DEVELOPER'S CERTIFICATE

"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.

[signature] 11/2/01
SIGNATURE OF DEVELOPER — DATE

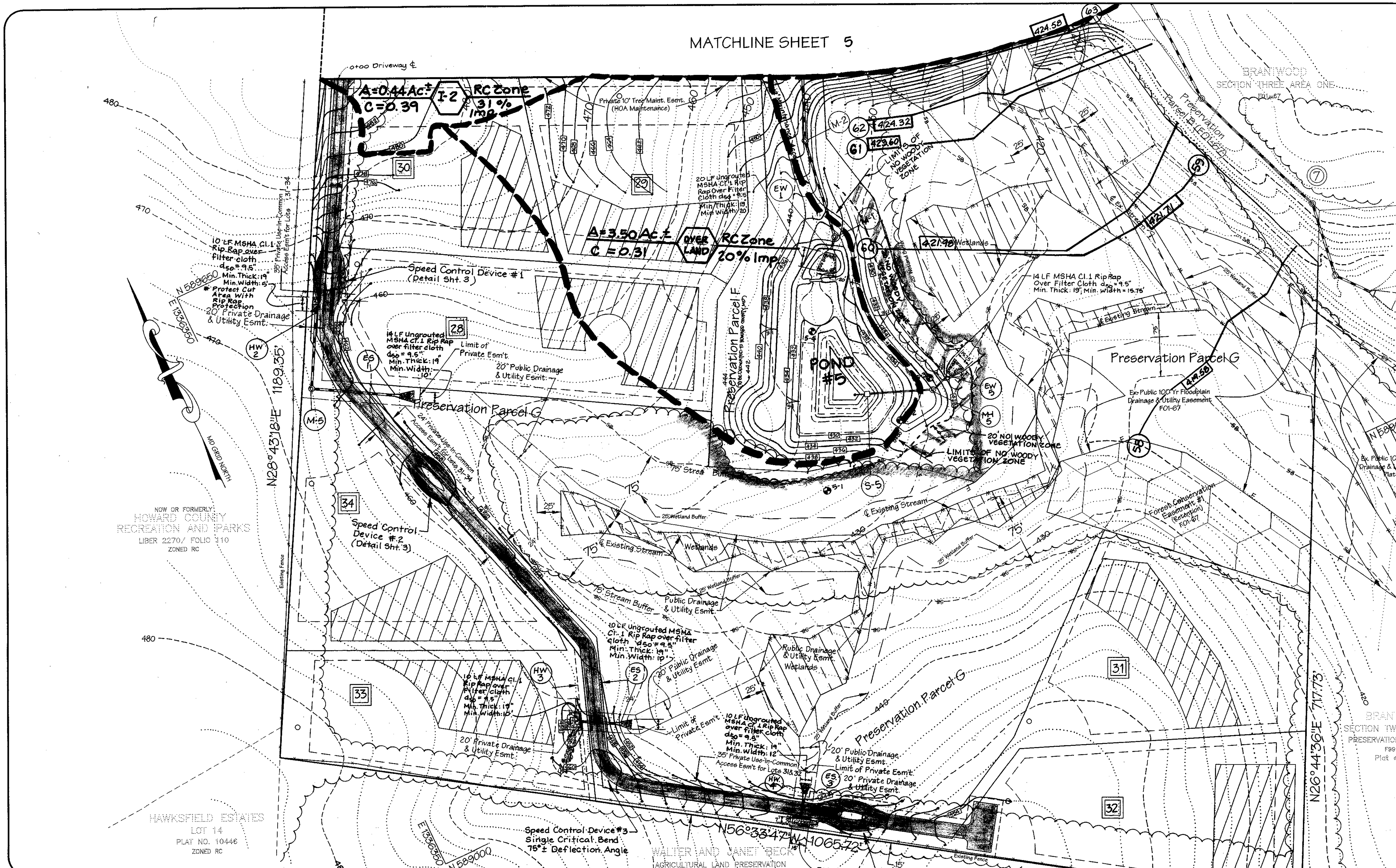
STATE OF MARYLAND — BRUCE DAVID [illegible] — PROFESSIONAL ENGINEER
[signature] 7/24/01

LDE, INC.

9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED	Drainage Area Map	SCALE
EDS	BRANTWOOD	1"=50'
DRAWN	Section Three - Area Three	DRAWING
JLM	Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C"	5 of 22
CHECKED	Tax Map No. 16 - Grid No. 21 - Parcel 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-73	JOB NO.
BDB		98-040.6
DATE	DEVELOPER: BRANTWOOD, LLC 8835-P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO.
7/2001		F01-78

F01-78



LEGEND

·····522·····	EX. 2FT. CONTOUR
—522—	PROP. 2FT. CONTOUR
- - -520- - -	EX. 10FT. CONTOUR
	PROP. SEPTIC AREA
	EX. SEPTIC AREA
	EX. TREES
	EX. TREES TO REMAIN
	EX. ℄ STREAM
—SB— —SB— —SB—	75' FT. STREAM BUFFER
—W— —W— —W—	EX. NON-TIDAL WETLAND
	25' FT. WETLAND BUFFER
—F— —F— —F—	100 YEAR FLOODPLAIN
○	PROPOSED WELL

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

By	Date	No.	Description

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 9/6/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE 9/6/01

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

NATURAL RESOURCE CONSERVATION SERVICE — DATE

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

HOWARD SOIL CONSERVATION DISTRICT — DATE

ENGINEER'S CERTIFICATE

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

SIGNATURE OF ENGINEER — DATE 7/24/01

DEVELOPER'S CERTIFICATE

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SIGNATURE OF DEVELOPER — DATE 11/2/00

NOTE: No clearing is proposed within the stream or wetland buffers.

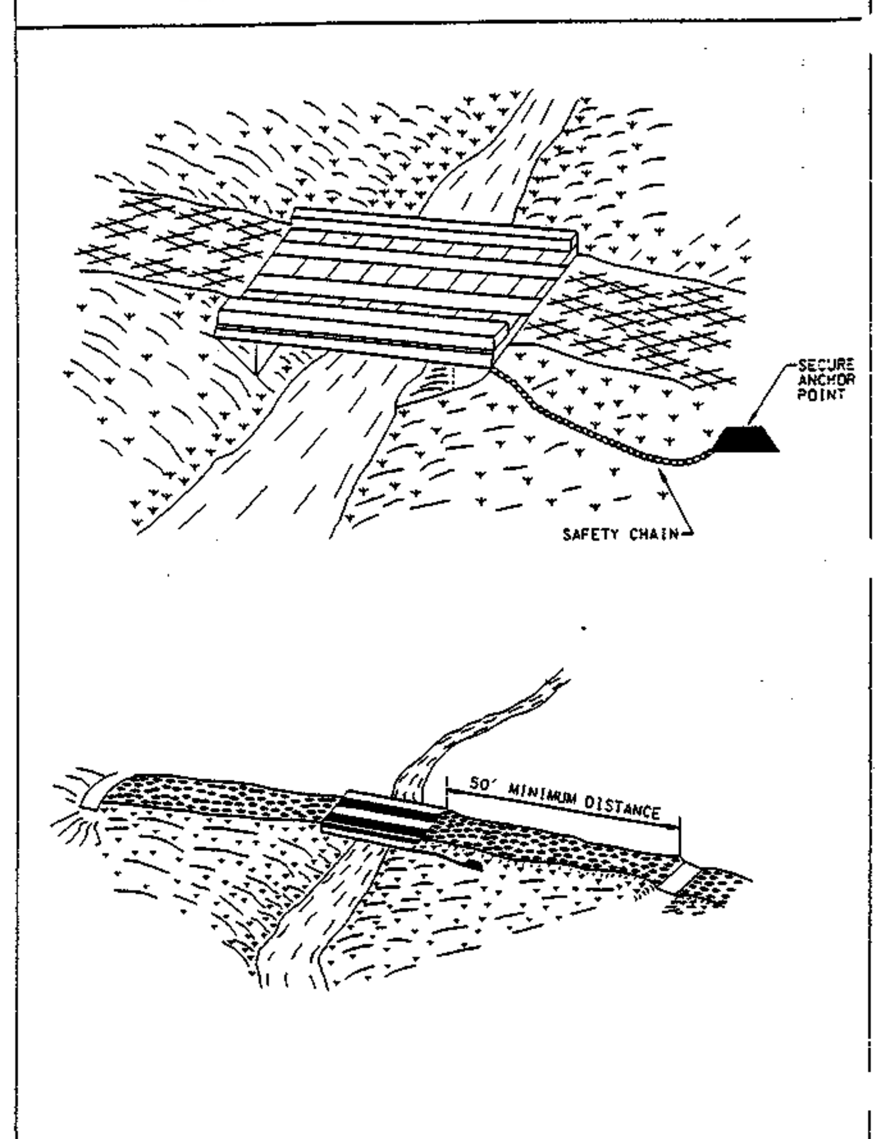
LDE, INC.

9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED		SCALE
EDS	Drainage Area Map **BRANTWOOD** Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcel 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-73	1"=50'
DRAWN: JLM		DRAWING: 6 of 22
CHECKED: BDB		JOB NO.: 98-040.6
DATE: 7/2001	DEVELOPER: BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO.: F01- 78

F01- 78

DETAIL 35 TEMPORARY ACCESS BRIDGE



U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE H - 29 - 9	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

PHASE 1 - CONSTRUCTION SEQUENCE

1. Obtain Grading Permit. - 1 day
2. Stakeout limits of disturbance. - 3 days
3. Install stabilized construction entrance. - 1 day
4. Install Tree Protection Fence (TPF) where shown hereon. - 1 day
5. Install Super Silt Fence (SSF) at the limit of disturbance near the CONTECH culvert construction area where shown. Footing should be staked out prior to installation of SSF in order to properly place the sediment control device in relationship to the stream bank and proposed footing. - 1 day
6. The accumulated sediment from the sediment & erosion control devices shall be placed up grade from the devices in such a manner as not to interfere with construction operations or cause erosion down grade from the devices. - 1 day
7. The contractor shall inspect and provide necessary maintenance on the sediment and erosion controls shown hereon after each rainfall and on a daily basis - 1 day
8. With permission of the sediment control inspector, clear & grub area required for Phase 1 "Culvert" construction. - 3 days
9. Install the Temporary Access Bridge where shown per the specifications and procedures shown on this sheet. - 1 day
10. Install Reinforced Concrete Footing per CONTECH culvert details; sheets 18 – 22. - 5 days
11. Install Scour / Rip Rap protection along culvert footing where shown on detail sheet 18 - 20. - 1 day
12. Complete construction of CONTECH culvert per details and specifications on sheets 18 – 22. - 2 weeks
13. Start back-filling operations around the CONTECH culvert structure. Note fill material should be available from the Brantwood Section Three – Area One (F01-67) excess
14. The 2:1 slopes are to be immediately stabilized with sod or erosion control matting & permanent seeding mixture. - 1 day
15. Backfilling operations includes the construction of "Keystone Wall" with "Tensar Geogrid" and placement of the Scour / Rip Rap protection common to the Keystone Wall. See details sheets 18 – 22. - 2 weeks
16. Once back-filling operations reach the top of structure and the minimum cover over is placed over the CONTECH culvert sufficient for construction traffic to traverse the crossing; remove the Temporary Access Bridge dress and stabilize the disturbed areas with permanent seeding mixture and straw mulch. - 2 days
17. Complete the construction of the "Keystone Wall" and bring the fill over the CONTECH culvert to an acceptable elevation for construction operations common to Phase 2 to commence. - 3 days
18. When side slopes are brought to the proposed elevation, the slopes shall be immediately stabilized with sod or erosion control matting & permanent seeding mixture and straw mulch. - 1 day
19. With permission of the sediment control inspector, proceed to Phase 2. - 1 day.

TEMPORARY ACCESS BRIDGE

Construction Specifications

1. Restriction - Construction, use, or removal of a temporary access bridge will not normally have any time of year restrictions since construction, use, or removal should not affect the stream or its banks, unless the bridge is built with a pier(s) in the water.

2. Bridge Placement - A temporary bridge structure shall be constructed at or above the bank elevation to prevent the entrapment of floating materials and debris.

3. Abutments - Abutments shall be placed parallel to, and on, stable banks.

4. Bridge Span - Bridges shall be constructed to span the entire channel. If the channel width exceeds 8 feet, (as measured from top-of-bank to top-of-bank), then a footing, pier, or bridge support may be constructed within the waterway. One additional footing, pier, or bridge support will be permitted for each additional 8 foot width of the channel. However, no footing, pier, or bridge support will be permitted within the channel for waterways less than 8 feet wide.

5. Stringers - Stringers shall either be logs, sawn timber, prestressed concrete beams, metal beams, or other approved materials.

6. Deck Material - Decking materials shall be of sufficient strength to support the anticipated load. All decking members shall be placed perpendicular to the stringers, butted tightly, and securely fastened to the stringers. Decking materials must be butted tightly to prevent any soil material tracked onto the bridge from falling into the waterway below.

7. Run Planks (optional) - Run planking shall be securely fastened to the length of the span. One run plank shall be provided for each track of the equipment wheels. Although run planks are optional, they may be necessary to properly distribute loads.

8. Curbs or fenders - Curbs or fenders may be installed along the outer sides of the deck. Curbs or fenders are an option which will provide additional safety.

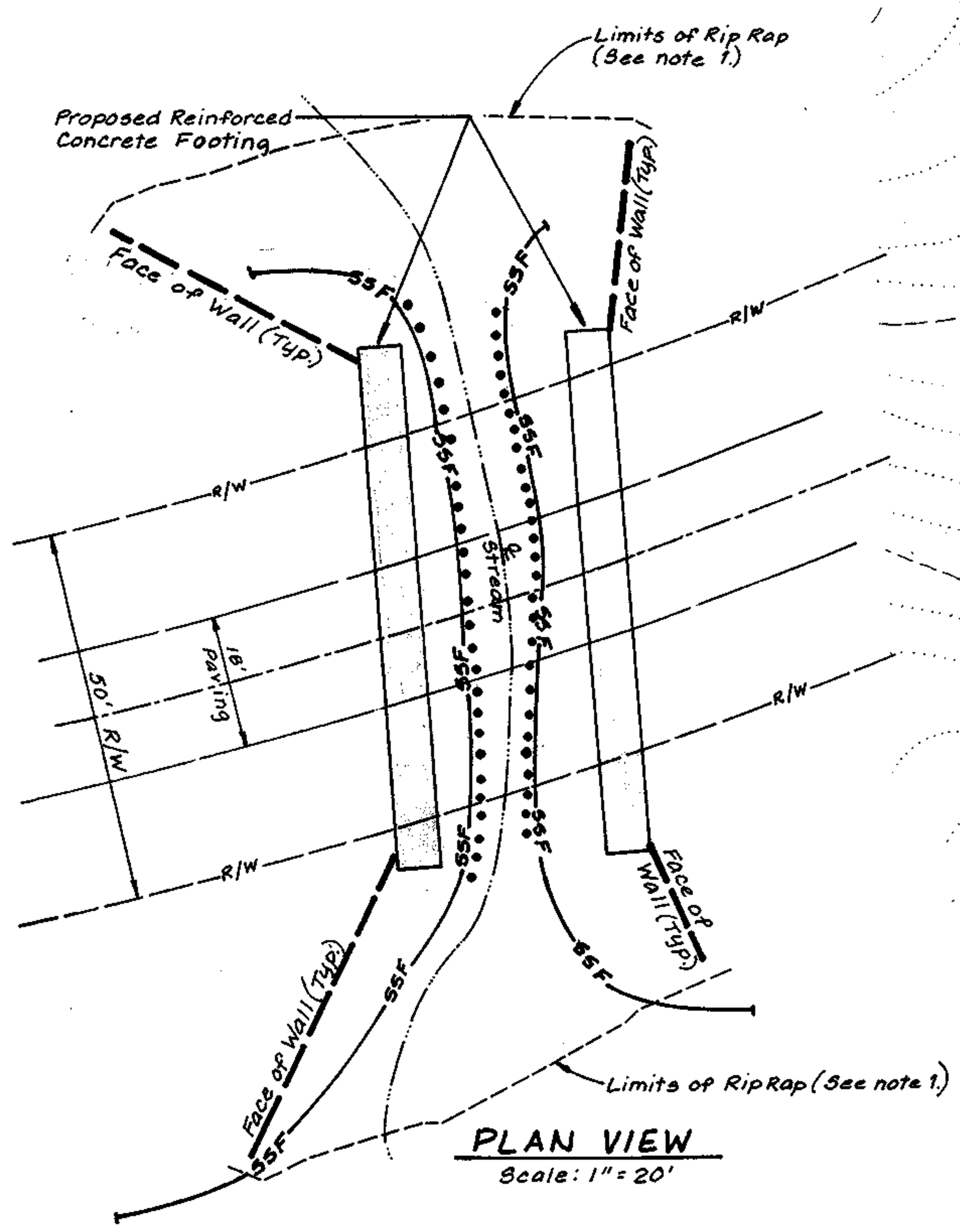
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE H - 29 - 9A	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

TEMPORARY ACCESS BRIDGE

9. Bridge Anchors - Bridges shall be securely anchored at only one end using steel cable or chain. Anchoring at only one end will prevent channel obstruction in the event that floodwaters float the bridge. Acceptable anchors are large trees, large boulders, or driven steel anchors. Anchoring shall be sufficient to prevent the bridge from floating downstream and possibly causing an obstruction to the flow.

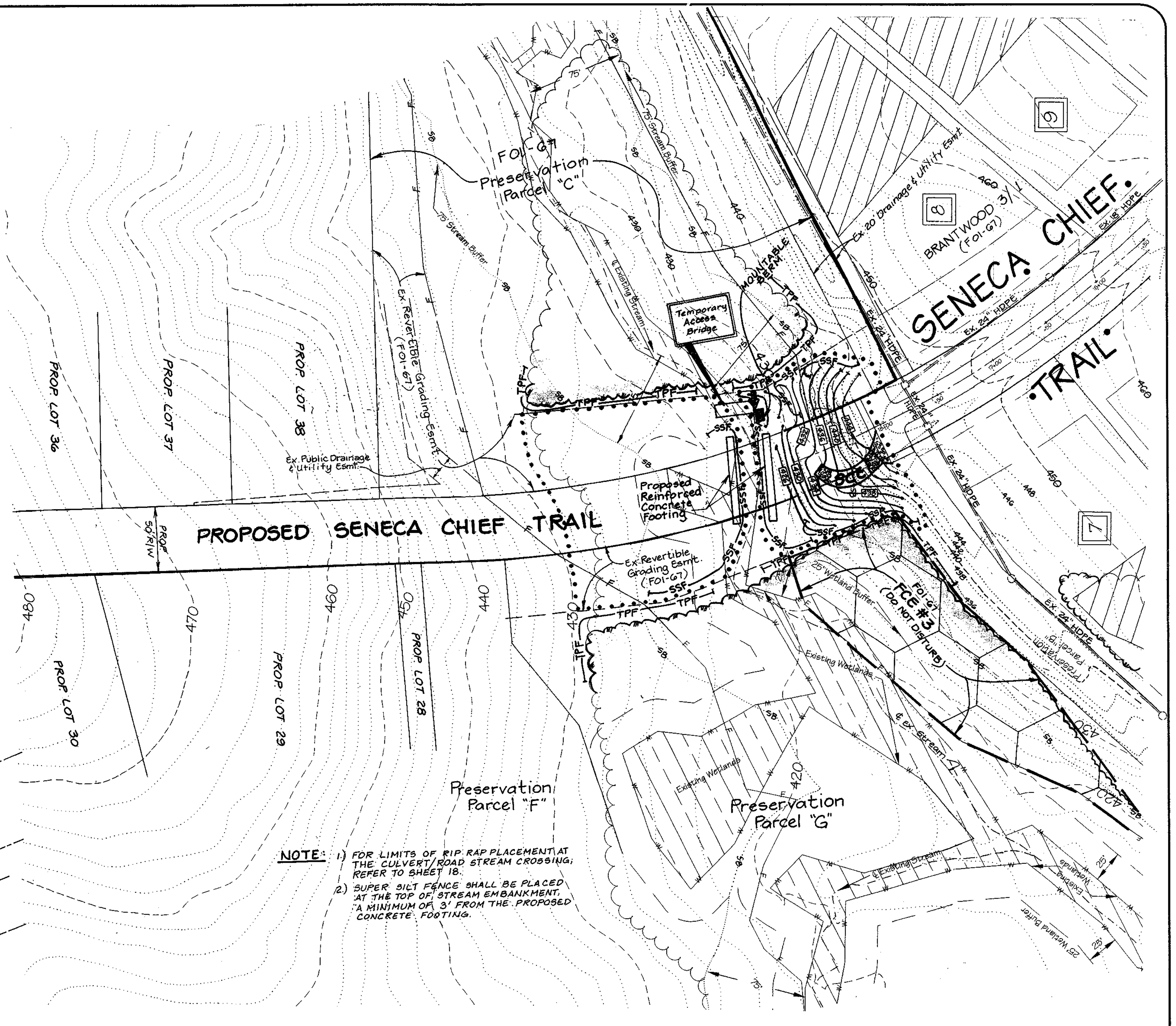
10. Stabilization - All areas disturbed during installation shall be stabilized within 14 calendar days of the disturbance in accordance with the Standard for "Critical Areas Stabilization With Permanent Seeding."

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE H - 29 - 10	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION



PLAN VIEW
Scale: 1" = 20'

NOTE: NO DISTURBANCE TO STREAM IS ALLOWED. (SEE NOTE 2)



NOTE:
1.) FOR LIMITS OF RIP RAP PLACEMENT AT THE CULVERT/ROAD STREAM CROSSING, REFER TO SHEET 18.
2.) SUPER SILT FENCE SHALL BE PLACED AT THE TOP OF STREAM EMBANKMENT, A MINIMUM OF 3' FROM THE PROPOSED CONCRETE FOOTING.

LEGEND

Symbol	Description
522	EX. 2FT. CONTOUR
522	PROP. 2FT. CONTOUR
520	EX. 10FT. CONTOUR
	PROP. SEPTIC AREA
	EX. SEPTIC AREA
	EX. TREES
	EX. TREES TO REMAIN
	EX. ℄ STREAM
SB SB	75 FT. STREAM BUFFER
W W	EX. NON-TIDAL WETLAND
	25 FT. WETLAND BUFFER
F F	100 YEAR FLOODPLAIN
SSF SSF	SUPER SILT FENCE
TPF TPF	TREE PROTECTION FENCE
• • • • • • • •	LIMIT OF DISTURBANCE
SCE	STABILIZED CONSTRUCTION ENTRANCE

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

By	Date	No.	Description

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 9/6/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE

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

NATURAL RESOURCE CONSERVATION SERVICE — DATE 8/7/01

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

HOWARD SOIL CONSERVATION DISTRICT — DATE 8/7/01

ENGINEER'S CERTIFICATE

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SIGNATURE OF ENGINEER — DATE 7/24/01

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SIGNATURE OF DEVELOPER — DATE 11/2/00

LDE, INC.

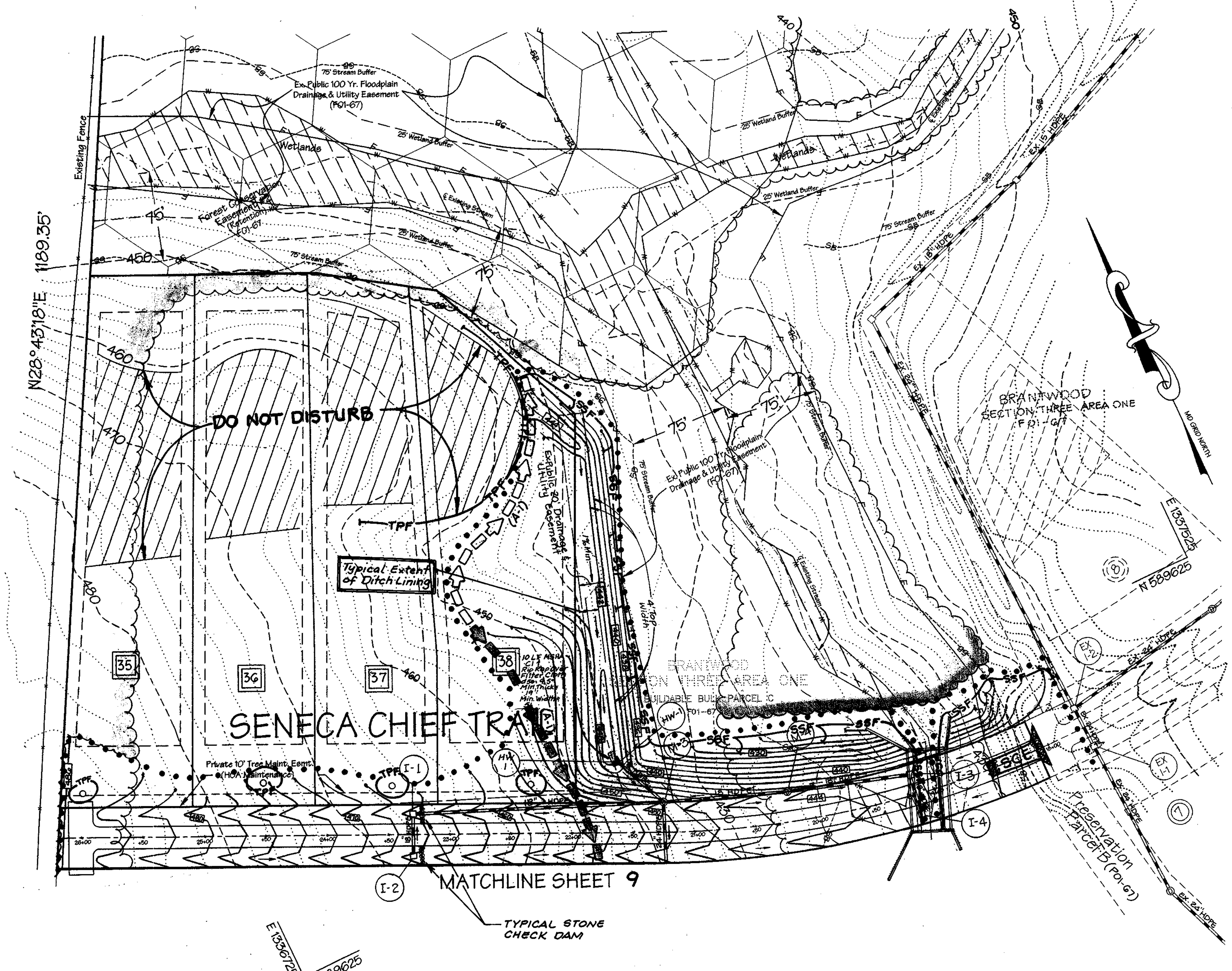
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED	Phase I : Grading and Soil Erosion & Sediment Control Plan	SCALE
EDS	**BRANTWOOD** Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcels 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-73	As Shown
DRAWN JLM KBW		DRAWING 7 of 22
CHECKED BDB		JOB NO. 98-040.6
DATE 7/2001	DEVELOPER: BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO. F01-78

F01-78

LEGEND

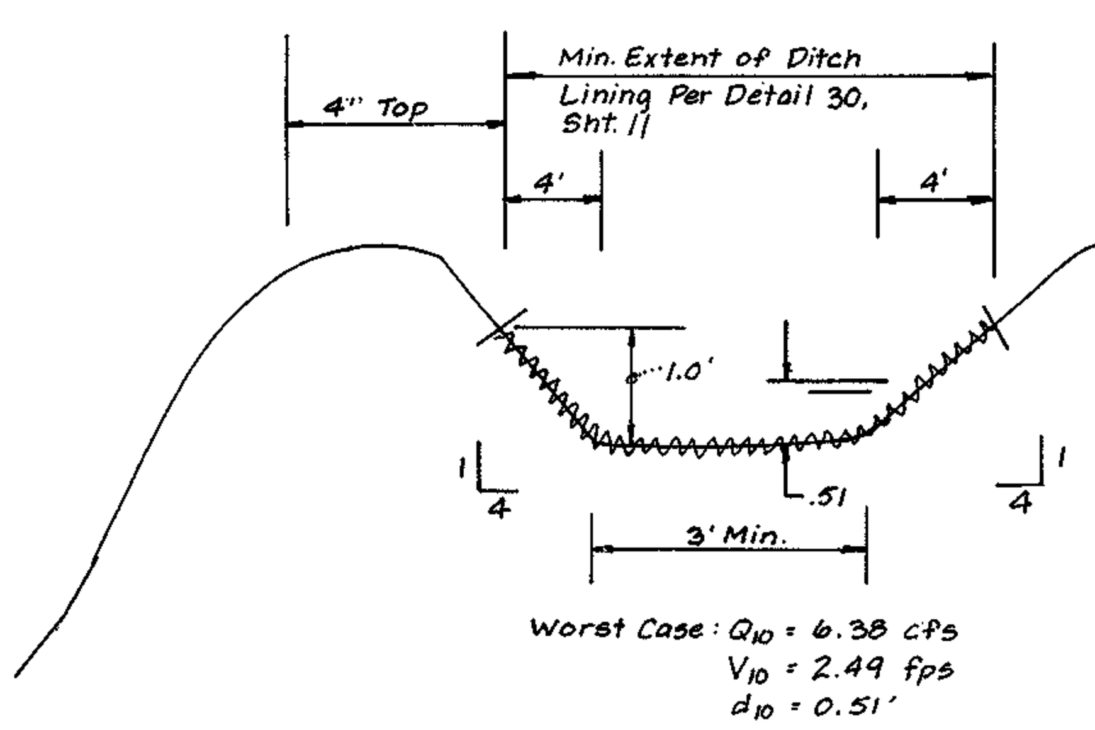
·······522·······	EX. 2FT. CONTOUR
——[522]——	PROP. 2FT. CONTOUR
– – –520– – –	EX. 10FT. CONTOUR
	PROP. SEPTIC AREA
	EX. SEPTIC AREA
	EX. TREES
	EX. TREES TO REMAIN
	EX. ℄ STREAM
—SB— —SB— —SB—	75' FT. STREAM BUFFER
—W—W—W—	EX. NON-TIDAL WETLAND
	25' FT. WETLAND BUFFER
—F—F—F—	100 YEAR FLOODPLAIN
	FILTER BAG
—— SSF ——	SUPER SILT FENCE
—— SF ——	SILT FENCE
—— TPF ——	TREE PROTECTION FENCE
• • • • • • • •	LIMIT OF DISTURBANCE
SCE	STABILIZED CONSTRUCTION ENTRANCE
	STONE CHECK DAM
	CLEARWATER DIVERSION
	EARTH DIKE



NOTE:
1.) 2:1 Slopes are to be immediately stabilized with sod or erosion control matting and permanent seeding mix.
2.) No disturbance within the stream at the road crossing is allowed.
3.) For limits of Rip Rap placement at the Culvert/ road stream crossing; refer to sheet 18.

PHASE 2 - CONSTRUCTION SEQUENCE

1. Re-install stabilized construction entrance. - 1 day
2. Install Tree Protection Fence (TPF) where shown hereon. - 1 day
3. Install Silt Fence (SF) and Super Silt Fence (SSF) at the limit of disturbance and where shown. - 2 days
4. The contractor shall inspect and provide necessary maintenance on the sediment and erosion controls shown hereon after each rainfall and on a daily basis. - 1 day
5. Obtain permission from the sediment control inspector to proceed. - 1 day
6. Clear & grub site. - 1 week
7. Construct Basin # 5 per the MD 378 specifications, shown on sheet 12 & 13. The riser shall be constructed per the Sediment Basin Details shown on sheet 13. Obtain permission from the sediment control inspector to proceed. - 3 weeks
8. The sediment basin shall be dewatered by pumping. The accumulated sediment from the basin shall be placed up grade from the structure in such a manner as not to interfere with construction operations or cause erosion down grade from the structure. - 2 days
9. The sediment shall be removed from the Sediment Basin when the cleanout elevation has been reached. - 2 days
10. The accumulated sediment from the sediment & erosion control devices shall be placed up grade from the devices in such a manner as not to interfere with construction operations or cause erosion down grade from the devices. - 1 day
11. Install the storm drain system from the roadway low point near the CONTECH culvert toward Basin / Pond #5 (I-4 through EW-1) and complete road fill required to bring roadway to base grade. - 4 days
12. The 2:1 slopes are to be immediately stabilized with sod or erosion control matting & permanent seeding mixture. - 1 day
13. Construct Earth Dike & Clearwater diversions where shown hereon. - 1 day
14. Complete grading required for the installation of the remainder of the Storm Drain system and construct swale along eastern lot line of Lot 11. Swale shall meet specifications shown on sheet 8 and be constructed per the "Temporary Swale" specifications shown on sheet 11. Drainage swale is to remain as a permanent feature draining toward Pond #5. Swale to be lined with Erosion Control Matting per the specifications on sheet 11 and stabilized with permanent seeding mixture and straw mulch. - 1 week
15. Install driveway culverts HW-2 to ES-1, HW-3 to ES-2 and HW-4 to ES-3 and immediately stabilize disturbed areas with sod & rip rap per the details & profile shown herein. Refer to the note regarding Clearwater Diversion Dike & Silt Fence sequencing on sheet 9. - 1 week
16. With permission of the sediment control inspector, grade driveway & remainder of the site, bring road grade to road sub-base level. - 1 week
17. Install road base and base coat paving and cut roadside swales. - 2 weeks
18. With permission of the sediment control inspector, complete any remaining grading, add topsoil per the specifications shown hereon, line road side swales with erosion control matting and stabilize all disturbed areas with permananent seeding mixture and straw mulch. - 1 week.
19. After all upgrade areas from Basin # 5 have been stabilized and permission has been given by Sediment Control Inspector, flush the storm drain system into the Basin # 5. - 1 day
20. After permission has been given by Sediment Control Inspector, remove earth dike, backfill Basin # 5 per the Ultimate Pond grades shown on sheet 14 and stabilize the disturbed areas with permanent seeding mixture and straw mulch - 5 days
21. Complete conversion of Basin # 5 to POND # 5 per the details on sheet 14. The temporary riser components are to remain in place during the grading of the pond body. Full stabilization must be achieved prior to the removal of the temporary riser components. - 1 week
22. Convert riser (S-5) by removing vertical draw-down device, installing permanent pond drain, installing "Water Quality Hood", and removing temporary weir blocking devices and re-installing the Trash Racks. - 3 days
23. After permission has been given by Sediment Control Inspector, remove silt fence & super silt fence, and stabilize those disturbed areas with permanent seeding mixture and straw mulch. - 1 week



Worst Case: Q_{10} = 6.38 cfs
V_{10} = 2.49 fps
d_{10} = 0.51'

TYPICAL DRAINAGE SWALE AT SIDE OF LOT 38

Not to Scale

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

By	Date	No.	Description

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 8/24/01 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT — 9/6/01 DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE

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

NATURAL RESOURCE CONSERVATION SERVICE — 8/7/01 DATE

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

HOWARD SOIL CONSERVATION DISTRICT — 8/7/01 DATE

ENGINEER'S CERTIFICATE

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

SIGNATURE OF ENGINEER — 7/24/01 DATE

DEVELOPER'S CERTIFICATE

"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.

