FINAL ROAD CONSTRUCTION PLAN
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57 AND A RESUBDIVISION OF BULK PARCEL 'C' WESLEY WOODS, SECTION 1
HOWARD COUNTY, MARYLAND

GENERAL NOTES

1. Subject property zoned "R-12" per 2/2/04 Comprehensive Zoning Plan.
2. This site is located within the metropolitan district.
3. Public water and sewer will be used within this site.
4. Howard County Soils Map 26.
5. Gross area of site subject to subdivision:
   a. Parcel 163: 25.58 ac.
   b. Bulk Parcel 'C': 3,321sf± or 0.08 ac.
   c. Total area: 25.66 ac.
6. Total area of steep slopes on site: 2.88 ac.±
7. Net area of site subject to subdivision: 22.78 ac.±
8. Area of proposed public r/w: 1.54 ac.±
9. Number of proposed buildable lots: 54
10. Area of proposed buildable lots: 13.30 ac.±
11. Number of proposed open space lots: 3
12. Area of proposed open space lots: 10.82 ac.±
13. Topography is based on a field run topography survey prepared by Fisher, Collins & Carter, inc. in Feb. of 2001 and aerial topography prepared by Harford Aerial Surveys, inc. in Feb. of 1999.
14. Field run boundary survey prepared by Fisher, Collins & Carter, inc. on April 2, 2001.
15. The coordinates shown hereon are based upon the Howard County Geodetic Control which is based on the Maryland State Plane Coordinate system. Howard County monument numbers 321A and 31BB were used for this project.
16. A.P.F.O. traffic study prepared by Street Traffic Studies L.T.D. and approved under S-01-24.
17. Wetlands delineation and report and forest stand delineation and report prepared by Exploration Research inc. and approved under S-01-24.
18. There are no floodplains, historic structures or cemeteries on-site.
19. No clearing, grading or construction is permitted within wetlands, streams or their required buffers, and steep slopes of 25% or greater containing a contiguous area of 20,000 SF or more, unless waivers have been approved. The steep slope disturbance for the construction of an access driveway for maintenance of the SWM facility located within Open Space Lot 56 determined to be necessary by DPZ in accordance with Section 16.116(c) of the Subdivision Regulations.
20. Open Space requirements:
   a. Open Space required (30%-8,400sf minimum lot size): 25.58ac.± x 0.30 = 7.67ac.±
   b. Open Space provided: 10.82 ac.±(0.2 ac.± non-credited)
21. Recreational open space requirements:
   a. Open Space required (200sf per buildable lot): 54 x 200 = 10,800 sf
   b. Open Space provided: 10,800 sf±
22. This plan is subject to the Fourth Edition of the Subdivision and Land Development Regulations and the Zoning Regulations as amended by Council Bill No. 50-2001. Development or construction on these lots must comply with setback and buffer regulations in effect at the time of submission of the site development plan, waiver petition, or building and grading permits.
23. The lots shown hereon comply with the minimum ownership width and lot area as required by the Maryland State Department of the Environment.
24. Internal landscaping for lots 25 and 54 will be shown at Site Development Plan stage.
25. For flag or pipestem lots, refuse collection, snow removal and road maintenance are provided to the junction of the flag or pipestem and road right-of-way line and not to the pipestem lot driveway.
26. Existing house on Lot 5 to remain.
27. Stormwater management & water quality is provided as necessary in accordance with the 2000 stormwater management manual. Pond to be a micro pool extended detention pond hazard class 'A'. Facility to be owned and maintained by the Homeowners Association. Stormwater Management recharge requirement will be provided by drywells located on lots 6 - 9, 18, 19, 28 - 32, 43 - 54. Soil borings for each drywell location shall be shown in accordance with H.B.A.M. Bulletin titled 'Disconnection of rooftop runoff credits using dry wells'. Level Spreaders will be provided on Lots 11 & 19.
28. All ditches and swales will have erosion control matting.
29. This project is subject to review and approval by the Maryland Aviation Administration (MAA) regarding confirmation that construction of proposed structures on this site will not penetrate any navigational airspace and that the proposed SWM landscaping will meet their approval requirements. Permit number 04-064 has been approved in a letter dated 6/23/04.
30. CPv management for a portion of Wesley Woods (3 ac.±) is provided in the stormwater management facility on site.
31. The retaining wall designed to construct the access to the stormwater management facility is privately owned and maintained by the homeowners association.
32. Soil borings for each drywell location have been shown in accordance with HBAM Bulletin titled, "Disconnection of Rooftop Runoff Credits Using Dry Wells."
33. A gravity sewer service waiver of Section 4.3.B.3.b of Volume II of the Howard County Design Manual has been approved by the Department of Public Works Bureau of Engineering for Lots 34-39 on June 18, 2004.
34. The contractor shall notify the following utility companies or agencies at least five(5) working days before starting work shown on these plans:

State Highway Administration	410.531.5533
BGE(contractor services)	410.850.4620
BGE(underground damage control)	410.787.9068
Miss Utility	1.800.257.7777
Colonial Pipeline Company	410.795.1390
Howard County, Dept. of Public Works, Bureau of Utilities	410.313.4900
Howard County Health Department	410.313.2640

35. The contractor shall notify Miss Utility at 1-800-257-7777 at least 48 hours prior to any excavation work being done.
36. The contractor shall notify the Department of Public Works/Bureau of Engineering Construction Inspection Division at (410) 313-1880 at least five (5) working days prior the start of work. All fills for public road surfaces require 95% compaction (AASHTO-T-180).
37. Landscape surety is based on the required landscaping of 65 shade trees, 23 evergreen trees and the Private Access Place street trees (19) and refuse pad shrubs (10) in the amount of $28,950.00.
38. This project complies with the requirements of section 16.1200 of the Howard County Code for Forest Conservation by retaining 1.65 acres of forest and planting 0.60 acres of reforestation within Forest Conservation Easement 1, retaining 2.60 acres of forest and planting 0.47 acres of reforestation within Forest Conservation Easement 2, planting 0.43 acres of reforestation within Forest Conservation Easement 3, and retaining 2.01 acres of forest and planting 0.22 acres of reforestation within Forest Conservation Easement 4. Total retention = 6.26 ac. Total reforestation provided = 1.72 ac. $91,998.80 surety to be posted with the Developer's Agreement. Requested Fee-in-lieu for 1.60 ac remaining obligation is $34,848.00.
39. Previous Howard County file numbers: S-99-16; S-01-24; WP-99-87; P-03-12
40. All construction shall be in accordance with the latest standards and specifications of Howard County plus MSHA standards and specifications if applicable.
41. Traffic control devices, markings and signing shall be in accordance with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD). All street and regulatory signs shall be in place prior to the placement of any asphalt.
42. Open Space Lots 55 thru 57:
   a. Open Space Lots 55 and 57 to be dedicated to Howard County.
   b. Open Space Lot 56 to be dedicated to the Homeowners Association.
43. Per the geotechnical report, prepared by Herbst/Benson & Associates, the following procedures are recommended for basin and embankment construction:
   a. Along the area of the proposed embankment, strip all vegetation, topsoil and any surface organically contaminated soils to expose relatively clean existing fills or competent native soils.
   b. Proof roll the exposed surface with a loaded tandem dump truck to delineate unsuitable areas and cut out any soft yielding areas to expose firm underlying soils.
   c. Excavate the core trench to a minimum depth of 4 feet below the proposed basin elevation using a minimum 4-foot bottom trench width and side slopes no steeper than 1:1. Beneath the principal spillway, the core trench depth should extend at least 4 feet beyond the bottom of the pipe cradle and use similar bottom widths and side slopes. Compact the bottom of the trench excavation to firm, unyielding condition.
   d. Backfill the core trench excavation using the native CL cut soils from the west slope as represented by boring SWM-4. Judging from the moisture/compacted density test results shown of SHEET 1, COMPACTION TEST, the fill should be readily compactible at the existing moisture content.
   e. Prior to placing the principal spillway pipe and cradle, examine the founding soils along the pipe alignment outside the core trench area. Undercut any organic or otherwise unsuitable material and compact the exposed grade to a firm, unyielding condition. The existing fill soils and core trench fills are expected to adequately support principal spillway construction providing that the applied bearing pressures do not exceed 1,000 PSF. Backfill the principal spillway excavation and place embankment fill using the native cut soils from the western slope and approved existing CL clay fill soil from the basin excavation to form the embankment.

General Notes to be Continued

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

10/19/04
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

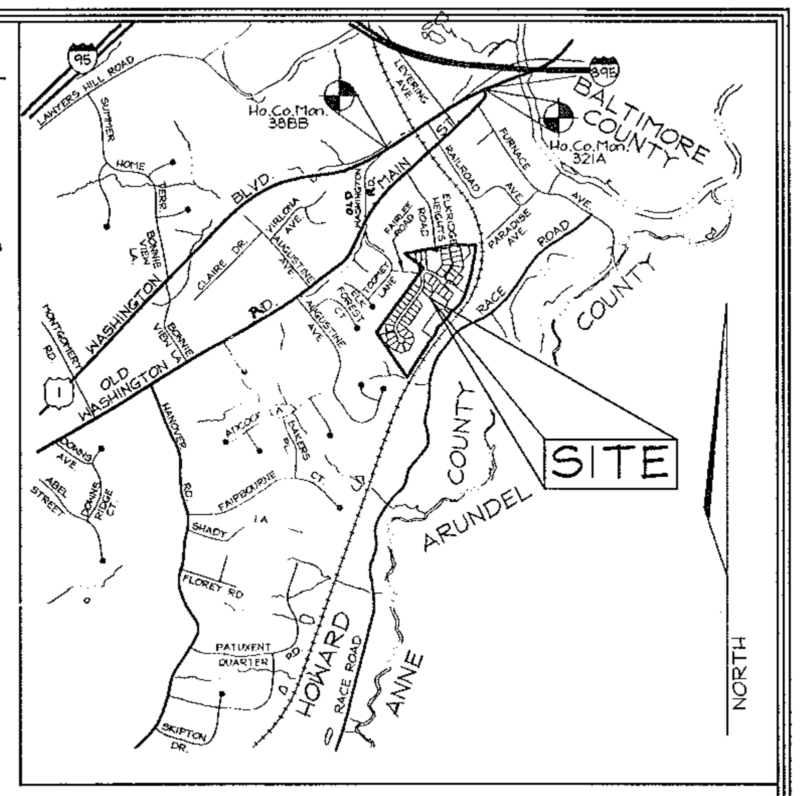
10/15/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

10-4-04
CHIEF, BUREAU OF HIGHWAYS — DATE

LEGEND

Existing Contour	382
Proposed Contour	82
Existing Spot Elevation	382.3
Proposed Spot Elevation	+82.53
Direction of Flow	
Existing Trees to Remain	
15-24.99% Slopes	
25% and Greater Slopes	
Wetlands	
Utility Pole	Guy Wire / Pole
Access Easement	
Access and Utility Easement	
Proposed Drainage Swale	
Proposed Dry Well	
Forest Conservation Easement	



VICINITY MAP
SCALE:1=2000'

BENCHMARKS

Sta.	321A	N 172,232.2977	E 425,261.5439	El.: 8.4417 (meters)
		N 565,065.463	E 1,395,212.248	El.: 27.696 (feet)
Sta.	38BB	N 171,909.8745	E 424,785.3620	El.: 19.6328 (meters)
		N 564,007.646	E 1,393,649.975	El.: 64.412 (feet)

SHEET INDEX

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Road Plan and Profile - Joseph Scott Drive	3 of 20
Road Plan and Profile - Private Access Place	4 of 20
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Sediment and Erosion Control and Grading Plan	6 of 20
Sediment and Erosion Control and SWM Pond Notes and Details	7 of 20
Retaining Wall Enlargement Plan and SEC Details	8 of 20
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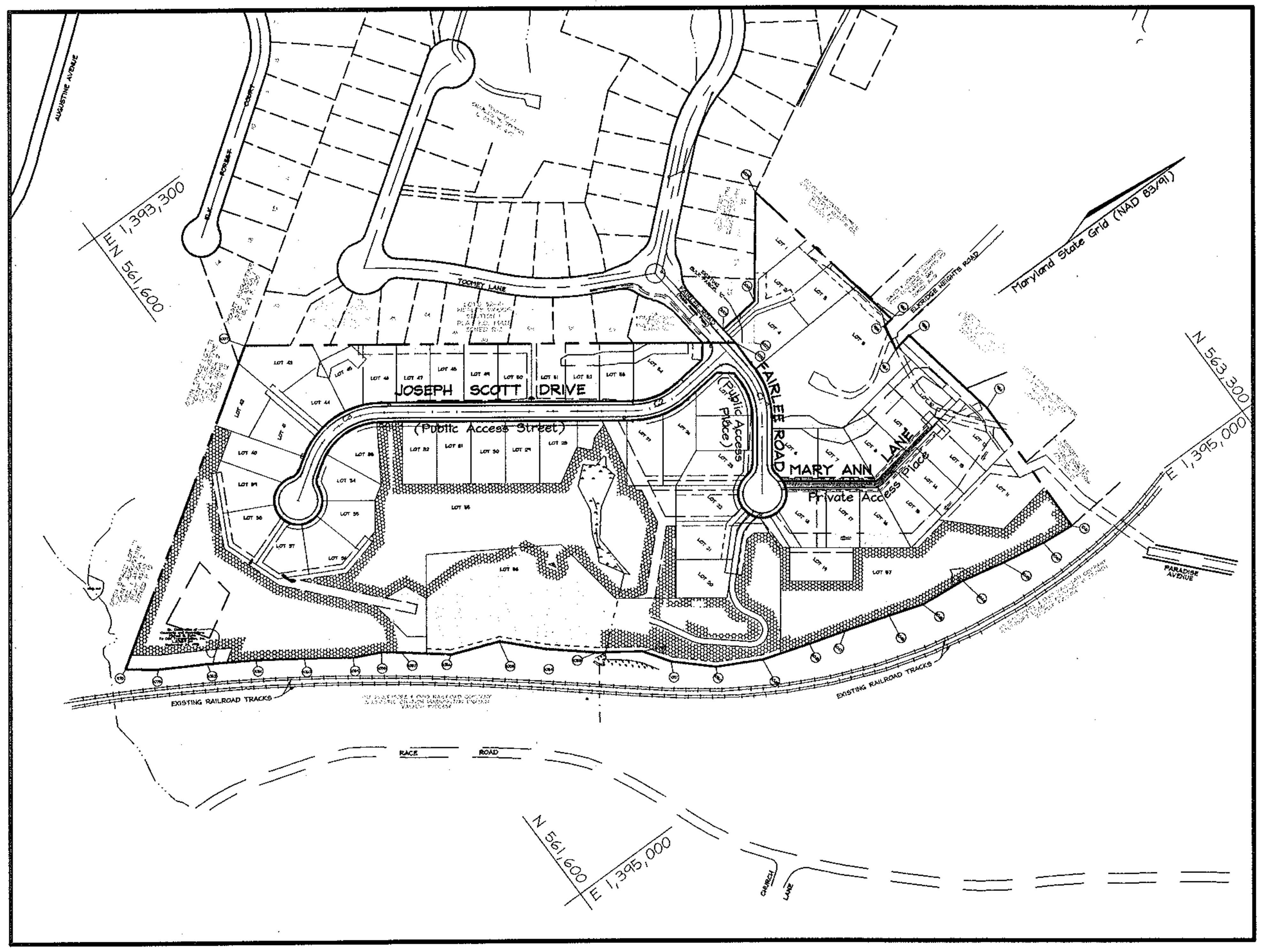
Retaining Wall Specifications	20 of 20