SIGNATURE OF DEVELOPER — 11/2/00 DATE

STATE OF MARYLAND — BRUCE DAVID BURTON — REGISTERED PROFESSIONAL ENGINEER — 7/24/01

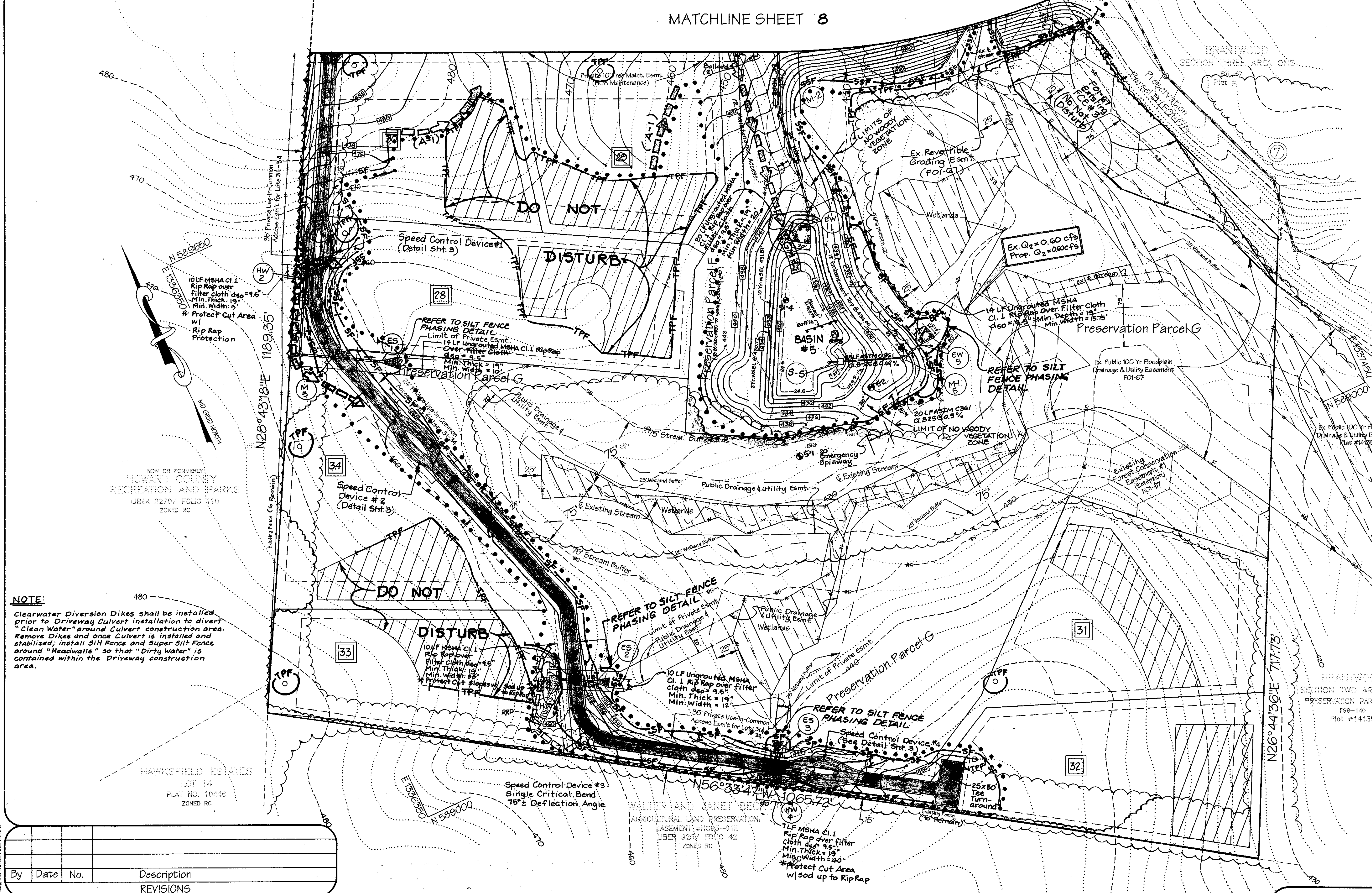
LDE, INC.

9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED EDS	Phase 2: Grading and Soil Erosion & Sediment Control Plan	SCALE 1"=50'
DRAWN JLM	**BRANTWOOD** Section Three - Area Three	DRAWING 8 of 22
CHECKED BDB	Lots 28-38 & Preservation Parcels "F" & "G" — A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" — Tax Map No. 16 - Grid No. 21 - Parcel 172 — 3rd Election District - Howard County, Maryland — Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-73	JOB NO. 98-040.6
DATE 7/2001	DEVELOPER BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO. F01-78

F01-78

F:\Land Projects R2\BRANTWOOD\dwg\Section 33\section33.dwg Drainage Area Map3



LEGEND

- EX. 2FT. CONTOUR
- PROP. 2FT. CONTOUR
- EX. 10FT. CONTOUR
- PROP. SEPTIC AREA
- EX. SEPTIC AREA
- EX. TREES
- EX. TREES TO REMAIN
- EX. ℄ STREAM
- 75' FT. STREAM BUFFER
- EX. NON-TIDAL WETLAND
- 25' FT. WETLAND BUFFER
- 100 YEAR FLOODPLAIN
- PROPOSED WELL
- FILTER BAG
- SSF — SUPER SILT FENCE
- SF — SILT FENCE
- TPF — TREE PROTECTION FENCE
- LIMIT OF DISTURBANCE
- SCE — STABILIZED CONSTRUCTION ENTRANCE
- RPS — REMOVABLE PUMPING STATION
- (A-1) — EARTH DIKE
- (A-12) — CLEARWATER DIVERSION

NOTE:

Clearwater Diversion Dikes shall be installed prior to Driveway Culvert installation to divert "Clean Water" around Culvert construction area. Remove Dikes and once Culvert is installed and stabilized; install Silt Fence and Super Silt Fence around "Headwalls" so that "Dirty Water" is contained within the Driveway construction area.

SUMMARY TABLE

TEMPORARY BASIN # 5
Hazard Classification "A"
Drainage Area = 7.76 Acres
Top of Facility = 434.20
Invert of Facility = 424.50

Sediment Storage Volume Required=	27936 cu.ft.
Wet Storage Volume Required =	13968 cu.ft.
Wet Storage Volume Provided =	14352 cu.ft.
Wet Storage Elevation =	426.75
Dry Storage Volume Required =	13968 cu.ft.
Dry Storage Volume Provided =	13584 cu.ft.
Dry Storage Elevation =	428.40
Sediment Storage Volume Provided=	28635 cu.ft.
Cleanout Elevation =	425.75
Cleanout Elevation =	5.25 ft. from Riser Crest

TSWM BASIN		2 Year	10 Year
Existing Flow		0.6	N/A
Acceptable Release	(cfs)	1.0	-
Computed Inflow	(cfs)	25.0	43.1
Facility Discharge	(cfs)	0.6	18.0
Elevation at Discharge		430.72	431.81
Storage at Elevation	(AC\FT)	1.30	1.66
Temporary Flow	(cfs)	0.6	18.0

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

By	Date	No.	Description

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 8/24/01 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT — 7/9/01 DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE

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

NATURAL RESOURCE CONSERVATION SERVICE — 8/7/01 DATE

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

HOWARD SOIL CONSERVATION DISTRICT — 8/7/01 DATE

ENGINEER'S CERTIFICATE

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

SIGNATURE OF ENGINEER — 7/24/01 DATE

DEVELOPER'S CERTIFICATE

"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.

SIGNATURE OF DEVELOPER — 11/7/00 DATE

7/24/01

NOTES:

1. There is no clearing proposed within the stream or wetland buffers.
2. 2:1 Slopes are to be immediately stabilized with sod or erosion control matting and permanent seed mix.
3. No disturbance within the stream at the road crossing is allowed.
4. For limits of RipRap placement at the Culvert/road stream crossing; refer to sheet 18.

LDE, INC.

9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED		SCALE
EDS	Grading and Soil Erosion & Sediment Control Plan **BRANTWOOD** Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcel 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-73	1"=50'
DRAWN: JLM		DRAWING: 9 of 22
CHECKED: BDB		JOB NO.: 98-040.6
DATE: 7/2001	DEVELOPER: BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO.: F01-78

F01-78

HOWARD SOIL CONSERVATION DISTRICT

STANDARD SEDIMENT CONTROL NOTES

1. A minimum of 48 hours notice must be given to the Howard County Department of Inspections, Licenses and Permits, Sediment Control Division prior to the start of any construction, (313-1855).
2. All vegetative and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the most current "MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL", and revisions thereto.
3. Following initial soil disturbance or redisturbance, permanent or temporary stabilization shall be completed within: a) 7 calendar days for all perimeter sediment control structures, dikes, perimeter slopes and all slopes greater than 3:1, b) 14 days as to all other disturbed or graded areas on the project site.
4. All sediment traps/basins shown must be fenced and warning signs posted around their perimeter in accordance with Vol. 1, Chapter 7, of the HOWARD COUNTY DESIGN MANUAL, Storm Drainage.
5. All disturbed areas must be stabilized within the time period specified above in accordance with the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL (Section G) for permanent seeding, sod, temporary seeding, and mulching. Temporary stabilization with mulch alone can only be done when recommended seeding dates do not allow for proper germination and establishment of grasses.
6. All sediment control structures are to remain in place and are to be maintained in operative condition until permission for their removal has been obtained from the Howard County Sediment Control Inspector.
7. Site Analysis:

Total Area of Site	22.39	Acres
Area Disturbed	9.22	Acres
Area to be roofed or paved	0.70	Acres
Area to be vegetatively stabilized	8.52	Acres
Total Cut	8855	Cu. Yds.
Total Fill	24,000	Cu. Yds.
Offsite waste/borrow area location	15,000 (F01-67) Excess	

8. Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.
9. Additional sediment control must be provided, if deemed necessary by the Howard County Sediment Control Inspector.
10. On all sites with disturbed areas in excess of 2 acres, approval of the inspection agency shall be requested upon completion of installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading. Other building or grading inspection approvals may not be authorized until this initial approval by the inspection agency is made.
11. Trenches for the construction of utilities is limited to three pipe lengths or that which can be back filled and stabilized within one working day, whichever is shorter.

HOWARD SOIL CONSERVATION DISTRICT

PERMANENT SEEDING NOTES

Apply to graded or cleared areas not subject to immediate further disturbance where a permanent long-lived vegetative cover is needed.

SEEDBED PREPARATION: Loosen upper three inches of soil by raking, disking, or other acceptable means before seeding, if not previously loosened.

SOIL AMENDMENTS: In lieu of soil test recommendations, use one of the following schedules:

1) PREFERRED -- Apply 2 tons per acres dolomitic limestone (92 lbs/1000sq. ft.) and 600 lbs per acre 10-10-10 fertilizer (14 lbs/1000 sq. ft.) before seeding. Harrow or disk into upper three inches of soil. At time of seeding, apply 400 lbs per acre 30-0-0 ureaform fertilizer (9 lbs/1000sq. ft.)

2) ACCEPTABLE -- Apply 2 tons per acres dolomitic limestone (92 lbs/1000sq. ft.) and 1000 lbs per acre 10-10-10 fertilizer (23 lbs/1000 sq. ft.) before seeding. Harrow or disk into upper three inches of soil.

SEEDING -- For the periods March 1 thru April 30, and August 1 thru October 15, seed with 60 lbs per acre (1.4 lbs/1000sq. ft.) of Kentucky 31 Tall Fescue. For the period May 1 thru July 31, seed with 60 lbs per acre (1.4 lbs/1000sq. ft.) of Kentucky 31 Tall Fescue and 2 lbs. per acre (.05 lbs/1000sq. ft.) of weeping lovegrass. During the period of October 16 thru 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 2 tons / acre well anchored straw.

MULCHING -- Apply 1-1/2 to 2 tons per acre (70 to 90 lbs/1000sq. ft.) of unrotted small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gallons per acre (5 gal/1000sq. ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal/1000sq. ft.) for anchoring.

MAINTENANCE -- Inspect all seeding areas and make needed repairs, replacements and reseedings.

HOWARD SOIL CONSERVATION DISTRICT

TEMPORARY SEEDING NOTES

Apply to graded or cleared areas likely to be redisturbed where a short-termvegetative cover is needed.

SEEDBED PREPARATION: -- Loosen upper three inches of soil by raking, disking, or other acceptable means before seeding, if not previously loosened.

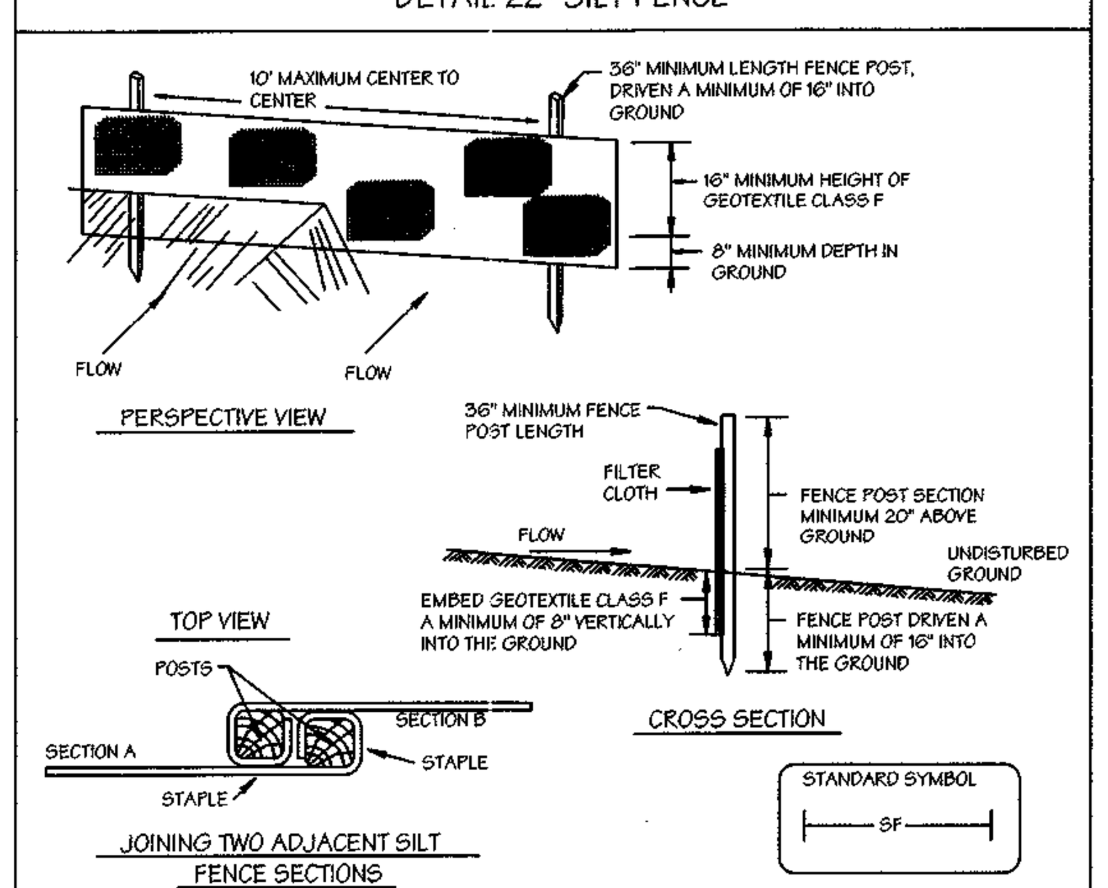
SOIL AMENDMENTS: -- Apply 600 lbs per acre 10-10-10 fertilizer (14 lbs/1000sq. ft.).

SEEDING -- For periods March 1 thru April 30, and from August 15 thru October 15 seed with 2-12 bushels per acre of annual rye (3.2 lbs/1000sq. ft.). For the period May 1 thru August 14, seed with 3 lbs. per acre of weeping lovegrass (.07 lbs/1000sq. ft.). For the period November 16 thru 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.

MULCHING -- Apply 1-1/2 to 2 tons per acre (70 to 90 lbs/1000sq. ft.) of unrotted weed free small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gallons per acre (5 gal/1000sq. ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal/1000sq. ft.) for anchoring.

Refer to the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for additional rates and methods not covered.

DETAIL 22- SILT FENCE



Construction Specifications

1. Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 11/2" x 11/2" square (minimum) cut, or 13/4" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighting not less than 1.00 pond per linear foot.

2. Geotextile shall be fastened securely to each fence post with wire ties or staples at top and mid-section and shall meet the following requirements for Geotextile Class F:

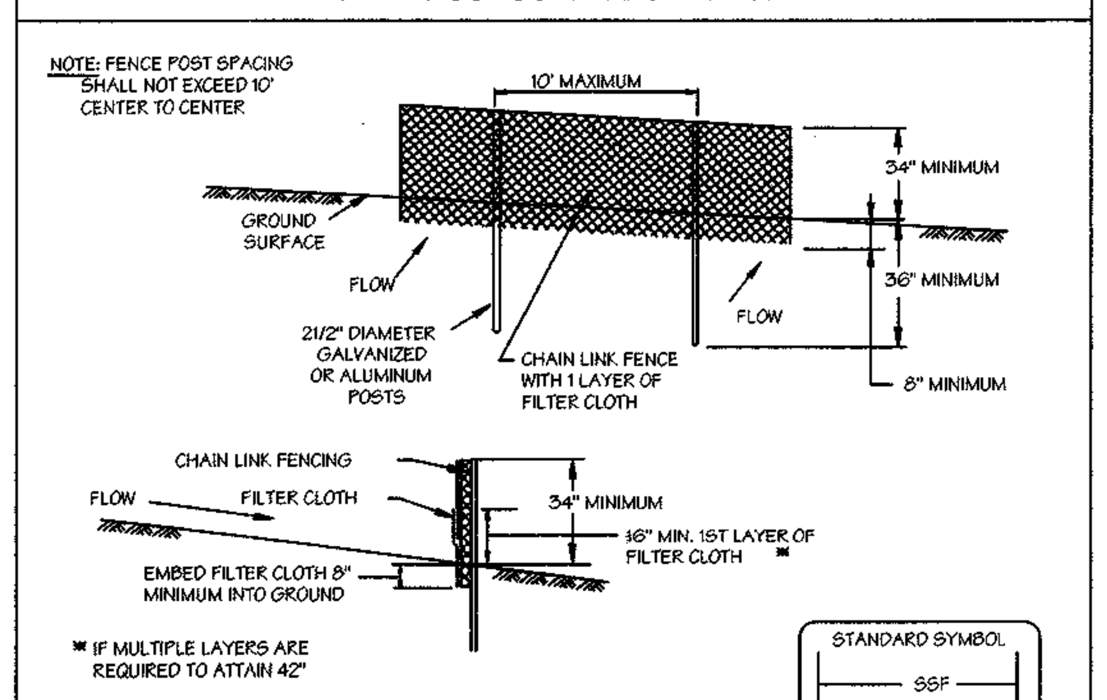
Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal ft² / minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

3. Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.

4. Silt Fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reached 50% of the fabric height.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E - 15 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 33- SUPER SILT FENCE



Construction Specifications

1. Fencing shall be 42" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 6' fence shall be used, substituting 42" fabric and 6' length posts.

2. Chain link fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, brace and truss rods, drive anchors and post caps are not required except on the ends of the fence.

3. Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.

4. Filter cloth shall be embedded a minimum of 8" into the ground.

5. When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and folded.

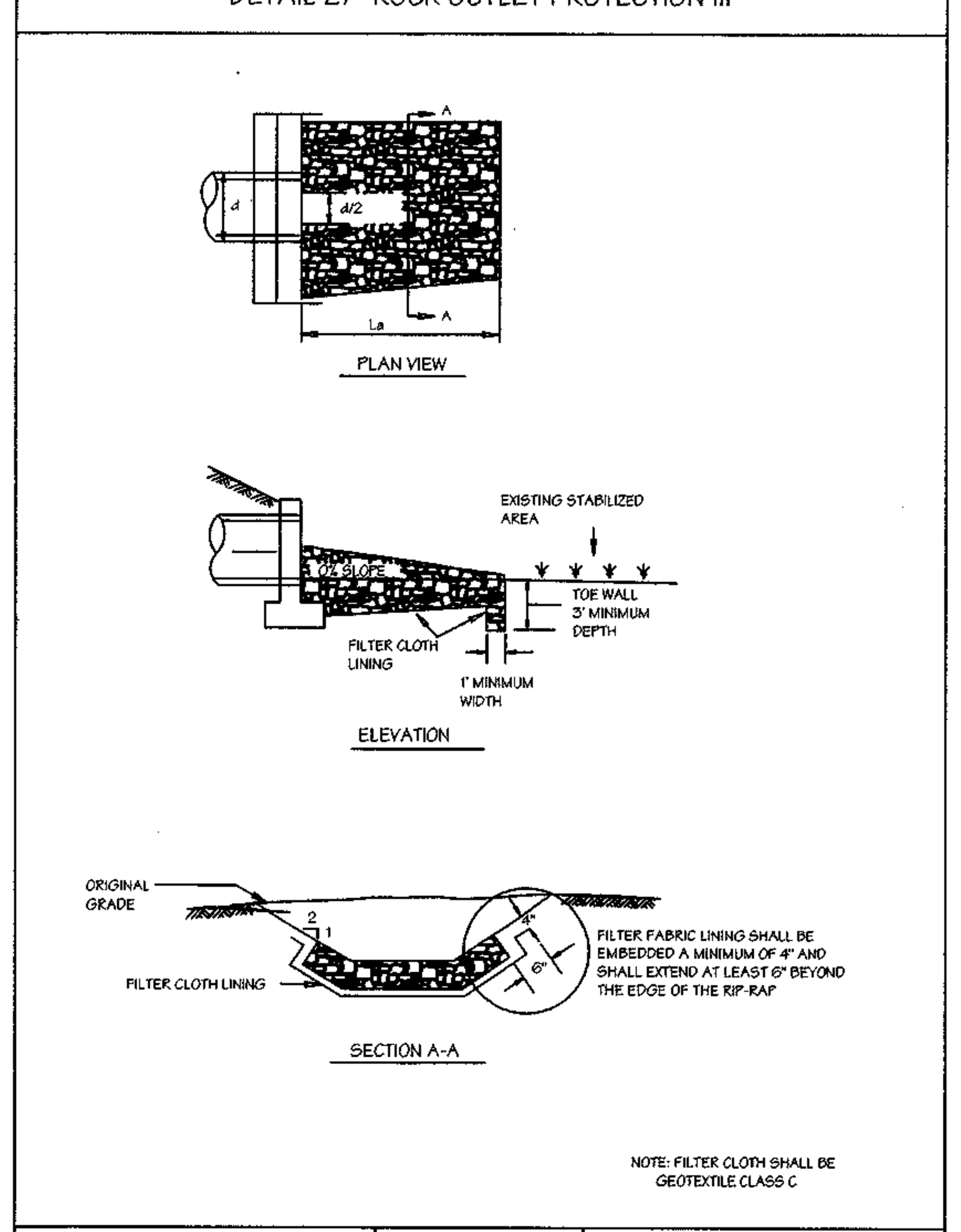
6. Maintenance shall be performed as needed and silt buildups removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height

7. Filter cloth shall be fastened securely to each fence post with wire ties or staples at top and mid section and shall meet the following requirements for Geotextile Class F:

Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal/ft /minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE H - 26 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 27- ROCK OUTLET PROTECTION III



U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE F - 18 - 10	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

ROCK OUTLET PROTECTION III

Construction Specifications

1. The subgrade for the filter, rip-rap, or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.

2. The rock or gravel shall conform to the specified grading limits when installed respectively in the rip-rap or filter.

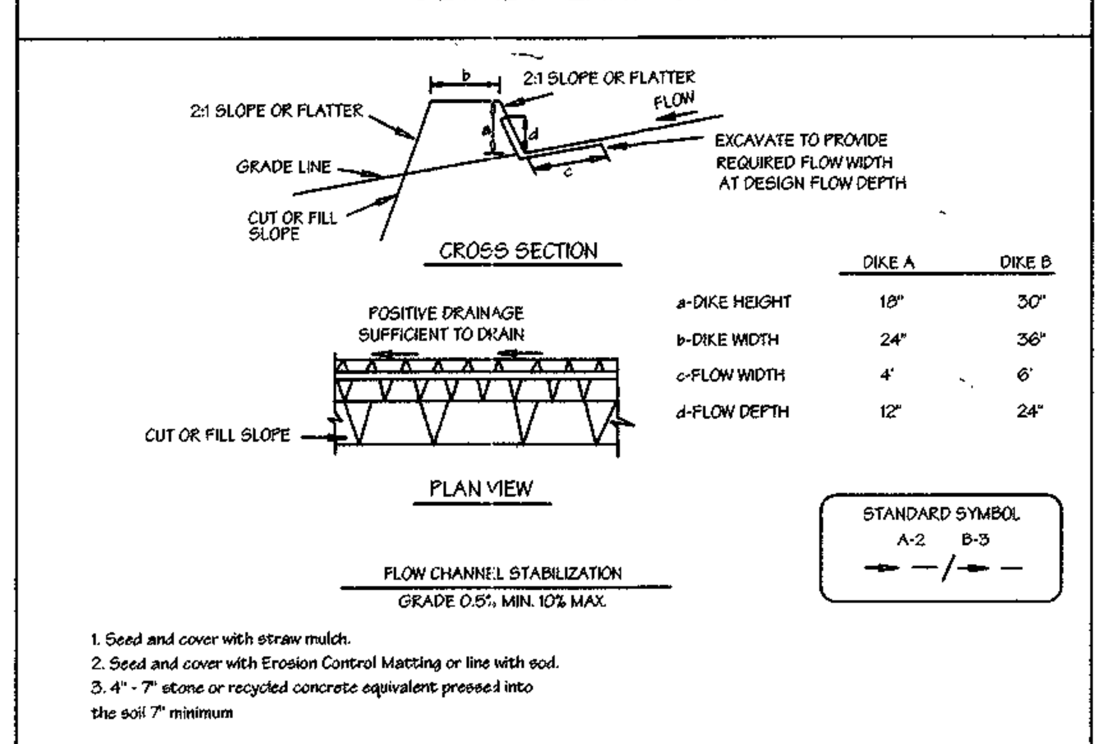
3. Geotextile shall be protected from punching, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of geotextile over the damaged part or by completely replacing the geotextile. All overlaps whether for repairs or for joining two pieces of geotextile shall be a minimum of one foot.

4. Stone for the rip-rap or gabion outlets may be placed by equipment. They shall be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The stone for rip-rap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogeneous with the smaller stones and spalls filling the voids between the larger stones. Rip-rap shall be placed in a manner to prevent damage to the filter blanket or geotextile. Hand placement will be required to the extent necessary to prevent damage to the permanent works.

5. The stone shall be placed so that it blends in with the existing ground. If the stone is placed too high then the flow will be forced out of the channel and scour adjacent to the stone will occur.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE F - 18 - 10A	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 1 - EARTH DIKE



1. Seed and cover with straw mulch.
2. Seed and cover with Erosion Control Matting or line with sod.
3. 4" - 7" stone or recycled concrete equivalent pressed into the soil 7" minimum

Construction Specifications

1. All temporary earth dikes shall have uninterrupted positive grade to an outlet. Spot elevations may be necessary for grades less than 1%.

2. Runoff diverted from a disturbed area shall be conveyed to a sediment trapping device.

3. Runoff diverted from an undisturbed area shall outlet directly into an undisturbed, stabilized area at a non-erosive velocity.

4. All trees, brush, stumps, obstructions, and other objectional material shall be removed and disposed of so as not to interfere with the proper functioning of the dike.

5. The dike shall be excavated or shaped to line, grade and cross section as required to meet the criteria specified herein and be free of bank projections or other irregularities which will impede normal flow.

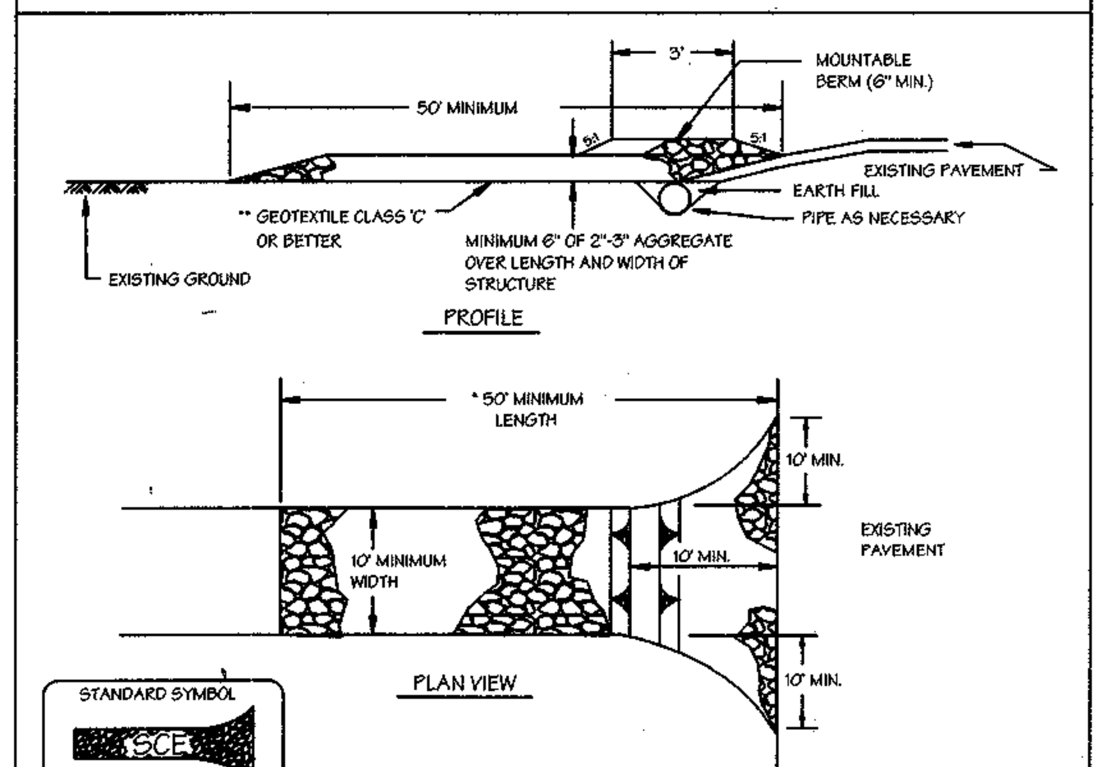
6. Fill shall be compacted by earth moving equipment.

7. All earth removed and not needed for construction shall be placed so that it will not interfere with the functioning of the dike.

8. Inspection and maintenance must be provided periodically and after each rain event.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE A - 1 - 6	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE



Construction Specification

1. Length - minimum of 50' (*30' for single residence lot).

2. Width - 10' minimum, should be flared at the existing road to provide a turning radius.

3. Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. **The plan approval authority may not require single family residences to use geotextile.

4. Stone - crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.

5. Surface Water - all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mountable berm with 5:1 slopes and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.

6. Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized construction entrance.

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21.0 STANDARD AND SPECIFICATIONS FOR TOPSOIL

Definition

Placement of topsoil over a prepared subsoil prior to establishment of permanent vegetation.

Purpose

To provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.

Conditions Where Practice Applies

I. This practice is limited to areas having 2:1 or flatter slopes where:

a. The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
b. The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
c. The original soil to be vegetated contains material toxic to plant growth.
d. The soil is so acidic that treatment with limestone is not feasible.

II. For the purpose of these Standards and Specifications, areas having slopes steeper than 2:1 require special consideration and design for adequate stabilization. Areas having slopes steeper than 2:1 shall have the appropriate stabilization shown on the plans.

Construction and Material Specifications

I. Topsoil salvaged from the existing site may be used provided that it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA-SCS in cooperation with Maryland Agricultural Experimental Station.

II. Topsoil Specifications - Soil to be used as topsoil must meet the following:

i. Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay Loam, loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Regardless, topsoil shall not be a mixture of contrasting textured subsoils and shall contain less than 5% by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1-1/2" in diameter.
ii. Topsoil must be free of plants or plant parts such as bermuda grass, quackgrass, Johnsongrass, nutsedge, poison ivy, thistle, or others as specified.
iii. Where the subsoil is either highly acidic or composed of heavy clays, ground limestone shall be spread at the rate of 4-8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.

III. For sites having disturbed areas under 5 acres:

i. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section I - Vegetative Stabilization Methods and Materials.

IV. For sites having disturbed areas over 5 acres:

i. On soil meeting Topsoil specifications, obtain test results dictating fertilizer and lime amendments required to bring the soil into compliance with the following:
   a. pH for topsoil shall be between 6.0 and 7.5. If the tested soil demonstrates a pH of less than 6.0, sufficient lime shall be prescribed to raise the pH to 6.5 or higher.
   b. Organic content of topsoil shall be not less than 1.5 percent by weight.
   c. Topsoil having soluble salt content greater than 500 parts per million shall not be used.
   d. No sod or seed shall be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phyto-toxic materials.

Note: Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.

ii. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization --Section I - Vegetative Stabilization Methods and Materials.

V. Topsoil Application

i. When topsoiling, maintain needed erosion and sediment control practices such as diversions, Grade Stabilization Structures, Earth Dikes, Slope Silt Fence and Sediment Traps and Basins.
ii. Grades on the areas to be topsoiled, which have been previously established, shall be maintained, albeit 4" - 8" higher in elevation.
iii. Topsoil shall be uniformly distributed in a 4" - 8" layer and lightly compacted to a minimum thickness of 4". Spreading shall be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations shall be corrected in order to prevent the formation of depressions or water pockets.
iv. Topsoil shall not be placed while the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.

VI. Alternative for Permanent Seeding - Instead of applying the full amounts of lime and commercial fertilizer, composted sludge and amendments may be applied as specified below:

i. Composted Sludge Material for use as a soil conditioner for sites having disturbed areas over 5 acres shall be tested to prescribe amendments and for sites having disturbed areas under 5 acres shall conform to the following requirements:
   a. Composted sludge shall be supplied by, or originate 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.
   b. 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 compost does not meet these requirements, the appropriate constituents must be added to meet the requirements prior to use.
   c. Composted sludge shall be applied at a rate of 1 ton/1,000 square feet,

ii. Composted sludge shall be amended with a potassium fertilizer applied at the rate of 4 lb./1,000 square feet, and 1/3 the normal lime application rate.

References:Guideline Specifications, Soil Preparation and Sodding. MD-VA, Pub.#1, Cooperative Extension Service, University of Maryland and Virginia Polytechnic Institutes. Revised 1973.

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, Bureau of Highways — DATE

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

NATURAL RESOURCE CONSERVATION SERVICE — DATE

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

HOWARD SOIL CONSERVATION DISTRICT — DATE

ENGINEER'S CERTIFICATE

SIGNATURE OF ENGINEER — DATE

DEVELOPER'S CERTIFICATE

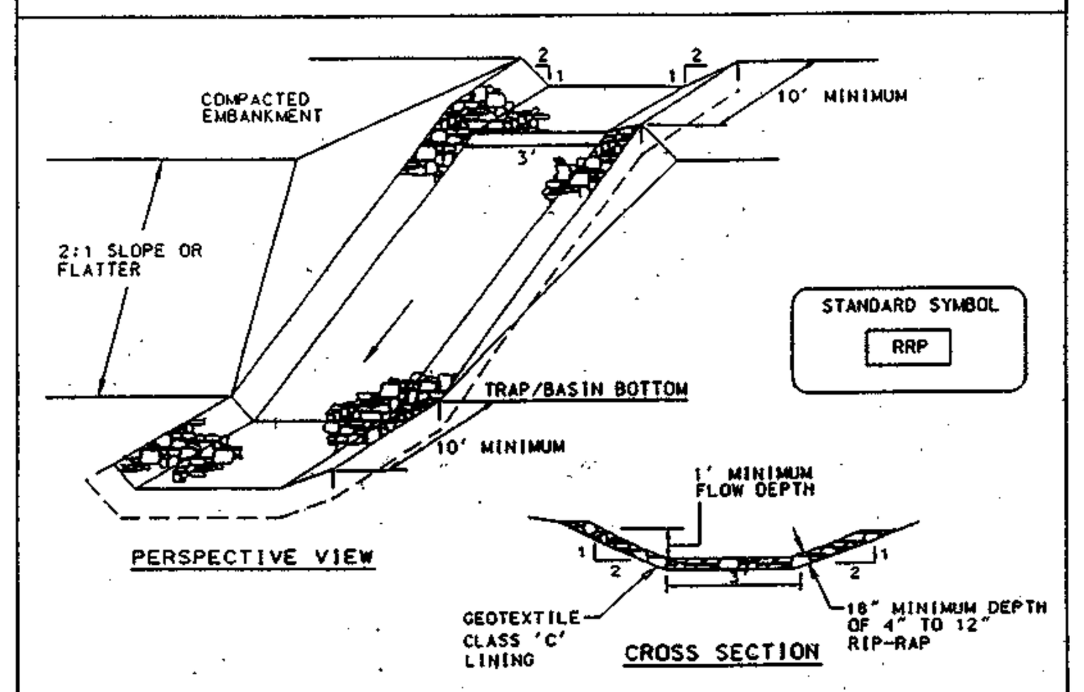
SIGNATURE OF DEVELOPER — DATE

By	Date	No.	Description
			REVISIONS

LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED EDS	Grading and Soil Erosion & Sediment Control Plan - Details	SCALE As Shown
DRAWN JLM KBW	BRANTWOOD Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcel 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-6, F 01	DRAWING 10 of 22
CHECKED BDB		JOB NO. 98-040.6
DATE 7 / 2001	DEVELOPER BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO. F01-78

DETAIL 5 - RIP-RAP INFLOW PROTECTION



Construction Specifications

1. Rip-rap lined inflow channels shall be 1' in depth, have a trapezoidal cross section with 2:1 or flatter side slopes and 3' (min.) bottom width. The channel shall be lined with 4" to 12" rip-rap to a depth of 18".

2. Filter cloth shall be installed under all rip-rap. Filter cloth shall be Geotextile Class C.

3. Entrance and exit sections shall be installed as shown on the detail section.

4. Rip-rap used for the lining may be recycled for permanent outlet protection if the basin is to be converted to a stormwater management facility.

5. Gabion Inflow Protection may be used in lieu of Rip-rap Inflow Protection.

6. Rip-rap should blend into existing ground.

7. Rip-rap Inflow Protection shall be used where the slope is between 4:1 and 10:1. for slopes flatter than 10:1 use Earth Dike or Temporary Swale lining criteria.

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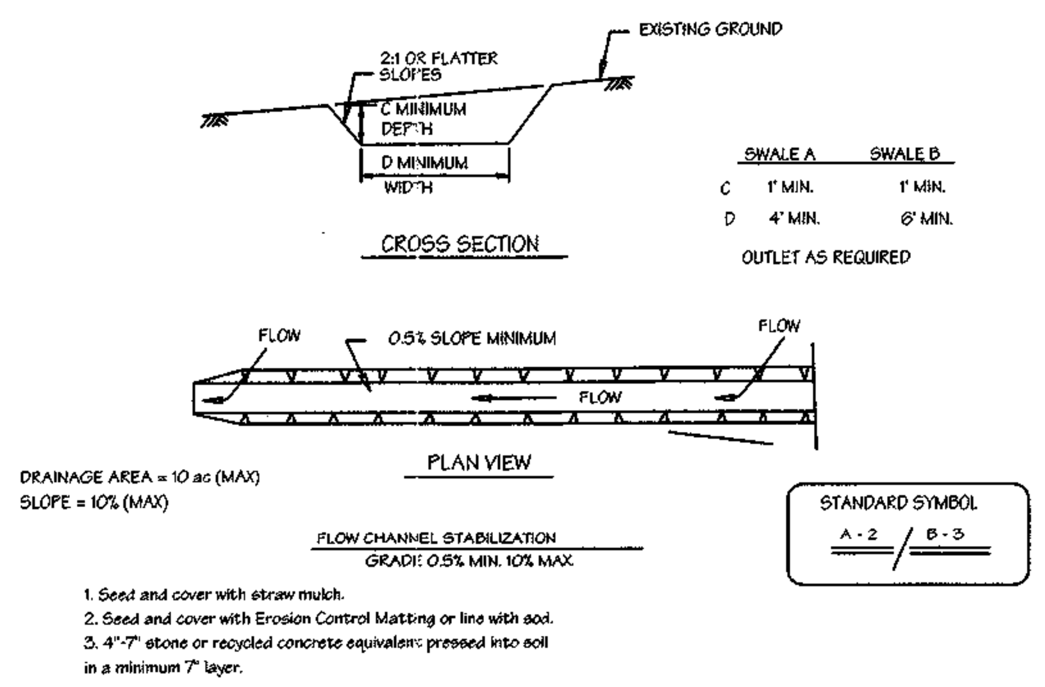
DETAIL 2 - TEMPORARY SWALE



DRAINAGE AREA = 10 ac (MAX)
SLOPE = 10% (MAX)

STANDARD SYMBOL
A - 2 / B - 3

FLOW CHANNEL STABILIZATION
GRADE 0.5% MIN. 10% MAX

1. Seed and cover with straw mulch.
2. Seed and cover with Erosion Control Matting or line with sod.
3. 4"-7" stone or recycled concrete equivalent pressed into soil in a minimum 7" layer.

Construction Specifications

1. All temporary swales shall have uninterrupted positive grade to an outlet. Spot elevations may be necessary for grades less than 1%.

2. Runoff diverted from a disturbed area shall be conveyed to a sediment trapping device.

3. Runoff diverted from an undisturbed area shall outlet directly into an undisturbed stabilized area at a non-erosive velocity.

4. All trees, brush, stumps, obstructions, and other objectional material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.

5. The swale shall be excavated or shaped to line, grade and cross section as required to meet the criteria specified herein and be free of bank projections or other irregularities which will impede normal flow.

6. Fill, if necessary, shall be compacted by earth moving equipment.

7. All earth removed and not needed for construction shall be placed so that it will not interfere with the functioning of the swale.

8. Inspection and maintenance must be provided periodically and after each rain event.

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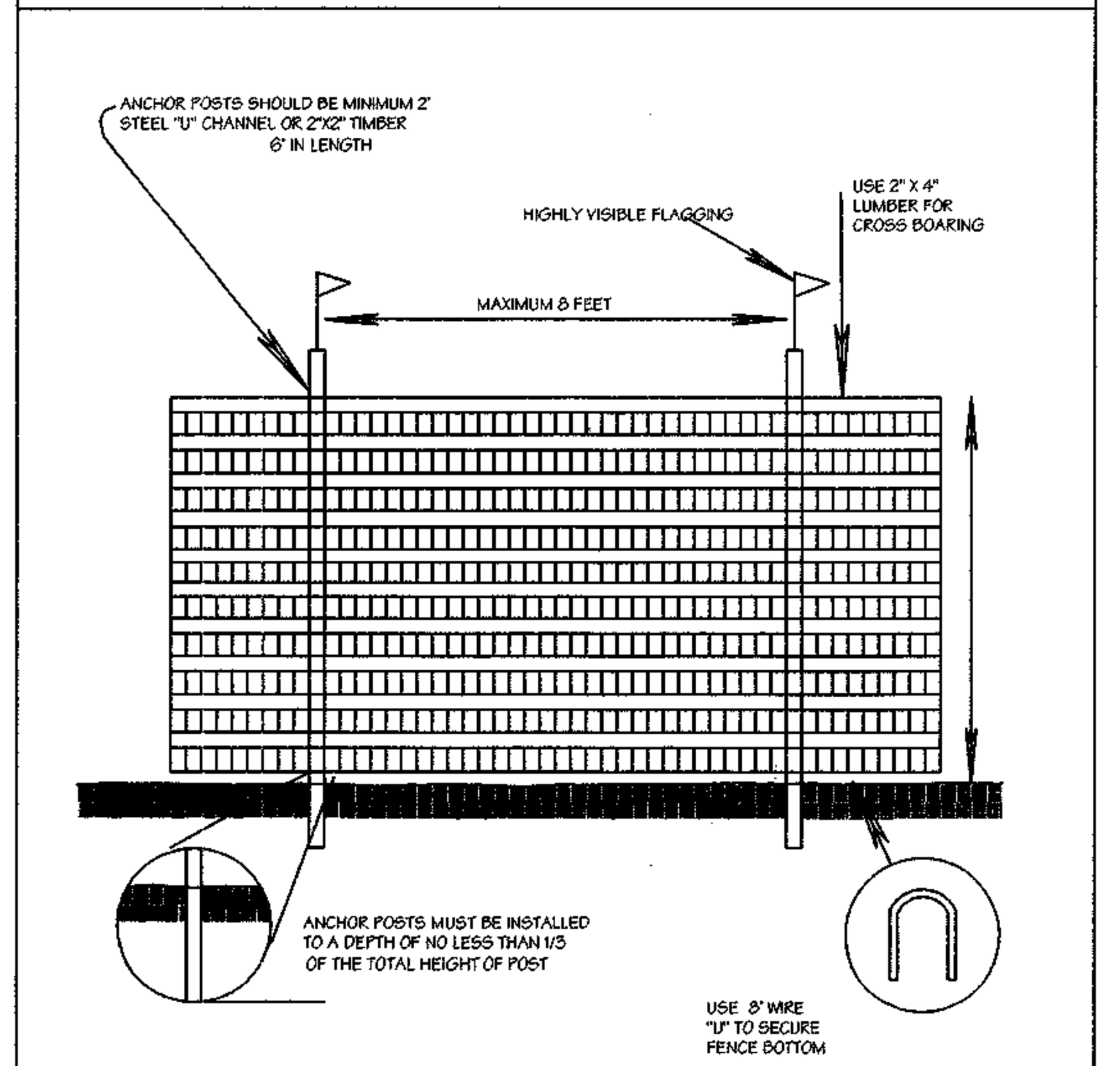
Blaze Orange Plastic Mesh

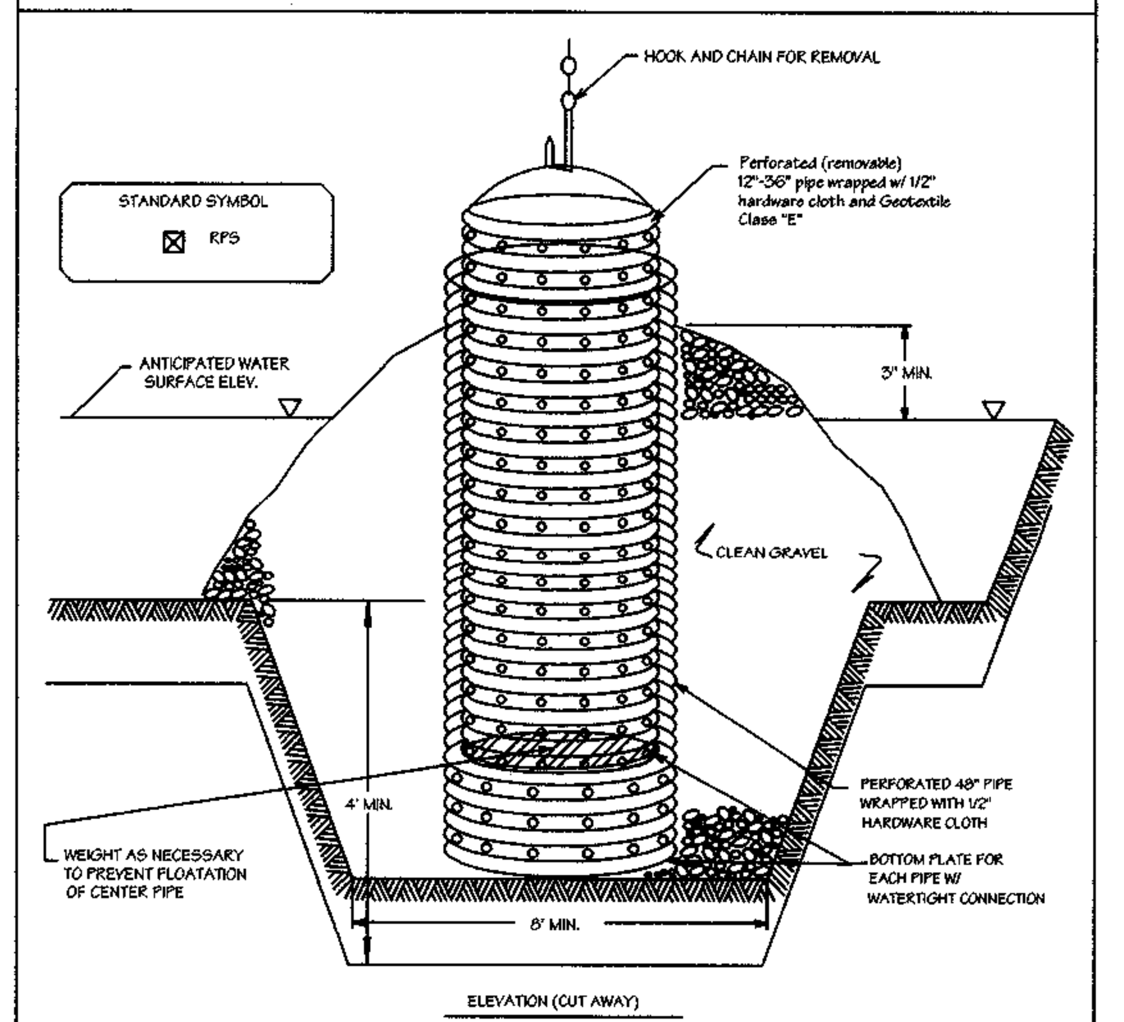


NOTES

1. Forest protection device only.
2. Retention Area will be set as part ofthe review process.
3. Boundaries of Retention Area should be staked and flagged prior to installing device
4. Root damage should be avoided.
5. Protective signage may also be used.
6. Device should be maintained throughout construction.

WOODLAND CONSERVATION MANUAL	EXHIBIT K - 8	PRINCE GEORGES COUNTY, MD

DETAIL 20A - REMOVABLE PUMPING STATION



1. The outer pipe should be 48" dia. or shall, in any case, be at least 4" greater in diameter than the center pipe. The outer pipe shall be wrapped with 1/2" hardware cloth to prevent backfill material from entering the perforations.
2. After installing the outer pipe, backfill around outer pipe with 2" aggregate or clean gravel.
3. The inside stand pipe (center pipe) should be constructed by perforating a corrugated or PVC pipe between 12" and 36" in diameter. The perforations shall be 1/2" X 6" slits or 1" diameter holes 6" on center. The center pipe shall be wrapped with 1/2" hardware cloth first, then wrapped again with Geotextile Class C.
4. The center pipe should extend 12" to 18" above the anticipated water surface elevation or riser crest elevation when dewatering a basin.

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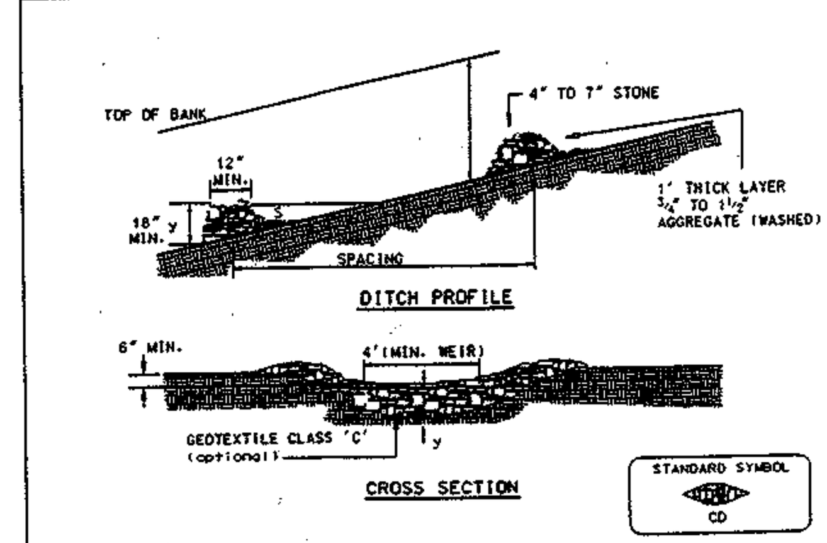
DETAIL 7 - STONE CHECK DAM



STANDARD STONE CHECK DAM DESIGN

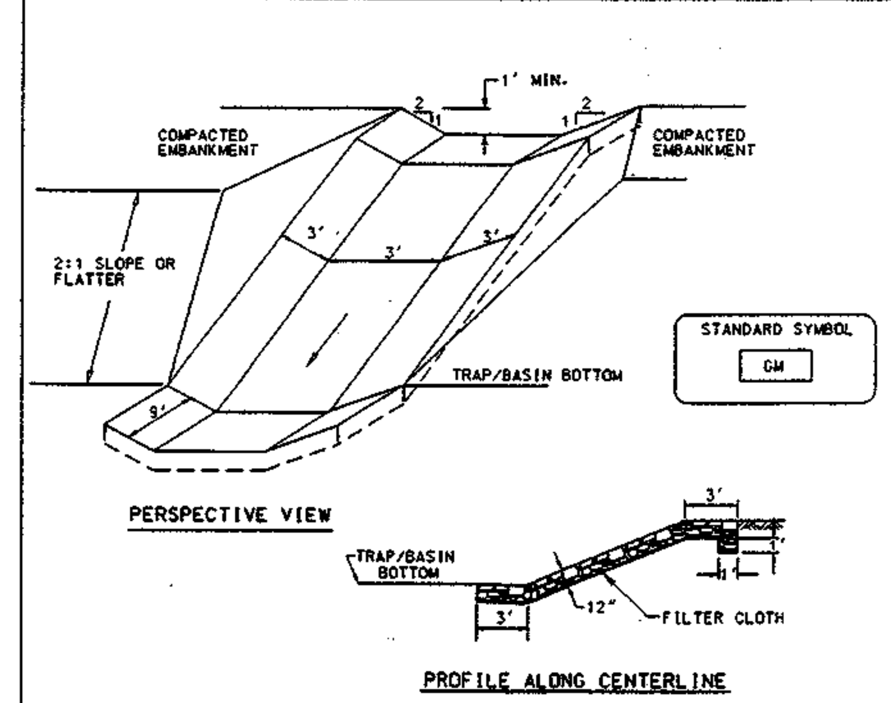
SLOPE	SPACING
2% or less	80'
2.1% to 4%	40'
4.1% to 7%	25'
7.1% to 10%	15'
over 10%	use lined waterway design

Construction Specifications

1. Swales and ditches shall be prepared in accordance with the construction specifications described in Section A-2. Standards and Specifications for Temporary Swale.
2. The check dam shall be constructed of 4"-7" stone. The stone shall be placed so that it completely covers the width of the channel and is keyed into the channel banks.
3. The top of the check dam shall be constructed so the the center is approximately 6" lower than the outer edges, forming a weir that water can flow across.
4. The maximum height of the check dam at the center shall not exceed 2'.
5. The upstream side of the check dam shall be lined with approximately 1' of 3/4" to 1 1/2" aggregate.
6. Accumulated sediment shall be removed when it has built up to 1/2 of the original height of the weir crest.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE B - 6 - 8	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 6 - GABION INFLOW PROTECTION



Construction Specifications

1. Gabion inflow protection shall be constructed of 9' x 3' x 9" gabion baskets forming a trapezoidal cross section 1' deep, with 2:1 side slopes, and a 3' bottom width.
2. Geotextile Class C shall be installed under all gabion baskets.
3. The stone used to fill the gabion baskets shall be 4" - 7".
4. Gabions shall be installed in accordance with manufacturers recommendations.
5. Gabion Inflow Protection shall be used where concentrated flow is present on slopes steeper than 4:1.

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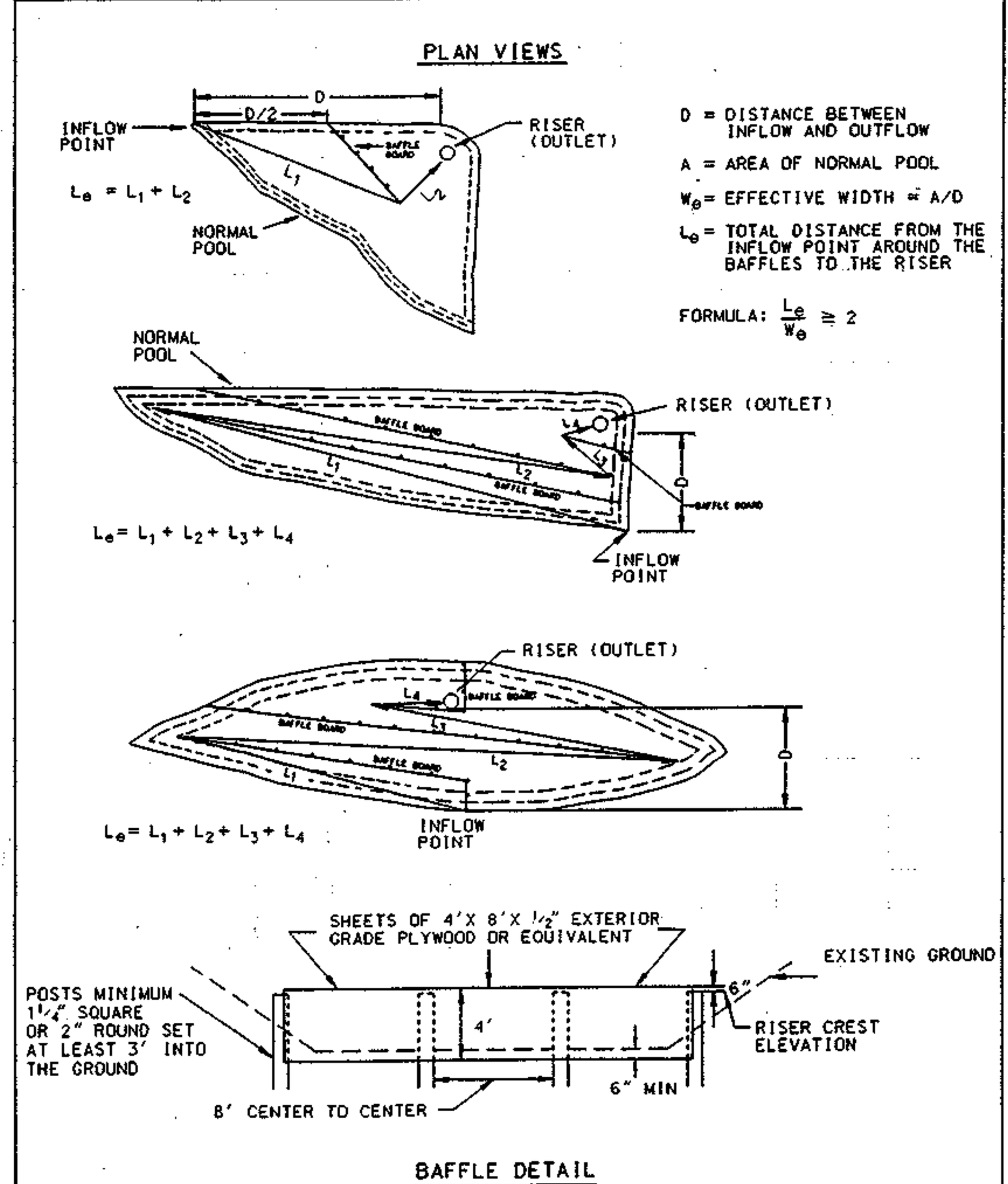
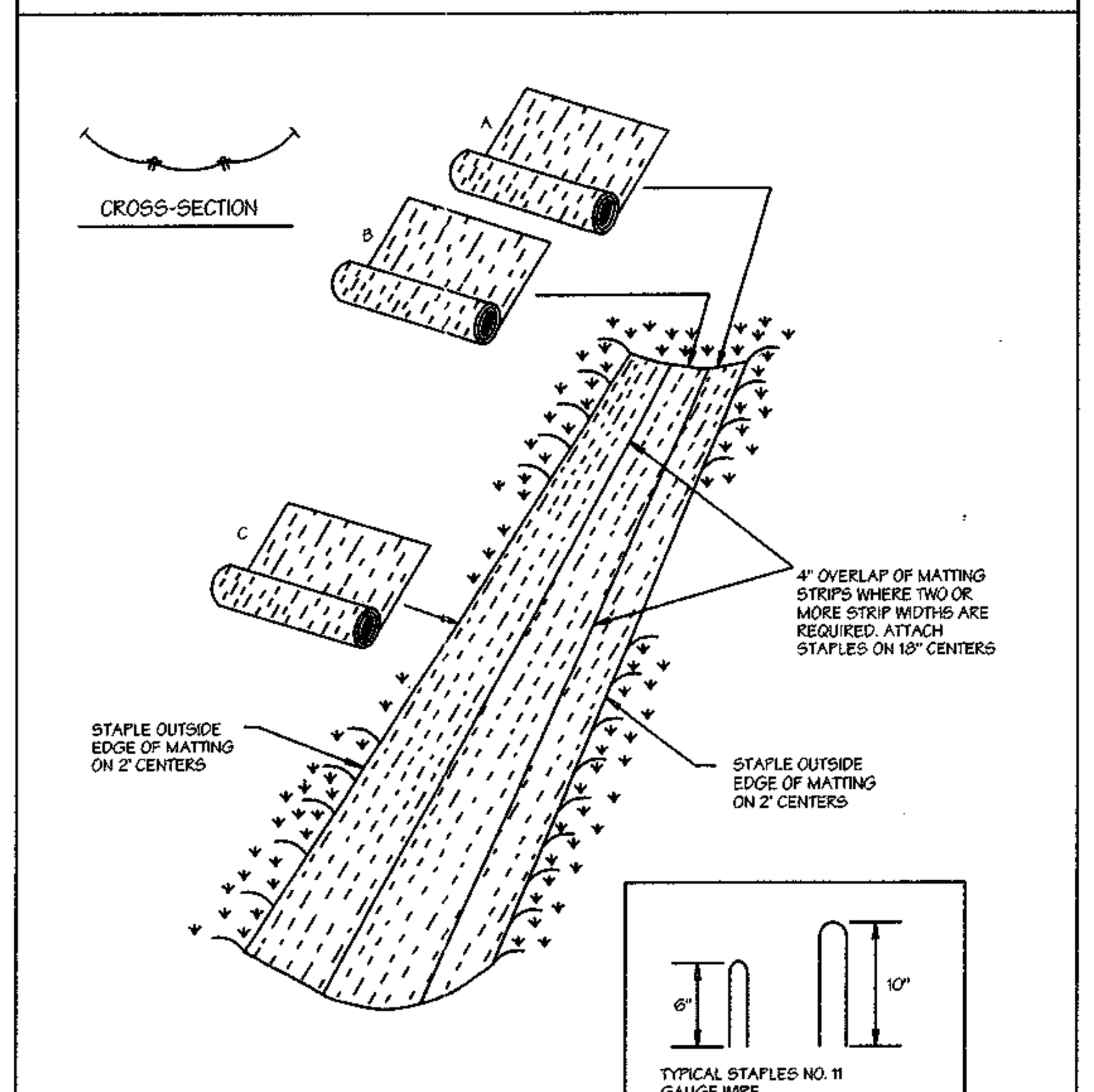
DETAIL 18 - SEDIMENT BASIN BAFFLES



U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE C - 30 - 25	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 30 - EROSION CONTROL MATTING



U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE G - 22 - 2	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

EROSION CONTROL MATTING

Construction Specifications

1. Key-in the matting by placing the top ends of the matting in a narrow trench, 6" in depth. Backfill the trench and tamp firmly to conform to the channel cross-section. Secure with a row of staples about 4" down slope from the trench. Spacing between staples is 6".

2. Staple the 4" overlap in the channel center using an 18" spacing between staples.

3. Before stapling the outer edges of the matting, make sure the matting is smooth and in firm contact with the soil.

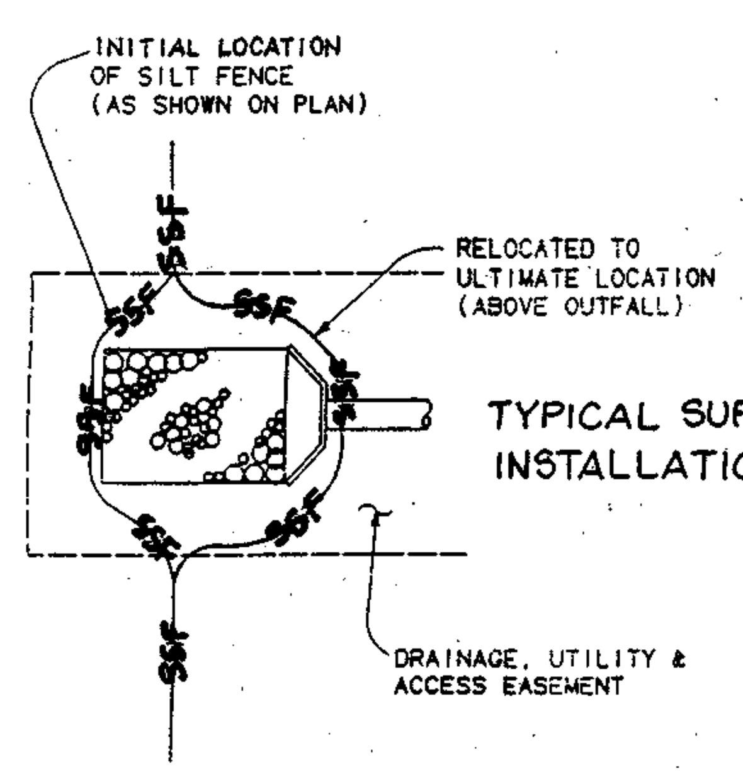
4. Staples shall be placed 2' apart with 4 rows for each strip, 2 outer rows, and 2 alternating rows down the center.

5. Where one roll of matting ends and another begins, the end of the top strip shall overlap the upper end of the lower strip by 4", shiplap fashion. Reinforce the overlap with a double row of staples spaced 6" apart in a staggered pattern on either side.

6. The discharge end of the matting liner should be similarly secured with 2 double rows of staples.

Note: If flow will enter from the edge of the matting then the area effected by the flow must be keyed-in.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE G - 22 - 2A	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION



TYPICAL SUPER SILT FENCE INSTALLATION AT PIPE OUTFALL

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 8/24/01 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT — 9/6/01 DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE

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

NATURAL RESOURCE CONSERVATION SERVICE — 8/7/01 DATE

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

HOWARD SOIL CONSERVATION DISTRICT — 8/7/01 DATE

ENGINEER'S CERTIFICATE

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

SIGNATURE OF ENGINEER — 7/24/01 DATE

DEVELOPER'S CERTIFICATE

"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.

SIGNATURE OF DEVELOPER — DATE

7/24/01

By	Date	No.	Description

REVISIONS

LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED EDS	Grading and Soil Erosion & Sediment Control Plan - Details	SCALE As Shown
DRAWN JLM KBW	**BRANTWOOD** Section Three - Area Three	DRAWING 11 of 22
CHECKED BDB	Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcel 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-	JOB NO. 98-040.6
DATE 7/2001	DEVELOPER BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO. F01-78

F01-78

F:\Land Projects R2\BRANTWOOD\dwg\Section 33\section33.dwg GRAD SOIL ERO & SED CON PLAN DETAILS 2

POND CONSTRUCTION SPECIFICATIONS

These specifications are appropriate to all ponds within the scope of the Standard for practice MD-378. All references to ASTM and AASHTO specifications apply to the most recent version.

SITE PREPARATION

Areas designated for borrow areas, embankment and structural works shall be cleared grubbed, and stripped of topsoil. All trees, vegetation, roots, and other objectionable material shall be removed. Channel banks and sharp breaks 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 to the ground surface. For dry stormwater management ponds, a minimum 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.

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.

Placement - Areas on which fill is to be placed shall be scarified prior to the 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 fill. The most permeable borrow material shall be placed in the downstream portions of the embankment. The principal spillway must be installed concurrently with fill placement and not excavated into the embankment.

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 of heavy equipment or compaction shall be achieved by a minimum of four complete passes of a sheepsfoot, rubber tired, 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 yet not be so wet that water can be squeezed out.

When required 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 AASHTO Method T-99 (Standard Proctor).

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.

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 additional, the core shall be placed concurrently with the outer shell of the embankment.

STRUCTURAL BACKFILL

Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining fill material. The fill shall be placed in horizontal layers not to exceed four inches 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 no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless there is 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 313 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 rigid conduits. Average slump of the fill shall be 7" to assure flowability of he 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 no circumstances shall equipment be driven over any part of a structure or pipe unless there is 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.

PIPE CONDUITS

All pipes shall be circular in cross section.

Corrugated Metal Pipe - All of the following criteria shall apply for corrugated metal pipe:

1. Materials - (Polymer Coated steel pipe) - Steel pipes with polymeric coatings shall have a minimum coating thickness of 0.01 inch (10 mil) on both sides of the pipe. This pipe and its appurtenances shall conform to the requirements of AASHTO Specifications M-245 & M-246 with watertight coupling bands or flanges.

Materials - (Aluminum Coated Steel Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-274 with watertight 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 AASHTO Specification M-190 Type A. Any aluminum coating damaged or otherwise removed shall be replaced with cold applied bituminous coating compound. 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 AASHTO Specifications M-196 or M211 with watertight 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 AASHTO Specifications M-190 Type A. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer. 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 watertight. The drain 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 watertight. Dimple bands are not considered to be watertight.

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 band width. The following type connections are acceptable for pipes less than 24" in diameter: flanges on both ends of the pipe, with a circular 3/8" closed cell neoprene gasket, pre-punched to the flange bolt circle, sandwiched between adjacent flanges; a 12 inch wide standard lap type band with 12" wide by 3/8" 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 corrugated depth. Pipes 24" in diameter and larger shall be connected by a 24" long annular corrugated band using a minimum of 4 (four) rods and lugs, 2 on each connecting pipe end. A 24" wide by 3/8" thick closed cell circular neoprene gasket will be installed with 12 inches on the end of each pipe. Flanged joints with 3/8" 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 caulking 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.

Reinforced Concrete Pipe - All of the following criteria shall apply for reinforced concrete pipe:

1. Materials - Reinforced concrete pipe shall have bell and spigot joints with rubber gaskets and shall equal or exceed ASTM Designation C-361.

2. Bedding - Reinforced concrete pipe conduits shall be laid in a concrete bedding/cradle for their entire length. This bedding/cradle 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 6 inches. Where a concrete cradle is not needed for structural reasons, flowable fill may be used as described in "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 of 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.

Plastic Pipe - The following criteria shall apply for 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" pipe shall meet the requirements of AASHTO M252 Type S, and 12" through 24" shall meet the requirements of AASHTO M294 Type S.

2. Joints and connections to anti-seep collars shall be completely watertight.

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.

DRAINAGE DIAPHRAGMS - When a drainage diaphragm is used, a registered professional engineer will supervise the design and construction inspection.

CONCRETE:

Concrete shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 414, Mix No. 3.

ROCK RIPRAP:

Rock riprap shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 311.

Geotexile 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.

CARE OF WATER DURING CONSTRUCTION:

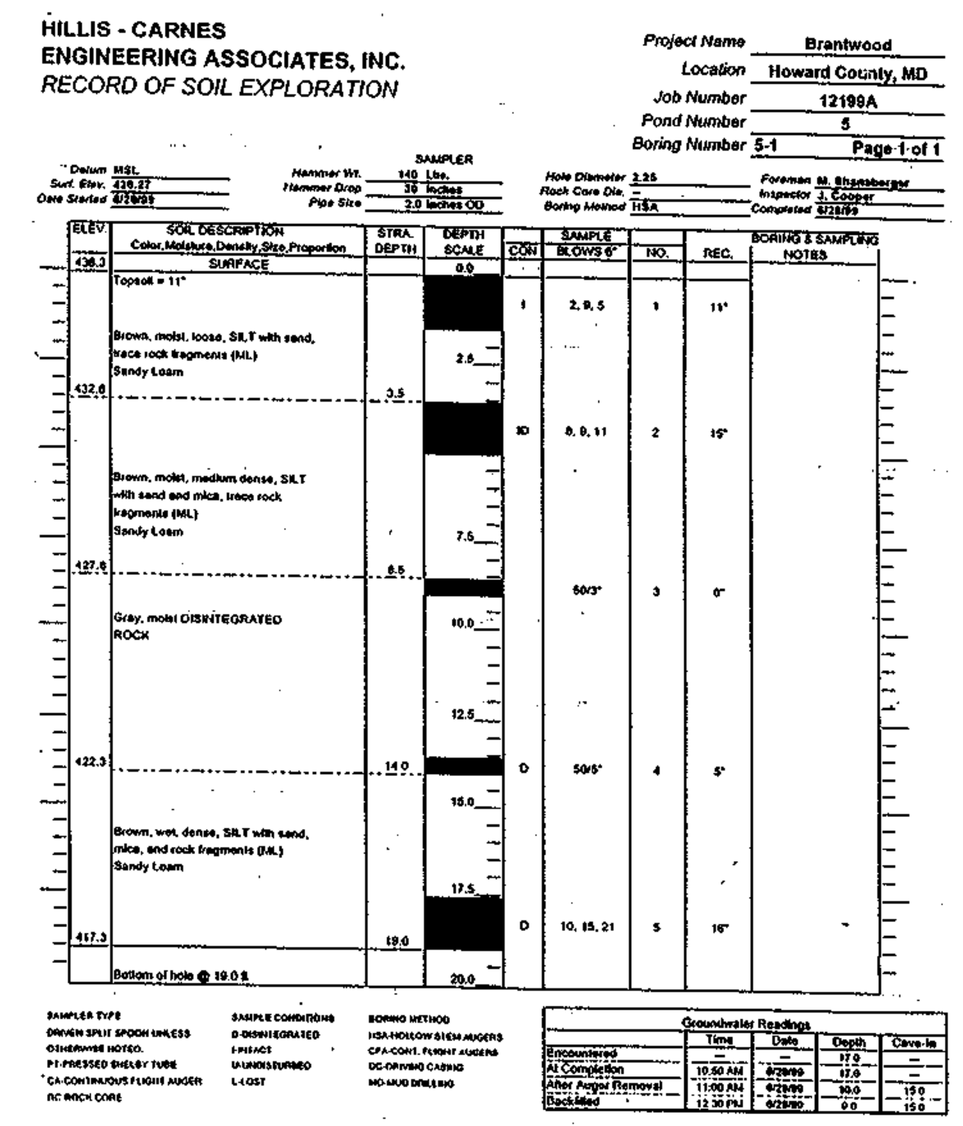
All work on permanent structures shall be carried out in areas free from water. The Contractor shall construct and maintain all temporary dikes, levees, cofferdams, drainage channels, and stream diversions necessary to protect the areas to be occupied by the permanent works. The contractor shall also furnish, install, operate and maintain all necessary pumping and other equipment required for removal of water from the 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 extend 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 required draining the water to sumps from which the water shall be pumped.