LOCATION MAP
SCALE: 1"=200'

CENTERLINE ROAD CURVE DATA

CURVE #	RADIUS	LENGTH	DELTA	TANGENT	CHORD BEARING	CHORD LENGTH
C1	150.00	110.59	42°14'27"	57.94	N74°55'08"W	108.10
C2	150.00	110.59	42°14'27"	57.94	N15°04'52"E	108.10
C3	150.00	183.26	70°00'00"	105.03	S01°12'06"W	172.07

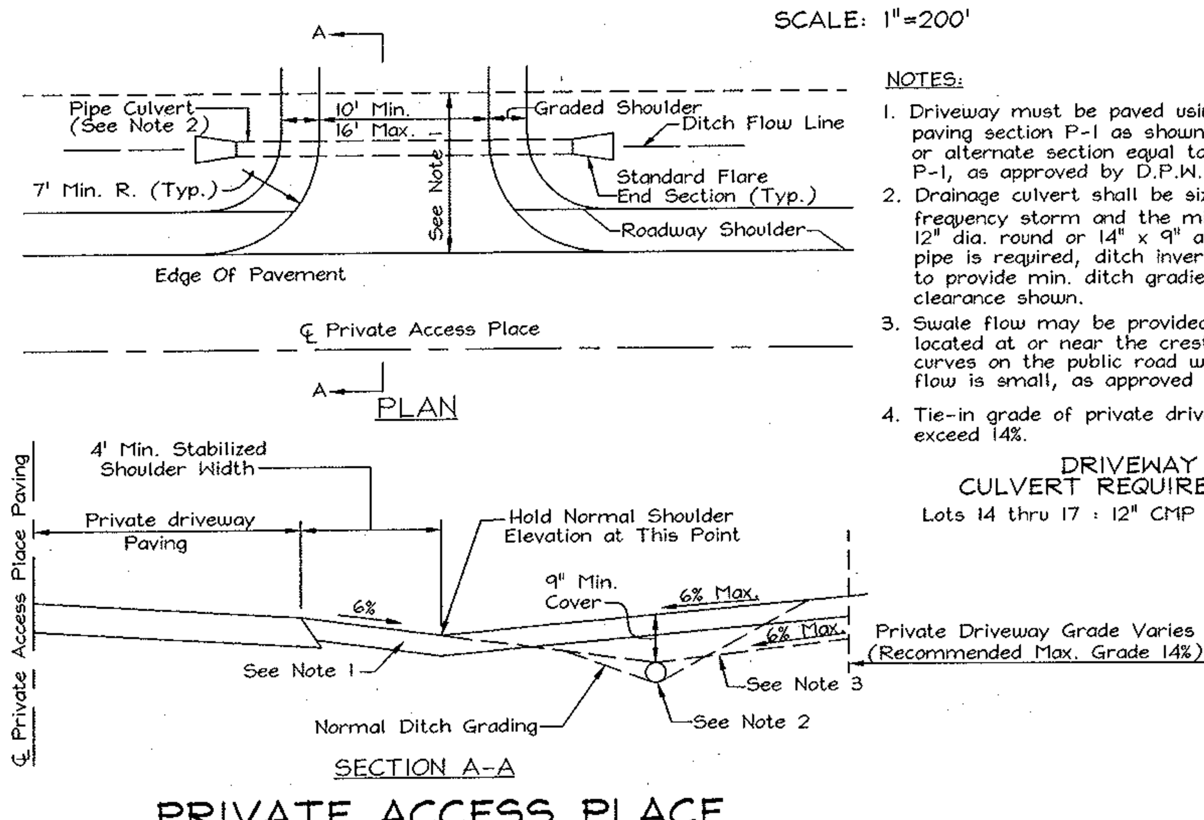
ROAD CLASSIFICATION

ROAD NAME	CLASSIFICATION	R/W
Fairlee Road	Public Access Place	40'
Joseph Scott Drive	Public Access Street	40'
Mary Ann Lane	Private Access Place	min. 24' easement

STREET LIGHT TABLE

FIXTURE TYPE	POLE TYPE	LOCATION	STREET
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 1+90 17' right	Fairlee Road
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 3+55 13' left	Fairlee Road
100 watt HPS vapor Premier post top mounted	14' black fiberglass	N 562,368.0 E 1,394,584.8	Fairlee Road
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 3+04 15' left	Joseph Scott Drive
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 7+90 15' right	Joseph Scott Drive
100 watt HPS vapor Premier post top mounted	14' black fiberglass	N 561,566.3 E 1,393,998.8	Joseph Scott Drive

Note: Light pole location given at center of base



PRIVATE ACCESS PLACE
RESIDENTIAL DRIVEWAY ENTRANCE
NOT TO SCALE

NOTES:
1. Driveway must be paved using standard paving section P-1 as shown on St'd. No. or alternate section equal to or better than P-1, as approved by D.P.W.
2. Drainage culvert shall be sized for a 10 year frequency storm and the minimum size shall be 12" dia. round or 14" x 9" arch pipe if larger pipe is required, ditch invert shall be lowered to provide min. ditch gradient of 0.5% and clearance shown.
3. Swale flow may be provided over driveway located at or near the crest of vertical curves on the public road where quantity of flow is small, as approved by D.P.W.
4. Tie-in grade of private driveway shall not exceed 14%.

DRIVEWAY CULVERT REQUIREMENTS
Lots 14 thru 17 : 12" CMP or equivalent

Continuation of General Notes

44. The 5'x20' concrete pad for the "Refuse and Recycle Collection Pad" located within the public right-of-way will be maintained by the owners of Lot 7-10 and 12-17, pursuant to the Declaration of Right of Access and Maintenance Obligations recorded among the land records of Howard County Maryland
45. For private driveway culverts for lots 14-17, see detail this sheet.
46. All Fill Areas within Public Right-Of-Ways to have 95% Compaction.
47. All street sign posts shall be 2" square metal tube posts (14 gauge) installed into a 3" sleeve (2.5" square metal tube, 12 gauge) with a cap on top.

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

COVER SHEET
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

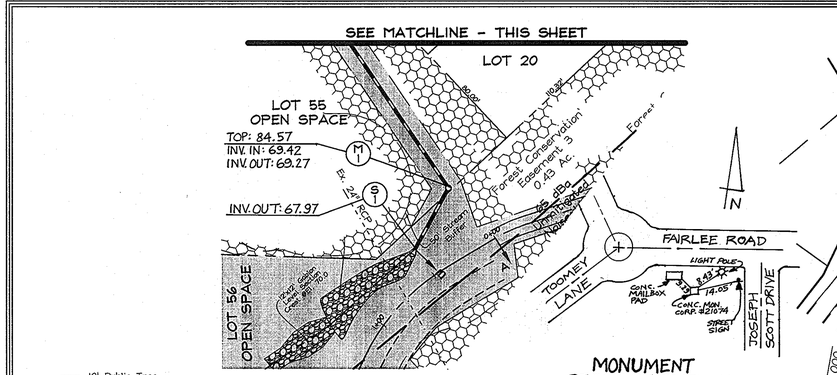
TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

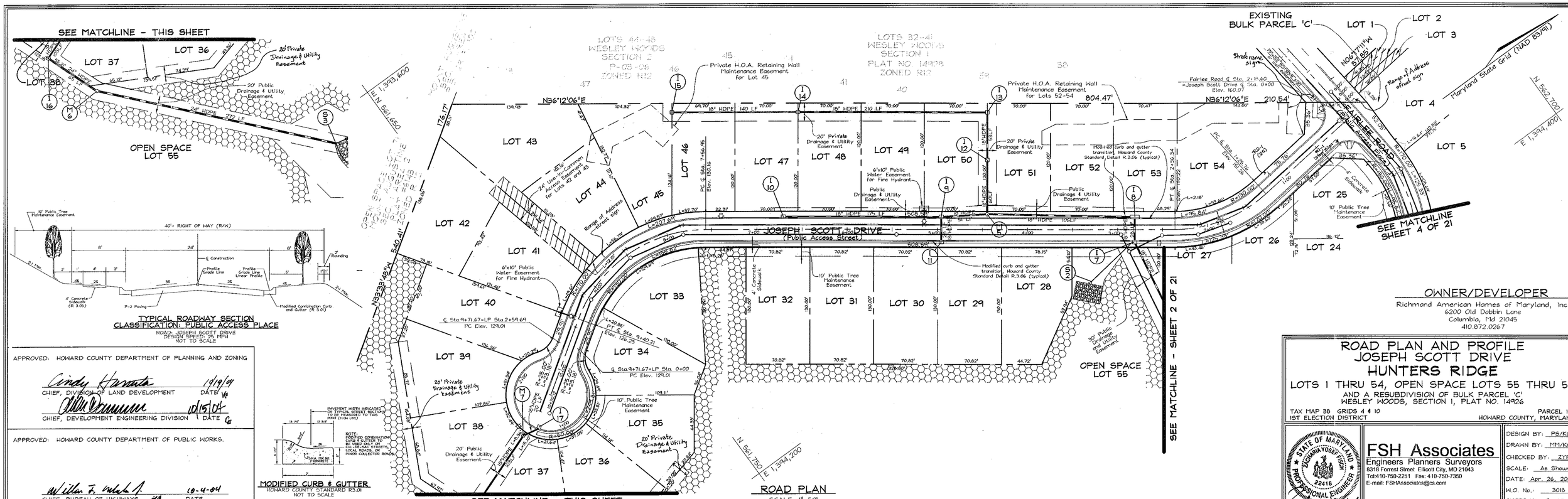
STATE OF MARYLAND — ZACHARIA YOSEF FISCH — 22418 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Pla... Surveyors
8318 Forrest Stree... ...ity, MD 21043
Tel:410-750-2251 ...50-7350
E-mail: FSHAsso...m

DESIGN BY:	PS/KO
DRAWN BY:	MM/KO
CHECKED BY:	ZYF
SCALE:	As Shown
DATE:	Sept. 15, 2004
W.O. No.:	3018
SHEET No.:	1 OF 20

F-04 111


SEE MATCHLINE - THIS SHEET
LOT 20
LOT 55
OPEN SPACE
TOP: 84.57
INV. IN: 69.42
INV. OUT: 69.27
INV. OUT: 67.97
Ex. 24" RCP
Forest Conservation Easement 3
0.43 Ac.±
Forest
LOT 56
OPEN SPACE
FAIRLEE ROAD
TOOMEY LANE
JOSEPH SCOTT DRIVE
LIGHT POLE
CONC. MAILBOX PAD
CONC. MON. CORR. #210194
STREET SIGN
Ex. 8" Water
Ex. SD
Ex. 6" Sewer
Ex. 12" Water
Ex. Gas
Ex. Overhead Wires
Ex. Chain Link Fence
Ex. Wood Fence
Ex. Stone Retaining Wall
Ex. Utility Pole
Ex. Guy Wire
Ex. Inlet
Ex. Manhole
Ex. Gas Valve
Ex. Water Valve
Ex. Gas Meter
Ex. Water Meter
Ex. Light Pole
Ex. Sign
Ex. Tree
Ex. Shrub
Ex. Bush
Ex. Hedge
Ex. Fence
Ex. Gate
Ex. Post
Ex. Bollard
Ex. Curb
Ex. Gutter
Ex. Sidewalk
Ex. Pavement
Ex. Ground
Ex. Contour
Ex. Spot Elevation
Ex. Building
Ex. Retaining Wall
Ex. Guard Rail
Ex. Utility Box
Ex. Utility Vault
Ex. Utility Pedestal
Ex. Utility Manhole
Ex. Utility Meter
Ex. Utility Valve
Ex. Utility Cabinet
Ex. Utility Transformer
Ex. Utility Pole
Ex. Utility Guy Wire
Ex. Utility Light
Ex. Utility Sign
Ex. Utility Tree
Ex. Utility Shrub
Ex. Utility Bush
Ex. Utility Hedge
Ex. Utility Fence
Ex. Utility Gate
Ex. Utility Post
Ex. Utility Bollard
Ex. Utility Curb
Ex. Utility Gutter
Ex. Utility Sidewalk
Ex. Utility Pavement
Ex. Utility Ground
Ex. Utility Contour
Ex. Utility Spot Elevation
Ex. Utility Building
Ex. Utility Retaining Wall
Ex. Utility



TYPICAL ROADWAY SECTION
CLASSIFICATION: PUBLIC ACCESS PLACE
ROAD: JOSEPH SCOTT DRIVE
DESIGN SPEED: 25 MPH
NOT TO SCALE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/9/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-4-04

MODIFIED CURB & GUTTER
HOWARD COUNTY STANDARD R3.01
NOT TO SCALE

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

ROAD PLAN AND PROFILE
JOSEPH SCOTT DRIVE
HUNTERS RIDGE

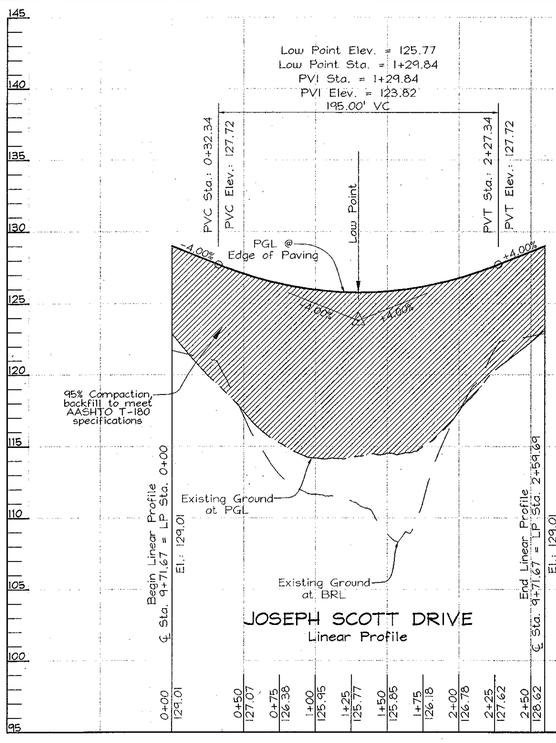
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