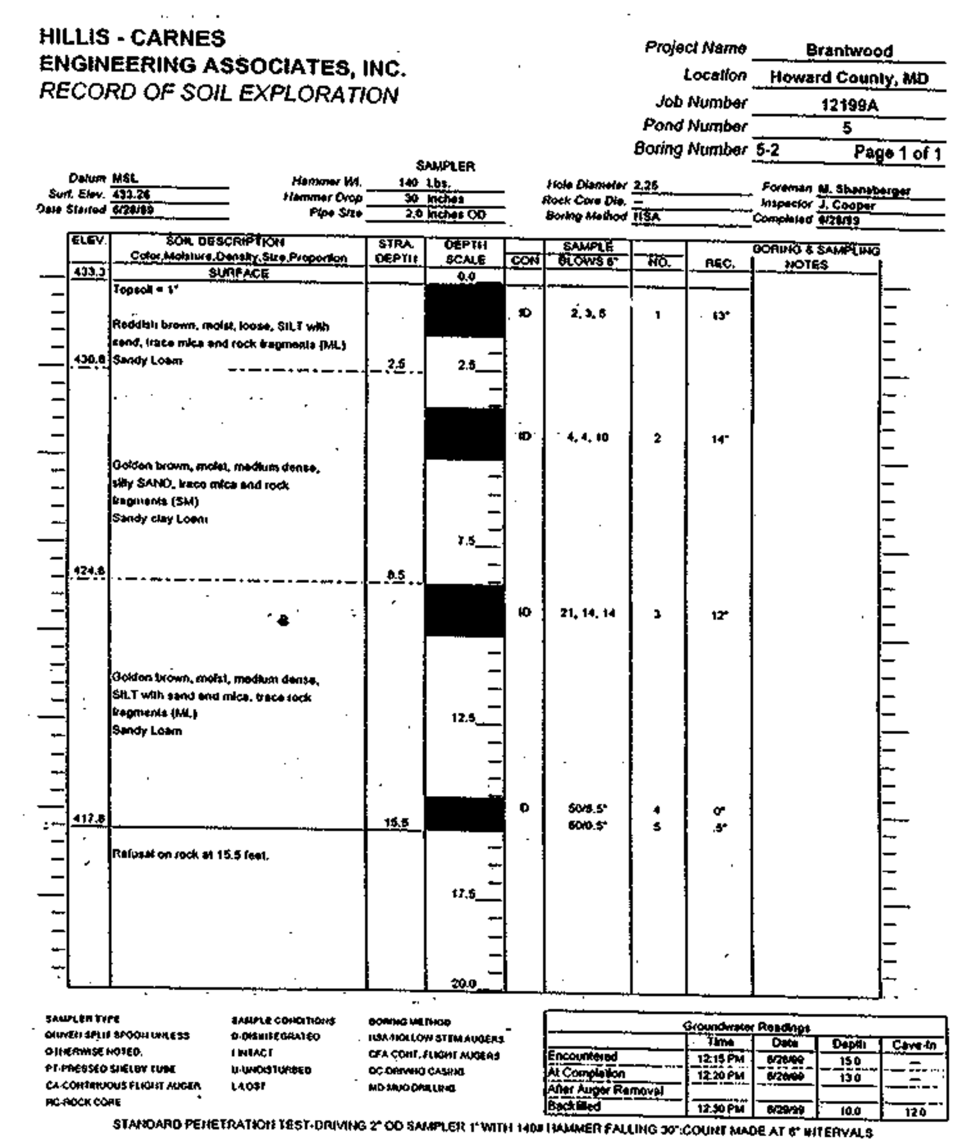
STABILIZATION:

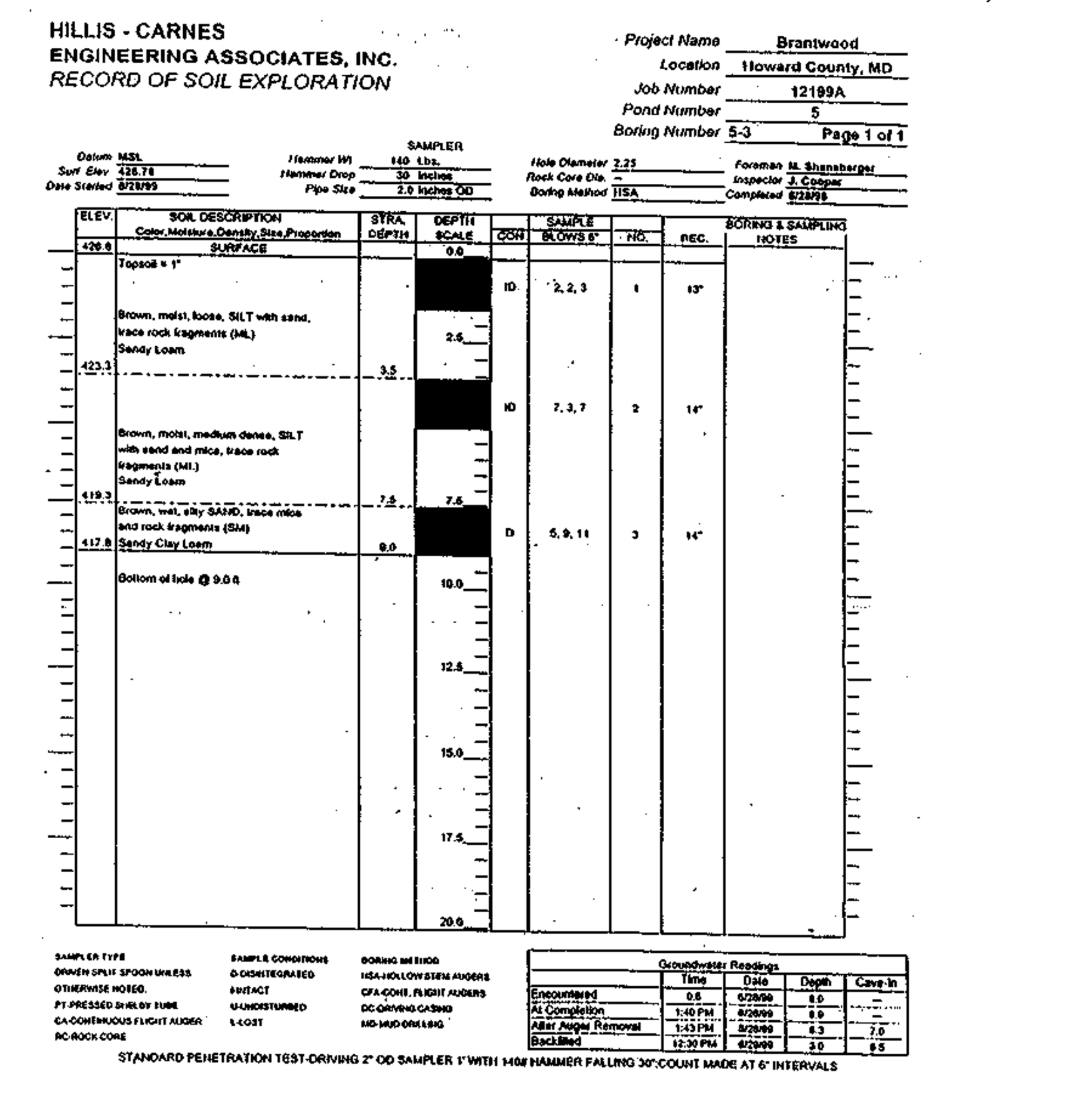
All borrow areas shall be graded to provide proper drainage and left in a sightly condition. All exposed surfaces of the embankment, spillway, spoil and borrow areas, and berms shall be stabilized by seeding, liming, fertilizing and mulching in accordance with the Natural Resource Conservation Service Standards and Specifications for Critical Area Planting (MD-342) or as shown on the accompanying drawings.

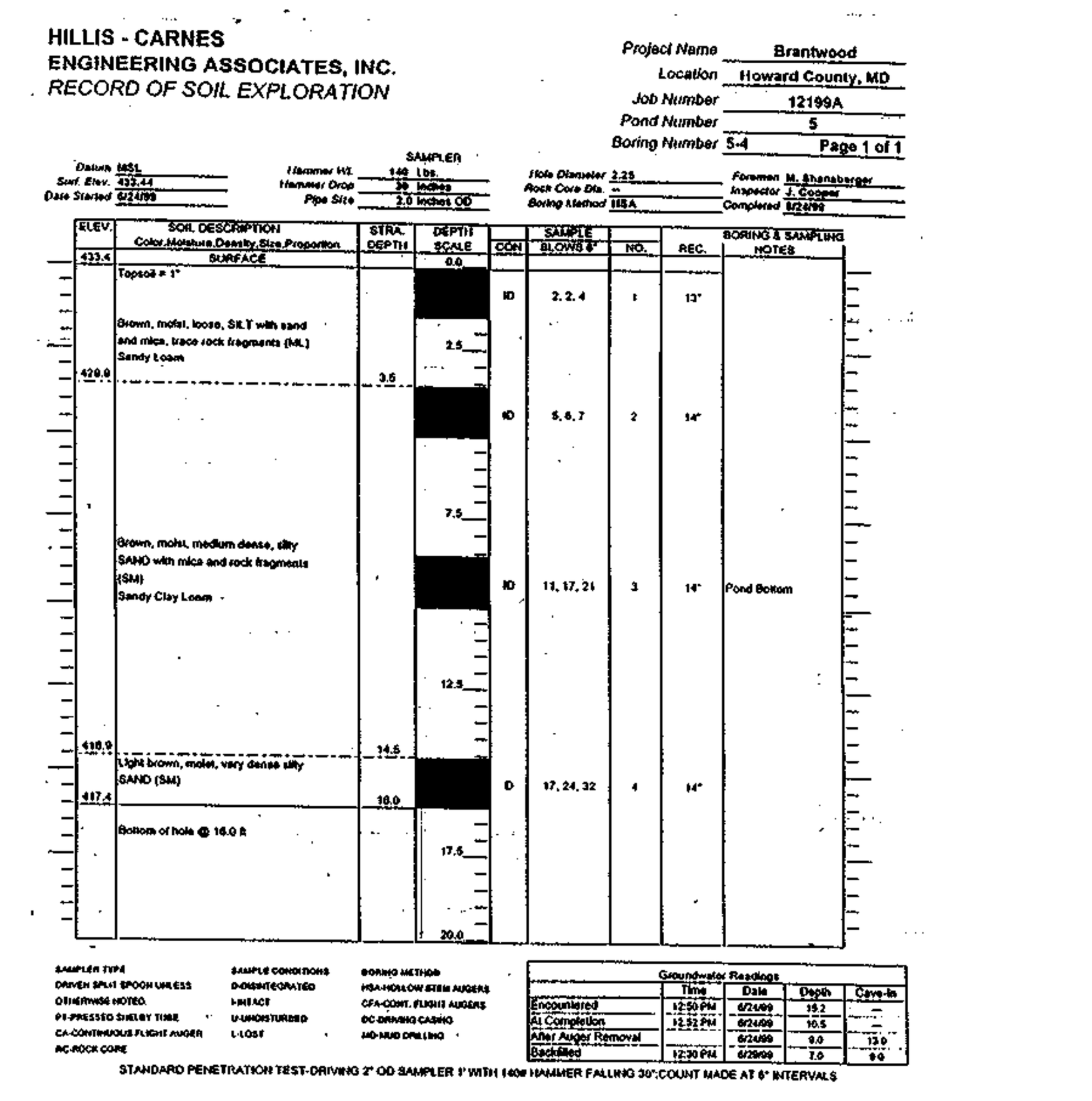
EROSION AND SEDIMENT CONTROL:

Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. State and local laws concerning pollution abatement will be followed. Construction plans shall detail erosion and sediment control measures.









Construction Considerations

The Soil Conservation Service of Maryland (SCS), Specification 378 (MD 378) governs design and construction of the storm water management facilities. MD 378 specifies that soils for use in cutoff trench and embankment core construction meet USCS Classification CL (low plasticity clay), CH (high plasticity clay), SC (clayey sand), or GC (clayey gravel). Furthermore, HCEA recommends that similar materials be used for backfill adjacent to the outfall pipe across the entire width of the embankment in order to decrease the potential of piping along the pipe. **These materials were not encountered in the borings.**

Based on our visual observations and laboratory testing, soils meeting the referenced classifications for cut-off trench construction are not readily available on site, and will require to be imported, unless a source of suitable soils are found on-site. The on-site soils classified as sandy SILT or silty SAND are considered suitable for use in the exterior portions of the proposed embankments.

Based on the laboratory test results and previous experience at similar sites, we recommend that the pond embankments should be designed at 3.0 horizontal to 1.0 vertical (3.0H:1.0V) or flatter. If steeper slopes are desired, HCEA can perform direct shear strength tests to verify the soil strength properties for embankment design.

Prior to cutoff trench or embankment construction, the areas to receive fill should be cleared of existing vegetation, topsoil, organic alluvial deposits, or unstable soils. Based on observations made during the test pit excavations, a soil bearing capacity of 2,500 psf may be assumed for pond structure design. Soil bearing capacities should be verified by HCEA during construction.

Fills for cutoff trench and embankment construction should be placed in eight-inch thick loose lifts, and compacted to at least 95 percent of the maximum dry density in accordance with the Standard Proctor, ASTM D-698. Fill should be placed in four-inch thick lifts around pipes, intake and outlet structures. Compactive effort should be monitored with in-place density testing as performed by a qualified representative under the direction of a professional engineer.

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/6/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE 8/16/01

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

NATURAL RESOURCE CONSERVATION SERVICE — DATE 8/7/01

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

HOWARD SOIL CONSERVATION DISTRICT — DATE 8/7/01

ENGINEER'S CERTIFICATE

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

SIGNATURE OF ENGINEER — DATE 7/24/01

DEVELOPER'S CERTIFICATE

"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.

SIGNATURE OF DEVELOPER — DATE

7/24/01

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

By	Date	No.	Description

REVISIONS

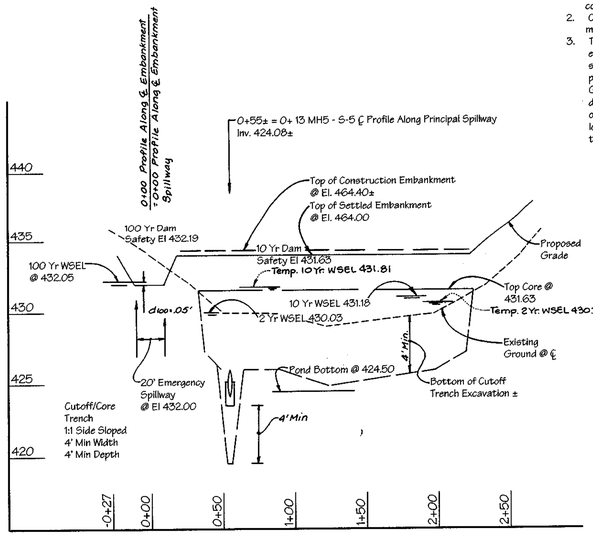
LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED EDS	Pond Construction Notes & Soil Borings	SCALE 1"=50'
DRAWN JLM KBW	BRANTWOOD Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C"	DRAWING 12 of 22
CHECKED BDB	Tax Map No. 16 - Grid No. 21 - Parcel 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-	JOB NO. 98-040.6
DATE 7/2001	DEVELOPER BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO. F01-78

F01-78

NOTES:

1. A Geotechnical Engineer is to be present on-site to supervise the construction of the core / cutoff trench, per MD 378 Specifications.
2. Core trench shall be dewatered prior to the placement of County Approved fill material.
3. The site shall be stripped of topsoil and any other unsuitable materials from the embankment of structure area in accordance with Soil Conservation guidelines. After stripping operations have been completed, the exposed subgrade materials should be proof-rolled with a loaded dump truck r similar equipment in the presence of the Geotechnical Engineer or his representative. For areas that are not accessible to a dump truck, exposed material shall be observed and tested by a geotechnical engineer or his representative utilized a Dynamic Cone Penetrometer. Any excessive soft or loose materials identified by proof rolling or penetrometer testing should be excavated to suitably firm soil, and then reestablished by backfilling with suitable soil.

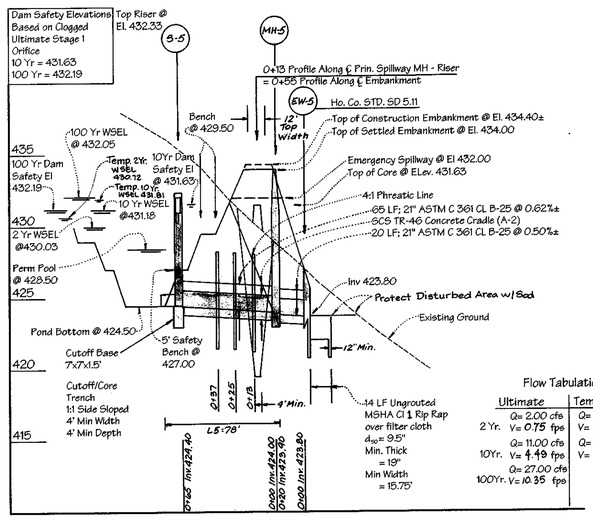


Profile Along ℄ Embankment
Scale: 1" = 50' Horizontal
1" = 5' Vertical

Flow Tabulations

Ultimate

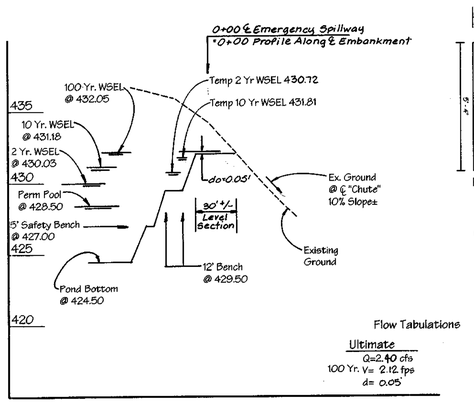
Q= 2.90 cfs
100Yr. V= 0.12 fps
d= 0.05'



Flow Tabulations

	Ultimate	Temporary
2 Yr.	Q= 2.00 cfs V= 0.75 fps	Q= 0.6 cfs V= 0.25 fps
10Yr.	Q= 11.00 cfs V= 4.49 fps	Q= 18.00 cfs V= 7.98 fps
100Yr.	Q= 27.00 cfs V= 10.35 fps	

Profile Along ℄ Principal Spillway
Scale: 1" = 50' Horizontal
1" = 5' Vertical



Flow Tabulations

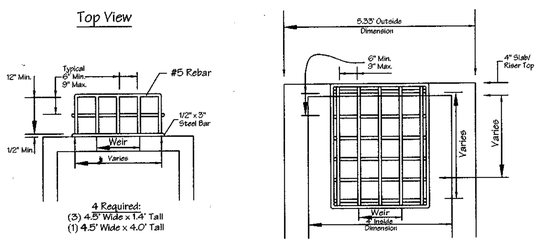
Ultimate

Q=2.90 cfs
100 Yr. V= 2.12 fps
d= 0.05

Profile Along ℄ Emergency Spillway
Scale: 1" = 50' Horizontal
1" = 5' Vertical

Face View

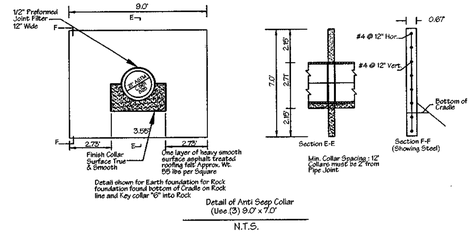
Top View



4 Required:
(3) 4.5' Wide x 1.4' Tall
(1) 4.5' Wide x 4.0' Tall

NOTES: 1. The steel used in the trash rack shall be galvanized and painted battleship grey after fabrication.
2. The #5 rebar to be welded to the 1/2" x 3" steel bar and bolted to the face of the structure.
3. All bolts used to be fasten track rack to the riser structure shall be galvanized.
4. The openings between the bars shall be a minimum of 6" in all directions.

Trash Rack Detail
Scale: 1" = 2'



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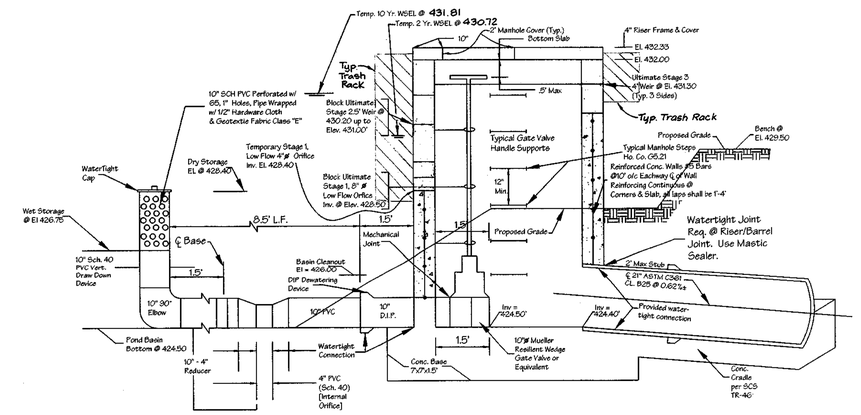
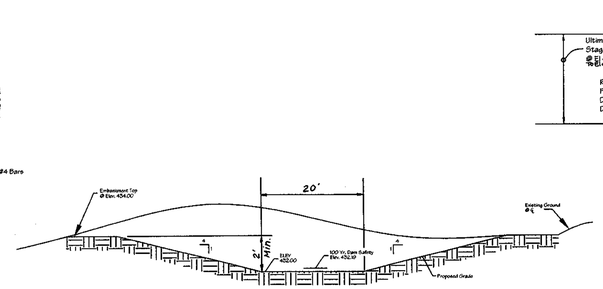


Sediment Basin S-5 Profile View
Scale: 1" = 2'

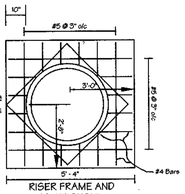
NOTES: 1. Gate Valve to remain open during Sediment Control Stage.
2. Refer to Plan View S - for weir location.
3. Draw down / Ultimate Pond Drain shall have concrete base per detail this sheet.

S-5 Plan View
Scale: 1" = 2'

NOTES: 1. Gate Valve to remain open during Sediment Control Stage.

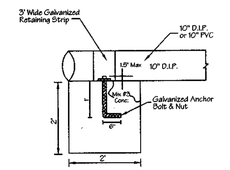


EMERGENCY SPILLWAY TYPICAL SECTION
Not to Scale

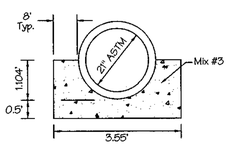


RISER FRAME AND COVER DETAIL
N.T.S.

Notes: 1) Riser Frame & Cover shall be bolted top Riser Structure.
2) Contractor shall place Cover on Riser so that "Manhole Cover" is directly over the Gate Valve Handle.



DEWATERING / DRAW DOWN DEVICE
CONCRETE BASE DETAIL
Not to Scale



SCS TR - 46
A-2 Cradle
Not to Scale

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

By	Date	No.	Description

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 9/6/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE

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

NATURAL RESOURCE CONSERVATION SERVICE — DATE 8/7/01

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

HOWARD SOIL CONSERVATION DISTRICT — DATE 8/7/01

ENGINEER'S CERTIFICATE

I CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION AND SOIL AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE OWNER OF THE REQUIREMENT TO 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.

SIGNATURE OF ENGINEER — DATE 7/24/01

DEVELOPER'S CERTIFICATE

"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.

SIGNATURE OF DEVELOPER — DATE 11/2/00

STATE OF MARYLAND — BRUCE DAVID BUTLER — REGISTERED PROFESSIONAL ENGINEER — 7/24/01

AS-BUILT CERTIFICATION

I hereby certify that the facility shown on this plan was constructed as shown on the "as-built" plans and meets the approved plans and specifications.

Signature — P.E. No: — Date:

Certify means to state or declare a professional opinion based upon onsite inspections and material tests which are conducted during construction. The onsite inspections and material tests are those inspections and tests deemed sufficient and appropriate by commonly accepted engineering standards. Certify does not mean or imply a guarantee by the engineer nor does an engineer's certification relieve any other party from meeting requirements imposed by contract, employment, or means, including meeting commonly accepted industry practices.

LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED: EDS
DRAWN: JLM KBW
CHECKED: BDB
DATE: 7/ 2001

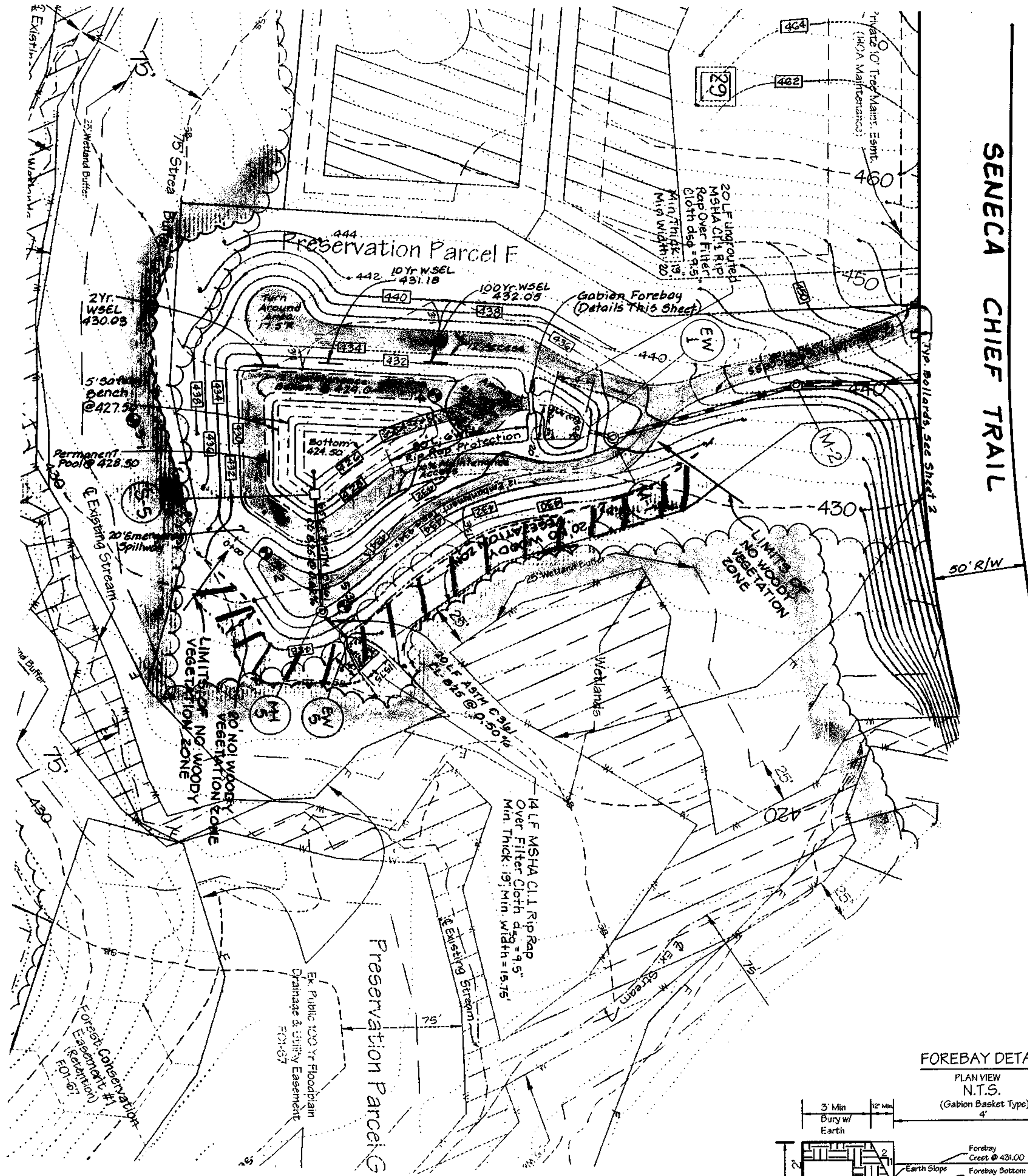
Pond #5 Construction Details
BRANTWOOD
Section Three - Area Three
Lots 28-38 & Preservation Parcels "F" & "G"
A Resubdivision of Brantwood - Section 3 Area 1
Buildable Bulk Parcel "C"
Tax Map No. 16 - Grid No. 21 - Parcels 172
3rd Election District - Howard County, Maryland
Previous Submittals: WP 90-86, F 90-128, WP 99-55, S 99-09, WP 00-55, F00-03, F 01-67, F 01-73

DEVELOPER: BRANTWOOD, LLC
8835 - P Columbia 100 Parkway
Columbia, Maryland 21045
(410) 730-0810

SCALE: As Shown
DRAWING: 13 of 22
JOB NO.: 98-040.6
FILE NO.: F01-78

F01-78

F:\Land Projects #2\BRANTWOOD\dwg\Section 3\Section3S.dwg POND #5 CD

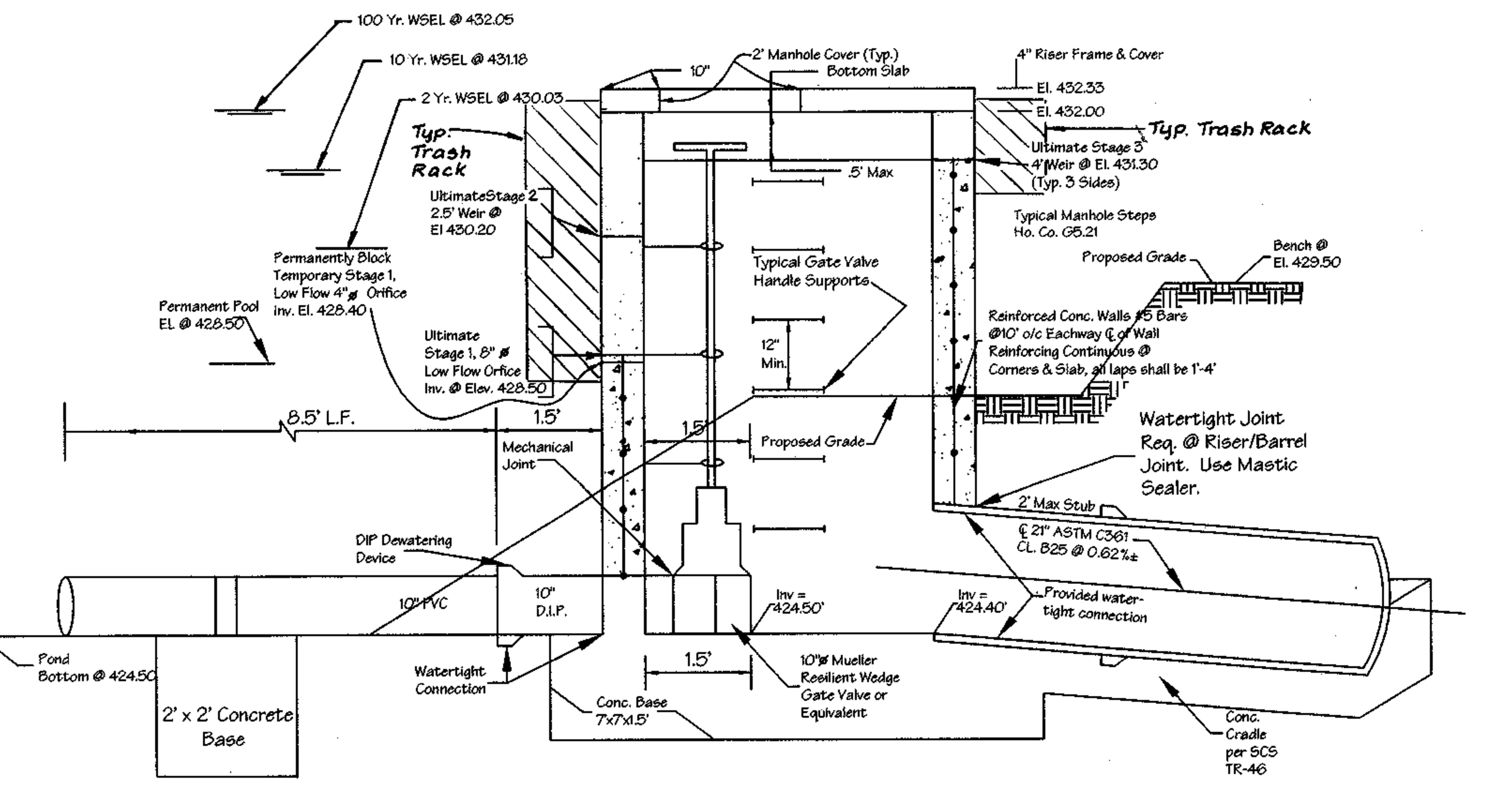


SUMMARY TABLE

PUBLIC POND #5
Joint Public/Private H.O.A. Maintenance
Hazard Classification "A"
Drainage Area = 7.76 Acres
Water Quality Management = Retention / Wet Pond
Water Quantity Management = Detention

		SWM POND 2 Year	10 Year	100 Year
Total Existing Flow	(cfs)	30	162.0	362
Unmanaged Flow	(cfs)	27	116	246
Acceptable Release*	(cfs)	3.0	46.0	N/A
Computed Inflow	(cfs)	11.0	26.0	44.0
Facility Discharge	(cfs)	2.0	11.0	27.0
Elevation at Discharge		430.03	431.18	432.05
Storage at Elevation	(AC\FT)	0.47	0.79	1.03
Total Developed Flow	(cfs)	29	158	379

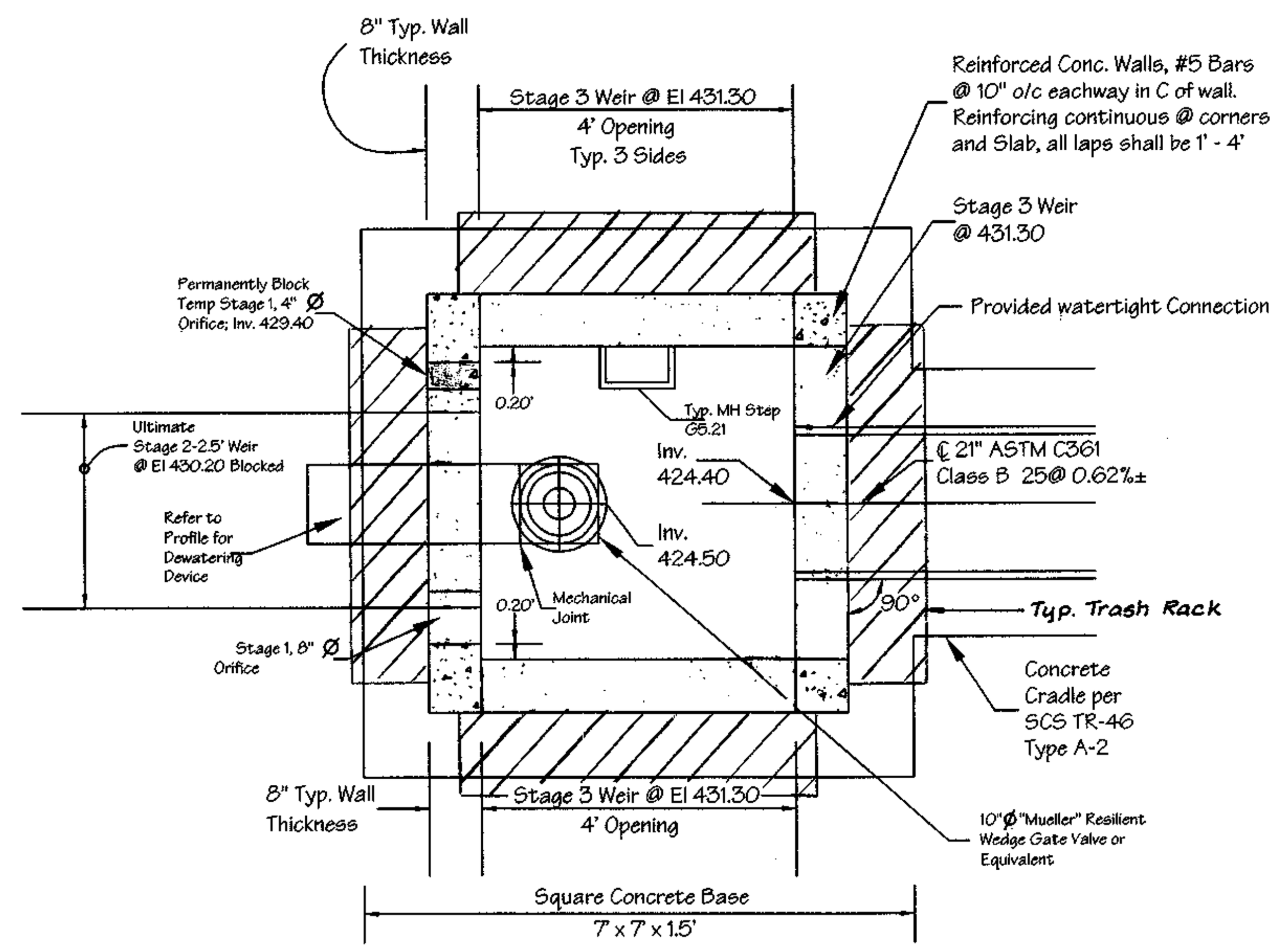
* With allowance for Future Pond



Sediment Basin S-5 Profile View

Scale: 1" = 2'

NOTES: 1. Refer to Plan View S - for weir location.
2. Draw down / Ultimate Pond Drain shall have concrete base per detail this sheet.

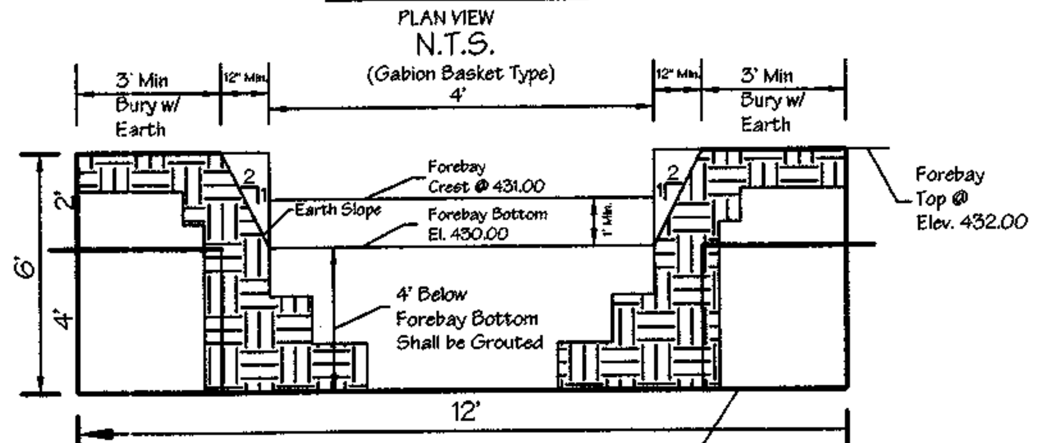


S-5 Plan View

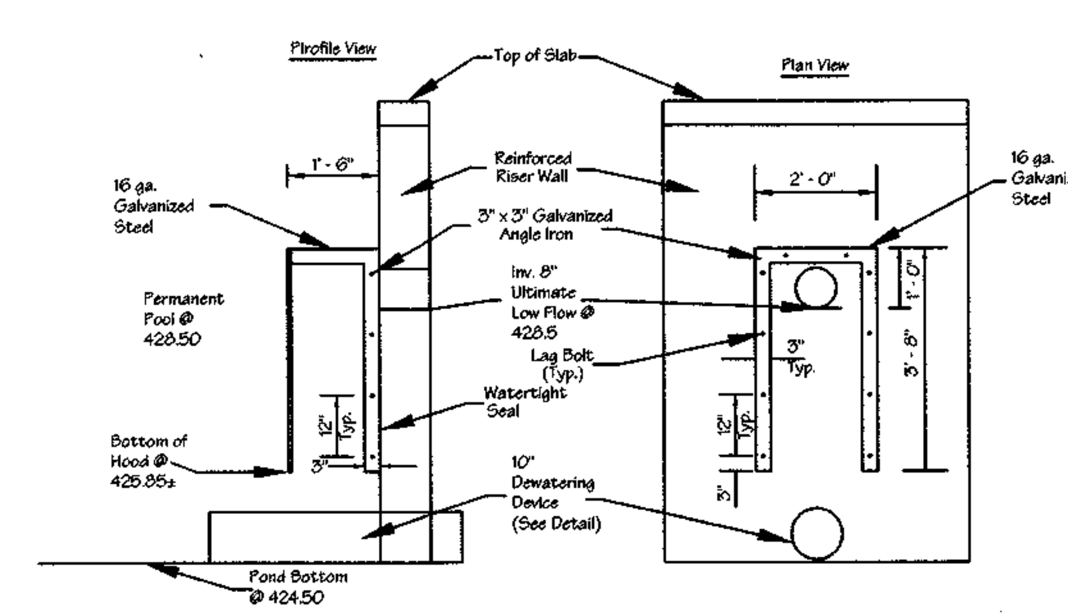
Scale: 1" = 2'

FOREBAY DETAIL

PLAN VIEW
N.T.S.



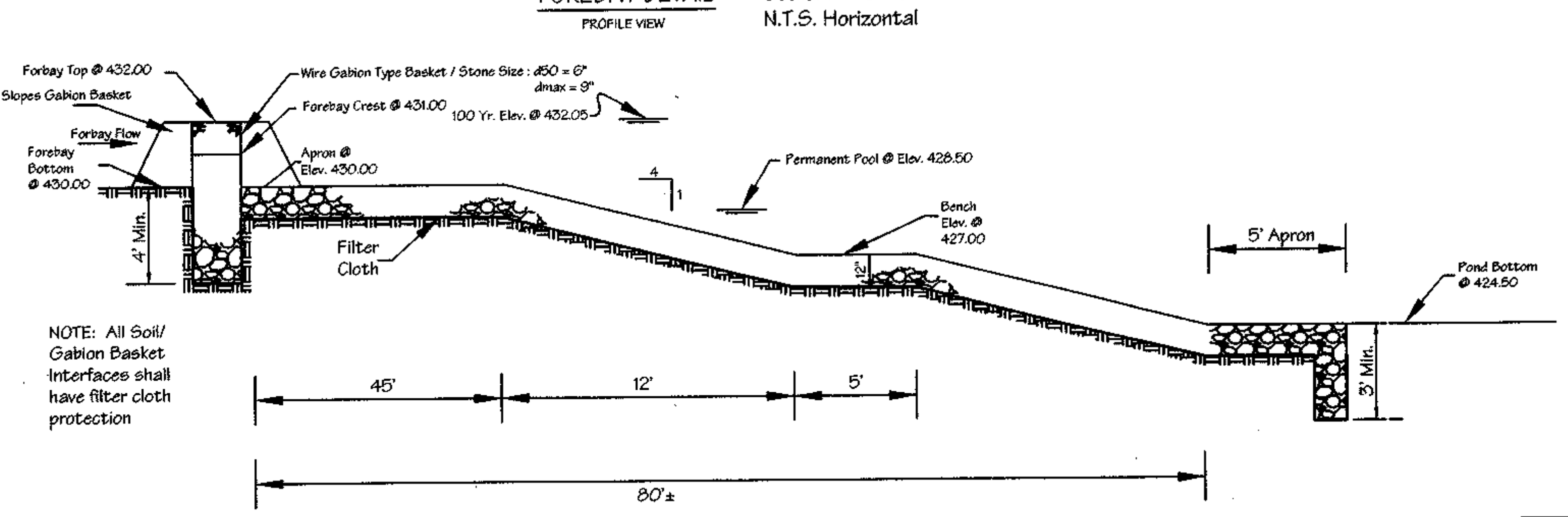
NOTES: 1. The steel used in the "Hood" shall be galvanized, 16 ga. and painted battleship grey after fabrication.
2. 3" x 3" Angle galvanized, and bolted to the face of the structure. All bolts sha;; be galvanized.
3. "Hood shall be bolted into 3" x 3" Angle Iron



Water Quality "Hood"
N.T.S.

FOREBAY DETAIL
PROFILE VIEW

Scale: 1" = 5' Vert.
N.T.S. Horizontal



NOTE: All Soil/ Gabion Basket Interfaces shall have filter cloth protection

Operation and Maintenance Schedule
Stormwater Management Facility
Wet Pond

1. Top and side slopes of the embankment shall be mowed a minimum of two (2) times a year, once in June and once in September. Other side slopes and maintenance access should be mowed as needed.

2. Debris and litter next to the outlet structure shall be removed during regular mowing operations and as needed.

3. When deemed necessary for aesthetic reasons, sediment should be removed from the pond. Approval of the Department of Public Works is required.

OPERATION, MAINTENANCE, AND INSPECTION

Inspection of the pond 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). The pond owner(s) and their heirs, successors, or assigns shall be responsible for the safety of the pond and the continued operation, surveillance, inspection, and maintenance thereof. The pond owner(s) shall promptly notify the Soil Conservation District of any unusual observations that may be indications of distress such as excessive seepage, turbid seepage, sliding or slumping.

F:\Land Projects R2\BRANTWOOD\dwg\Section 33\section33.dwg ULT POND

APPROVED: DEPARTMENT OF PLANNING AND ZONING

[signature] 8/24/01
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

[signature] 9/6/01
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

[signature] 8/15/01
Chief, Bureau of Highways — DATE

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

[signature] 8/7/01
NATURAL RESOURCE CONSERVATION SERVICE — DATE

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

[signature] 8/7/01
HOWARD SOIL CONSERVATION DISTRICT — DATE

ENGINEER'S CERTIFICATE

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

[signature] 7/24/01
SIGNATURE OF ENGINEER — DATE

DEVELOPER'S CERTIFICATE

"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.

[signature] 11/2/01
SIGNATURE OF DEVELOPER — DATE

STATE OF MARYLAND — BRUCE DAVID BURTON — REGISTERED PROFESSIONAL ENGINEER
[signature] 7/24/01

Maintenance Notes

1) County maintenance responsibility for facilities located on HOA property will be limited to the structural maintenance of the man-made elements of the facility (e.g. pipes, headwalls, riprap, dams and risers). County maintenance responsibilities shall also include removal of accumulated silt.
2) Homeowners Association maintenance responsibilities will include landscape maintenance and trash removal. Landscape maintenance shall include mowing of all areas in open space including side slopes, dam top, embankment and spillways, except that the bottom of the facility shall not be mowed to less than 4 inches in height. Woody vegetation shall not be allowed to grow on the dam or within 20 feet of the top of cut slopes or toe of embankment (See Section 5.2.4.G.). The maintenance responsibilities shall be included in the Homeowners Association By-Laws and Declaration of Covenants and be recorded with the developer agreement for the project.

Maintenance Requirements

a. Removal of silt when accumulation exceeds six (6) inches in basins without forebays. In basins with forebays, removal of silt shall occur when the accumulation exceeds four (4) inches in the forebay.
b. Removal of accumulated paper, trash and debris as necessary.
c. Vegetation growing on the embankment top and faces is not allowed to exceed 18 inches in height at any time.
d. Annual inspection and repair of the structure.
e. Corrective maintenance is required any time an extended detention basin does not drain the equivalent of the Water Quality Volume within 60 hours (i.e., no standing water is allowed).
f. Corrective maintenance is required any time the forebay does not drain down completely within 60 hours (i.e., no standing water is allowed).

By	Date	No.	Description

REVISIONS

LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED EDS	Ultimate Pond #5 Plan View & Details	SCALE As Shown
DRAWN JLM KBW	BRANTWOOD Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcel 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-73	DRAWING 14 of 22
CHECKED BDB		JOB NO. 98-040.6
DATE 7/ 2001	DEVELOPER BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO. F01-78

F01-78

FOREST PROTECTION PROCEDURES - PRECONSTRUCTION PHASE

Stress Reduction and Protection of Specimen Trees Isolated from Forest Retention Areas and General Forest Retention Areas (As They May Apply)

1.) The edge of the woods to be protected will be marked (staked or flagged) in the field per the limits of disturbance shown on this approved Final Construction Plan prior to the start of construction activity. All areas within protective fences are to be considered "off limits" to any construction activities. The protective fencing shall be installed at the outside edge of forested areas and specimen trees to be retained and should be combined with sediment control devices when possible. The limit of the critical root zone and therefore the location of the protective devices is to be determined as follows:

Isolated Specimen Trees - 1.5 feet of protective radius per inch of DBH

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

2.) Construction activities expressly prohibited within the preservation areas are:

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

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

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

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

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

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

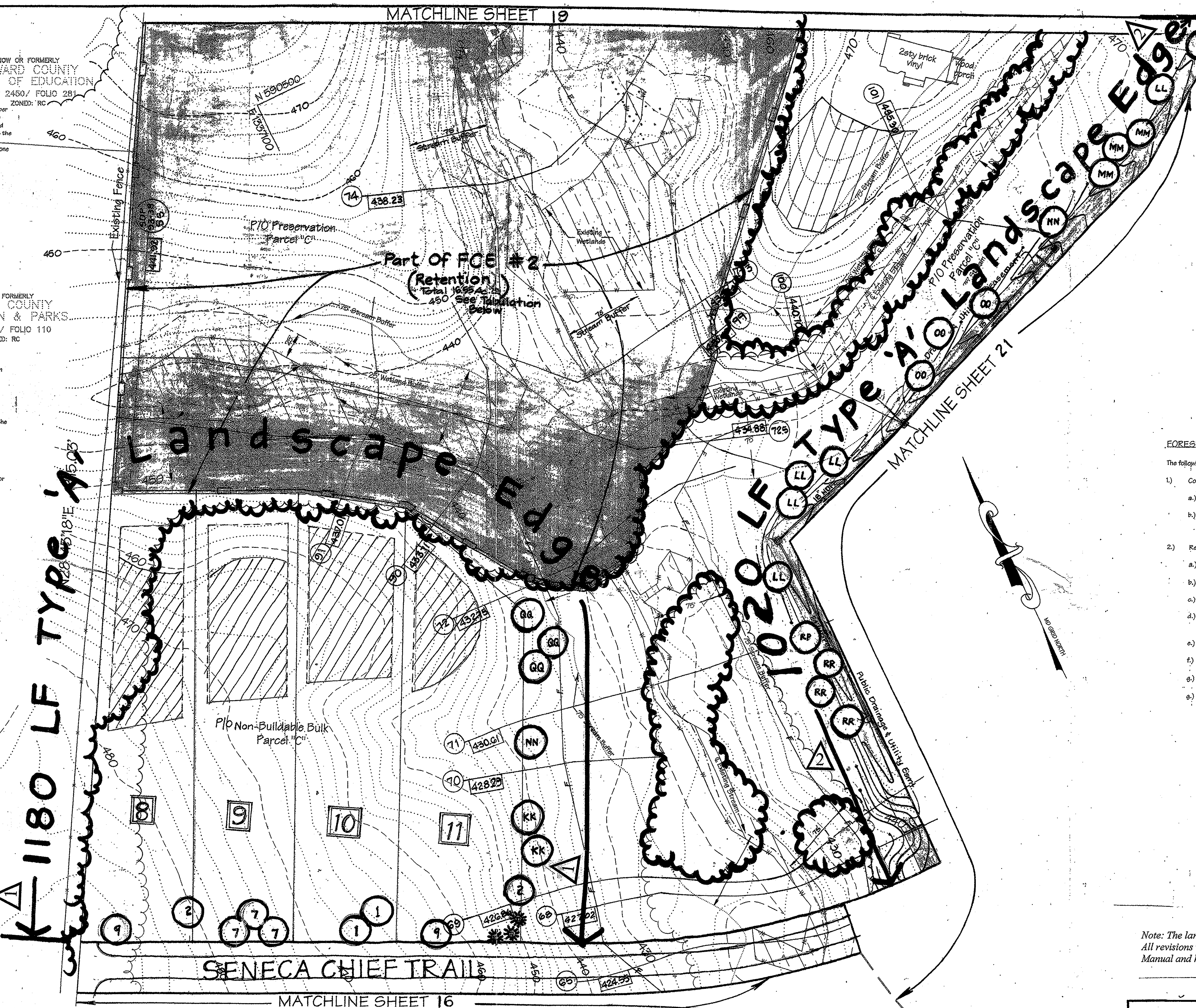
8.) A pre-construction meeting shall be held with local authorities before any disturbance has taken place on site.

FOREST PROTECTION PRODCEDURES – CONSTRUCTION PHASE

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

The following shall be monitored:

a.) Soil compaction
b.) Root injury – prune and monitor; consider crown reduction
c.) Limb injury – prune and monitor
d.) Flooded conditions – drain and monitor; correct problem
e.) Drought conditions – water and monitor; correct problem
f.) Other stress signs – determine reason, correct and monitor



LEGEND

······522······	EX. 2FT. CONTOUR
—522—	PROP. 2FT. CONTOUR
— —520— —	EX. 10FT. CONTOUR
(hatched box)	PROP. SEPTIC AREA
(dashed hatched box)	EX. SEPTIC AREA
(scalloped line)	EX. TREES
(shaded scalloped line)	EX. TREES TO REMAIN
— · — · —	EX. ℄ STREAM
··········	75' FT. STREAM BUFFER
—W—W—W—	EX. NON-TIDAL WETLAND
— — — —	25' FT. WETLAND BUFFER
—F—F—F—	100 YEAR FLOODPLAIN
●	WELL PROPOSED
○	WELL EXISTING
—□—	FOREST CONSERVATION EASEMENT FENCING WITH SIGNAGE
(73) 436.60	100 YEAR FLOODPLAIN CROSS SECTION AND ELEVATION

FOREST PROTECTION PROCEDURES - POST CONSTRUCTION PHASE

The following measures shall be taken:

1.) Corrective measures if damages were incurred due to negligence:

a.) Stress reduction

b.) Removal of dead or dying trees. This may be done only if trees pose an immediate safety hazard

2.) Removal of temporary structures:

a.) No burial of discarded materials will occur on-site within the conservation area.

b.) No open burning within 200 feet of a wooded area.

c.) All temporary forest protection structures will be removed after construction.

d.) Remove temporary roads by removing stone or broadcasting mulch; pre-construction elevation shoilld be maintained.

e.) Aerate compacted soil.

f.) Replant disturbed sites with trees, shrubs and/or herbaceous plants.

g.) Retain signs for retention areas or specimen trees.

g.) A County official shall inspect the entire site.

OWNERS:

Parcel 172
Brantwood LLC
8835 P Columbia 100 Pkwy
Columbia, Md. 21045

Parcel 45
Hugh F. Cole, Jr.
8835 P Columbia 100 Pkwy
Columbia, Md. 21045

Parcel 205
Brantwood LLC
8835 P Columbia 100 Pkwy
Columbia, Md. 21045

Note: The landscaping plantings have been revised (as shown on this sheet). All revisions were made in accordance with the Howard County Landscape Manual and have been approved by Howard County.

DEVELOPER'S CERTIFICATE

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 Howard Soil Conservation District.

[signature] 10/12/10
Signature of Developer — Date

F:\Land Projects R2\BRANTWOOD\dwg\Section 3\a\section3.dwg LFC&STP Plan3

APPROVED: DEPARTMENT OF PLANNING AND ZONING

[signature] 10/26/10
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

[signature] /for 10/28/10
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

APPROVED: DEPT OF PUBLIC WORKS

[signature] 10-22-10
CHIEF, BUREAU OF HIGHWAYS — DATE

I hereby certify that the landscaping plans were prepared or approved by me, and that I am a duly licensed professional landscape architect under the laws of the state of Maryland License Number 906, expiration date 3.8.12

[seal: STATE OF MARYLAND — NO. 906]
[signature]

FOREST CONSERVATION EASEMENT STANDARD NOTES:

The Forest Conservation Easement has been established to fulfill the requirements of Section 16.1200 of the Howard County Code, Forest Conservation Act. No clearing, grading or construction is permitted within the Forest Conservation Easement; however, forest management practices as defined in the Deed of Forest Conservation Easement are allowed.

NOTES: 1. THIS SHEET SHALL NOT BE USED FOR GRADING PURPOSES. REFER TO SHEET 10 OF 23.

NAME	DATE	DESCR.
CF	10/7/10	REVISED LANDSCAPING

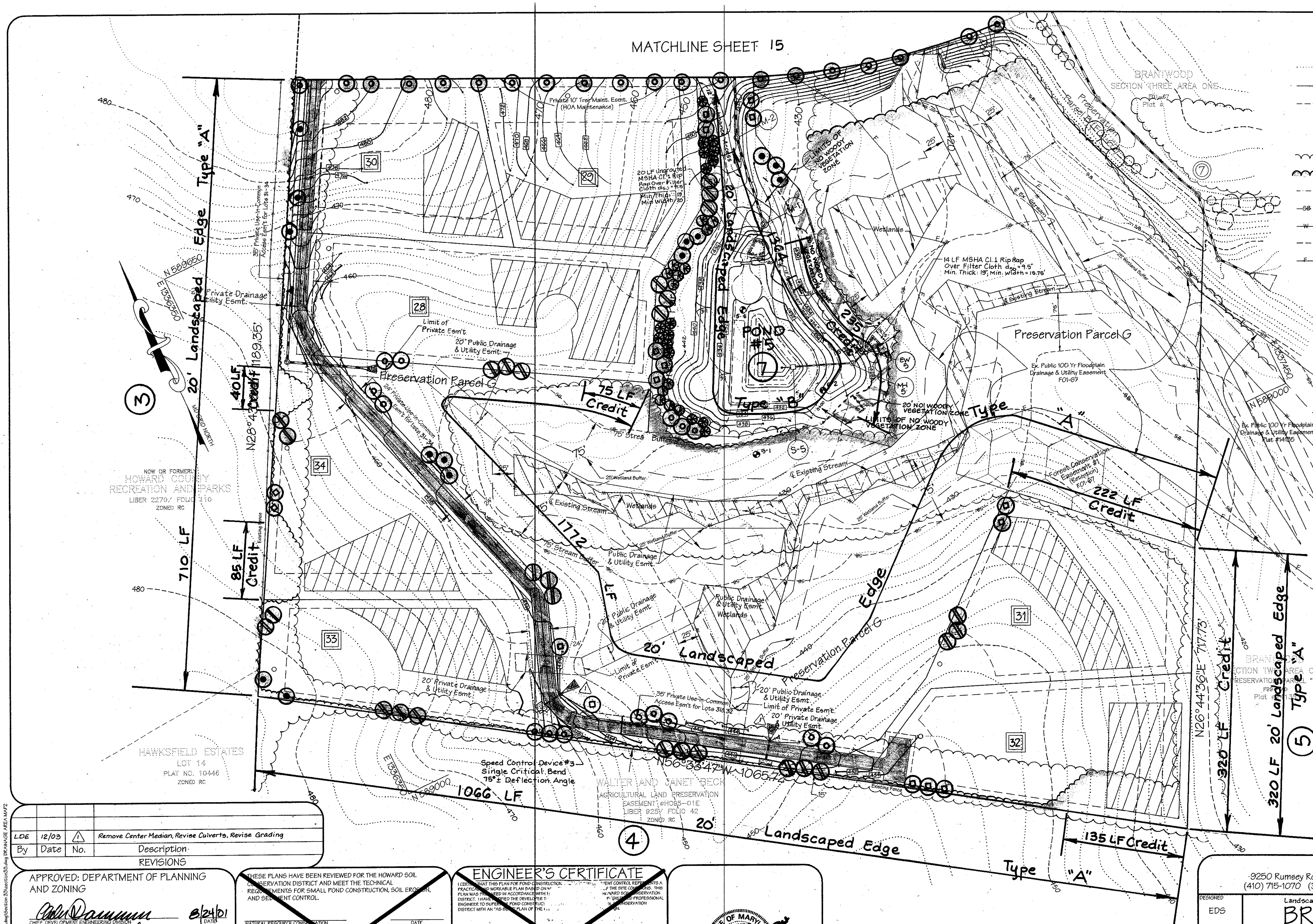
FCE # 2 TABULATION
TOTAL GROSS AREA = 16.55 Ac.±
AREA THIS SHEET = 6.41 Ac.±
AREA OF FLOODPLAIN = 2.29 Ac.±
TOTAL NET RETENTION ESMT. = 4.12 Ac.±

[seal: STATE OF MARYLAND — REGISTERED PROFESSIONAL ENGINEER — NO. 19184] 3/8/10

"AS-BUILT"

LDE, INC. 9250 Rumsey Road, Suite 106, Columbia, MD. 21045 (410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)		
DESIGNED EDS	REVISED Landscape and Street Tree Planting Plan **BRANTWOOD** Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcel 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-73	SCALE 1"=50'
DRAWN JLM		DRAWING 15 of 22
CHECKED BDB		JOB NO 98-040.6
DATE 7/2001	DEVELOPER BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO F01- 78

F01- 78



LEGEND

522 (dotted)	EX. 2FT. CONTOUR
522 (boxed, solid)	PROP. 2FT. CONTOUR
520 (dashed)	EX. 10FT. CONTOUR
(hatched box)	PROP. SEPTIC AREA
(dashed hatched box)	EX. SEPTIC AREA
(tree line)	EX. TREES
(shaded tree line)	EX. TREES TO REMAIN
(dash-dot line)	EX. ℄ STREAM
SB — SB — SB	75' FT. STREAM BUFFER
W — W — W	EX. NON-TIDAL WETLAND
(dashed line)	25' FT. WETLAND BUFFER
F — F — F	100 YEAR FLOODPLAIN
O	PROPOSED WELL

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

F:\Land Projects R2\BRANTWOOD\dwg\Section 33\section33.dwg DRAINAGE AREA MAP2

By	Date	No.	Description
LDE	12/03	1	Remove Center Median, Revise Culverts, Revise Grading

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

[signature] 8/24/01
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

[signature] 9/6/01
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

[signature] 8/13/01
Chief, Bureau of Highways — DATE

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

NATURAL RESOURCE CONSERVATION SERVICE — DATE

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

HOWARD SOIL CONSERVATION DISTRICT — DATE

ENGINEER'S CERTIFICATE

SIGNATURE OF ENGINEER — DATE

DEVELOPER'S CERTIFICATE

SIGNATURE OF DEVELOPER — DATE

[seal: STATE OF MARYLAND REGISTERED PROFESSIONAL ENGINEER No. 19189] [signature] 7/24/01

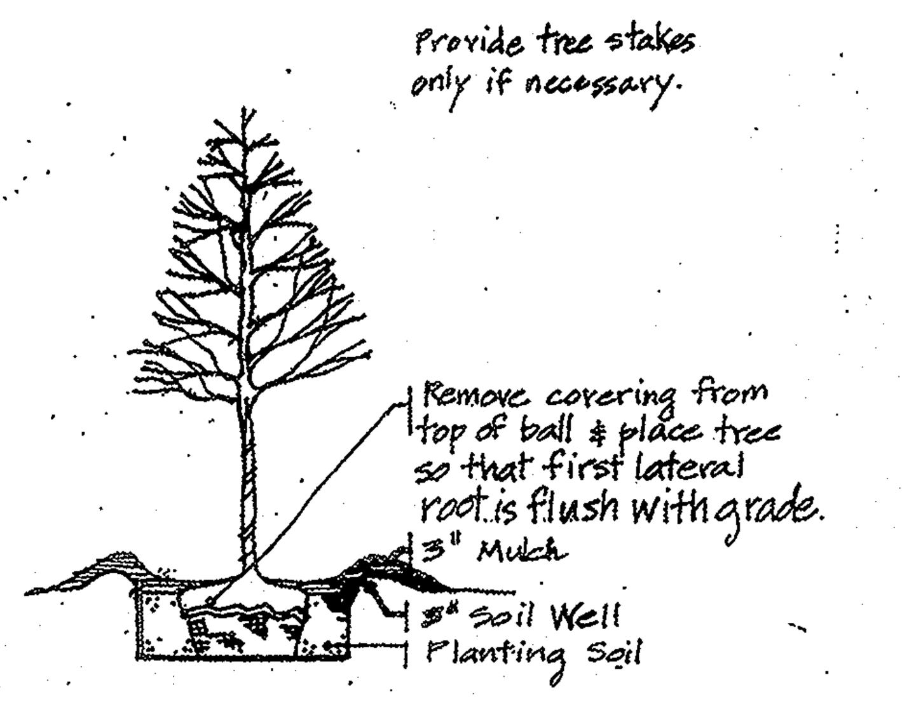
LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED		SCALE
EDS	Landscape and Street Tree Planting Plan **BRANTWOOD** Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcel 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-73	1"=50'
DRAWN: JLM		DRAWING: 16 of 22
CHECKED: BDB		JOB NO.: 98-040.6
DATE: 7/2001	DEVELOPER: BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO.: F01- 78

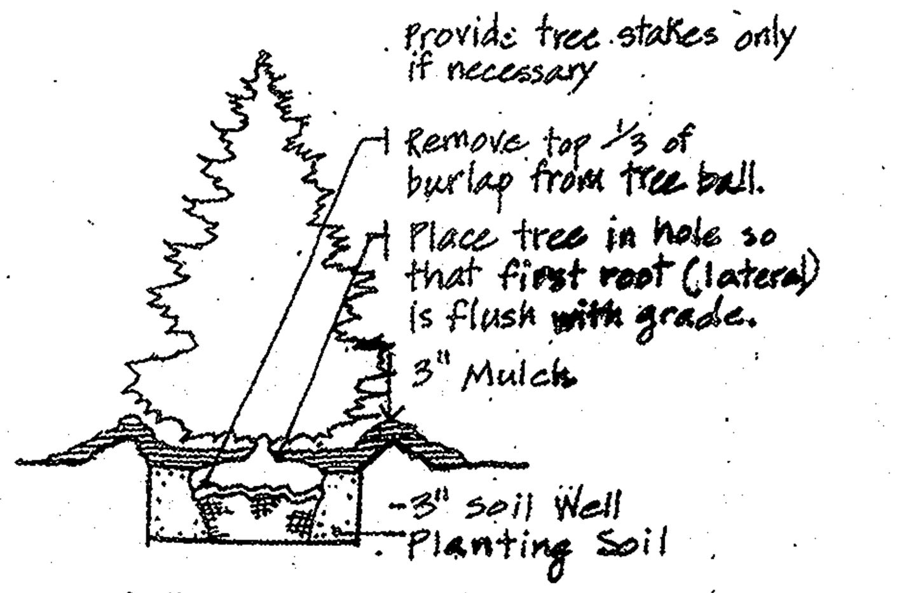
F01- 78

TREE PLANTING NOTES

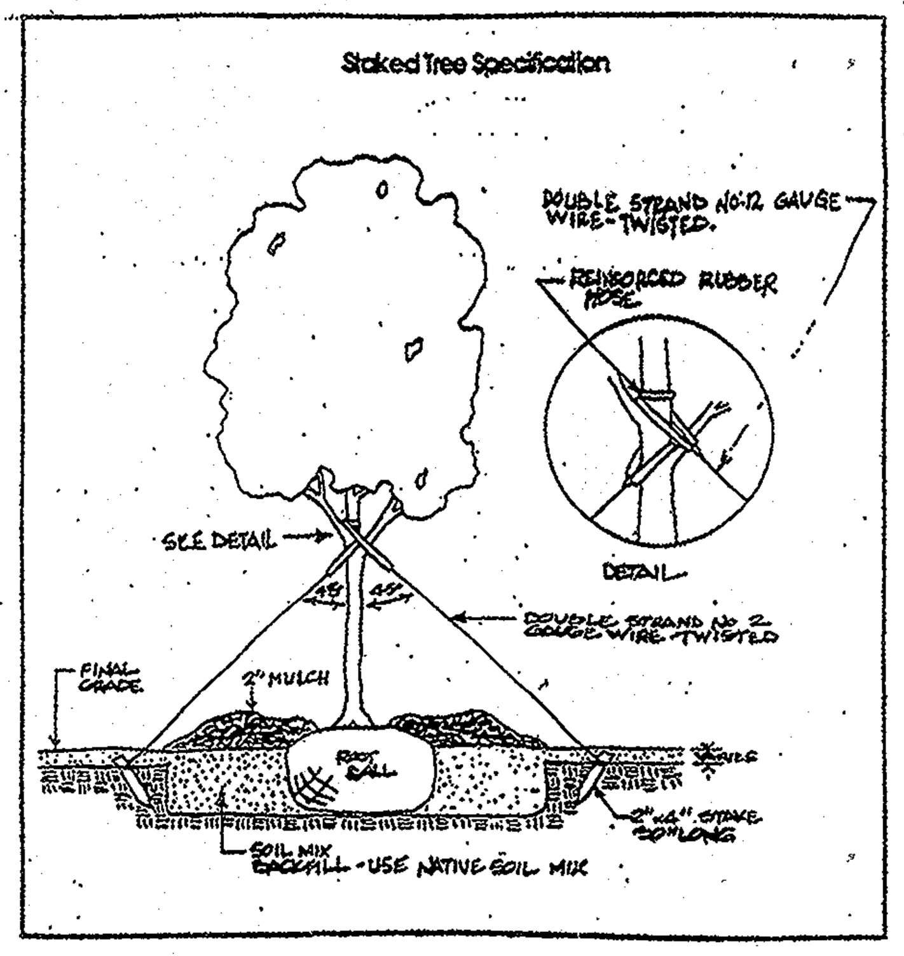
1. Notify "Miss Utility" 72 hours prior to installation of all plant material.
2. Plant installation must conform to the minimum standards cited in the latest edition of Landscape Specification Guidelines, published by the Landscape Contractors Association.
3. Plants to be located in the field by the owner or owner's representative. Notify owner 72 hours in advance of planting.
4. A Certification of Landscape Installation is required as per the Howard County Landscape Ordinance.
5. The number, size, location of plants shall not be changed without the approval of the Landscape Architect. Substitutions must be included in the recommended plant list in the Howard County Landscape Ordinance.
6. Street tree locations may be adjusted for final location of driveways. Trees to be located a minimum of 10 feet from driveways.
7. Street trees may not be planted within 5 feet of drain inlets, 5 feet of an open space access strip and 10 feet of a driveway.
8. Street tree planting must conform to the Subdivision and Land Development Regulations and the Department of Public Works Design Manual of Howard County.
9. Bailed and burlapped plant material shall not be accepted if bail is cracked or broken before or during planting. Protect all plants from drying by either sun of wind.
10. Tree pits shall be backfilled with 50% topsoil, 25% peat 25% sand with one pound of 10-10-10 fertilizer per pit.
11. Top soil shall be sandy loam soil free from noxious weeds or grasses, roots, clay clumps, stones, sticks, etc. Peat moss shall be commercial with pi 4.5 to 5.5, free of woody material or harmful minerals.
13. All plants shall be watered at planting with weekly watering thereafter for the first 80 days. Watering shall continue bimonthly or as necessary to maintain plants in a healthy condition during the guarantee period.
14. Maintain the site in an orderly manner. Streets and sidewalks shall be swept clean. All rejected or dead materials shall be immediately removed from the site.
15. Plant material to be alive and healthy at the time of the guarantee period (one year), as specified in the Howard County Landscape Ordinance.
16. Maintenance shall begin immediately after planting and continue to the end of guaranteed period.
17. Maintenance consist of pruning, watering weeding, re-mulching, resetting plants to proper grades as needed and repairing guys and staked as needed.
18. There shall be a minimum of 20 feet between street lights and street trees. All street trees shall be maintained by the HOA (Homeowners Association) end of guaranteed period.



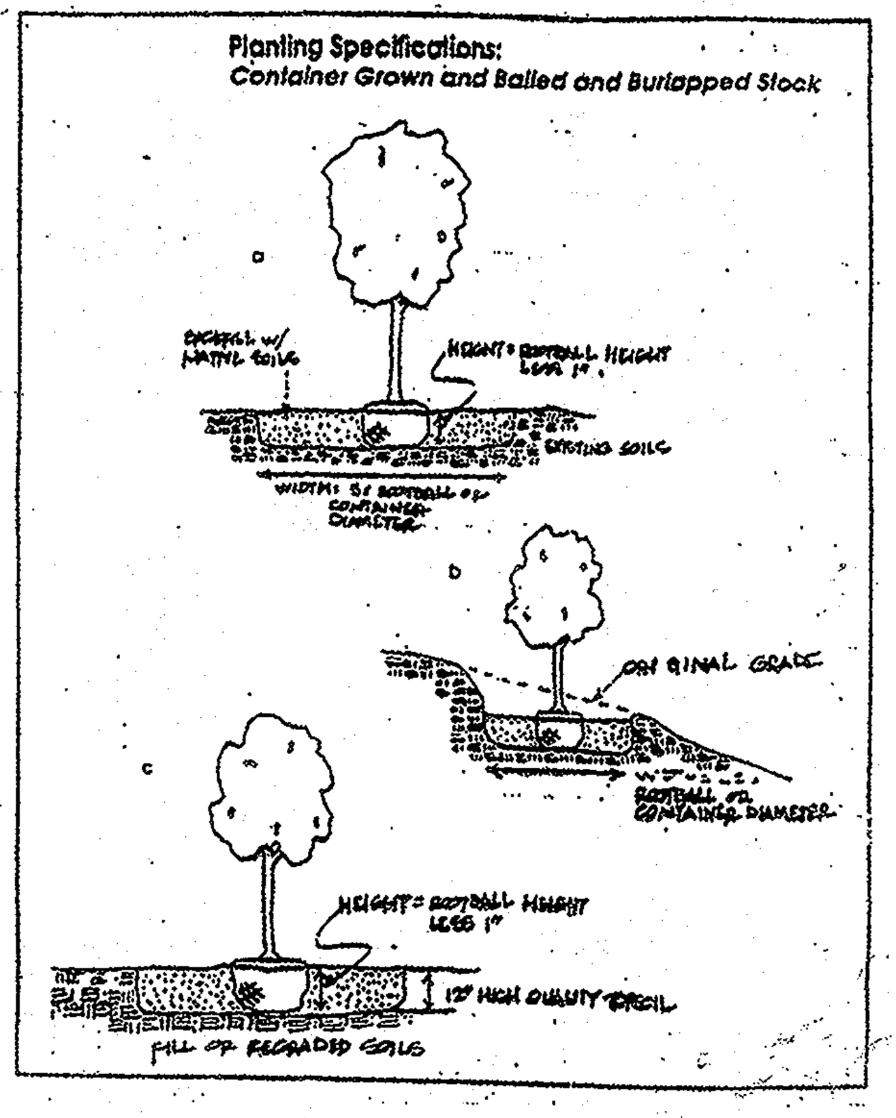
DECIDUOUS TREE PLANTING DETAIL
N.T.S.