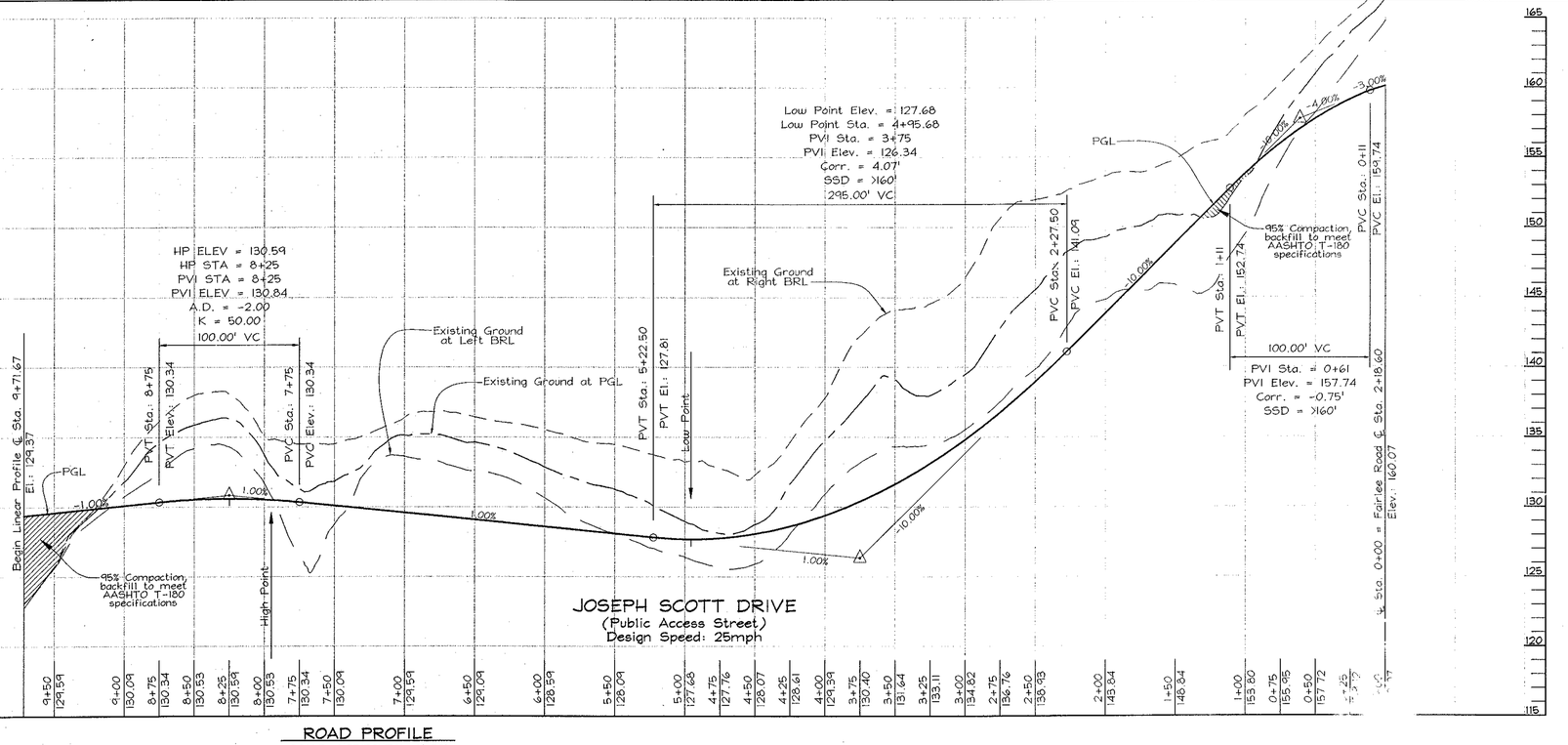
TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — VIRGINIA YOSEF KOCH — 22416 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY:	PS/KO
DRAWN BY:	MM/KO
CHECKED BY:	ZYF
SCALE:	As Shown
DATE:	Apr. 26, 2004
W.O. No.:	3018
SHEET No.:	3 OF 20





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

F-04-111

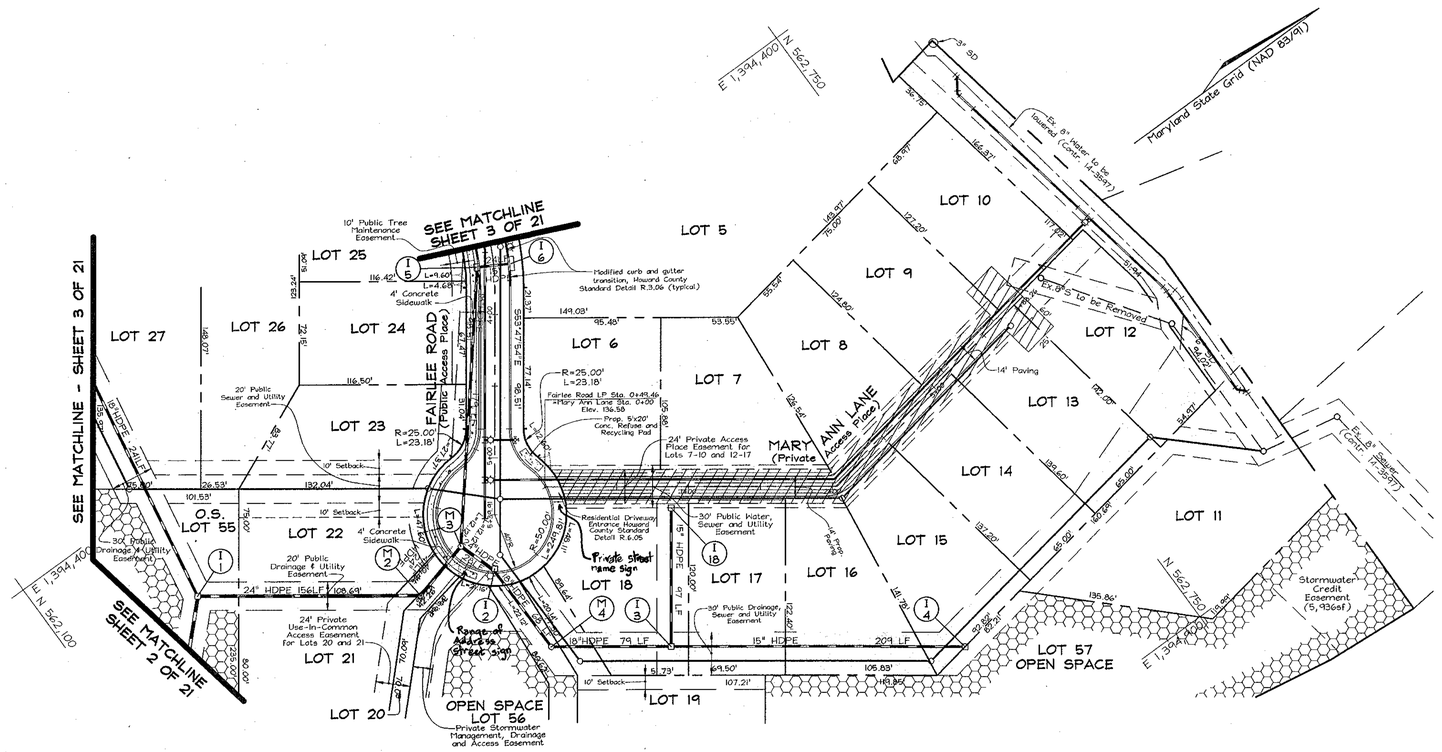
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/8/04

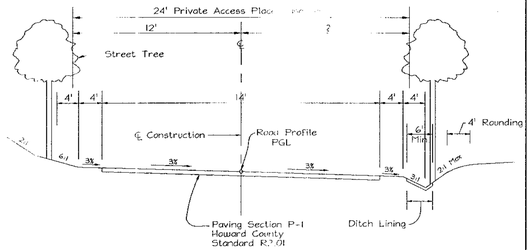
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-4-04



ROAD PLAN
SCALE: 1"=50'



TYPICAL ROADWAY SECTION
CLASSIFICATION :: PRIVATE ACCESS PLACE
NOT TO SCALE

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

ROAD PLAN AND PROFILE
PRIVATE ACCESS PLACE
HUNTERS RIDGE

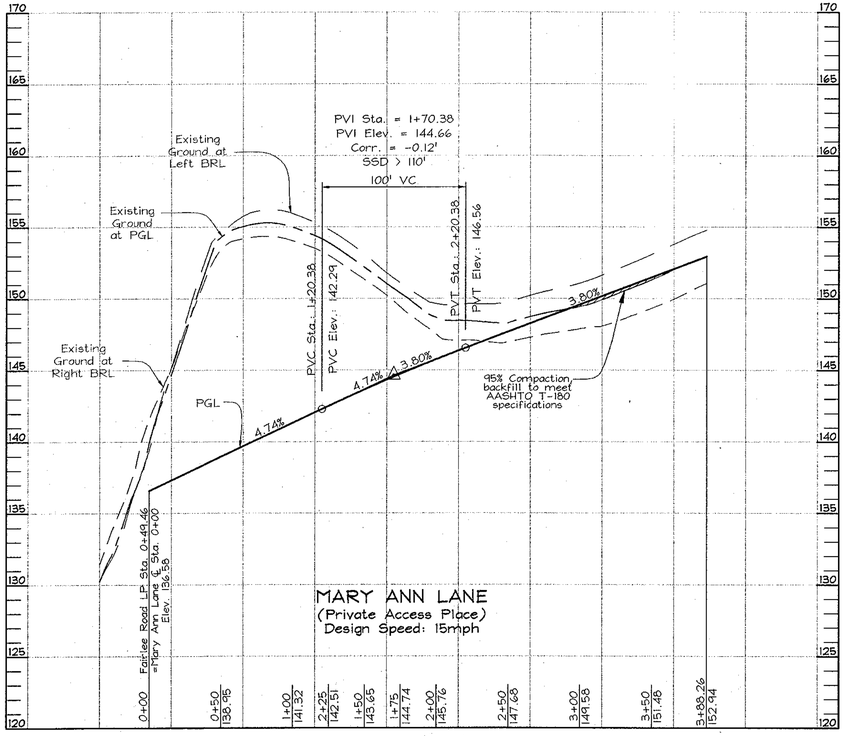
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND · JOSHUA YOSEF FISCH · 22418 · PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY: FS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: As Shown
DATE: Apr. 26, 2004
W.O. No.: 3018
SHEET No.: 4 OF 20