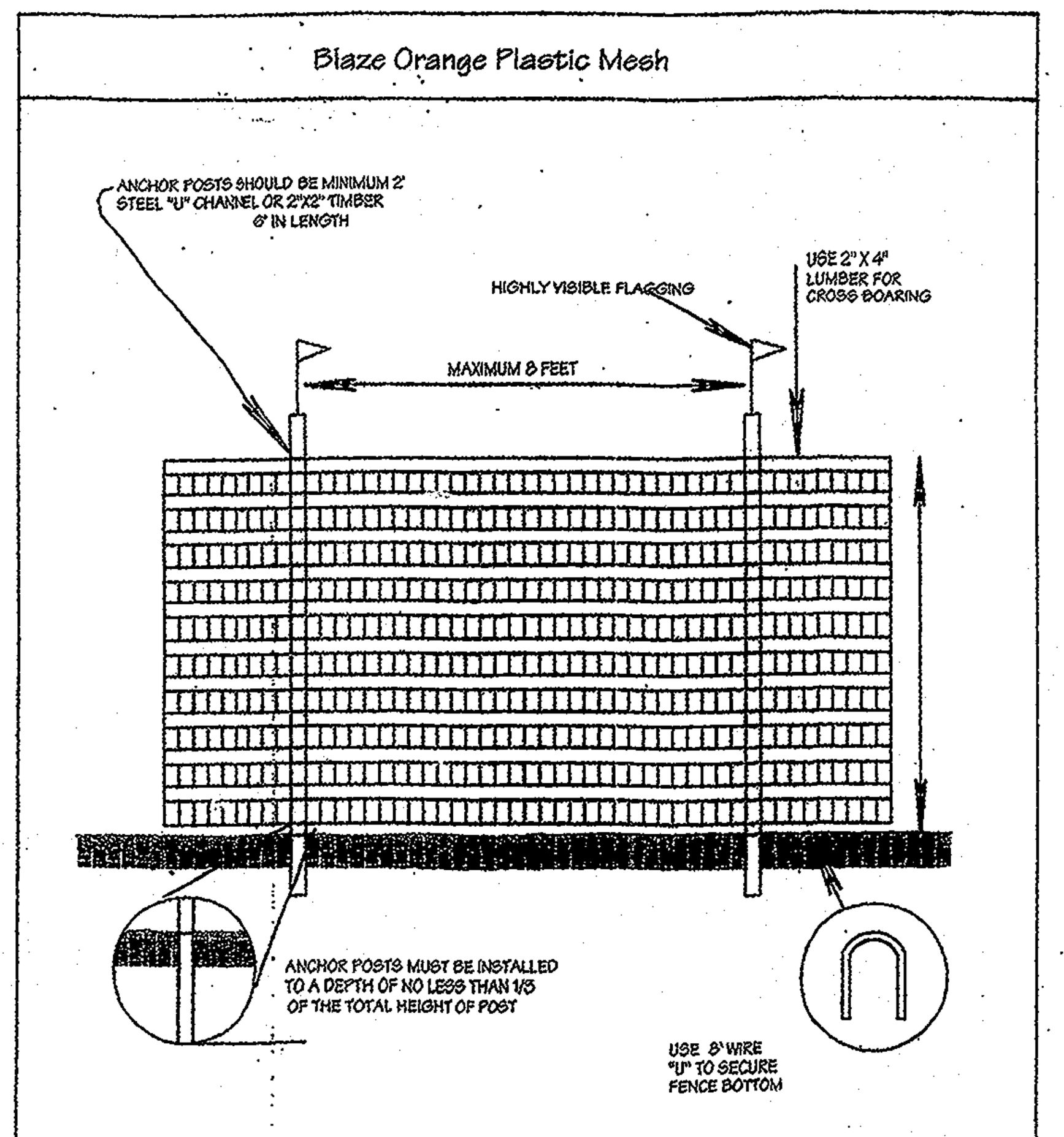


EVERGREEN TREE PLANTING DETAIL
N.T.S.



Staking of trees may be used only when transplanting in areas of high winds for trees larger than eight feet in height. Stakes and wires should be removed after the first growing season.





NOTES
1. Forest protection device only.
2. Retention Area will be set as part of the review process.
3. Boundaries of Retention Area should be staked and flagged prior to installing device.
4. Root damage should be avoided.
5. Protective signage may also be used.
6. Device should be maintained throughout construction.

WOODLAND CONSERVATION MANUAL	EXHIBIT K - 8	PRINCE GEORGES COUNTY, MD

GENERAL NOTES

1. This plan has been prepared in accordance with the provisions of Section 16.124 of the Howard County Code and Landscape Manual.
2. The Owner/Developer is responsible for the planting of all plants material required to meet the standards established by the Howard County Landscape Manual.
3. Financial Surety for the required landscaping has been posted as part of the Department of Public Works Developer's Agreement in the amonut of $ 31,050
4. Financial Surety for the required street trreeshas been posted in teh amount of $ 12,000

Proposed Street Tree (Cluster Plan) Plant Schedule

Symbol	Botanical Name	Common Name	Quantity	Size
1	Acer r. 'October Gray'	October Glory Maple	3	2 1/2 - 3" cal. BB
2	Acer s. 'Green Mountain'	Green Mt. Sugar Maple	5	2 1/2 - 3" cal. BB
7	Prunus yedeonsis	Yoshino Cherry	3	1 1/2 - 2" cal. BB
9	Zelkova s. 'Village Green'	Village Green Zelkova	4	2 1/2 - 3" cal. BB
11	Picea abies	Norway Spruce	3	6 - 7' Ht. BB
12	Picea omorika	Serbian Spruce	3	6 - 7' Ht. BB
14	Pinus strobus	White Pine	3	6 - 8' Ht. BB

Proposed Type 'A' Landscape Edge Plant List

Symbol	Botanical Name	Common Name	Quantity	Size
KK	Cercidiphyllum japonicum	Katsura-tree	5	2 - 2 1/2" cal. BB/ cont.
LL	Fraxinus p. 'marshall's seedless'	Green Ash	8	2 1/2 - 3" cal. BB
MM	Liquidambar styraciflua	Sweet Gum	3	2 1/2 - 3" cal. BB
NN	Nyssa sylvatica	Black Gum	3	2 1/2 - 3" cal. BB
OO	Platanus a. 'Bloodgood'	London Plane-tree	3	2 1/2 - 3" cal. BB
PP	Prunus sargentii	Sargent Cherry	3	2 - 2 1/2" cal. BB
QQ	Quercus rubra	Red Oak	5	2 1/2 - 3" cal. BB
RR	Betula n. 'Heritage'	River Birch	7	10 - 12' Ht. BB/ cont.

Proposed SWM Area Landscape Schedule

Symbol	Botanical Name	Common Name	Quantity	Size
A.	Fagus grandiflora	American Beech	1	2 1/2" cal. BB
B.	Fraxinus a. 'Autumn Purple'	Autumn Purple Ash	3	2 1/2 - 3" cal. BB
E.	Quercus acutissima	Sawtooth Oak	3	2 1/2 - 3" cal. BB
F.	Taxodium distichum	Bald Cypress	3	8-10' Ht. BB
G.	Picea omorika	Serbian Spruce	2	6 - 7' Ht. Ht. BB
H.	Pinus strobus	White Pine	7	6 - 8' Ht. BB
I.	Thuja p. 'Green Giant'	Green Giant Western Arborvitae	7	7 - 8' Ht. BB/ cont.
J.	Salix babylonica	Weeping Willow	3	2 1/2 - 3" cal. BB

Perimeter Summary

Area #	Type	Sheet #	# LF	Trees Required	Credit for Existing	Total Trees Required	Proposed Trees
1	A	15 of 22	1180	1180 / 60 = 20 Trees	820 / 60 = 14 Trees	20 - 14 = 6 Trees	6 Shade
2	A	15 of 22	1020	1020 / 60 = 17 Trees	0	17 - 0 = 17 Trees	17 Shade
3	A	16 of 22	2560	2560 / 60 = 43 Trees	1760 / 60 = 29 Trees	43 - 29 = 14 Trees	14 Shade
4	B	16 of 22 (Shade)	1364	1364 / 50 = 27	725 / 50 = 14	27 - 14 = 13	13 Shades
	B	16 of 22 (Evergreen)	1364	1364 / 40 = 34	725 / 40 = 18	34 - 18 = 16	16 Evergreens

Type A - 1:60- Shade   Type B - 1:50- Shade; 1:40 Evergreen   Type D - 1:60 Shade; 1:10 evergreen

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION   10/26/10 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT   10/28/10 DATE

APPROVED: DEPT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS   10-27-10 DATE

I hereby certify that the landscaping plans were prepared or approved by me, and that I am a duly licensed professional landscape architect under the laws of the state of Maryland, License Number 906, expiration date 3.8.12

STATE OF MARYLAND

DEVELOPER'S CERTIFICATE

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 Howard Soil Conservation District.

Signature of Developer   10/12/10 *Date*

Note: The landscaping plantings have been revised (as shown on this sheet). All revisions were made in accordance with the Howard County Landscape Manual and have been approved by Howard County.

By	Date	No.	Description
CF	10/1/10	1	LANDSCAPING REVISIONS

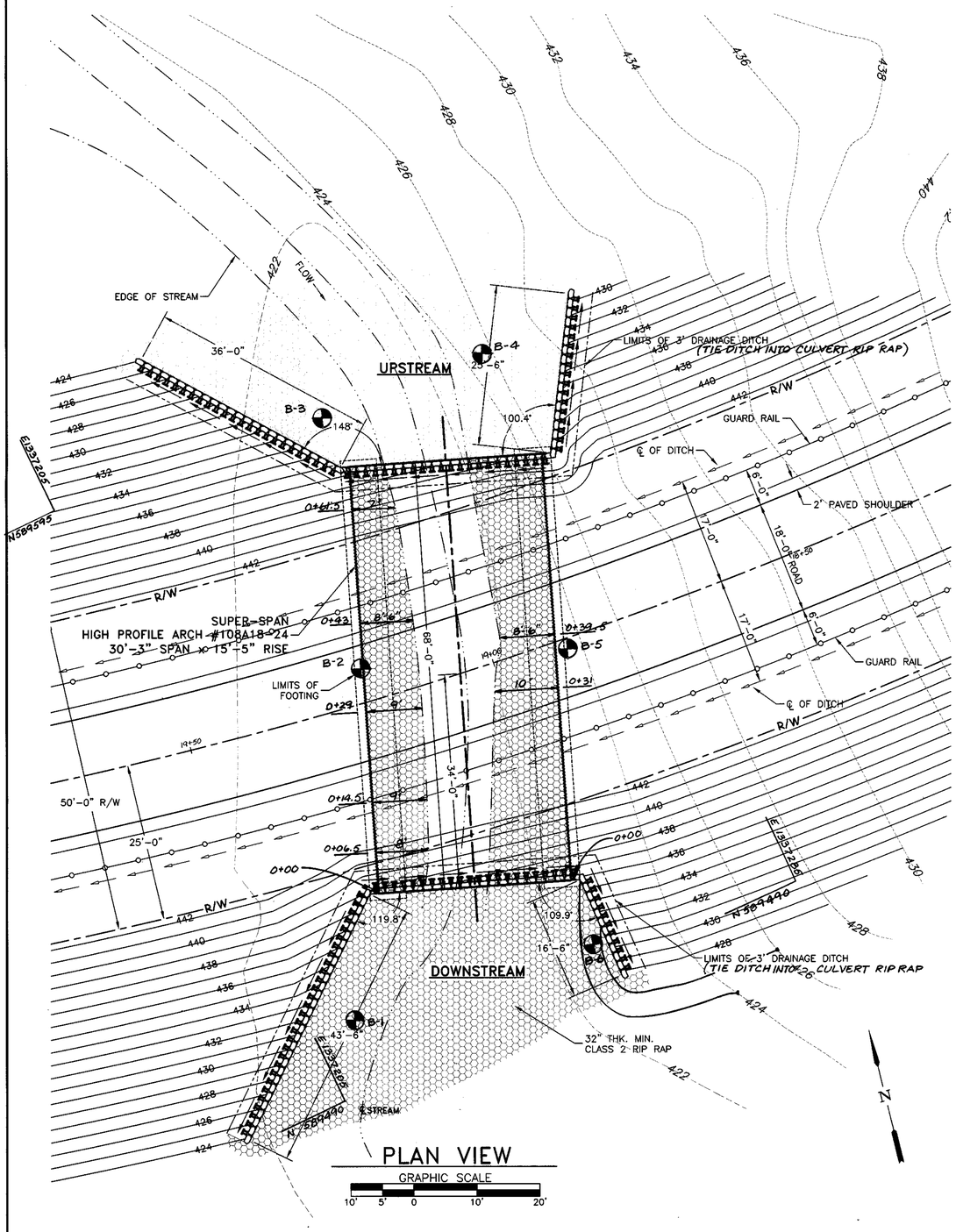
REVISIONS

STATE OF MARYLAND REGISTERED PROFESSIONAL ENGINEER

LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED		SCALE
EDS	REVISED Landscape & Street Tree Planting Plan - Details & Notes BRANTWOOD Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcel 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-73	As Shown
DRAWN JLM KBW		DRAWING 17 of 22
CHECKED BDB		JOB NO. 98-040.6
DATE 7/2001	DEVELOPER BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO. F01-78

F:\Land Projects R2\BRANTWOOD\dwg\Section 33\section33.dwg LAND & STREET TTP DETAILS & NOTES

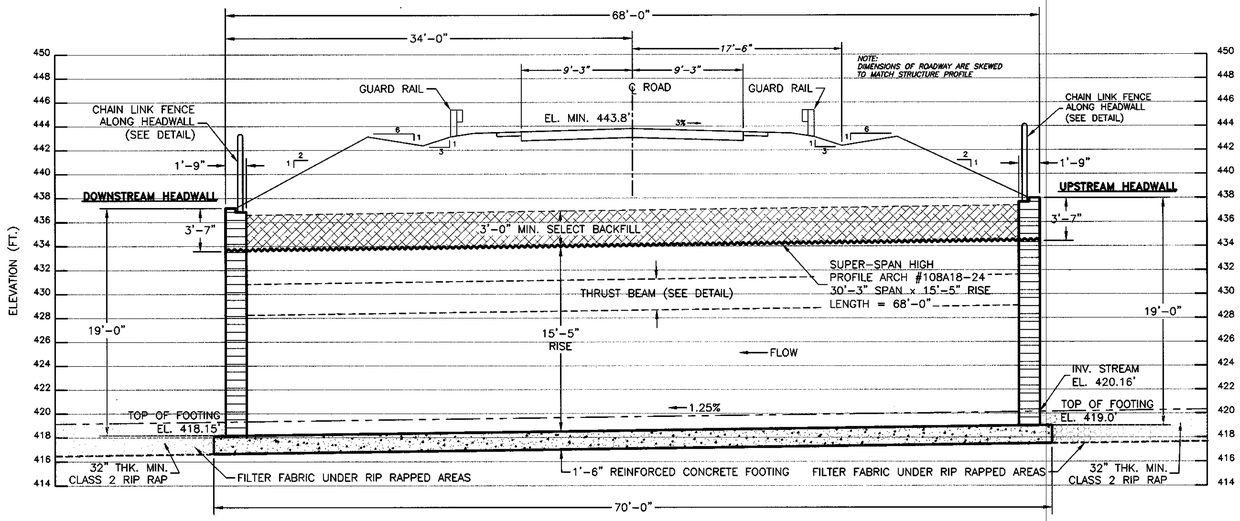


PLAN VIEW

GRAPHIC SCALE
10' 5' 0 10' 20'

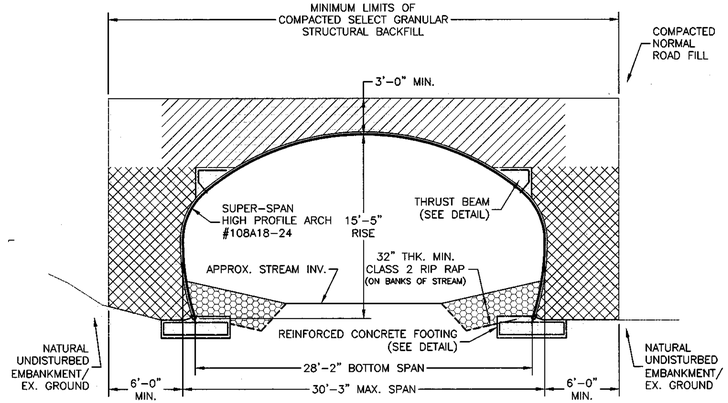
LEGEND

● SOIL BORING



PROFILE THRU ℄ OF STRUCTURE

GRAPHIC SCALE
6' 3' 0 6' 12'



TYPICAL MINIMUM BACKFILL REQUIREMENTS

GRAPHIC SCALE
6' 3' 0 6' 12'

LEGEND:

▨ – CRITICAL BACKFILL ZONE, PRESSURE ON SOIL GREATEST HERE.

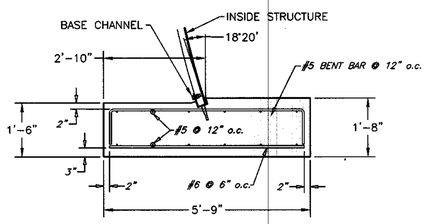
▨ – INITIAL LIFTS OVER CROWN OF STRUCTURE AS INDICATED BY SHADED AREA TO BE COMPACTED TO REQUIRED DENSITY WITH HAND OPERATED EQUIPMENT OR WITH SMALL TRACTOR (D-4 OR SMALLER) DRAWN EQUIPMENT.

NOTES FOR BACKFILL REQUIREMENTS:

1.) ALL SELECT GRANULAR FILL TO BE COMPACTED TO 90% PER AASHTO T-180.
2.) COMPLETE AND REGULAR MONITORING OF THE SUPER-SPAN SHAPE IS NECESSARY DURING ALL BACKFILLING OF THE STRUCTURE.
3.) DO NOT OPERATE HEAVY OR MEDIUM COMPACTORS ON BACKFILL (USE WALK BEHIND EQUIPMENT) CLOSER THAN 2 FEET FROM THE SIDE PLATES.
4.) PREVENT EXCESSIVE DISTORTION OF SHAPE AS NECESSARY BY VARYING COMPACTION METHODS AND EQUIPMENT.

RIP RAP GRADATION

Stone Size (in)	% Smaller by Size	Stone Weight (lbs)
24	100	500
16	50	200
5	10	5



DETAIL OF FOOTING

GRAPHIC SCALE
2' 1' 0 2' 4'

NOTES:
1.) CONCRETE SHALL BE f'c = 3,500 psi.
2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60

06/13/01	DWR	REVISION 2 COMMENTS
04/23/01	DJH	REVISION 1 COMMENTS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF: DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF: DEVELOPMENT OF LAND DEVELOPMENT — DATE 9/6/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

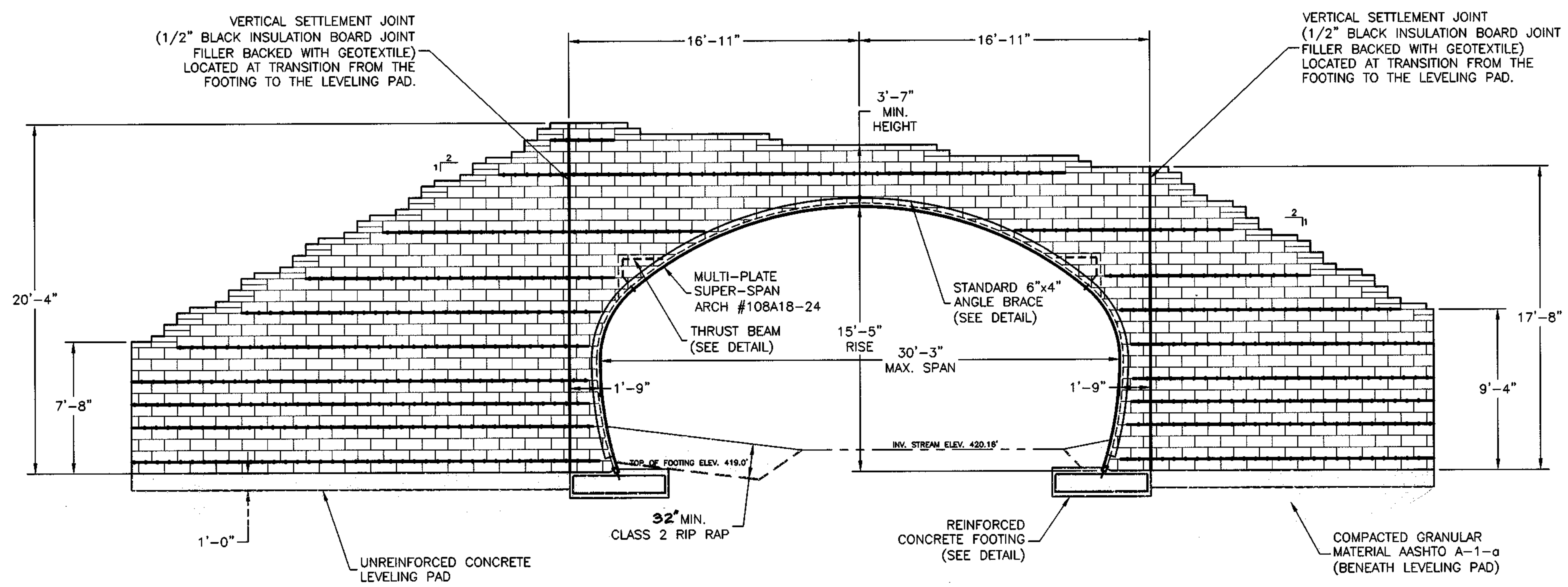
CHIEF: BUREAU OF HIGHWAYS — DATE 8/16/01

CBC ENGINEERS
DAYTON, OHIO

PLAN & PROFILE

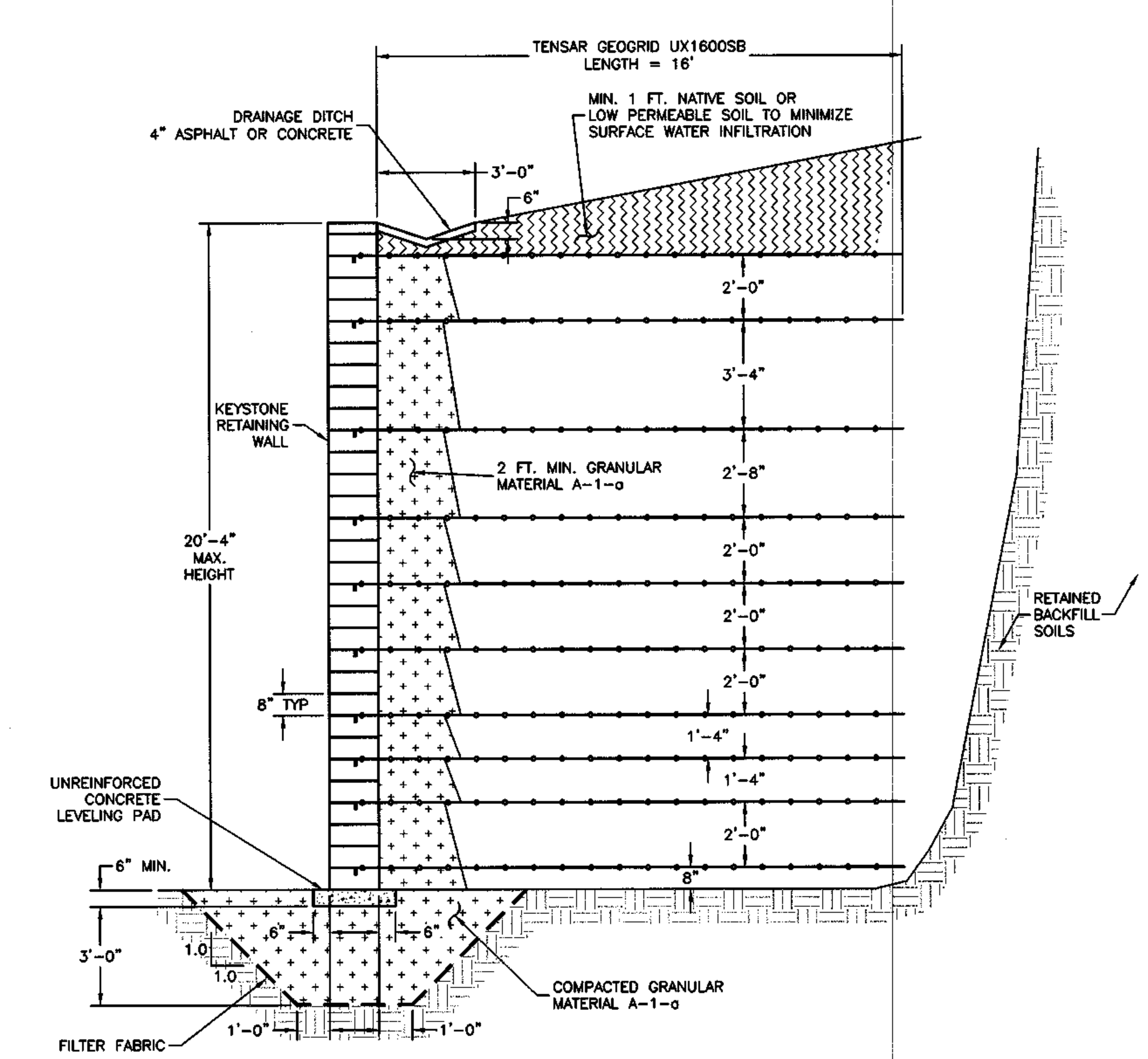
Drawn By	Date	CONTECH CONSTRUCTION PRODUCTS, INC. DESIGN OF SUPER SPAN CULVERT- BRANTWOOD SECTION 3 HOWARD COUNTY, MARYLAND		
DWR	02/07/01			
Approved By	Date			
Scale		Project No.	Rev.	Sheet
GRAPHIC		CBC-2931	2	18 OF 22

F-01-78



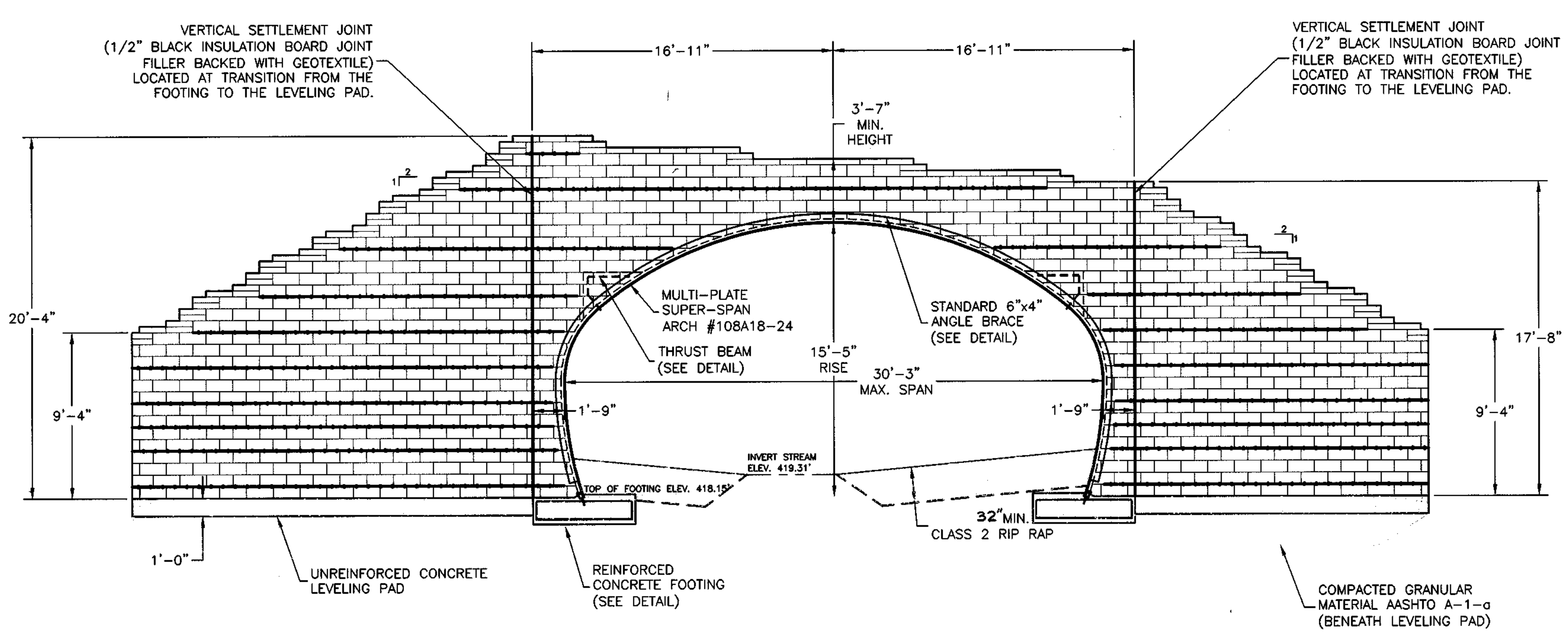
UPSTREAM ELEVATION VIEW (WINGWALL ROTATED FOR CLARITY)

GRAPHIC SCALE
5' 2.5' 0 5' 10'



TYPICAL SECTION OF KEYSTONE
RETAINING WALL @ MAX. HEIGHT

GRAPHIC SCALE
4' 2' 0 4' 8'



DOWNSTREAM ELEVATION VIEW (WINGWALL ROTATED FOR CLARITY)

GRAPHIC SCALE
5' 2.5' 0 5' 10'

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 8/24/01 DATE

CHIEF, DEVELOPMENT OF LAND DEVELOPMENT — 7/6/01 DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — 8/13/01 DATE

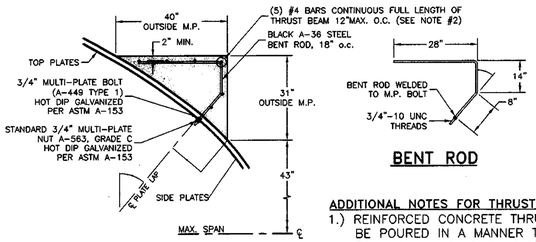
04/23/01	DJH	REVISION 1 COMMENTS

CBC ENGINEERS
DAYTON, OHIO

HEADWALLS & WINGWALLS

Drawn By: DWR	Date: 02/07/01	CONTECH CONSTRUCTION PRODUCTS, INC. DESIGN OF SUPER SPAN CULVERT- BRANTWOOD SECTION 3 HOWARD COUNTY, MARYLAND
Approved By:	Date:	
Scale: GRAPHIC	Project No.: CBC-2931	Rev.: 1 — Sheet: 19 OF 22

F-01-78



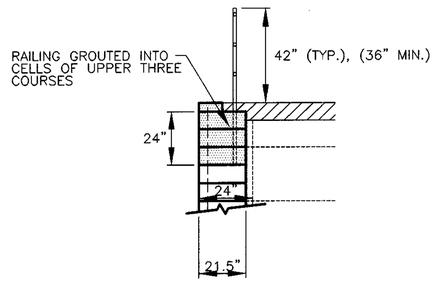
DETAIL OF THRUST BEAM

NOT TO SCALE

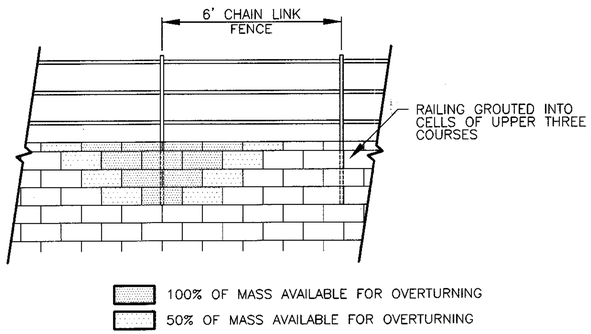
BENT ROD

ADDITIONAL NOTES FOR THRUST BEAM:

1.) REINFORCED CONCRETE THRUST BEAMS TO BE POURED IN A MANNER TO MAINTAIN A BALANCED LOADING ON EACH SIDE OF THE STRUCTURE.
2.) LONGITUDINAL REINFORCING BARS MAY BE PLACED ON EITHER SIDE OF BENT ROD.
3.) CONCRETE MAY BE f'_c = 2,400 psi.
4.) REINFORCEMENT SHALL BE ASTM A-615 GRADE 40.



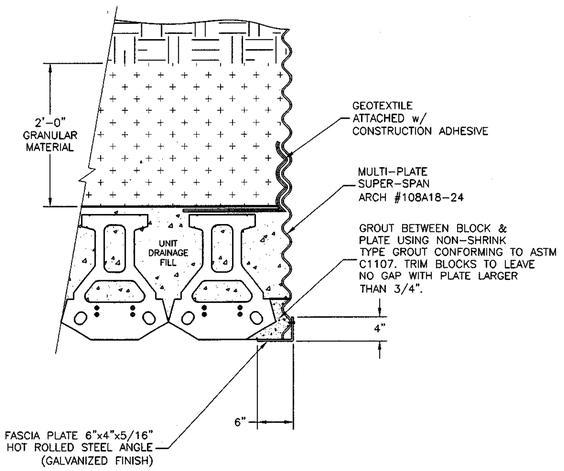
STANDARD TYPICAL RAILING DESIGN SECTION



TYPICAL RAILING ELEVATION

TYPICAL RAILING DESIGN

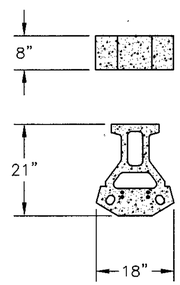
DIRECT MOUNT – 20 PLF – STANDARD UNITS
NO SCALE



DETAIL OF ANGLE BRACING

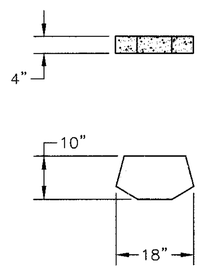
GRAPHIC SCALE

1' .5' 0 1' 2'



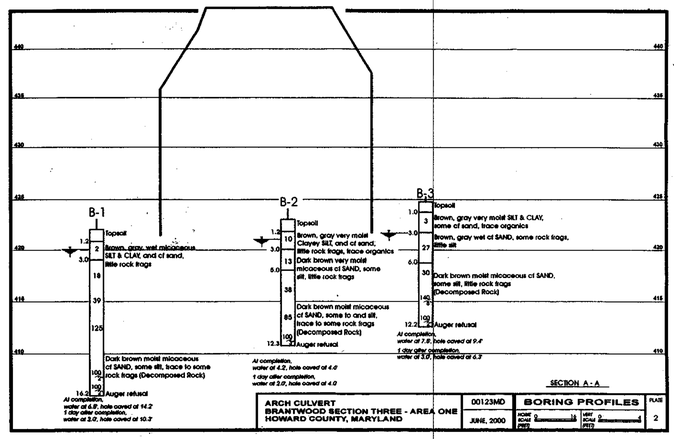
KEYSTONE BLOCK

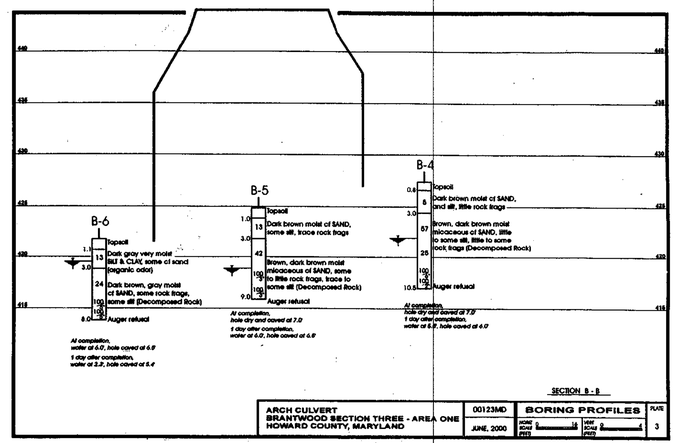
NOT TO SCALE



KEYSTONE CAP

NOT TO SCALE





SOIL BORINGS COMPLETED BY: HERBERT/BENSON & ASSOCIATES - REISTERSTOWN, MARYLAND
PHONE 410-526-7200

NOTES:
1.) CONCRETE SHALL BE f'c = 3,500 psi. EXCEPT FOR THRUST BEAM (SEE THRUST BEAM DETAIL)
2.) ALL REINFORCEMENT SHALL BE ASTM A-615 GRADE 60 EXCEPT FOR THRUST BEAM (SEE THRUST BEAM DETAIL)

04/23/01	DJH	REVISION 1 COMMENTS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF: DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF: DEVELOPMENT OF LAND DEVELOPMENT — DATE 7/6/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF: BUREAU OF HIGHWAYS — DATE 8/14/01

CBC ENGINEERS
DAYTON, OHIO

DETAILS

Drawn By	Date	CONTECH CONSTRUCTION PRODUCTS, INC. DESIGN OF SUPER SPAN CULVERT- BRANTWOOD SECTION 3 HOWARD COUNTY, MARYLAND		
DWR	02/07/01			
Approved By	Date			
Scale		Project No.	Rev.	Sheet
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F-01-78

I - GENERAL

1.0 STANDARDS AND DEFINITIONS

1.1 STANDARDS - All standards refer to latest edition unless otherwise noted.

1.1.1 ASTM D-698-70 (Method C) "Standard Test Methods for Moisture. Density Relations of Soils and Soil Aggregate Mixtures Using 5.5-lb (2.5 kg.) Rammer and 12" (305-mm) Drop".

1.1.2 ASTM D-1557 "Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 [2,700 kN · m/m^3]).

1.1.3 ASTM D-2922 "Standard Test Method for Density of Soil and Scil Aggregate in Place by Nuclear Methods (Shallow Depth)".

1.1.4 ASTM D-1556 "Standard Test Method for Density of Soil in Place by the Sand-Cone Method".

1.1.5 All construction and materials shall be in accordance with the current AASHTO Specifications.

1.2 DEFINITIONS

1.2.1 Owner - In these specifications the word "Owner" shall mean Brantwood, LLC.

1.2.2 Engineer - In these specifications the word "Engineer" shall mean the Owner designated engineer.

1.2.3 Design Engineer - In these specifications the words "Design Engineer" shall mean CBC Engineers and Associates, Ltd.

1.2.4 Contractor - In these specifications the word "Contractor" shall mean the firm or corporation undertaking the execution of any work under the terms of these specifications.

1.2.5 Approved - In these specifications the word "approved" shall refer to the approval of the Engineer or his designated representative.

1.2.6 As Directed - In these specifications the words "as directed" shall refer to the directions to the Contractor from the Owner or his designated representative.

2.0 GENERAL CONDITIONS

2.1 The Contractor shall furnish all labor, material and equipment and perform all work and services except those set out and furnished by the Owner, necessary to complete in a satisfactory manner the site preparation, excavation, footings, culvert installation, head walls, wing walls, filling, compaction, and grading as shown on the plans and as described therein.

This work is to be accomplished under the observation of the Owner or his designated representative.

2.2 The Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including, without limitation, the character of surface or subsurface conditions and obstacles to be encountered on and around the construction site; and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work.

If conditions other than those indicated are discovered by the Contractor, the Owner should be notified immediately. The material which the Contractor believes to be a changed condition should not be disturbed so that the owner can investigate the condition.

2.3 The construction shall be performed under the direction of an experienced engineer who is familiar with the SUPER-SPAN structures.

2.4 Contech Construction Products, Inc. will provide a shape technician to monitor the shape of the structure during construction of the backfill until all select backfill has been placed.

II - FOUNDATION PREPARATION

1.0 UNDERCUTS

1.1 The Contractor shall undercut the material beneath all footings to firm soil or highly weathered rock, as directed by the geotechnical engineer.

1.2 The excavation shall extend to at least 2 feet outside the edge of the footings.

1.3 The excavation for removal of the soft alluvium shall be refilled with either A1a granular soil compacted to 95% of the maximum modified Proctor dry unit weight or lean concrete (1000 psi).

1.4 There may be a need to dewater before excavating.

III - SELECT BACKFILL SPECIFICATIONS

1.0 GENERAL CONDITIONS

1.1 The contractor shall furnish all labor, materials, and equipment, and perform all work and services necessary to complete in a satisfactory manner the site preparation, excavation, filling, compaction and grading as shown on the plans and as described therein.

1.2 This work shall consist of all clearing and grading, removal of existing structures unless otherwise stated, preparation of the land to be filled, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades, slopes, and specifications.

1.3 This work is to be accomplished under the constant and continuous supervision of the Owner or his designated representative.

2.0 SUBSURFACE CONDITIONS

2.1 The Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including, without limitation, the character of surface or subsurface conditions and obstacles to be encountered on and around the construction site; and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work.

2.2 If conditions other than those indicated are discovered by the Contractor, the Owner should be notified immediately. The material which the Contractor believes to be a changed condition should not be disturbed so that the Owner can investigate the condition.

3.0 SITE PREPARATION

3.1 Within the specified areas, all debris, existing stockpile material, and structures scheduled for demolition shall be removed and disposed of.

3.2 Any rubbish, organic and other objectionable soils, and other deleterious material, shall be disposed of off the site, or as directed by the Owner or his designated representative if on site disposal is provided. In no case shall such objectionable material be allowed in, or under the fill.

3.3 Prior to the addition of fill, the undercuts specified in Section II shall be made and the original ground shall be compacted to the project specifications as outlined below. Special attention shall be given to the proposed fill area at this time. If wet spots, spongy conditions, or ground water seepage is found, corrective measures must be taken before the placement of fill.

4.0 FORMATION OF FILL AREAS

4.1 SELECT BACKFILL

4.1.1 Select backfill shall be placed to a minimum distance of 6 feet horizontally, as measured from the springline of the structure, and to a distance of 3 feet above the crown of the structure as shown on the construction drawings.

5.0 MINIMUM BACKFILL REQUIREMENTS FOR SUPER-SPAN AND LONG SPAN STRUCTURES

5.1 MATERIAL

A granular type of material shall be used around and over the structure. This select structural backfill material shall conform to AASHTO Specification M-145, A-1, A2(4), or A2(5). Maximum particle size shall not exceed 3 inches. The gradation must conform to the following table:

TABLE III-1
BACKFILL REQUIREMENTS

AASHTO M-145 - TABLE 2 (MODIFIED)*				
GROUP CLASSIFICATION	A-1		A-2 (Modified)	
	A-1-a	A-1-b	A-2-4	A-2-5
Sieve Analysis, Percent Passing				
No. 10 (2.00 mm)	50 max.	--	--	--
No. 40 (0.425 mm)	30 max.	50 max.	--	--
No. 100 (.150 mm)	--	--	50 max.	50 max.
No. 200 (0.075 mm)	15 max.	25 max.	20 max.	20 max.
CHARACTERISTICS OF FRACTION PASSING NO. 40 (0.425 mm)				
Liquid Limit	--	--	40 max.	41 min.
Plasticity Index	6 max.		10 max.	10 max.
USUAL TYPES OF SIGNIFICANT CONSTITUENT MATERIALS	Stone Fragments, Gravel and Sand		Silty or Clayey Gravel and Sand	

*Modified to be more select than M-145.

Additional Backfill Material Requirements:
1. Backfill must be well-graded material. Open-graded or gap-graded materials are not allowed.
2. Fine beach sands, windblown sands, stream deposited sands exhibiting fine, rounded particles and typically classified by AASHTO M-145 as A-3 materials are not allowed.
3. On-site mixing or blending to achieve specified gradation is not allowed.
4. The maximum particle size shall not exceed 3 inches.

Other backfill materials which provide equivalent long term structural properties in the environmental conditions expected (saturation, freeze-thaw, etc.) may be used. Such materials shall be approved only after thorough investigation and testing by a soils engineer familiar with the requirements for structural backfill of MULTI-PLATE and long span structures and approval by the Chief Engineer, Contech.

5.2 BACKFILL LIMITS

The required width of the structural backfill shall be 6 feet minimum outside the springline and to 3 feet over the top of the structure.

5.3 BACKFILL PLACEMENT

Before backfilling, the erected structure shall meet the tolerance and symmetry requirements of AASHTO and Contech.

Approved backfill material shall be placed in horizontal, uniform layers not exceeding 8" in thickness, before compaction, and shall be brought up uniformly on both sides of the structure. Each layer of backfill shall be compacted to a relative density of not less than 90%, modified Proctor per AASHTO Test Method No. T-180. Field density tests of compacted backfill shall be made at regular intervals during backfill.

SUPER-SPAN and long span structures, due to their size and shape, are sensitive to the types and weights of equipment used to place and compact the select backfill material. This is especially critical in the areas immediately adjacent to and above the structure. Therefore, equipment types will be restricted in those critical zones. Compaction equipment or methods that produce horizontal or vertical earth pressures which cause excessive distortion or damage to these structures shall not be used.

Contractors should plan to have a D4 (approximately 20,000 lbs.) or similar weight tracked dozer to place and grade backfill immediately alongside and above the structure until minimum cover level is reached. Lightweight vibratory plate or roller type compaction equipment must be used to compact the backfill in these zones. Use of heavier equipment and/or rubber tired equipment such as scrapers, graders and front end loaders are prohibited inside the select fill envelope zone until appropriate minimum cover height has been obtained.

5.5 CONSTRUCTION OBSERVATION

Contech shall provide a Shape Control Technician who is a qualified representative of a professional soils engineering firm, or other qualified organization, to monitor the installation and backfilling of the structure. The Shape Control Technician shall monitor the structure shape during the placement of structural backfill to the minimum cover height over the structure. The Shape Control Technician shall take initial measurements of the erected structure before backfilling, monitor all backfill materials, their placement and their compaction. He shall record all density readings and ensure they meet the requirements of the plans and specifications. However, in no case shall the relative densities be less than 90% per AASHTO T-180. **No structural backfill shall be placed without the Contech Shape Control Technician on site. A competent geotechnical engineer registered in the state of Maryland shall be present on-site for the placement of any fill material.**

5.5 Cont'd The Contech Shape Control Technician shall;

- monitor the structure's shape throughout the backfilling operation and report shape change rates to the contractor.
- contact the Contech Regional Engineer immediately if there are problems in meeting the established tolerances.
- have full authority to stop backfill work if necessary.

It is the Project Engineer's responsibility to insure that the requirements of AASHTO and Contech have been met relative to the installation and backfilling of the structure. The Project Engineer shall also provide field density tests of the compacted backfill as directed by the Contech Shape Control Technician.

The Contech Shape Control Technician is not directly responsible for additional project control matters. However, the Shape Control inspector is expected to make observations and notify the Engineer of Record, Contractor, Project Engineer and Contech Region Engineer of any apparent problems or site condition charges which, in his judgment, may affect the quality or performance of the finished installation. Such conditions may include, but are not limited to:

- Observed soft or weak spots in the foundation, trench wall, embankment, or area within the controlled backfill zone.
- Apparent improper or changing backfill material quality. Specific details of the backfill material approved for the job will be provided by the Contech Region Engineer. Any changes in the backfill requirements must be approved in writing by the Contech Region Engineer.
- Use of improper compaction methods and/or lift thicknesses.
- Structural backfill limits that are less than those required by the plans and specifications.
- Adverse reaction of the SUPER-SPAN or long span to backfill placement or compaction methods.
- All items discussed and outlined in the Installation and Inspection Practices included in the Inspection Plan.

6.0 SLOPE RATIO AND STORM WATER RUN-OFF

Protected slopes shall not be greater than 2.0 (horizontal) to one (1) (vertical) in both cut and fill, and storm water shall not be drained over the slopes.

7.0 GRADING

The Contractor shall furnish, operate, and maintain such equipment as is necessary to construct uniform layers, and control smoothness of grade for maximum compaction and drainage.

8.0 COMPACTING

8.1 The compaction equipment shall be approved equipment of such design, weight, and quantity to obtain the required density in accordance with these specifications, without distorting the structure.

8.2 During backfill, only small tracked vehicles (D-4 or smaller) shall be near the structure as fill progresses above the crown and to finished grade. The contractor is cautioned that the minimum cover may need to be increased to handle temporary construction vehicle loads (larger than a D-4).

9.0 TOP LOADING

9.1 If the structure rises, and chord dimensions have become distorted by more than ±2% of plan, top loading or bracing may be necessary.

9.2 The structure can carry legal highway loads once the backfill is placed and compacted to a minimum cover of 3 feet. For heavier construction loads in the unpaved conditions the Contractor shall consult the Engineer.

10.0 TESTING AND INSPECTION SERVICES

10.1 Testing and inspection services will be provided by the Owner. No structural backfill shall be placed without the Contech Shape Control Technician on site.

10.2 Regular inspection during erection and backfilling is required to achieve a structure with proper shape and backfill compacted to the specified density. The structure's shape shall be monitored at all times during installation, and soil materials and compaction methods must be verified by testing.

11.0 SPECIFICS OF SHAPE MONITORING

11.1 The shape of the structure shall be monitored during construction.

11.2 Monitoring points other than the shape control hooks shall be identified with permanent paint. These points shall be monitored periodically throughout the placement of the backfill to determine if the shape of the structure has changed and to determine the rate of change. Typically the rise and chord dimensions should be maintained to less than ±2% of design values.

11.3 A set of measurements shall be made for each 12 to 16 inches of fill placed or one time each day, whichever is greater. The structure measurements should continue throughout the backfilling operation until all of the select material has been placed and compacted. After placement of soil over the select fill and completion of the final grade and roadway surfacing, the structure's shape should be documented by preparing an as-built shape of the structure.

11.4 Additional measurements shall be made to provide a record of the shape of the structure for comparison during future inspections. Corrugated metal structures can deflect and distort during erection and backfilling and also under subsequent loading. Although these distortions are not generally serious, the initial shape of the structure shall be documented for comparison with future inspections.

IV – MODULAR BLOCK WALLS

1.0 GENERAL

1.1 DESCRIPTION

1.1.1 Work includes furnishing and installing modular block retaining wall units to the lines and grades shown on the construction drawings and as specified herein. The keystone blocks color and texture shall match other walls being constructed on site.

1.1.2 Work includes preparing foundation, furnishing and installing leveling pad, unit fill and backfill to the lines and grades shown on the construction drawings.

1.1.3 Work includes furnishing and installing all related materials required for construction of the retaining wall as shown on the construction drawings.

1.2 RELATED WORK

1.2.1 Section V – Geogrid soil reinforcement.

1.3 REFERENCE STANDARDS

1.3.1 ASTM C90 – Hollow load bearing masonry units.

1.3.2 ASTM C140 – Sampling and testing concrete masonry units.

1.3.3 ASTM C145 – Solid load bearing concrete masonry units.

1.3.4 UN-STD 1804.

1.3.5 ASTM 2339.

1.3.6 FHA UM-60.

1.4 DELIVERY, STORAGE AND HANDLING

1.4.1 Contractor shall check the materials upon delivery to assure that proper materials have been received.

1.4.2 Contractor shall prevent excessive mud, wet cement, epoxy and similar materials (which may affix themselves) from coming in contact with the materials.

1.4.3 Contractor shall protect the materials from damage. Damaged material shall not be incorporated into the retaining wall structure.

1.5 SUBMITTALS

1.5.1 Samples of all products used in the work of this section.

1.5.2 Latest edition of manufacturer's specifications for proposed materials, method of installation and list of material proposed for use.

1.6 QUALITY ASSURANCE

1.6.1 Owner will supply soil testing and inspection service for quality control testing during earth work operations.

2.0 PRODUCTS

2.1 CONCRETE UNITS

2.1.1 Masonry units shall be KEYSTONE Retaining Wall Standard Units manufactured in accordance with ASTM C-90 and ASTM C-140.

2.1.2 Exterior dimensions may vary in accordance with ASTM C90. Standard units shall have a minimum of 1 sq. ft. face area each.

2.1.3 KEYSTONE Standard units shall provide a minimum of 150 psf of wall face area. Fill which is contained within the dimensions of the units may be considered as 80% effective weight.

2.1.4 Units shall have angled sides capable of concave and convex alignment curves with a minimum radius of 3.5 feet (Where applicable, for straight walls, use non-angled straight side cap units).

2.1.5 Units shall be interlocked with non-corrosive fiberglass pins.

2.1.6 Units shall be interlocked and provide either a vertical setback

2.2 FIBERGLASS CONNECTING PINS

2.2.1 Connecting pins shall be ½" diameter thermoset isophalic polyester resin-pultruded fiberglass reinforcement rods.

2.2.2 Pins shall have a minimum flexural strength of 128,000 psi and shoot beam shear of 64,000 psi.

PROFESSIONAL ENGINEER 22775 DONALD J. HUTCHISON STATE OF MARYLAND

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF: DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF: DEVELOPMENT OF LAND DEVELOPMENT — DATE 7/6/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF: BUREAU OF HIGHWAYS — DATE 8/15/01

06/13/01	DWR	REVISION 2 COMMENTS
04/23/01	DJH	REVISION 1 COMMENTS

CBC ENGINEERS
DAYTON, OHIO

SPECIFICATIONS

Drawn By	Date	CONTECH CONSTRUCTION PRODUCTS, INC.
DWR	02/07/01	DESIGN OF SUPER SPAN CULVERT-
Approved By	Date	BRANTWOOD SECTION 3
		HOWARD COUNTY, MARYLAND

Scale	Project No.	Rev.	Sheet
GRAPHIC	CBC-2931	2	21 OF 22

F-01-78

2.3 KEYSTONE KAPSEAL CONSTRUCTION ADHESIVE

2.3.1 Material conforms to UN-STD 1804, ASTM 2339-70 and FHA UM-60.

2.4 BASE LEVELING PAD MATERIAL

2.4.1 Material shall consist of unreinforced concrete as shown on the construction drawing.

2.5 UNIT FILL

2.5.1 Fill for units shall be free draining crushed stone or coarse gravel. 3/8" to ¾" with (no more than 5% passing the No. 200 sieve). Gradation of the fill shall be approved by the engineer.

2.5.2 Place recommended fill behind the retaining wall units. Peagravel shall not be used.

2.6 BACKFILL

2.6.1 Material shall be site excavated soils when approved by the engineer unless otherwise specified in the drawings. Unsuitable soils for backfill (heavy clays or organic soils) shall not be used in the backfill or in the reinforced soil mass.

2.6.2 Where borrow fill is required, contractor shall submit sample and specifications to the engineer for approval.

3.0 EXECUTION

3.1 EXCAVATION

3.1.1 Contract shall excavate to the lines and grades shown on the construction drawings. Contractor shall be careful not to disturb embankment materials beyond lines shown.

3.2 FOUNDATION SOIL PREPARATION

3.2.1 Foundation soil shall be excavated as required for leveling pad dimensions shown on the construction drawings, or as directed by the engineer.

3.2.2 Foundation soil shall be approved by the engineer to confirm that the actual foundation soil conditions meet or exceed the design strength. Soils not meeting required strength shall be removed and replaced with acceptable material.

3.2.3 Over-excavated areas shall be filled with approved compacted backfill material.

3.3 BASE LEVELING PAD

3.3.1 Leveling pad materials shall be placed as shown on the construction drawings.

3.3.2 Material shall be compacted so as to provide a level surface on which to place the first course of units. Compaction shall be to 95% of modified Proctor for sand or gravel type materials. For crushed rock, material shall be densely compacted.

3.3.3 Leveling pad shall be prepared to ensure complete contact of retaining wall unit with base.

3.3.4 Leveling pad materials shall be to the depth and widths shown. Concrete shall be unreinforced and a maximum of 6" thick.

3.4 UNIT INSTALLATION

3.4.1 Place first course of concrete wall units on the base leveling pad. The units shall be checked for level and alignment.

3.4.2 Ensure that units are in full contact with base.

3.4.3 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.

3.4.4 Install fiberglass connecting pins and fill all voids at units with unit fill material. Tamp fill.

3.4.5 Sweep all excess material from top of units and install next course. Ensure each course is completely unit filled, backfilled and compacted prior to proceeding to next course.

3.4.6 Lay up each course ensuring that pins protrude into adjoining courses above a minimum of 1". Two pins required per unit. Pull each unit forward, away from the embankment, against pins in the previous course, and backfill as the course is completed. Repeat procedure to the extent of wall height.

3.4.7 As appropriate where the wall changes elevation, units can be stepped with grade or turned into the embankment with a convex return end. Provide appropriate buried units on compacted leveling pad in area of convex return end.

3.5 CAP INSTALLATION

3.5.1 Place KEYSTONE Cap units over projecting pins from units below. Pull forward to setback position. Backfill and compact to finished grade.

3.5.2 As required, provide permanent mechanical connection to wall units with KEYSTONE KapSeal construction adhesive. Apply adhesive to top surface of unit below, and place cap unit into position.

3.6 GEOGRID INSTALLATION

3.6.1 Follow the requirements of Section V, Geogrid Soil Reinforcement.

V - GEOGRID SPECIFICATIONS

1.0 GENERAL

1.1 Geogrid meeting the requirements of this specification shall be placed at the locations shown on the construction drawings.

1.2 The geogrid shall extend to the lengths shown on the construction drawings.

1.3 The geogrid shall be secured to the modular block as recommended by the manufacturer.

2.0 DELIVERY, STORAGE AND HANDLING

2.1 The contractor shall check the geogrid upon delivery to assure that the proper material has been received.

2.2 Geogrids shall be stored above -20°F (-29°C) and be shaded from prolonged periods of direct exposure to sunlight.

2.3 The contractor shall prevent excessive mud, wet cement, epoxy, and like materials, which may affix themselves to the gridwork, from coming in contact with the geogrid material.

2.4 Rolled geogrid material may be laid flat or stood on end for storage.

3.0 DEFINITIONS

3.1 Geogrid: A polymer grid structure specifically fabricated for use as soil reinforcement.

3.2 Uniaxial Grid: A geogrid which has been manufactured with high junction strength and a high tensile strength and modulus in one direction only.

3.3 Direction of Reinforcement: Refers to the orientation that the geogrid is used in for a particular project; along the roll for uniaxial geogrid and either along or across the roll for biaxial geogrid.

3.4 MD: Machine direction.

3.5 CMD: Cross machine direction.

4.0 MATERIALS

4.1 The geogrid reinforcement shall:
- Be uniaxially oriented polymer grid structure.
- Be composed of high density polyethylene.

4.2 The manufacturer shall furnish test reports certifying that the product meets the requirements of this Specification upon request.

4.3 The geogrid shall be a regular grid structure formed by uniaxially drawing a continuous sheet of select high density polyethylene material and shall have aperture geometry and rib and juncture cross-sections sufficient to permit significant mechanical interlock with the material being reinforced. The geogrid shall have high flexural rigidity and high tensile modulus in relation to the material being reinforced and shall also have high continuity of tensile strength through all ribs and junctions of the grid structure. The geogrid shall have high resistance to deformation under sustained long term design load while in service and shall also be resistant to ultraviolet degradation, to damage under normal construction practices and to all forms of biological or chemical degradation normally encountered in the material being reinforced.

The geogrid shall also conform in all respects to the property requirements of TENSAR UX1600SB or equivalent listed below.

PROPERTY	TEST METHOD	UNITS	VALUE
INTERLOCK			
• Apertures[1]	I.D. Calipered[2]		
- MD		in	5.40 (nom)
- CMD		in	0.66 (nom)
• Open Area	COE Method[3]	%	60 (nom)
• Thickness	ASTMD1777-64		
- Ribs		in	0.070 (nom)
- Junctions		in	0.230 (nom)
REINFORCEMENT			
• Creep Limited Strength[8]	GRI GG3-87[4]	lb/ft	3,000 (min)
• Flexural Rigidity	ASTM D1388-64[5]	MG-CM	6,600,000 (min)
• Tensile Modulus – MD	GRI GG1-87[6]	lb/ft	130,000 (min)
• Junctions	GRI GG2-87[7]		
- Strength		lb/ft	7,000 (min)
- Efficiency		%	90 (min)
MATERIAL			
• High Density Polyethylene	ASTM D 1248	%	97.0 (min)
	Type III/Class A/Grade 5		
• Carbon	ASTM 4218	%	2.0 (min)
DIMENSIONS			
• Roll Length		ft	98
• Roll Width		ft	4.3

NOTES:

1. MD dimensions is along roll length. CMD dimension is across roll width.
2. Maximum inside dimension in each principal direction measured by calipers.
3. Percent open area measured without magnification by Corps of Engineers method as specified in CW 02215 Civil Works Construction Guide, November 1977.
4. Long term load capacity measured by through the junction tensile creep testing to 10,000 hours as described in Geosynthetic Research Institute test method GG3+87 "Creep Behavior and Long Term Design Load of Geogrids".
5. ASTM D 1388-64 modified to account for wide specimen testing as described in Tensar test method TTM-5.0 "Stiffness of Geosynthetics".
6. Secant modulus at 2% elongation measured by Geosynthetic Research institute test method GG1-87 "Geogrid Tensile Strength". No offset allowances are made in calculating secant modulus.
7. Geogrid junction strength and junction efficiency measured by Geosynthetic Research Institute test method GG2-87 "Geogrid Junction Strength".
8. The long-term allowable design strength (LTADS) is determined using the method outlined in GRI-GG4 "Determination of the Long Term Design Strength to Stiff Geogrids". The GRI-GG4 method applies various partial factors of safety to account for construction damage, junction strength, connections, chemical and biological degradation.

5.0 GEOGRID INSTALLATION

5.1 Geogrid shall be laid at the proper elevation and orientation (i.e., the machine direction shall be perpendicular to the pipe structure axis) as shown on the construction drawings.

5.2 Correct orientation (roll direction) of the geogrid shall be verified by the Contractor. The correct roll direction shall be perpendicular to the structure axis.

5.3 Geogrid may 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.

5.4 Geogrid Placement:

- Geogrids should be laid horizontally on compacted fill and pulled taut from their connection to the concrete units before wall fill is placed over them. Care must be taken to prevent slack from becoming trapped within the geogrid as fill is placed.

6.0 BACKFILL PLACEMENT OVER GEOGRID

6.1 Backfill material shall be placed in lifts and compacted as directed in the text of this document.

6.2 Backfill shall be placed, spread, and compacted in such a manner that minimizes the development of wrinkles in and/or movement of the geogrid.

6.3 Tracked construction equipment shall not be operated directly upon the geogrid. A minimum fill thickness of six (6) inches (150mm) is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

6.4 Rubber tired equipment may pass over geogrid reinforcement at slow speeds, less than 10 MPH (16 KPH). Sudden braking and sharp turning shall be avoided.

VI - CONCRETE

1.0 CODES AND STANDARDS

1.1 Reinforced concrete shall conform to the requirements of AASHTO Standard Specifications for Highway Bridges, Division II - Construction, Section 8, "Concrete Structures" having a minimum compressive strength of 3,000 psi except for a minimum of 2400 psi for thrust beams.

2.0 STANDARDS FOR MATERIALS

2.1 Portland Cement - Conforming to ASTM Specification C-150, Type I or II.

2.2 Water - The water shall be drinkable, clean free from injurious amounts of oils, acids, alkalis, organic materials, or deleterious substances.

2.3 Aggregates - Fine and coarse aggregates shall conform to current ASTM Specification C-33 "Specification for Concrete Aggregates" except that local aggregates which have been shown by tests and by actual service to produce satisfactory qualities may be used when approved by the Engineer.

2.4 Submittals - Test data and/or certifications to the Owner shall be furnished upon request.

3.0 PROPORTIONING OF CONCRETE

3.1 COMPOSITION

3.1.1 The concrete shall be composed of cement, fine aggregate, coarse aggregate and water.

3.1.2 The concrete shall be homogeneous, readily placeable and uniformly workable and shall be proportioned in accordance with ACI-211.1.

3.1.3 Proportions shall be established on the basis of field experience with the materials to be employed. The mount of water used shall not exceed the maximum 0.49 water/cement ratio, and shall be reduced as necessary to produce concrete of the specified consistency at the time of placement.

3.2 Qualities Required - As indicated in the table below:

TABLE VI-1
QUALITIES REQUIRED

ITEM	QUALITY REQUIRED
Class	A
Type of Cement	I or II
Compressive Strength f'c @ 28 days	3000 psi, 2400 psi for Thrust Beams
Slump, inches	2 - 4 in.

3.3 Maximum Size of Coarse Aggregates - Maximum size of coarse aggregates shall not be larger than 38 mm (1 ½ inches).

3.4 Rate of Hardening of Concrete - Concrete mix shall be adjusted to produce the required rate of hardening for varied climatic conditions:

Under 40°F Ambient Temperature - Accelerate calcium chloride at 2% is acceptable when used within the recommendations of ACI-306R "Cold Weather Concreting." Admixtures containing chloride ion in excess of 1% by weight of admixture shall not be used in reinforced concrete.

4.0 MIXING AND PLACING

4.1 Equipment - Ready Mix Concrete shall be used and shall conform to the "Specifications for Ready-Mix Concrete," ASTM C-94. Approval is required prior to using job mixed concrete.

4.2 Preparation - All work shall be in accordance with ACI-304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete." All construction debris and extraneous matter shall be removed from within the forms. Concrete shall be placed on clean surfaces, free from water. Concrete that has to be dropped four (4) feet or more shall be placed through a tremie.

4.3 All concrete shall be consolidated by internal mechanical vibration immediately after placement. Vibrators shall be of a size appropriate for the work, capable of transmitting vibration to concrete at frequencies of not less than 4,500 impulses per minute.

5.0 FORM WORK

5.1 Forms shall be of wood, steel or other approved material and shall be set and held true to the dimensions, lines and grades of the concrete elements prior to and during the placement of concrete.

5.2 Forms shall not be removed until the concrete has sufficient strength to prevent concrete drainage.

6.0 CURING

6.1 Fresh concrete shall be protected from rains, flowing water and mechanical injury for a period of four (4) days.

7.0 REINFORCING STEEL

7.1 MATERIAL

7.1.1 All reinforcing bars shall be deformed bars (ASTM-A615) Grade 60. The reinforcement bars can be Grade 40 for the thrust beams.

7.2 BENDING AND SPLICING

7.2.1 Bar reinforcement shall be cut and bent to the shapes shown on the plans. Fabrication tolerances shall be in accordance with ACI 315. All bars shall be bent cold, unless otherwise permitted.

7.2.2 All reinforcement shall be furnished in the full lengths indicated on the plans unless otherwise permitted. Except for splices shown on the plans and splices for No. 5 or smaller bars, splicing of bars will not be permitted without written approval. Splices shall be staggered as far as possible.

7.2.3 In lapped splices, the bars shall be placed and wired in such a manner as to maintain the minimum distance to the surface of the concrete shown on the plans.

7.2.4 Substitution of different size bars will be permitted only when authorized by the engineer. The substituted bars shall have an area equivalent to the design area, or larger.

7.3 PLACING AND FASTENING

7.3.1 Steel reinforcement shall be accurately placed as shown on the plans and firmly held in position during the placing and setting of concrete. Bars shall be tied at all intersections around the perimeter of each mat and at not less than 2 foot centers or at every intersection, whichever is greater, elsewhere. Welding of cross bars (tack welding) will not be permitted for assembly of reinforcement.

7.3.2 Reinforcing steel shall be supported in its proper position by use of mortar blocks, wire bar supports, supplementary bars or other approved devices. Such devices shall be of such height and placed at sufficiently frequent intervals so as to maintain the distance between the reinforcing and the formed surface or the top surface within 1/4 inch of that indicated on the plans.

VII - FILTER FABRIC

1.1 Filter fabric shall be placed around the granular material placed below the modular block walls, and below the rip rap protection in accordance with MD S.H.A. specifications.

1.2 Filter fabric cloth shall conform to the following ASTM tests:

1.2.1 Equivalent opening size equal to #70 - #100 U.S. Standard Sieve Size.

1.2.2 ASTM D4632 (Grab Tensile Test) - Minimum Strength = 120 pounds.

1.2.3 ASTM D4632 (Grab Elongation) - 30-70%.

1.2.4 ASTM D4533 (Trapezoidal Tear) - Minimum Strength = 55 pounds.

1.2.5 ASTM D4355 (Stabilized for Heat and Ultra-Violet Degradation) - 70% strength retained.

1.3 The minimum fabric coefficient of permeability shall be 1×10^{-2} cm/sec.

1.4 Gradient ratio shall be less than or equal to three.

1.5 Fabric shall not be placed over sharp or angular rocks that could tear or puncture it.

1.6 Care should be exercised to prevent any puncturing or rupture of the filter fabric. Should such rupture occur the damaged area should be covered with a patch of filter fabric using an overlap minimum of one (1) foot.

VIII - RIPRAP GRADATION

1.0 All riprap placed in conjunction with this project shall be Class II armoring and shall possess the following minimum FHWA gradation:

TABLE VIII-1
RECOMMENDED RIPRAP GRADATION

STONE SIZE (INCHES)	% SMALLER BY SIZE	STONE WEIGHT (lbs)
24	100	500
16	50	200
5	10	5

1.1 Riprap shall be placed in the locations shown on the construction drawings.

1.2 The total thickness of riprap shall be not less than 32".

PROFESSIONAL ENGINEER 22779 DAVID CARLTON CONHERD STATE OF MARYLAND

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF: DEVELOPMENT OF LAND DEVELOPMENT — DATE 7/6/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF BUREAU OF HIGHWAYS — DATE 8/16/01

04/23/01	DJH	REVISION 1 COMMENTS

CBC ENGINEERS
DAYTON, OHIO

SPECIFICATIONS cont'd

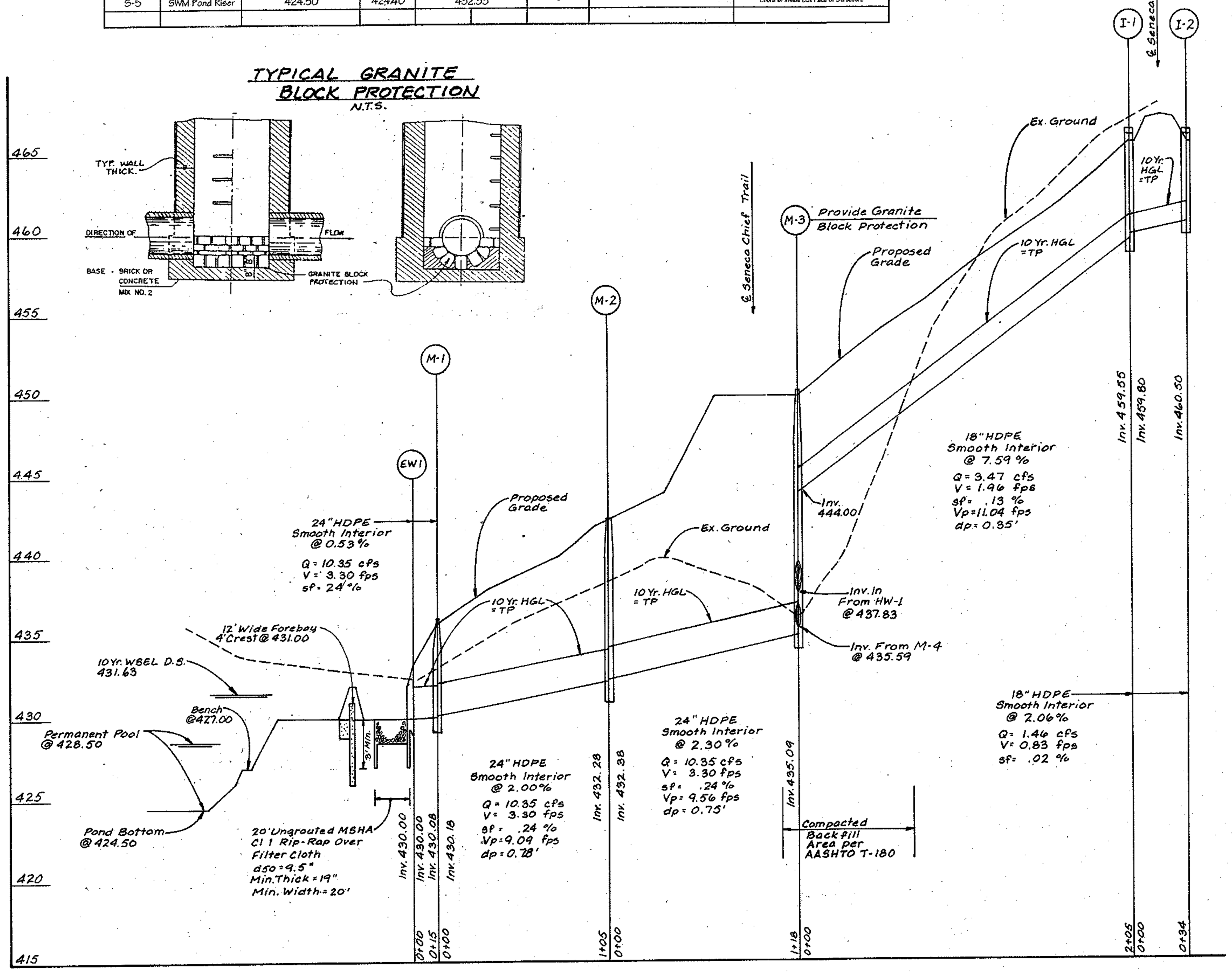
Drawn By	Date	
DWR	02/07/01	CONTECH CONSTRUCTION PRODUCTS, INC. DESIGN OF SUPER SPAN CULVERT- BRANTWOOD SECTION 3 HOWARD COUNTY, MARYLAND
Approved By	Date	