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

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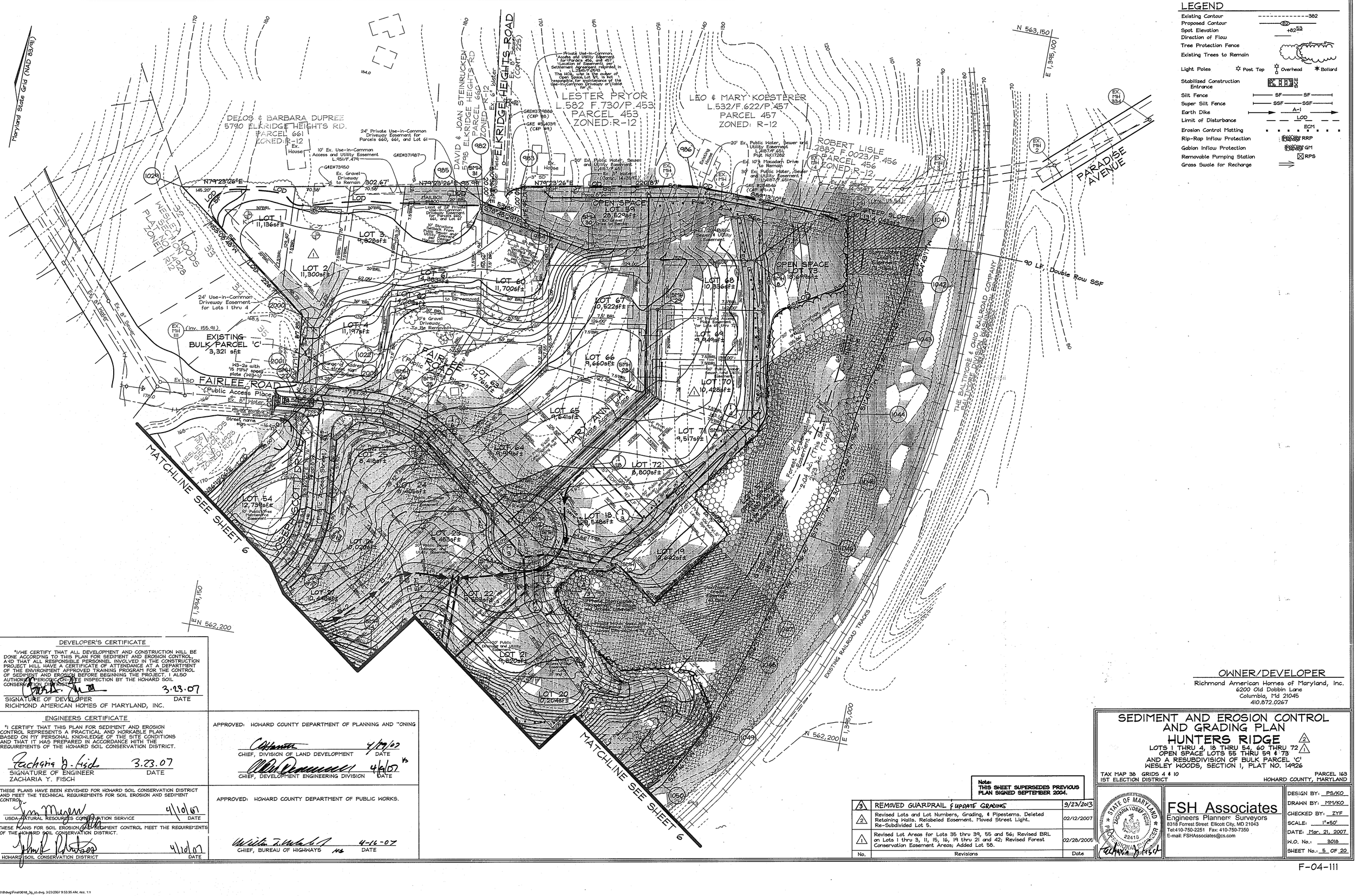
Maryland State Grid (NAD 83/91)
DELOS & BARBARA DUPREE
5790 ELKRIDGE HEIGHTS RD.
PARCEL 661
ZONED:R-12
Ex. House
DAVID & JOAN STEINRUCKEN
5796 ELKRIDGE HEIGHTS RD
PARCEL 662
ZONED:R-12
Ex. House
LESTER PRYOR
L.582 F.730/P.453
PARCEL 453
ZONED:R-12
LEO & MARY KOESTERER
L.532/F.622/P.457
PARCEL 457
ZONED: R-12
ROBERT LISLE
L.2882 F.0023/P.456
PARCEL 456
ZONED:R-12
ELKRIDGE HEIGHTS ROAD
(Public Access Place)
Ex. 6" Water
Ex. 8" Sewer
Ex. 8" Water
Ex. SD
Ex. Gravel Driveway to Remain
24' Private Use-in-Common Driveway Easement for Parcels 660, 661, and Lot 61
10' Ex. Use-in-Common Access and Utility Easement L.451/F.479
24' Private Use-in-Common Driveway Easement for Parcels 662, 661, and Lots 61 & 62
Private Use-in-Common Access and Utility Easement for Parcels 456 and 457 (Location or easement, per Settlement Agreement recorded in L.2687/F.0044)
The HOA, who is the owner of Open Space Lot 55, is not responsible for maintenance of the Use-in-Common Driveway or Utilities for it.
20' Ex. Public Water, Sewer and Utility Easement L.4187/F.651
Ex. 10" Water
Ex. 8" Sewer (Contr. 14-3567)
Ex. 10" Monadnock Drive to Remain
30' Ex. Public Water, Sewer and Utility Easement L.4187/F.651
Ex. 8" Sewer (Contr. 14-3567)
Existing Utility Easement & Utility Easement
Existing Access Easement
Existing Forest Conservation Easement
Existing Utility Easement
Existing Drainage Easement
Existing Water Easement
Existing Sewer Easement
Existing Storm Drain Easement
Existing Public Access Easement
Existing Public Utility Easement
Existing Public Water and Sewer Easement
Existing Public Water, Sewer and Utility Easement
Existing Public Drainage and Utility Easement
Existing Public Storm Drain Easement
Existing Public Drainage Easement
Existing Public Sewer Easement
Existing Public Water Easement
Existing Public Forest Conservation Easement
Existing Public Landscape Easement
Existing Public Use-in-Common Access Easement
Existing Public Use-in-Common Driveway Easement
Existing Public Use-in-Common Access and Utility Easement
Existing Public Use-in-Common Driveway and Utility Easement
Existing Public Use-in-Common Access, Utility and Drainage Easement
Existing Public Use-in-Common Driveway, Utility and Drainage Easement
Existing Public Use-in-Common Access, Utility, Drainage and Forest Conservation Easement
Existing Public Use-in-Common Driveway, Utility, Drainage and Forest Conservation Easement
Existing Public Use-in-Common Access, Utility, Drainage, Forest Conservation and Landscape Easement
Existing Public Use-in-Common Driveway, Utility, Drainage, Forest Conservation and Landscape Easement
Existing Public Use-in-Common Access, Utility, Drainage, Forest Conservation, Landscape and Water Easement
Existing Public Use-in-Common Driveway, Utility, Drainage, Forest Conservation, Landscape and Water Easement
Existing Public Use-in-Common Access, Utility, Drainage, Forest Conservation, Landscape, Water and Sewer Easement
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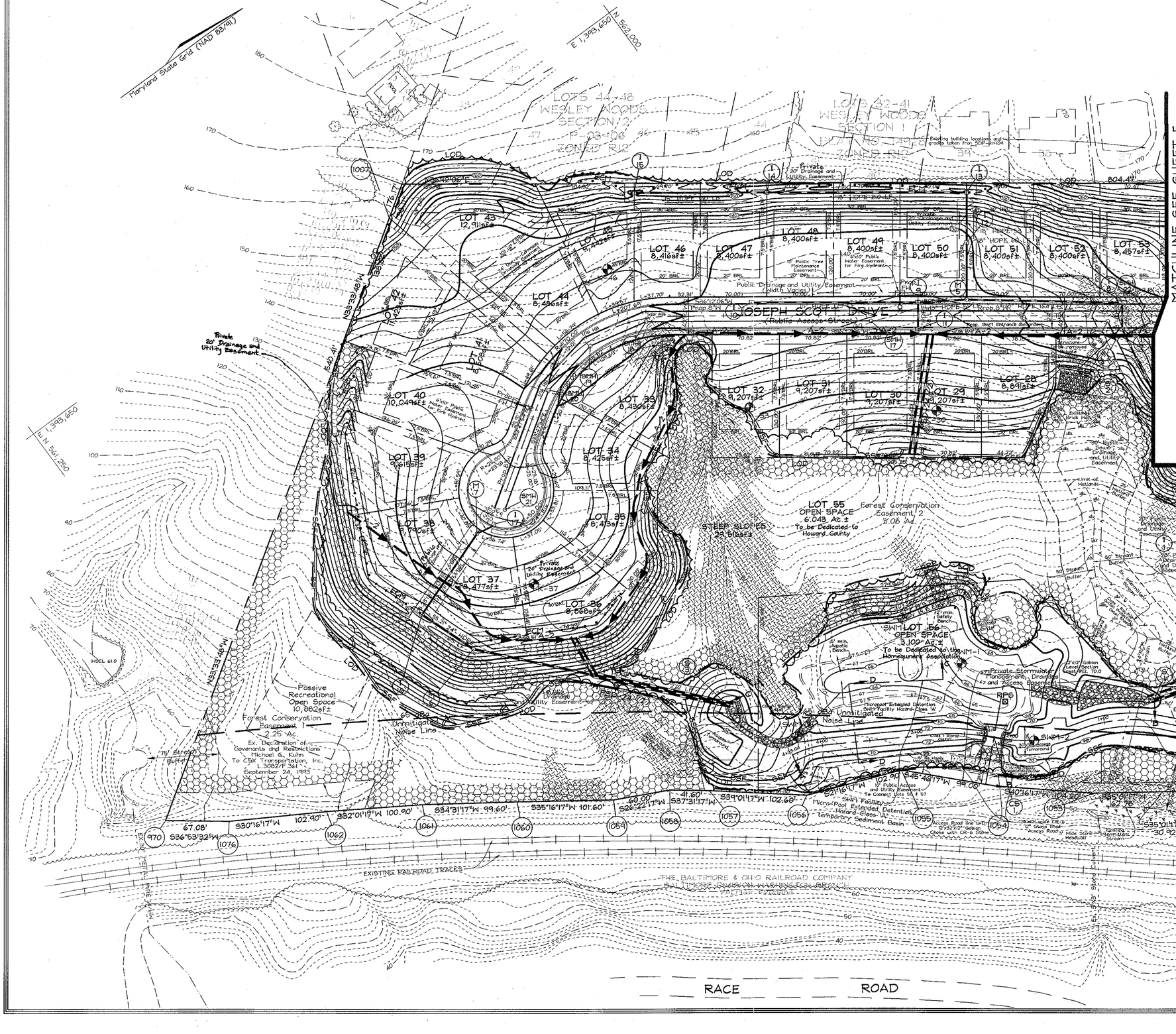


APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Linda Stanton — CHIEF, DIVISION OF LAND DEVELOPMENT — 10/13/04 DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 10/15/04 DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — 10-4-04 DATE

DEVELOPER'S CERTIFICATE

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

John D. Rix PROJECT MGR — 9/15/04 DATE

SIGNATURE OF DEVELOPER

RICHMOND AMERICAN HOMES OF MARYLAND, INC.

ENGINEERS CERTIFICATE

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

Zacharia Y. Fisch — 9/16/04 DATE

SIGNATURE OF ENGINEER

ZACHARIA Y. FISCH

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

USDA-NATURAL RESOURCES CONSERVATION SERVICE — 9/23/04 DATE

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

HOWARD SOIL CONSERVATION DISTRICT — 9/23/04 DATE

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

SEDIMENT AND EROSION CONTROL AND GRADING PLAN
HUNTERS RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND ZACHARIA YOSEF FISCH 22418 PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street [illegible]y, MD 21043
Tel:410-750-2251 [illegible]-750-7350
E-mail: FSHAssociates[illegible].com

DESIGN BY:	PS/KO
DRAWN BY:	MM/KO
CHECKED BY:	ZYF
SCALE:	1"=50'
DATE:	Sept. 15, 2004
W.O. No.:	3018
SHEET No.:	6 OF 20

F-04-111

SEQUENCE OF CONSTRUCTION

1. Obtain grading permit and contact Howard County Sediment Control Inspector (SCI) to arrange a preconstruction meeting. (1 Day)
2. Install Stabilized Construction Entrance at Fairlee Road as access point for construction. (1 Day)
3. Clear and grub as necessary for installation of sediment control features, including super silt fences, earth dikes, slope drains, and sediment basin.
4. Install silt fence, super silt fence, forebays and CS-1 for sediment basin use phase. Provide temporary 1.0' weir opening and temporary brick and mortar blocking per detail this sheet. (2 weeks)
5. Clear and grub site and install earth dikes and pipe slope drains to convey runoff to basin. Note that earth dikes to be adjusted as grading and filling progresses on a daily basis. * *
6. With permission of SCI, begin road and lot grading. (2 Weeks)
7. Grade roads and lots to subgrade and install storm drain system and grass channels to be used for runoff conveyance to basin, * and construct retaining wall. (4 Weeks)
8. Pave roadways and apply permanent stabilization to all disturbed areas. (2 Weeks)
9. With permission of SCI, remove all silt fences/super silt fences and stabilize those areas. (1 Week)
10. Flush storm drains of sediment. Convert sediment/stormwater basin to permanent SWM(CS-1): dewater and remove accumulated sediment blocking devices on weir, construct permanent weir to proposed elevation, install trash rack, fine grade bottom to proposed elevations and apply permanent seeding and mulching to disturbed areas. (1 week)

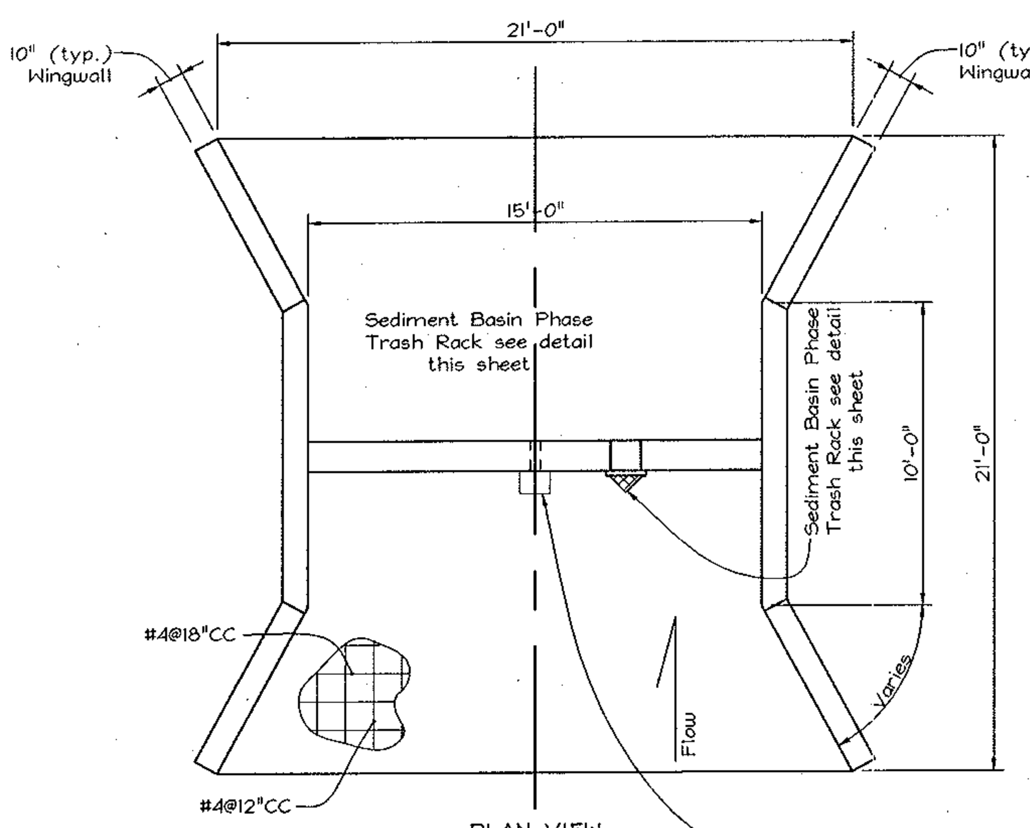
* Remove earth dikes and pipe slope drains where storm drains are in-place to convey runoff to basin.

* * Contractor to provide temporary stabilization to perimeter slopes within 7 days of grading or as directed by Howard County Sediment Control Inspector.

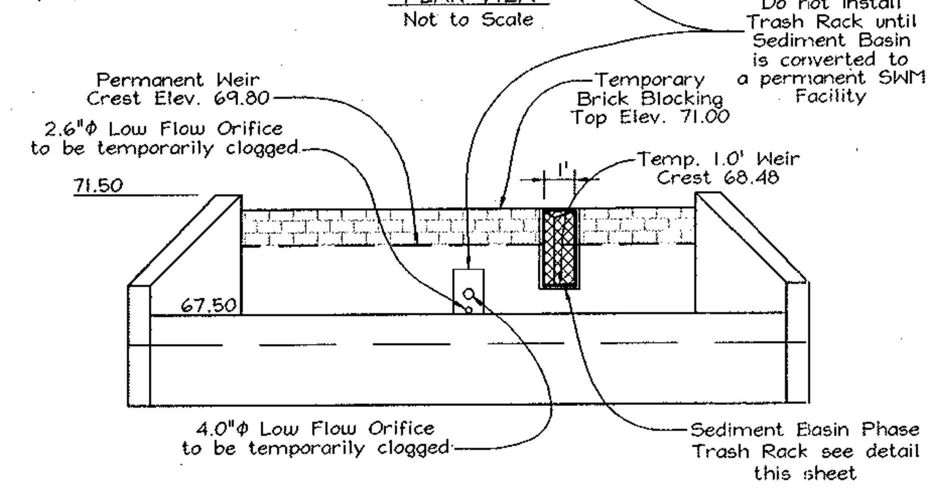
HUNTERS RIDGE SWM SUMMARY TABLE

Category	Volume Required	Volume Provided	Notes
Water Quality Volume (WQ_v)	0.5 Ac. Ft.	0.86 Ac. Ft.	0.36 Ac. Ft. stored in micro pool with 0.25 Ac. Ft. of extended detention.
Recharge Volume/Area (Re_v) (Re_a)	0.92 Ac.Ft. 0.99 Ac.	1.0 Ac. Ft.	See Note below
Channel Protection Volume (Cp_v)	33,106 cu. ft	33,106 cu. ft	1/2 incoming volume is detained for 18.48 hrs.
Overbank Flood Protection (Q_p)	N/A	N/A	Not Required
Extreme Flood Volume (Q_f)	N/A	N/A	Not Required

Notes:
Recharge area (Re_a) treatment provided for lots 12-17, 1/2 lot 18, 1/2 lot 35 and all of lots 36-39 with grass channels at average slopes of 4%.
Sheet Flow to Buffer credit taken for lot 11 and 1/2 of lot 19.
Dry well treatment provided for lots 43-54. (Dry wells at downspouts provided).



PLAN VIEW
Not to Scale



FRONT ELEVATION
Not to Scale

CS-1 CONCRETE WEIR CONTROL STRUCTURE MODIFICATIONS FOR SEDIMENTCONTROL

NOT TO SCALE

NOTE:

Contractor shall form up a 1.0' wide temporary weir notch in the weir wall at crest elevation 68.48, providing a 2"x2" keyway. Contractor shall extend permanent weir crest to elevation 71.0 using brick and mortar, leaving a 1.0' wide opening to elevation 68.48. Once Sediment Control Measures are removed, these modifications shall be removed and the 1' wide weir shall be formed and poured to the permanent weir crest elevation (69.80).

LEGEND

(SWM Facility Hydrologic Zones Planting Requirements)

Zone 1 - 6406 s.f. - 12"-36" depth below normal pool elevation
Pickerelweed, Deep Water Duck Potato, Sago Pond Plant, Wild Celery, Redhead Grass. Plugs or bare root at 24" centers.

Zone 2 - 7177 s.f. - 0"-12" depth below normal pool elevation
Blue Flag Iris, Duck Potato, Flowering Bulrush, Softrush, Sedges, Lobelia, Pond Cypress, various asters. Plugs or bare root at 24" centers.

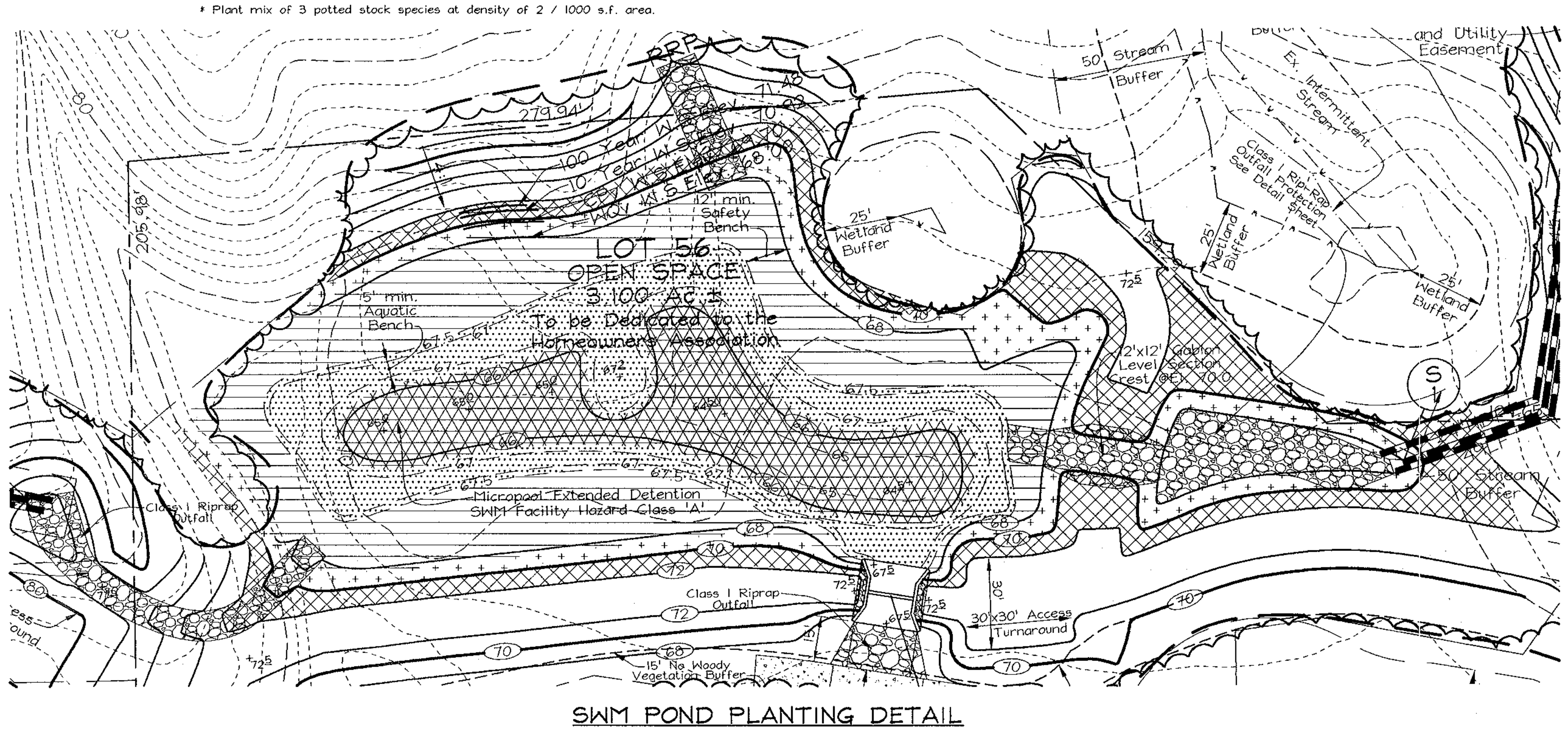
Zone 3 - 11236 - 0"-12" elevation above normal pool elevation
New England Aster, Marsh Aster, Marsch Marigold (Appalachian Plateau), Tussock Sedge, Spotted Joe Pye Weed, Forget Me Nots, Inkberry, Purple, Red Osier Dogwood, Seed Mix Only

Zone 4 - 4488 s.f. - 1' to Cpv water surface elevation
Purple Cone Flower, Birds Foot Trefoil, Slender Rush, Deer Tongue Grass, Lespedeza, Switch Grass, Serviceberry, Gray Birch, Hackberry, Sweet Pepper, Bush (Coastal Plain), Gray Stem Dogwood, Red Osier Dogwood, Green Ash. Seed Mix with potted stock (No trees/shrubs on dam slopes).*

Zone 5 - Cpv to Qp100 water surface elevation
(many wildflowers and native grasses) American Holly, Witch Hazel, Ninebark, Red Oak, American Elderberry, American Hemlock, Lowbush, Blueberry, Maple Leaf Viburnum, Nannyberry, Blackhaw Viburnum Seed Mix with potted stock (No trees/shrubs on dam slopes).*

None Shown — Zone 6 - Qp100 water surface elevation and above
This area will be planted, where necessary, as part of forest conservation obligations. Many Natives. All species must be able to tolerate flood plain conditions.
Native Grasses. Seed Mix with potted stock (No trees/shrubs on dam slopes).*

* Plant mix of 3 potted stock species at density of 2 / 1000 s.f. area.



SWM POND PLANTING DETAIL
Scale: 1" = 30'

21.0 STANDARDS 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 vegetable 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 a 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 that 1 and 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.

II. 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.

iii. 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 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 ammendments 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 place 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.

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, discing 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 acre dolomitic limestone (92 lbs/100 sq.ft.) and 600 lbs per acre 10-10-10 fertilizer (14 lbs./1000 sq.ft.) before seeding. Harrow or disc into upper three inches of soil. At the time of seeding, apply 400 lbs. per acre 30-0-0 ureaform fertilizer (9 lbs/1000 sq.ft.)
2) Acceptable-Apply 2 tons per acre dolomatic limestone (92 lbs/1000 sq.ft.) and apply 1000 lbs. per acre 10-10-10- fertilizer (23 lbs./1000 sq.ft.) before seeding. Harrow or disc 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/1000 sq.ft.) of Turf Type Tall Fescue. For the period May 1 thru July 31, seed with 60 lbs. Turf Type Tall Fescue per acre and 2 lbs. per acre (.05 lbs./1000 sq.ft.) of weeping lovegrass. During the period of October 16 thru February 28, protect site by: Option (1) 2 tons per acre well anchored straw mulch and seed as soon as possible in the spring. Option (2) Use sod. Option (3) Seed with 60 lbs/acre Kentucky 31 Tall Fescue and mulch with 2 tons/acre well anchored straw.

MULCHING: Apply 1 1/2 to 2 tons per acre (70 to 90 lbs/1000 sq. 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/1000 sq.ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq.ft.) for anchoring.

MAINTENANCE: Inspect all seeded areas and make needed repairs, replacements and reseedings.

TEMPORARY SEEDING NOTES

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

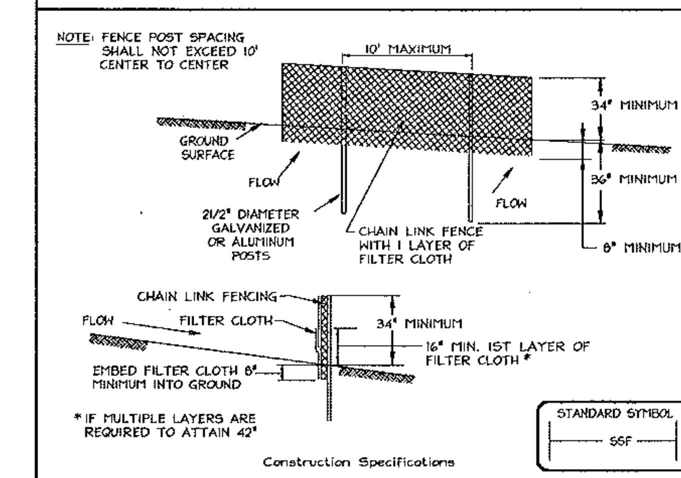
SOIL AMENDMENTS: Apply 600 lbs. per acre 10-10-10 fertilizer (14 lbs./1000 sq.ft).

SEEDING: For periods March 1 thru April 30 and from August 15 thru November 15, seed with 2 1/2 bushel per acre of annual rye (3.2 lbs./1000 sq.ft.) For the period May 1 thru August 14, seed with 3 lbs. per acre of weeping lovegrass (.07 lbs./1000 sq.ft.). For the period November 1 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./1000 sq.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/1000 sq.ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq.ft.) for anchoring.

REFER TO THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR RATE AND METHODS NOT COVERED.

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

SEDIMENT CONTROL NOTES

1. A minimum of 48 hours notice must be given to the Howard County Department of Inspection, License and Permits Sediment Control Division prior to the start of any construction (313-1855).
2. All vegetation and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the 1994 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. I, Chapter 7, 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 for permanent seeding, sod, temporary seeding, and mulching (Sec. G). Temporary stabilization with mulch alone shall 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 :

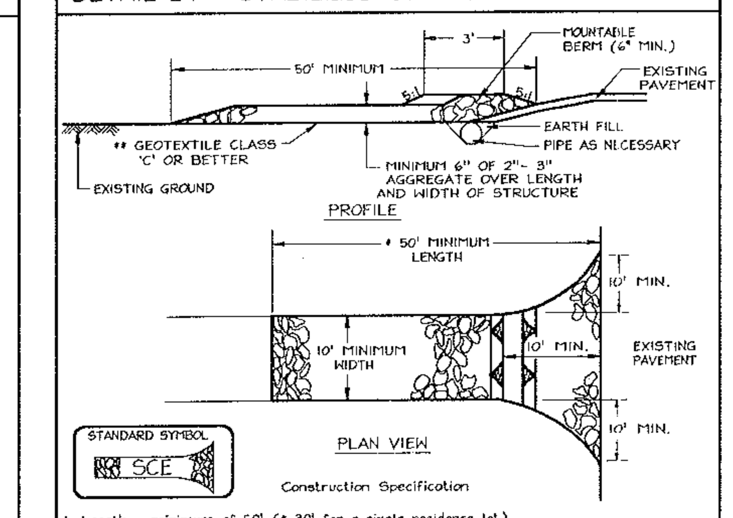
Total Area	25.66 Acres
Area Disturbed	17.68 Acres
Area to be roofed or paved	1.39 Acres
Area to be vegetatively stabilized	16.29 Acres
Total Cut	92,098 CY **
Total Fill	91,706 CY **
Offsite waste/borrow area location	*

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 controls 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 shall be back-filled and stabilized within one working day, whichever is shorter.

* To be determined by contractor, with pre-approval of the Sediment Control Inspector with an approved and active grading permit

**Total cut and fill quantities are for permit purposes only. Contractor to verify earthwork quantities.

DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE

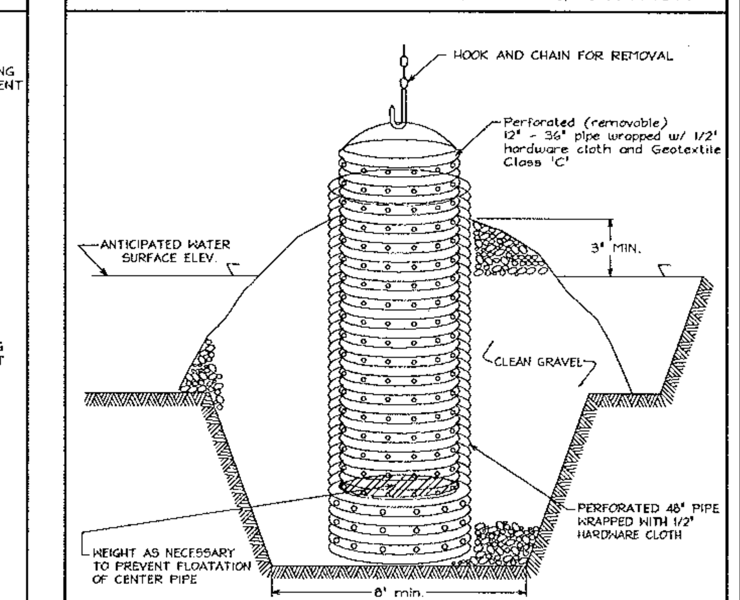


Construction Specification

1. Length - minimum of 50' (* 30' for a 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.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE F - 17 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 20A - REMOVABLE PUMPING STATION



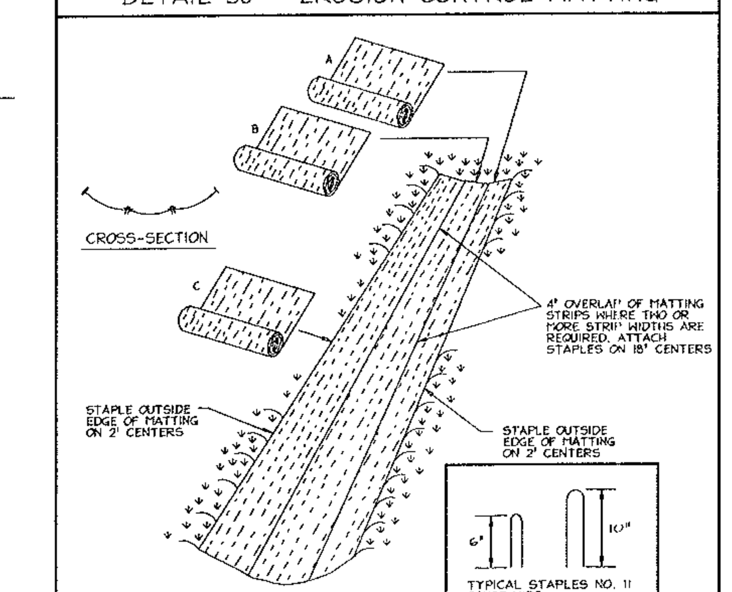
ELEVATION

Construction Specifications

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.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE D - 12 - 4	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 30 - EROSION CONTROL MATTING



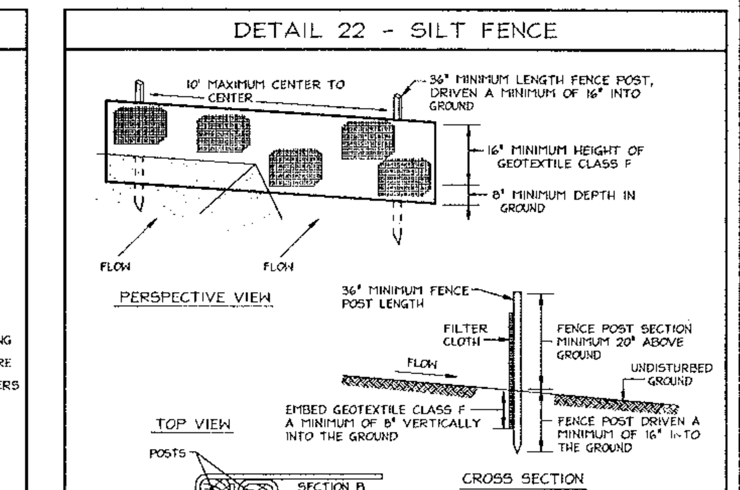
Construction Specifications

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 - 2	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 22 - SILT FENCE