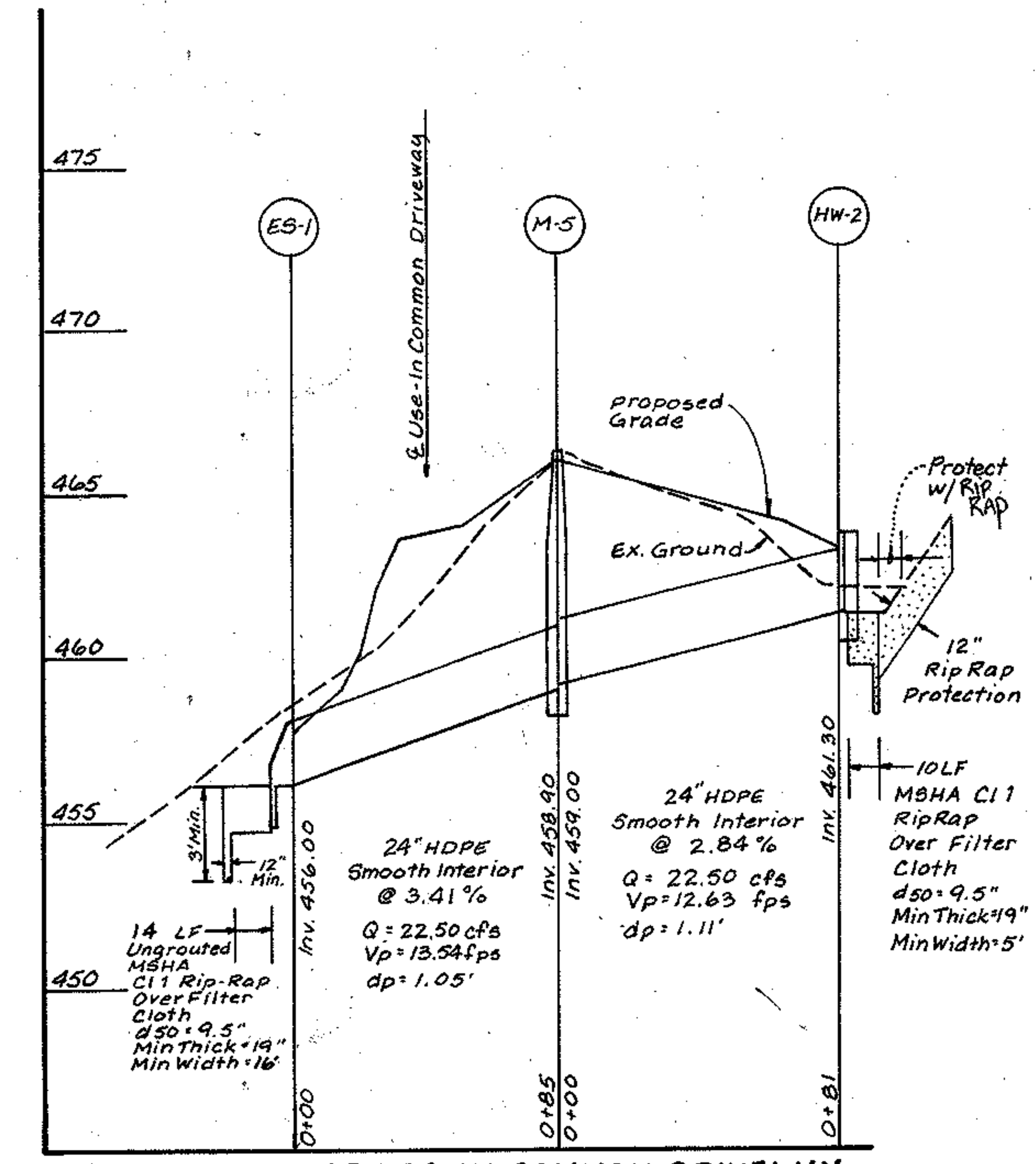
Scale	Project No.	Rev.	Sheet
GRAPHIC	CBC-2931	1	22 OF 22

F01.78

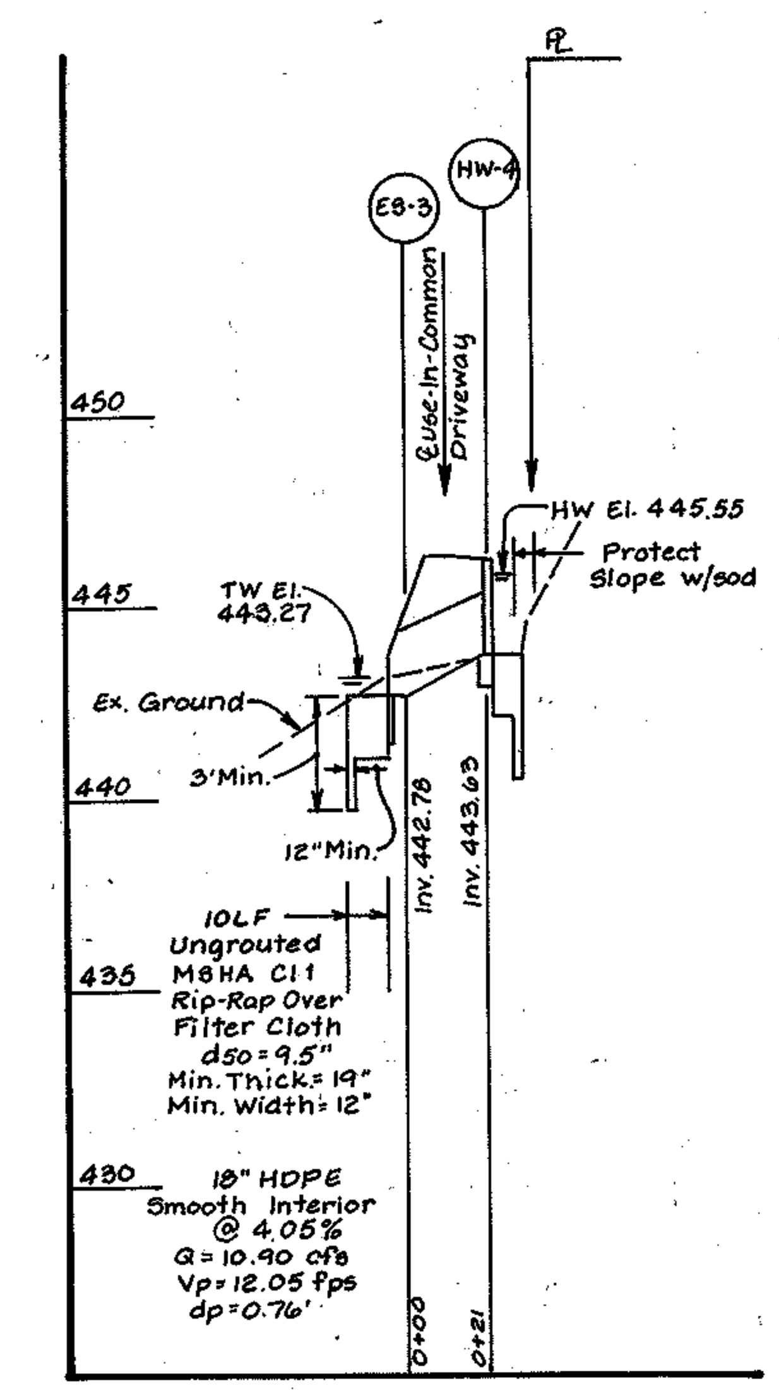
STRUCTURE SCHEDULE

Inlet No.	Type	Inv. In	Inv. Out	MH Top or Top Slab Elev	Detail	Location	Remarks
I-1	"D"	459.80	459.55	465.85	SD 4.39	23+30 - 17' RT	Throat 3 Sides - No Weir Downhill Side
I-2	"D"	-	460.50	465.85	SD 4.39	23+30 - 17' LT	Throat 3 Sides - No Weir Downhill Side
I-3	"D"	437.82	437.72	442.91	SD 4.39	19+16.67 - 17' RT	Sump Inlet - Throat 4 Sides
I-4	"D"	-	438.50	442.91	SD 4.39	19+16.67 - 17' LT	Sump Inlet - Throat 4 Sides
HW-1	"E" Headwall	-	439.30	441.55	SD-5.31	N 589672.55 E 1337033.30	Coord @ Inside Cor. Face of Structure
HW-2	"E" Headwall	-	461.30	463.55	SD-5.31	N 589575.73 E 1336474.57	Coord @ Inside Cor. Face of Structure
HW-3	"C" Headwall	-	455.29	457.54	SD-5.21	N589026.12 E1336533.31	Coord @ End of Pipe
HW-4	"C" Headwall	-	443.63	445.88	SD-5.21	N588862.59 E1336734.08	Coord @ End of Pipe
M-1	Manhole	430.18	430.08	436.00	G 5.12	N 589415.75 E 1336990.87	
M-2	Manhole	432.38	432.28	443.00	G 5.12	N 589519.63 E 1337006.17	
M-3	Manhole	444.00/437.83/435.59	435.09	450.00	G 5.12	21+24.37 - 25' RT	
M-4	Manhole	436.61	436.71	444.70	G 5.12	20+20 - 25' RT	
M-5	Manhole	459.00	458.90	466.00	G 5.12	N 589505.13 E 1336435.88	
EW-1	"A" Headwall	430.00	430.00	433.50	SD-5.11	N 589401.88 E 1336985.15	Coord @ Face Structure D.S.
ES-1	End Section	456.00	456.00	457.50	SD-5.51	N 589462.51 E 1336509.42	Coord @ End of Pipe
ES-2	End Section	452.98	452.98	454.48	SD-5.51	N589029.97 E1336533.94	Coord @ End of Pipe
ES-3	End Section	442.78	442.78	444.28	SD-5.51	N588879.38 E1336746.41	Coord @ End of Pipe
EW-5	"A" Headwall	423.80	423.80	427.05	SD-5.11		Coord @ Face Structure D.S.
MH-6	Manhole	424.00	423.90	434.00	G 5.12		
S-5	SWM Pond Riser	424.50	424.40	432.33	-		Coord @ Inside Box Face of Structure

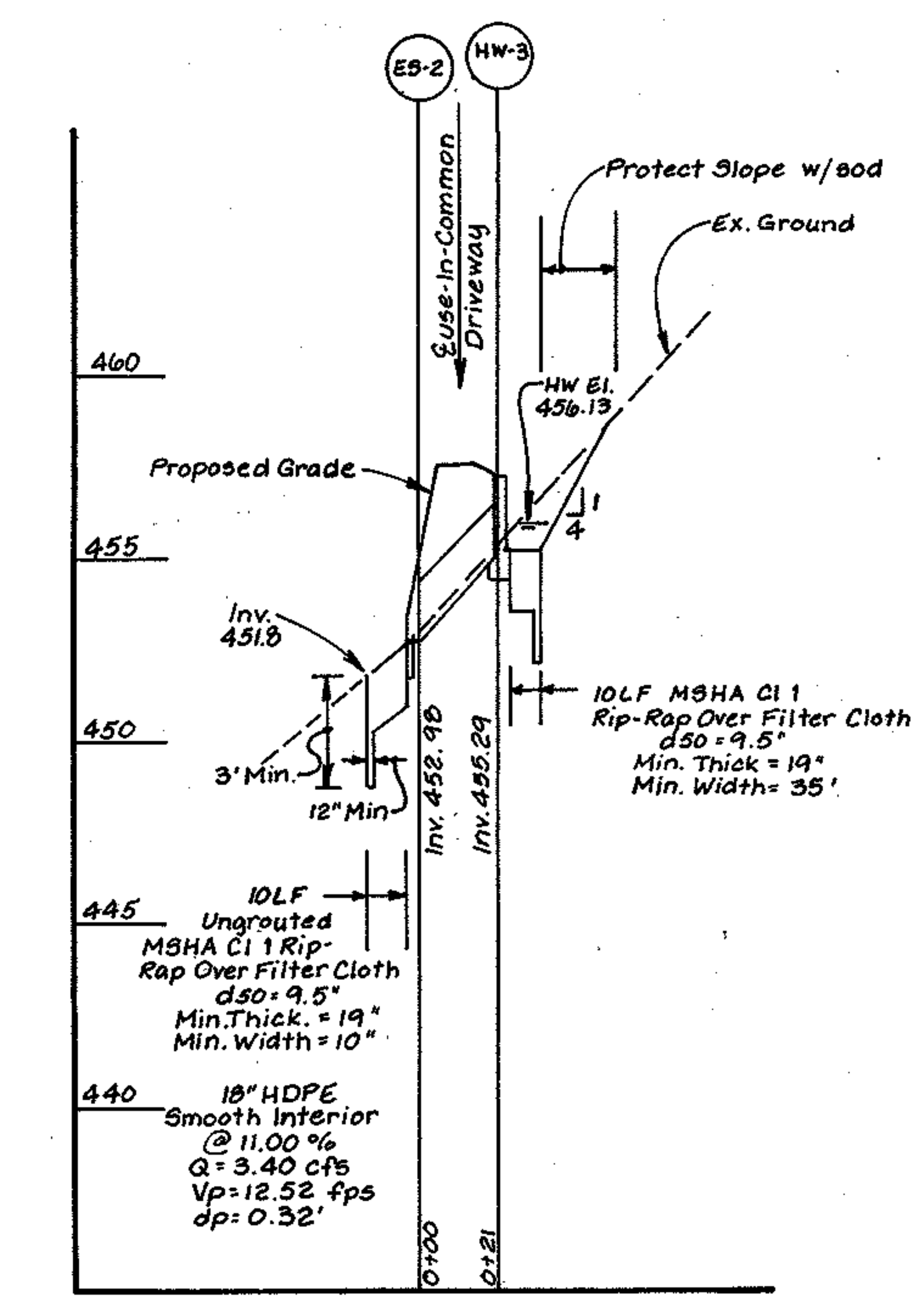




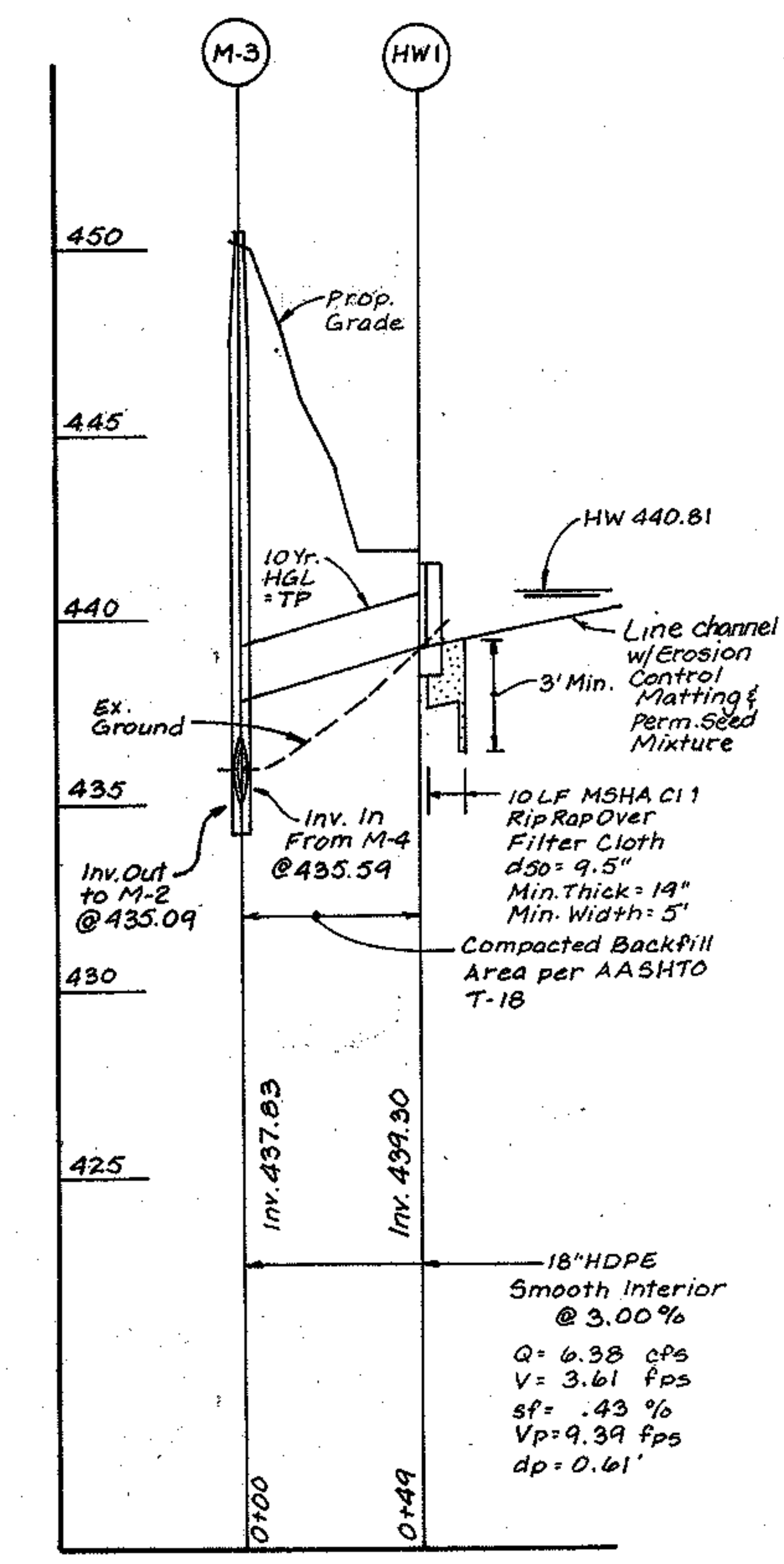
CULVERT UNDER USE-IN-COMMON DRIVEWAY NEAR LOTS 28 & 34

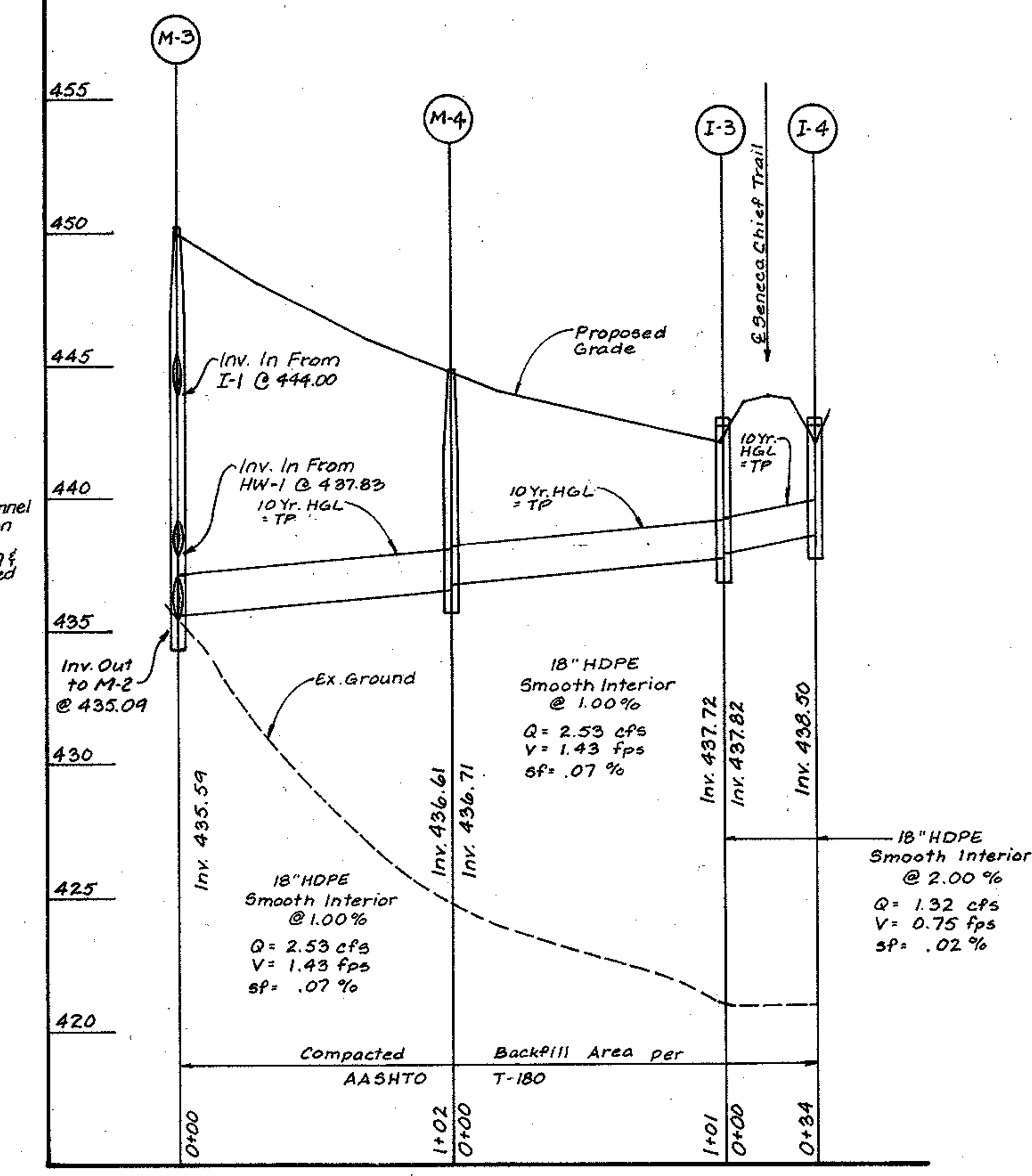


CULVERT UNDER USE-IN-COMMON DRIVEWAY NEAR LOTS 31 & 32 ⚠1



CULVERT UNDER USE-IN-COMMON DRIVEWAY NEAR LOT 33 ⚠1





By	Date	No.	Description
LDE	8/03	⚠1	Revise Use-In-Common Driveway Culvert Profiles

REVISIONS

F:\Land Projects R2\BRANTWOOD\dwg\Section 33\section33.dwg STORM

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 9/6/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE 8/16/01

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

NATURAL RESOURCE CONSERVATION SERVICE — DATE 8/7/01

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

HOWARD SOIL CONSERVATION DISTRICT — DATE 8/7/01

ENGINEER'S CERTIFICATE

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

SIGNATURE OF ENGINEER — DATE 7/24/01

DEVELOPER'S CERTIFICATE

"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.

SIGNATURE OF DEVELOPER — DATE 11/2/00

7/24/01

PIPE SCHEDULE

Size	Class	Total Length *
18"	HDPE Smooth Interior	733
24"	HDPE Smooth Interior	238

* The total length of pipe does not take into account the slope of the pipe. This total is for linear feet only.

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

DESIGNED		SCALE
EDS	Storm Drain Profiles **BRANTWOOD** Section Three - Area Three Lots 28-38 & Preservation Parcels "F" & "G" A Resubdivision of Brantwood - Section 3 Area 1 Buildable Bulk Parcel "C" Tax Map No. 16 - Grid No. 21 - Parcels 172 3rd Election District - Howard County, Maryland Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-	1" = 5' Vert. 1" = 50' Horiz.
DRAWN: JLM STB		DRAWING: 4 of 22
CHECKED: BDB		JOB NO.: 98-040.6
DATE: 7/2001	DEVELOPER: BRANTWOOD, LLC 8835 - P Columbia 100 Parkway Columbia, Maryland 21045 (410) 730-0810	FILE NO.: F01-78

By	Date	No.	Description
LDE	12/03	2	Remove Center Median, Revise Culverts HW3-ES2 & HW4-ES3, Revise Grading.
LDE	12/01	1	Add clarity to Note.

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 9/6/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE 8/16/01

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

NATURAL RESOURCE CONSERVATION SERVICE — DATE

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

HOWARD SOIL CONSERVATION DISTRICT — DATE

ENGINEER'S CERTIFICATE

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

SIGNATURE OF ENGINEER — DATE 7/24/01

DEVELOPER'S CERTIFICATE

"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.

SIGNATURE OF DEVELOPER — DATE 11/2/00

STATE OF MARYLAND — REGISTERED PROFESSIONAL ENGINEER — 7/24/01

NOTE: No clearing is proposed within the stream or wetland buffers (1) except @ the proposed Road Crossing.

LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

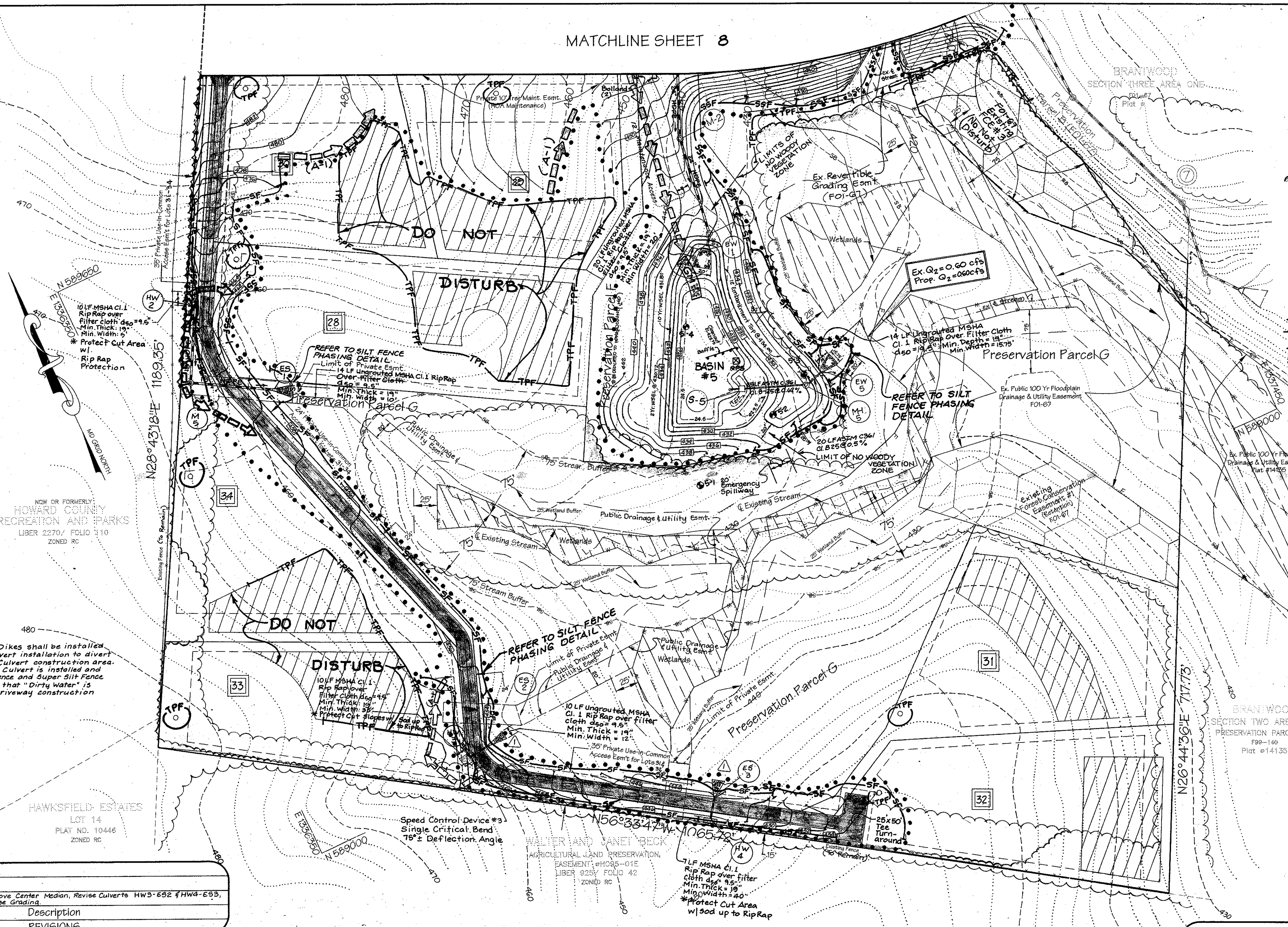
Drainage Area Map
BRANTWOOD
Section Three - Area Three
Lots 28-38 & Preservation Parcels "F" & "G"
A Resubdivision of Brantwood - Section 3 Area 1
Buildable Bulk Parcel "C"
Tax Map No. 16 - Grid No. 21 - Parcel 172
3rd Election District - Howard County, Maryland
Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03 F 01-67, F 01-73

DESIGNED	DRAWN	CHECKED	DATE	SCALE	DRAWING	JOB NO.	FILE NO.
EDS	JLM	BDB	7/2001	1"=50'	6 of 22	98-040.6	F01-78

DEVELOPER: BRANTWOOD, LLC
8835 - P Columbia 100 Parkway
Columbia, Maryland 21045
(410) 730-0810

F01-78

F:\Land Projects R2\BRANTWOOD\dwg\Section 33\section33.dwg DRAINAGE AREA MAP2



LEGEND

- EX. 2FT. CONTOUR
- PROP. 2FT. CONTOUR
- EX. 10FT. CONTOUR
- PROP. SEPTIC AREA
- EX. SEPTIC AREA
- EX. TREES
- EX. TREES TO REMAIN
- EX. ℄ STREAM
- 75' FT. STREAM BUFFER
- EX. NON-TIDAL WETLAND
- 25' FT. WETLAND BUFFER
- 100 YEAR FLOODPLAIN
- PROPOSED WELL
- FILTER BAG
- SSF — SUPER SILT FENCE
- SF — SILT FENCE
- TPF — TREE PROTECTION FENCE
- LIMIT OF DISTURBANCE
- SCE — STABILIZED CONSTRUCTION ENTRANCE
- RPS — REMOVABLE PUMPING STATION
- (A-1) EARTH DIKE
- (A-1) CLEARWATER DIVERSION

NOTE:

Clearwater Diversion Dikes shall be installed prior to Driveway Culvert installation to divert "Clean Water" around Culvert construction area. Remove Dikes and once Culvert is installed and stabilized; install Silt Fence and Super Silt Fence around "Headwalls" so that "Dirty Water" is contained within the Driveway construction area.

SUMMARY TABLE

TEMPORARY BASIN # 5
Hazard Classification "A"
Drainage Area = 7.76 Acres
Top of Facility = 434.20
Invert of Facility = 424.50

Sediment Storage Volume Required=	27936 cu.ft.
Wet Storage Volume Required =	13968 cu.ft.
Wet Storage Volume Provided =	14352 cu.ft.
Wet Storage Elevation =	426.75
Dry Storage Volume Required =	13968 cu.ft.
Dry Storage Volume Provided =	13584 cu.ft.
Dry Storage Elevation =	428.40
Sediment Storage Volume Provided=	28635 cu.ft.
Cleanout Elevation =	425.75
Cleanout Elevation =	5.25 ft. from Riser Crest

		TSWM BASIN 2 Year	10 Year
Existing Flow		0.6	N/A
Acceptable Release	(cfs)	1.0	-
Computed Inflow	(cfs)	25.0	43.1
Facility Discharge	(cfs)	0.6	18.0
Elevation at Discharge		430.72	431.81
Storage at Elevation	(AC\FT)	1.30	1.66
Temporary Flow	(cfs)	0.6	18.0

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

By	Date	No.	Description
LDE	12/03	1	Remove Center Median, Revise Culverts HW3-ES2 & HW4-ES3, Revise Grading.

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8/24/01

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/9/01

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE

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

NATURAL RESOURCE CONSERVATION SERVICE — DATE 8/7/01

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

HOWARD SOIL CONSERVATION DISTRICT — DATE 8/7/01

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SIGNATURE OF ENGINEER — DATE 7/24/01

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SIGNATURE OF DEVELOPER — DATE 11/2/00

7/24/01

NOTES:

1. There is no clearing proposed within the stream or wetland buffers.
2. 2:1 Slopes are to be immediately stabilized with sod or erosion control matting and permanent seed mix.
3. No disturbance within the stream at the road crossing is allowed.
4. For limits of RipRap placement at the Culvert/road stream crossing; refer to sheet 18.

LDE, INC.
9250 Rumsey Road, Suite 106, Columbia, MD. 21045
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Grading and Soil Erosion & Sediment Control Plan

BRANTWOOD

Section Three - Area Three

Lots 28-38 & Preservation Parcels "F" & "G"
A Resubdivision of Brantwood - Section 3 Area 1
Buildable Bulk Parcel "C"
Tax Map No. 16 - Grid No. 21 - Parcel 172
3rd Election District - Howard County, Maryland
Previous Submittals: WP 90-96, F 90-128, WP 99-55, S 99-09, WP 00-55, P00-03
F 01-67, F 01-73

DESIGNED	EDS
DRAWN	JLM
CHECKED	BDB
DATE	7/ 2001
SCALE	1"=50'
DRAWING	9 of 22
JOB NO.	98-040.6
FILE NO.	F01-78

DEVELOPER
BRANTWOOD, LLC
8835 - P Columbia 100 Parkway
Columbia, Maryland 21045
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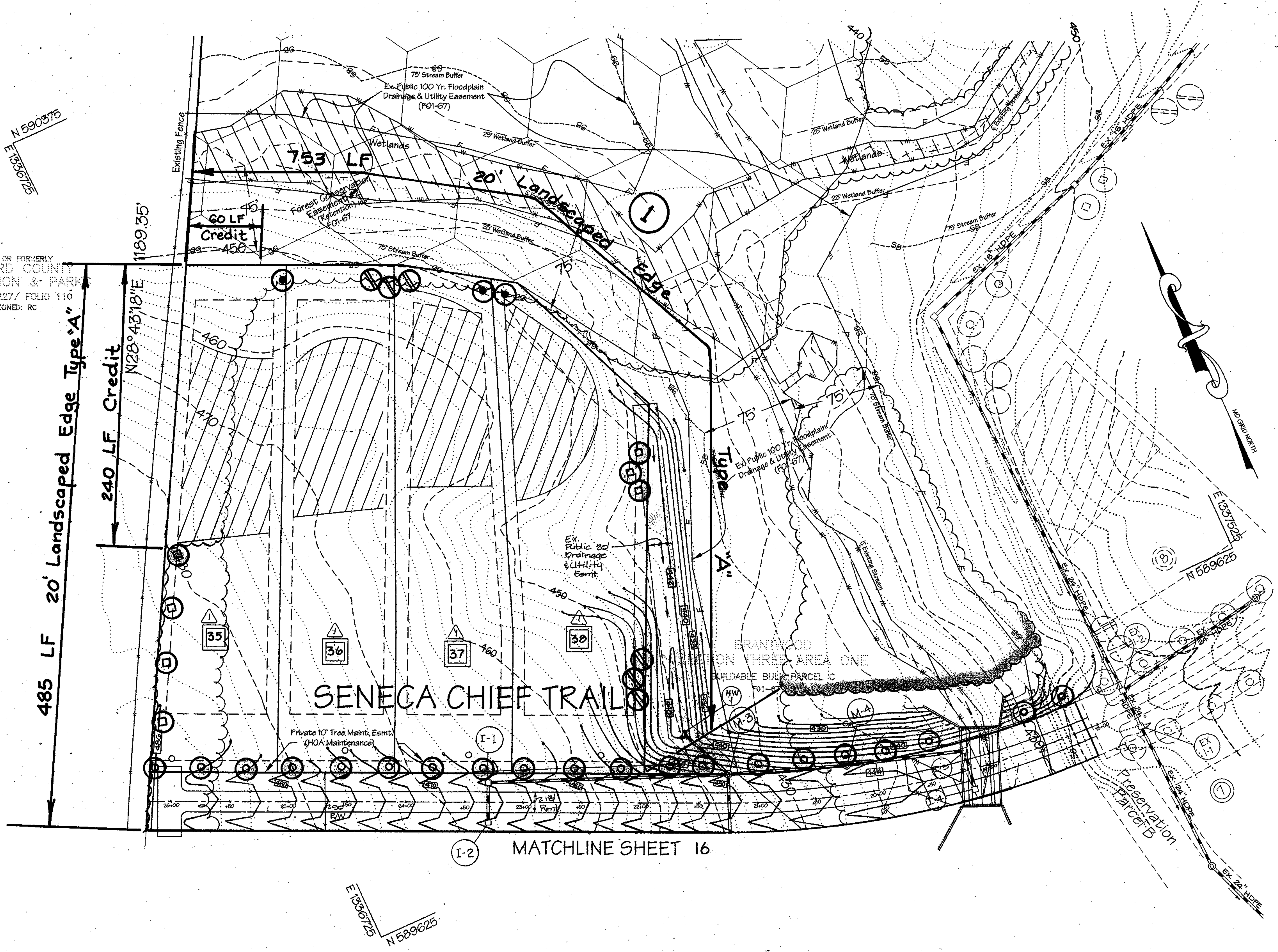
F01-78

F:\Land Projects R2\BRANTWOOD\dwg\Section 33\section33.dwg DRAINAGE AREA MAP2



LEGEND

·····522·····	EX. 2FT. CONTOUR
—522—	PROP. 2FT. CONTOUR
---520---	EX. 10FT. CONTOUR
(hatch)	PROP. SEPTIC AREA
(hatch)	EX. SEPTIC AREA
(tree line)	EX. TREES
(tree line)	EX. TREES TO REMAIN
—·—·—	EX. ℄ STREAM
—SB— SB— SB—	75' FT. STREAM BUFFER
—W— W— W—	EX. NON-TIDAL WETLAND
———	25' FT. WETLAND BUFFER
—F— F— F—	100 YEAR FLOODPLAIN

OWNERS:

Parcel 172
Richard B. Talkin, Trustee
9175 Guilford Road, Suite 301
Columbia, Md. 21046

By	Date	No.	Description
LDE	12/03	1	Revise Lot Numbers

REVISIONS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 8/24/01 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT — 9/6/01 DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

Chief, Bureau of Highways — DATE

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SIGNATURE OF DEVELOPER — DATE

STATE OF MARYLAND — BRUCE DAVID BURTON — PROFESSIONAL ENGINEER

7/24/01

Notes: 1. This plan shall not be used for grading (See Sht. 7)

LDE, INC.

9250 Rumsey Road, Suite 106, Columbia, MD. 21045
(410) 715-1070 (301) 596-3424 (410) 715-9540 (Fax)

Landscape and Street Planting Plan

BRANTWOOD

Section Three - Area Three

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DEVELOPER
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F01-78

F:\Land Projects R2\BRANTWOOD\dwg\Section 33\section33.dwg Drainage Area Map3