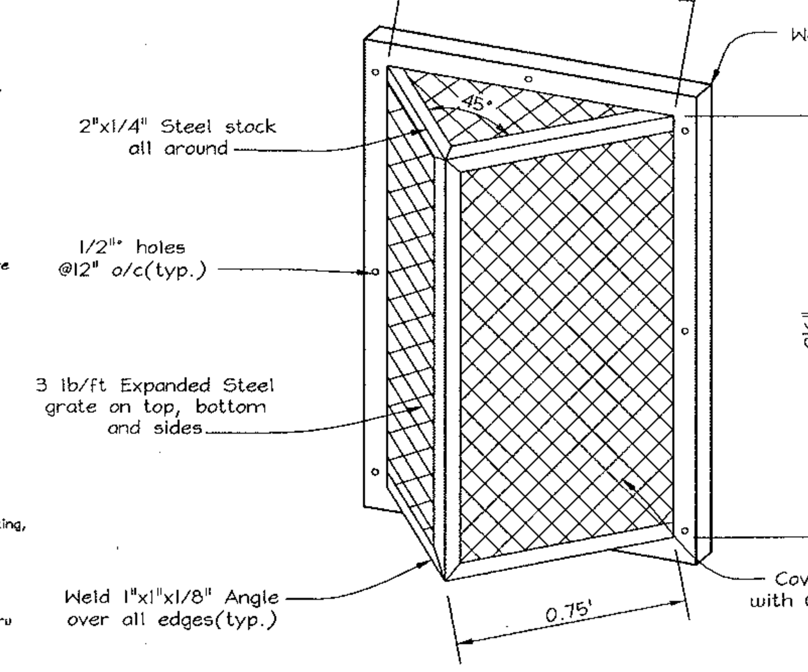
Construction Specifications

1. Fence posts shall be a minimum of 36" long, driven 16" minimum into the ground. Wood posts shall be 1 1/2" x 1 1/2" square (minimum) cut, or 1 3/4" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighing not less than 1.00 pound 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 ft /minute (max.)	Test: MSMT 322
Filtering Eggeciency	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 reaches 50% of the fabric height.

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



TRASH RACK DETAIL
NOT TO SCALE

NOTES FOR TEMPORARY TRASH RACK

(To be used on Temporary Weir during Sediment Basin Phase only.)
1. Trash rack to be centered over opening.
2. Steel to conform to ASTM A-36.
3. All surfaces to be coated with ZRC cold galvanizing compound after welding.
4. Trash rack to be fastened to the wall with 1/2" masonry anchors. Trash rack to be removeable.

SEDIMENT BASIN SCHEDULE (CS-1)

Drainage Area 22.23 Ac.
Storage Required 40,014 cu.ft. wet & dry
Storage Provided 40,014 cu.ft. wet & dry
Weir Length 15' tot.
Bottom Elevation: 64.5
Cleanout Elevation: 67.5
Embankment Elevation: 73.0 (constructed)
Wet Storage Elevation: 68.48
Dry Storage Elevation: 70.20
Q_1 Existing: 12.17 CFS
Q_1 Proposed: 8.65 CFS @ elevation 70.44
Q_{10} Existing: 66.51 CFS
Q_{10} Proposed: 52.77 CFS @ elevation 71.78

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cindy Hamilton 10/19/04
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

[signature] 10/15/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

[signature] 10-4-04
CHIEF, BUREAU OF HIGHWAYS — DATE

DEVELOPER'S CERTIFICATE

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

[signature] PROJECT MGR 9/15/04
SIGNATURE OF DEVELOPER — DATE
RICHMOND AMERICAN HOMES OF MARYLAND, INC.

ENGINEERS CERTIFICATE

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

Zacharia Y. Fisch 9/15/04
SIGNATURE OF ENGINEER — DATE
ZACHARIA Y. FISCH

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

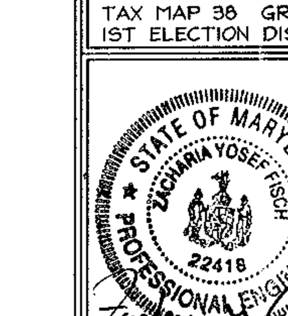
[signature] 9/23/04
USDA-NATURAL RESOURCES CONSERVATION SERVICE — DATE

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

[signature] 9/23/04
HOWARD SOIL CONSERVATION DISTRICT — DATE

SEDIMENT AND EROSION CONTROL AND SWM POND NOTES AND DETAILS
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

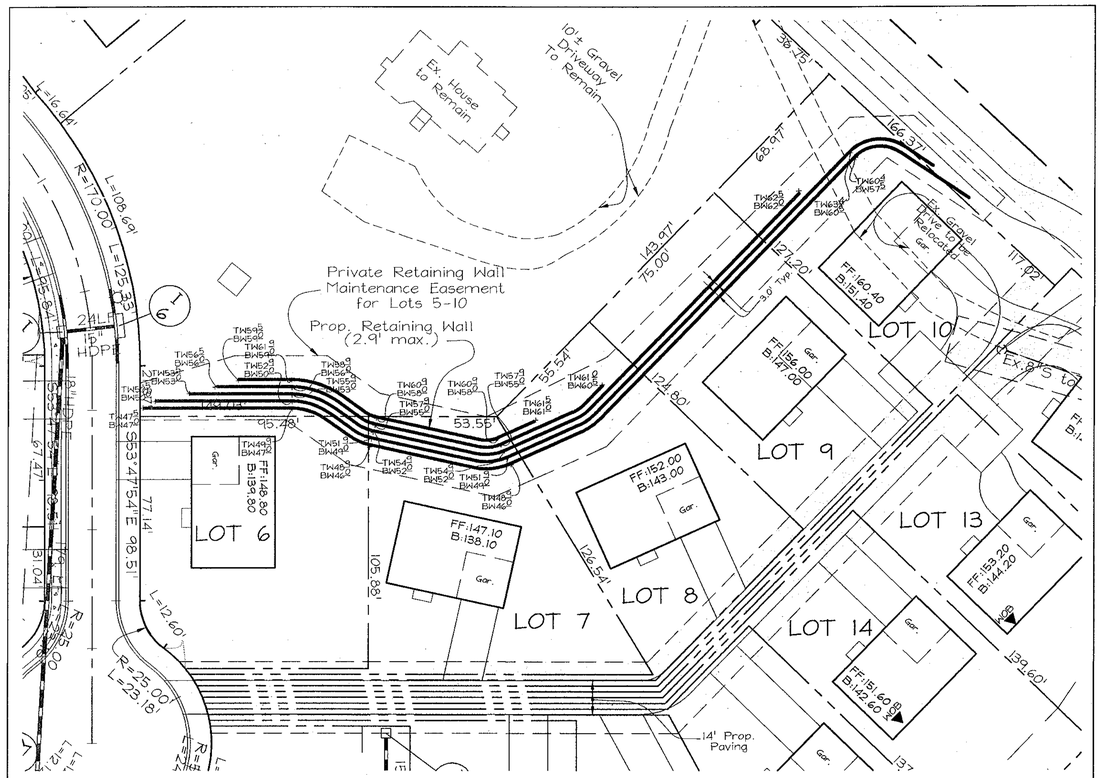
TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND



FSH Associates
Engineers Planners Surveyors
8318 Forrest Street ...ty, MD 21043
Tel:410-750-2251 ...750-7350
E-mail: FSHAssociates...com

DESIGN BY:	KO
DRAWN BY:	KO
CHECKED BY:	ZYF
SCALE:	As Shown
DATE:	Sept. 15, 2004
W.O. No.:	3018
SHEET No.:	7 OF 20

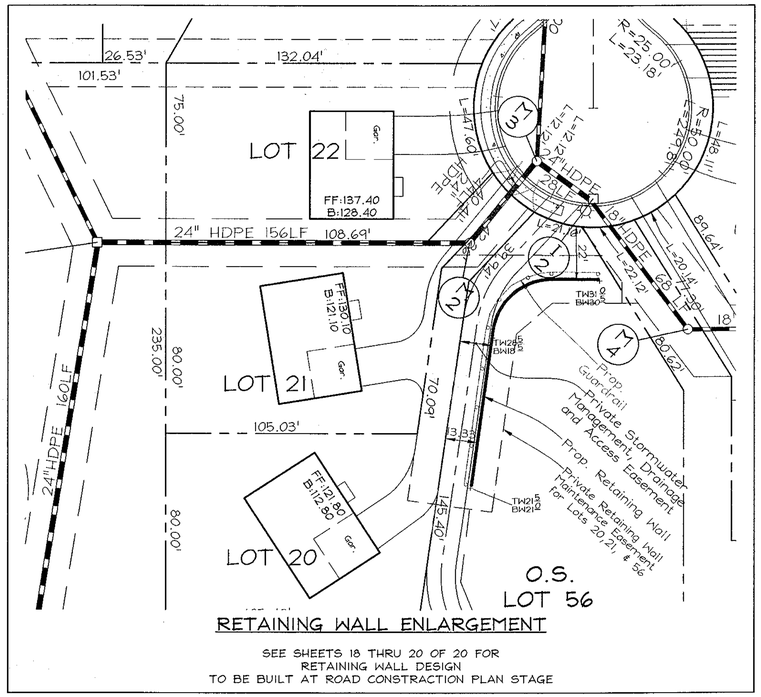
F-04-111



RETAINING WALL ENLARGEMENT

LOTS 6 - 10

TO BE BUILT AT SITE DEVELOPMENT PLAN STAGE

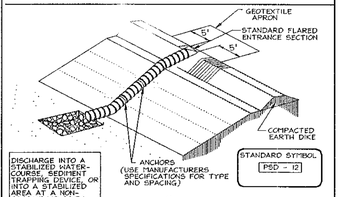


RETAINING WALL ENLARGEMENT

SEE SHEETS 18 THRU 20 OF 20 FOR RETAINING WALL DESIGN

TO BE BUILT AT ROAD CONSTRACTION PLAN STAGE

DETAIL 2 - PIPE SLOPE DRAIN



NOTE: PIPE SIZE DESIGNATION IS PSD 12 = PIPE SLOPE DRAIN WITH A 12" DIAMETER PIPE.

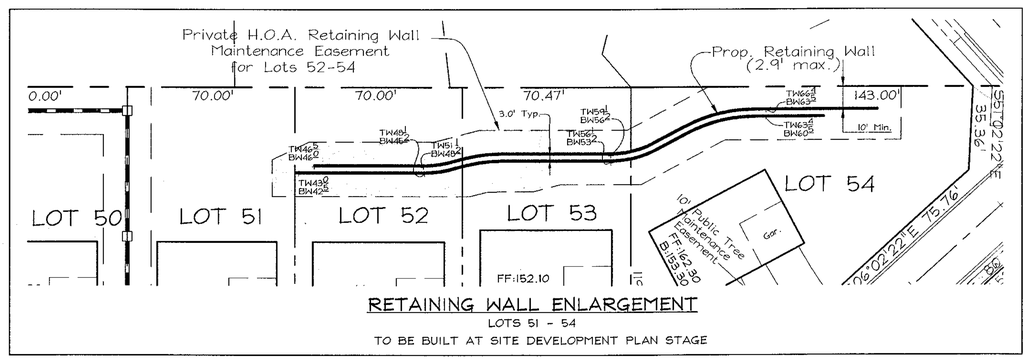
Table 6 Design Criteria for Pipe Slope Drain

Size	Pipe/Tubing Diameter (D) in	Maximum Drainage Area (Acres)
PSD-12	12	0.5
PSD-18	18	1.5
PSD-21	21	2.5
PSD-24	24	3.5
PSD-24 (2)	24	5.0

Construction Specifications - Pipe Slope Drain

1. The Pipe Slope Drain (PSD) shall have a slope of 3 percent or steeper.
2. The top of the earth dike over the inlet pipe shall be at least 2 times the pipe diameter measured at the invert of the pipe.
3. Flexible tubing is preferred. However, corrugated metal pipe or equivalent PVC pipe can be used. All connections shall be watertight.
4. A flared end section shall be attached to the inlet end of pipe with a watertight connection. Filter cloth shall be placed under the inlet of the pipe slope drain and shall extend out 5' from the inlet. The filter cloth shall be "keyed in" on all sides.
5. The Pipe Slope Drain shall be securely anchored to the slope by staking at the grommets provided. Spacing for anchors shall be as provided by manufacturer's specification. In no case shall less than two (2) anchors be provided, equally spaced along the length of pipe. These details should be provided by pipe suppliers.
6. The soil around and under the pipe end and section shall be hand tamped in 4 inch lifts to the top of the earth dike.
7. All pipe connections shall be watertight.
8. Wherever possible where a PSD drains an unstabilized area,it shall outlet into a sediment trap or basin. If this is not possible than the slope drain will discharge into a stable conveyance that leads to a sediment trap or basin. When discharging into a trap or basin the PSD shall discharge at the same elevation as the wet pool elevation. The discharge from the PSD must be as far away from the sediment control outlet as possible.
9. When the drainage area is stabilized, the PSD shall discharge onto a stabilized area at a non-erosive velocity.
10. Inspection and any required maintenance shall be performed periodically and after each rain event.
11. The inlet must be kept open at all times.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE B - 5 - 4	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

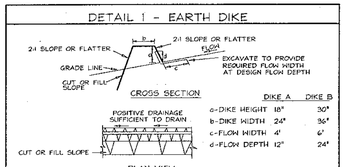


RETAINING WALL ENLARGEMENT

LOTS 51 - 54

TO BE BUILT AT SITE DEVELOPMENT PLAN STAGE

DETAIL 1 - EARTH DIKE



	DIKE A	DIKE B
a-DIKE HEIGHT	18"	30"
b-DIKE WIDTH	24"	36"
c-FLOW WIDTH	4'	6'
d-FLOW DEPTH	12"	24"

STANDARD SYMBOL A-2 B-3

FLOW CHANNEL STABILIZATION GRADE 0.5% MIN. 10% MAX.

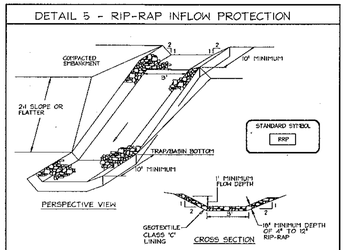
1. Seed and cover with straw mulch.
2. Seed and cover with Erosion Control Matting or line with sod.
3. 4" - 7" stone or recycled concrete equivalent pressed into the soil 7" minimum

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

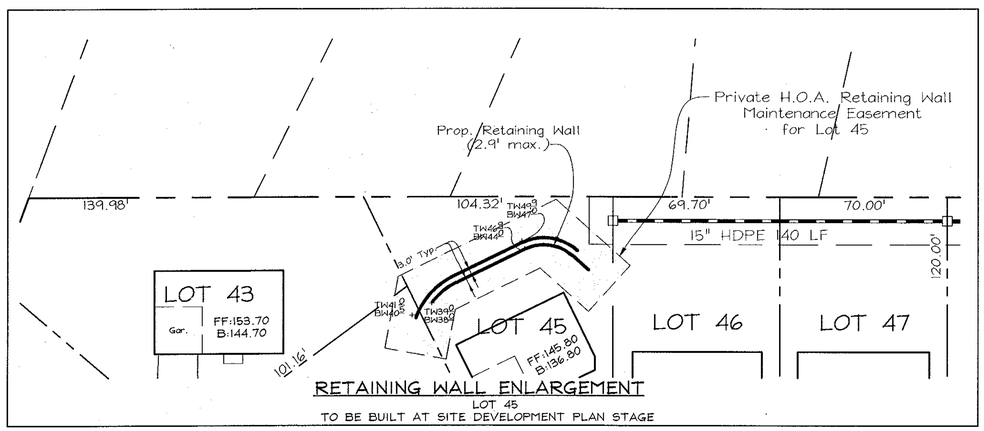
DETAIL 5 - RIP-RAP INFLOW PROTECTION



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.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE B - 6 - 2	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION



RETAINING WALL ENLARGEMENT

LOT 45

TO BE BUILT AT SITE DEVELOPMENT PLAN STAGE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/19/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-4-04

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

RETAINING WALL ENLARGEMENTS and SEDIMENT AND EROSION CONTROL DETAILS

HUNTERS RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57

AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163

1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND ZACHARY YOSEF FISCH 22418 PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: 1"=30'
DATE: Sept. 15, 2004
W.O. No.: 3018
SHEET No.: 8 OF 20

F-04-111

SOILS LEGEND

SYMBOL	NAME / DESCRIPTION	SOIL GROUP
BeB2	Beltsville silt loam, 1 to 5 percent slopes, moderately eroded	C
BeC2	Beltsville silt loam, 5 to 10 percent slopes, moderately eroded	C
BeD2	Beltsville silt loam, 10 to 15 percent slopes, moderately eroded	C
CIC3	Chillum gravely loam, 5 to 10 percent slopes, moderately eroded	C
CIE2	Chillum gravely loam, 15 to 30 percent slopes, moderately eroded	C
Md	Made land	
ScD	Sandy and clayey land, moderately sloping	C
ScE	Sandy and clayey land, moderately steep	C
SIC2	Sassafras soils, 5 to 10 percent slopes	B
SsE	Sassafras soils, 15 to 40 percent slopes	B

TOOMEY LANE

FAIRLEE ROAD

ELKRIDGE HEIGHTS ROAD

Maryland State Grid (NAD 83/91)

N 562,700 E 1,394,250

N 561,400 E 1,394,250

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

STORM DRAIN DRAINAGE AREA MAP
HUNTERS RIDGE
LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 36 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

AS-BUILT
FOR STORMWATER MANAGEMENT AND LANDSCAPING

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/19/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/19/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 4-26-07

ZACHARIA Y. FISCH PE #22418 — DATE 12/17/13

Note: THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

No.	Revisions	Date
3	UPDATED GRADING & REMOVED GUARDRAIL	9/23/2013
2	Revised Lots and Lot Numbers. Revised Drainage Divides. Deleted Retaining Walls and Easements. Re-Subdivided Lot 5. Revised Easements.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/25/2005

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Engineers Planners Surveyors
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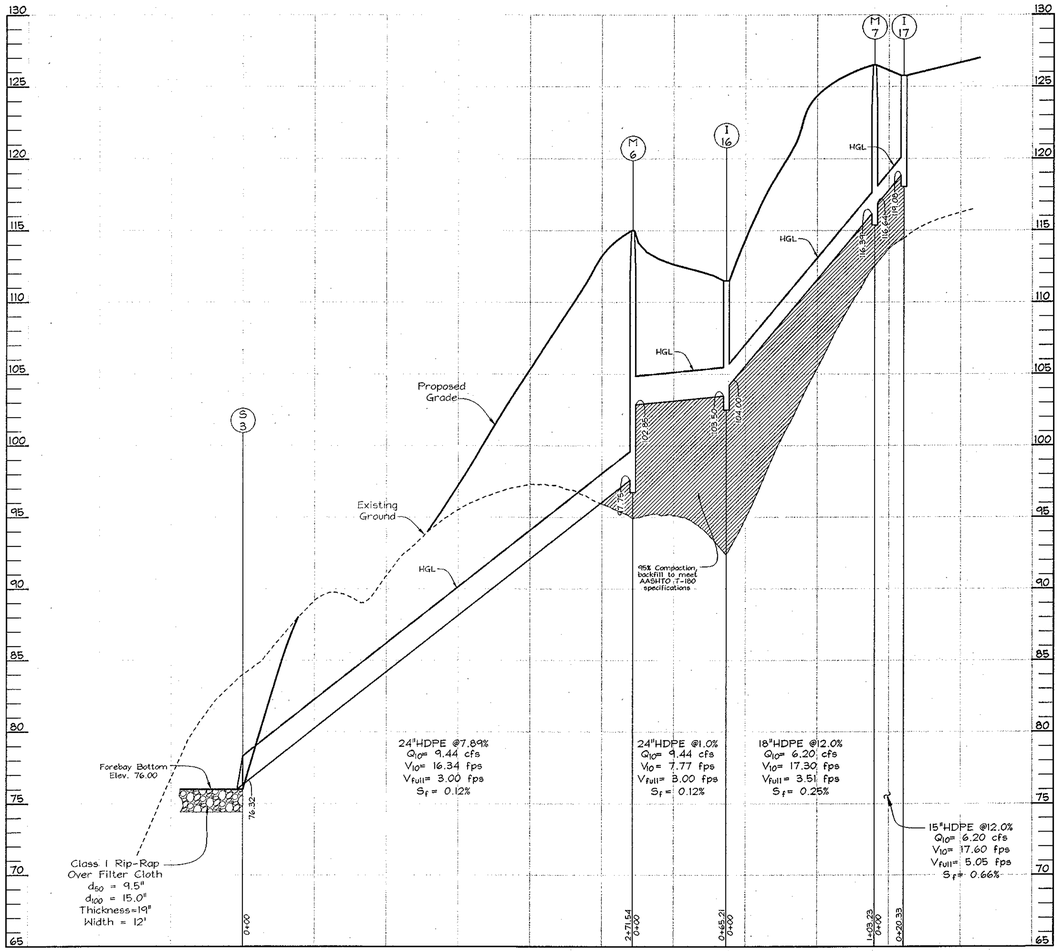
E-mail: FSHAssociates@cs.com

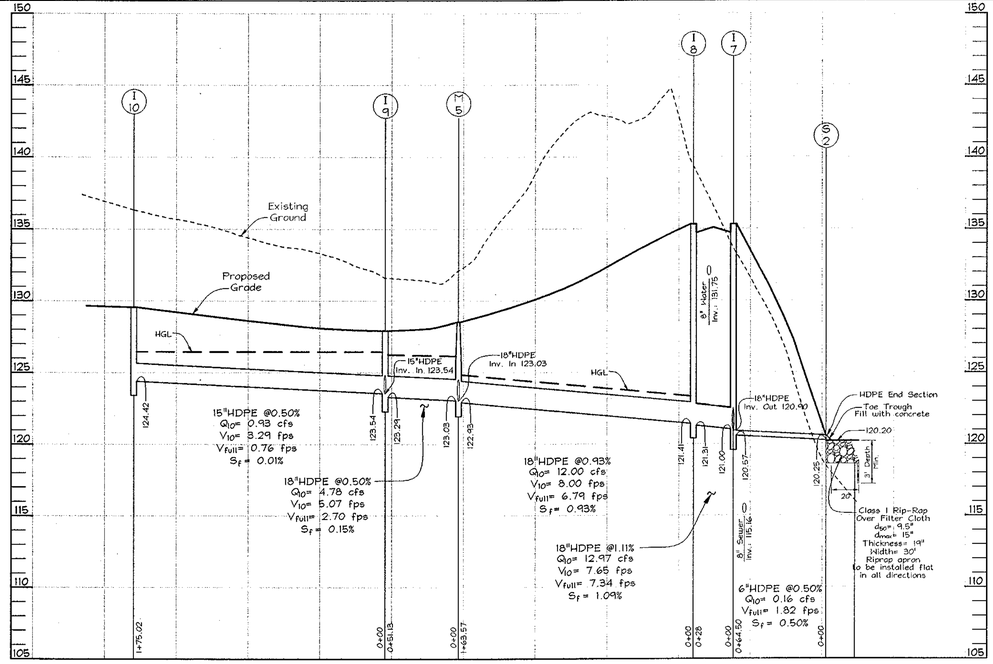
DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: 1"=50'
DATE: Mar. 21, 2007
W.O. No.: 3018
SHEET No.: 9 OF 20

F-04-111



STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'



STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
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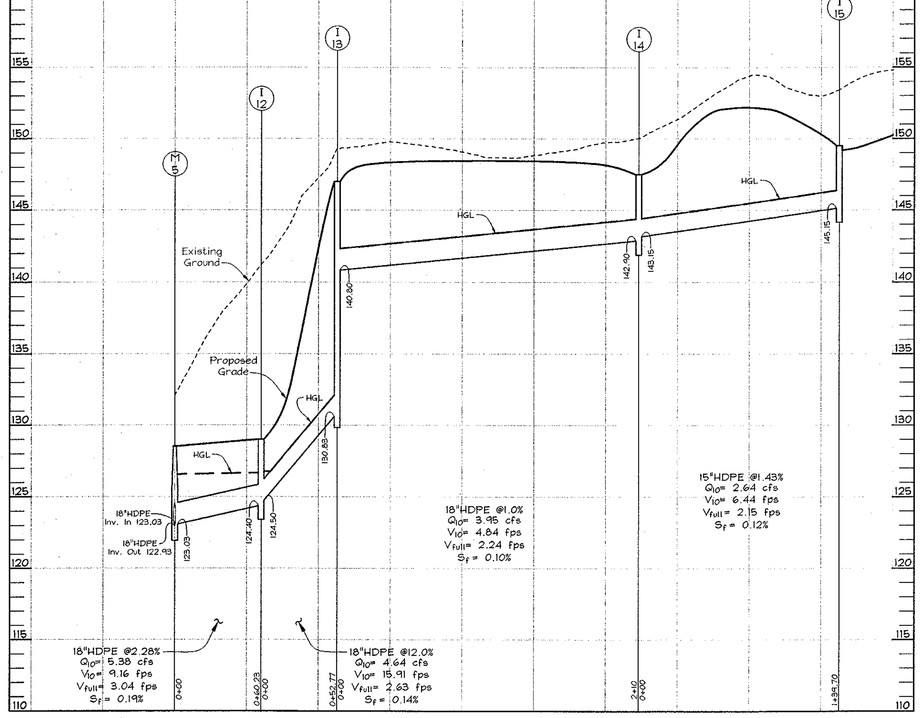
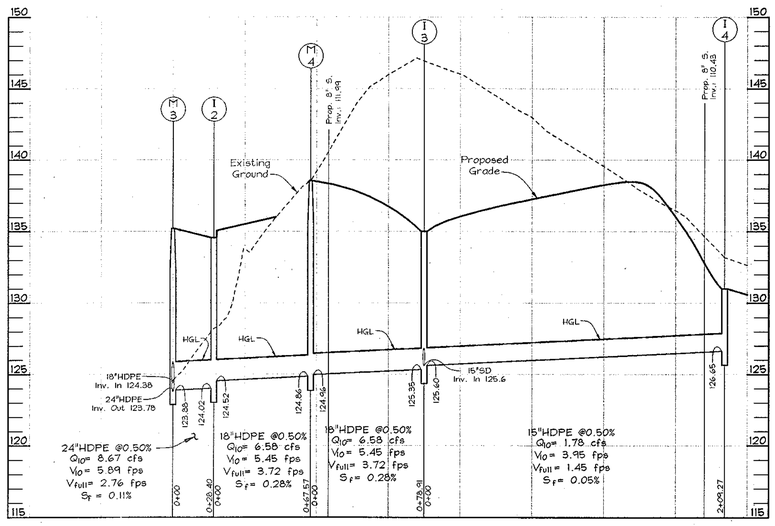


STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'



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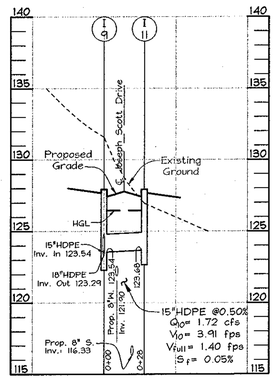

STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/9/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-4-04

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

STORM DRAIN PROFILES
HUNTERS RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — VICTORIA YOSEFF TESCH — 22418 — PROFESSIONAL ENGINEER

FSH Associates
Engineers & Planners Surveyors
8318 Forrest Stn — Ellicott City, MD 21043
Tel:410-750-225 — 410-750-7350
E-mail: FSHAsso...com

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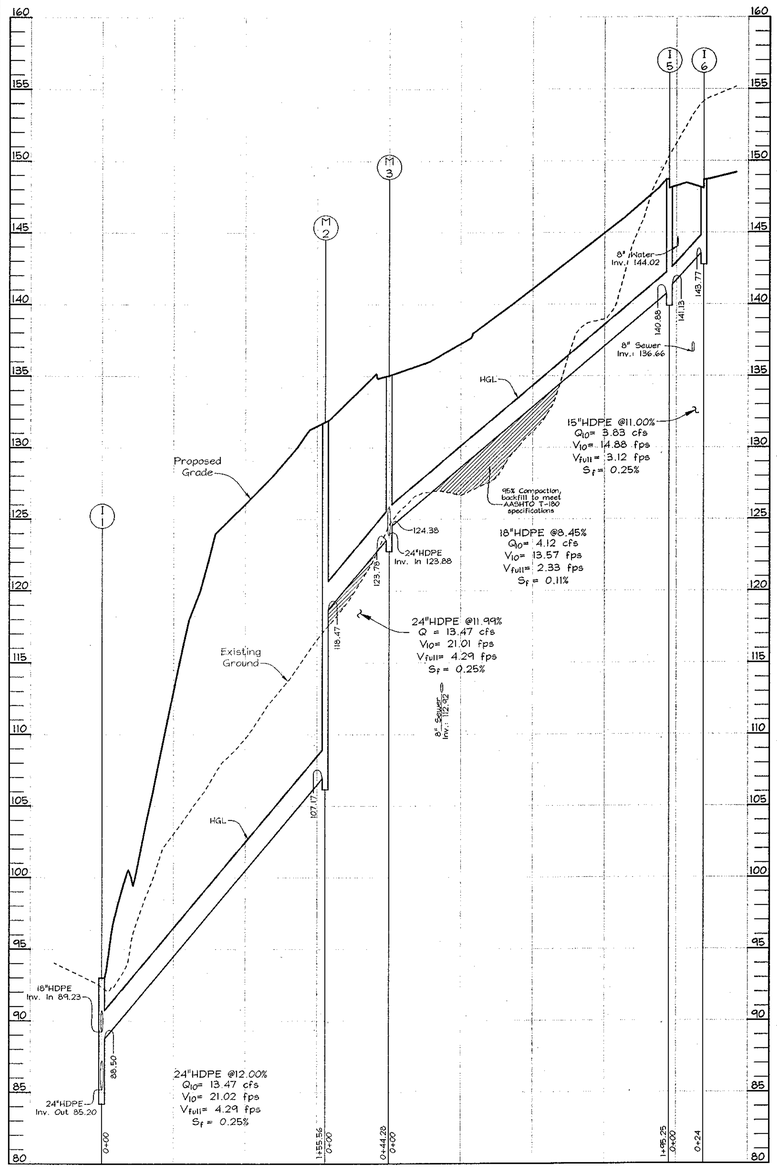

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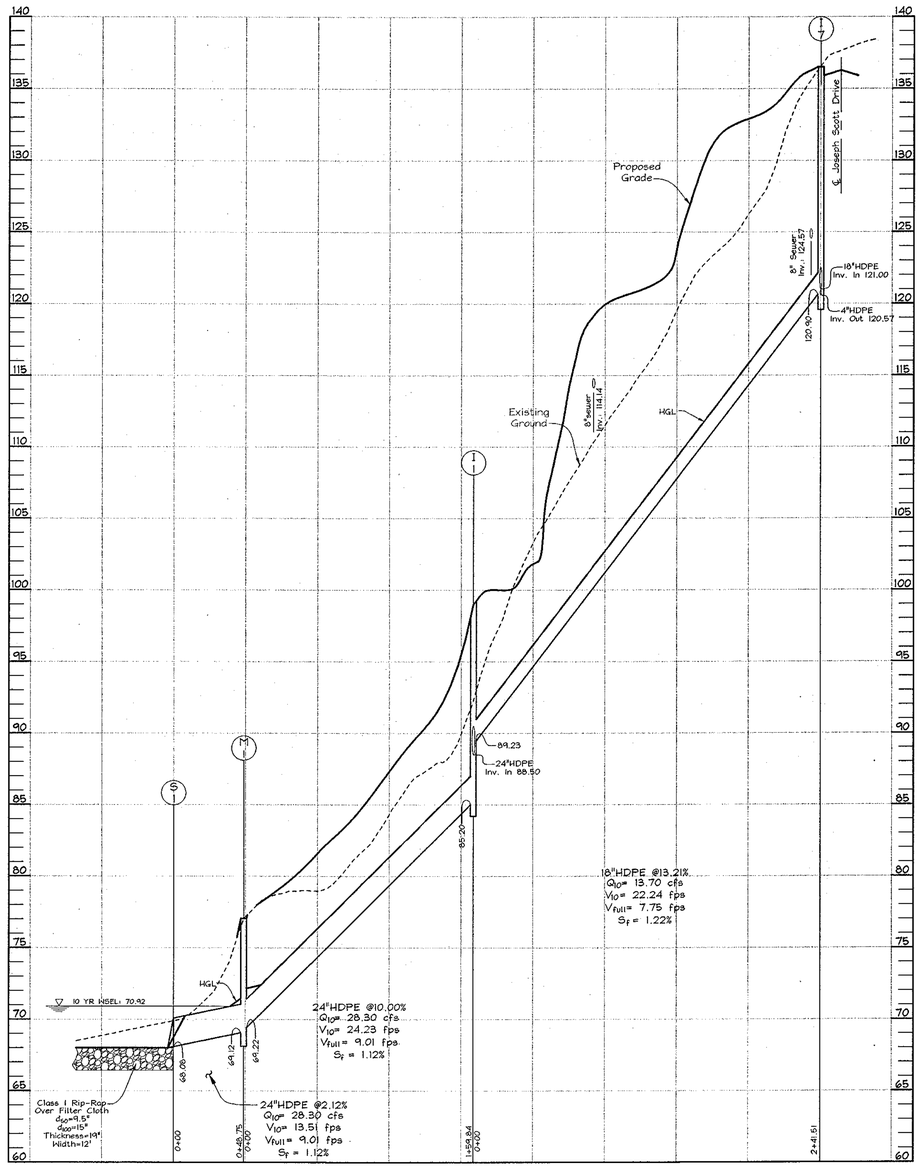


STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'

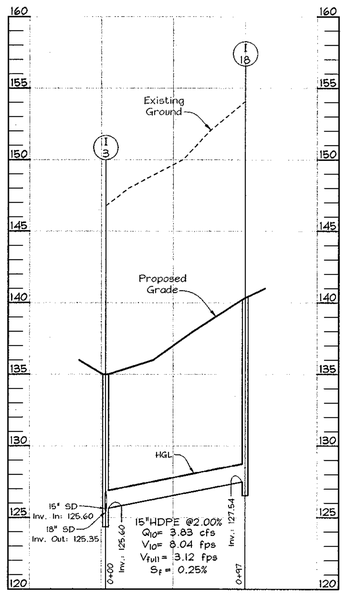
STRUCTURE SCHEDULE

NO.	TYPE	LOCATION		TOP ELEV.	INV. IN	INV. OUT	REMARKS
I-1	Single 'S' Inlet	N 562,195.31	E 1,394,475.28	99.00	84.23'(18") 88.50'(24")	85.20	SD 4.22
I-2	Single 'S' Inlet	N 562,373.40	E 1,394,582.73	134.56	124.52	124.02	SD 4.22
I-3	Single 'S' Inlet	N 562,440.31	E 1,394,699.57	136.0	125.60'(15") 125.60'(15")	125.35	SD 4.22
I-4	Single 'S' Inlet	N 562,605.52	E 1,394,820.50	131.0	-	126.65	SD 4.22
I-5	'A-5' Cast-In-Place Inlet	Fairlee Road Sta. 3+65.86	10.00' Right	148.75	141.13	140.88	SD 4.01
I-6	'A-10' Precast Inlet	Fairlee Road Sta. 3+65.86	10.00' Left	148.75	-	143.77	SD 4.41
I-7	'A-5' Cast-In-Place Inlet	Joseph Scott Drive Sta. 2+81.09	12.00' Left	136.49	121.00	120.57'(4") 120.40'(18")	SD 4.01
I-8	'A-10' Cast-In-Place Inlet	Joseph Scott Drive Sta. 2+81.09	12.00' Right	136.49	121.41	121.31	SD 4.02
I-9	'A-5' Precast Inlet	Joseph Scott Drive Sta. 4+95.67	12.00' Right	127.90	123.54'(15") 123.54'(15")	123.29	SD 4.40
I-10	'A-5' Precast Inlet	Joseph Scott Drive Sta. 6+70.69	12.00' Right	129.52	-	124.42	SD 4.40
I-11	'A-5' Precast Inlet	Joseph Scott Drive Sta. 4+95.67	12.00' Left	127.90	-	123.68	SD 4.40
I-12	Single 'S' Inlet	Joseph Scott Drive Sta. 4+44.64	77.23' Right	129.0	124.50	124.40	SD 4.22
I-13	Single 'S' Inlet	Joseph Scott Drive Sta. 4+44.64	130.00' Right	147.0	140.80	130.83	SD 4.22
I-14	Single 'S' Inlet	Joseph Scott Drive Sta. 6+54.64	130.00' Right	147.50	143.15	142.90	SD 4.22
I-15	Single 'S' Inlet	Joseph Scott Drive Sta. 7+76.86	132.49' Right	149.50	-	145.15	SD 4.22
I-16	Single 'S' Inlet	N 561,466.96	E 1,394,045.59	111.50	104.00	103.50	SD 4.22
I-17	Single 'S' Inlet	N 561,584.24	E 1,394,013.03	125.77	-	119.08	SD 4.22
I-18	Single 'S' Inlet	N 562,497.60	E 1,394,621.30	140.36	-	127.54	SD 4.22
M-1	Precast Manhole (4')	N 562,081.90	E 1,394,587.91	77.00	69.22	69.12	G 5.12
M-2	Precast Manhole (4')	N 562,320.84	E 1,394,567.16	133.30	118.47	107.17	G 5.12
M-3	Precast Manhole (4')	N 562,363.70	E 1,394,556.04	135.20	124.38'(18") 123.88'(24")	123.78	G 5.12
M-4	Precast Manhole (4')	N 562,372.98	E 1,394,650.29	138.53	124.96	124.86	G 5.12
M-5	Precast Manhole (4')	Joseph Scott Drive Sta. 4+44.64	17.00' Right	128.59	123.03'(18") 123.03'(18")	122.93	G 5.12
M-6	Precast Manhole (4')	N 561,489.09	E 1,394,106.93	115.00	102.85	97.75	G 5.12
M-7	Precast Manhole (4')	N 561,564.06	E 1,394,010.57	126.50	116.64	116.39	G 5.12
S-1	24" HDPE End Section	N 562,035.50	E 1,394,572.94	-	-	68.08	-
S-2	6" HDPE End Section	N 562,173.80	E 1,394,244.96	-	-	120.25	-
S-3	24" HDPE End Section	N 561,668.92	E 1,394,310.39	-	-	76.32	-

NOTE: 1. Top elevations are to the center, top of grate inlet for all 'S' inlets; center, top of concrete slab @ curb line for A-5 and A-10; and center top of manhole cover for precast manholes.
2. Structures I-3, I-13 and M-2 to have granite bottoms.
3. See Grading plans, sheets 5 and 6, for top of structure slopes.

PIPE SCHEDULE

SIZE	TYPE	LENGTH
6"	HDPE	64.5 LF
15"	HDPE	693 LF
18"	HDPE	1,225 LF
24"	HDPE	774 LF



STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cindy Hanson 10/19/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

10/15/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

William E. Mahoney Jr. 10-11-04
CHIEF, BUREAU OF HIGHWAYS DATE

STORM DRAIN PROFILES
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 PARCEL 163
1ST ELECTION DISTRICT HOWARD COUNTY, MARYLAND

STATE OF MARYLAND · VIRGINIA YOSEF FISCH · 22418 · PROFESSIONAL ENGINEER

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DRAWN BY: KO
CHECKED BY: ZYF
SCALE: As Shown
DATE: Sept. 15, 2004
W.O. No.: 3018
SHEET No.: 11 OF 20

F-04-111

MARYLAND 378
STORMWATER MANAGEMENT FACILITY CONSTRUCTION SPECIFICATIONS
CONSTRUCTION SPECIFICATIONS (FOR SWM DETENTION FACILITY CS-1)

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 tow of the embankment.

Areas to be covered by the reservoir will be cleared of all trees, brush, logs, fences, rubbish and other objectionable material unless otherwise designated on the plans. Trees, brush, and stumps shall be cut approximately level with the ground surface. For dry stormwater management 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 placement of fill. Fill materials shall be placed in maximum 8 inch thick (before compaction) layers which are to be continuous over the entire length of the fill. The most permeable borrow material shall be placed in the downstream portions of the embankment. The 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

Structure Backfill

Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining fill material. The fill shall be placed in horizontal layers not to exceed four inches 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 operated closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless there is a compacted fill of 24" 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 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 the material. Adequate measures shall be taken (sand bags, etc.) to prevent floating the pipe. When using flowable fill, all metal pipe shall be bituminous coated. Any adjoining soil fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material shall completely fill all voids adjacent to the flowable fill zone. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of the structure. Under no circumstances shall equipment be driven over any part of a structure or pipe unless there is a compacted fill of 24" or greater over the structure or pipe. Backfill (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 coating 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 Specification M-196 or M-211 with watertight coupling bands or flanges. Aluminum Pipe, when used with flowable fill or when soil and/or water conditions warrant for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt. Hot dip galvanized bolts may be used for connections. The pH of the surrounding soils shall be between 4 and 9.

2. Coupling, bands, anti-seep collars, end sections, etc., must be composed of the same material and coatings as the pipe. Metals must be insulated from dissimilar materials with use of rubber or plastic insulating materials at lease 24 mils in thickness.

3. Connections - All connections with pipes must be completely watertight. The drain pipe or barrel connection to the riser shall be welded all around when the pipe and riser are metal. Anti-seep collars shall be connected to the pipe in such a manner as to be completely 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 bandwidth. The following type connections are acceptable for pipes less than 24 inches diameter: flanges on both ends of the pipe with a circular 3/8 inch thick closed cell circular neoprene gasket; and a 12-inch wide hugger type band with o-ring gaskets having a minimum diameter of 1/2 inch greater than the corrugation depth. Pipes 24 inches in diameter and larger shall be connected by a 24 inch long annular corrugated band using a minimum of 4(four) rods and lugs, 2 on each connecting pipe end. A 24-inch wide by 3/8-inch thick closed cell circular neoprene gasket will be installed with 12 inches on the end of each pipe. Flanged joints with 3/8"inch closed cell gaskets the full width of the flange is also acceptable.

Helically corrugated pipe shall have either continuously welded seams or have lock seams with internal 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 PipeAll 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 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 the "Structure Backfill" section of this standard. Gravel bedding is not permitted.

3. Laying pipe - Bell and spigot pipe shall be placed with the bell end upstream. Joints shall be made in accordance with recommendations of the manufacturer of the material. After the joints are sealed for the entire line, 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 shown on the drawings.

Plastic PipeThe 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" inch pipe shall meet the requirements of AASHTO M252 Type S, and 12" through 24" inch 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 Materials, Section 311.

Geotexile shall be placed under all riprap and shall meet 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 to be occupied by the permanent works. The contractor shall also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the engineer for constructing each part of the work free from water as required or directed by the engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works. The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom required excavations and will allow satisfactory performance of all construction operations. During the placing and compacting of material in required excavations, the water level at the locations being refilled shall be maintained below the bottom of the excavation at such locations which may require draining the water sumps from which the water shall be pumped.

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 Resources 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.

OPERATION AND MAINTENANCE SCHEDULE FOR STORMWATER MANAGEMENT DETENTION FACILITY

STORMWATER MANAGEMENT FACILITY

ROUTINE MAINTENANCE BY H.O.A.
1. FACILITY WILL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHOULD BE PERFORMED DURING WET WEATHER TO DETERMINE IF IT IS FUNCTIONING PROPERLY.
2. 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.
3. DEBRIS AND LITTER NEXT TO THE OUTLET STRUCTURE SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
4. VISIBLE SIGNS OF EROSION IN THE POND AS WELL AS RIPRAP OUTLET AREAS SHALL BE REPAIRED AS SOON AS IT IS NOTICED.

NON-ROUTINE MAINTENANCE BY H.O.A.
1. STRUCTURAL COMPONENTS OF THE POND SUCH AS THE DAM, THE RISER, AND THE PIPES SHALL BE REPAIRED UPON DETECTION OF ANY DAMAGE. THE COMPONENTS SHOULD BE INSPECTED DURING ROUTINE MAINTENANCE OPERATIONS.
2. SEDIMENT SHOULD BE REMOVED WHEN ITS ACCUMULATION SIGNIFICANTLY REDUCES THE DESIGN STORAGE, INTERFERE WITH THE FUNCTION OF THE RISER, WHEN DEEMED NECESSARY FOR AESTHETIC REASONS, OR WHEN DEEMED NECESSARY BY THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

SPECIAL CONSTRUCTION METHODS FOR SEEPAGE CONTROLS

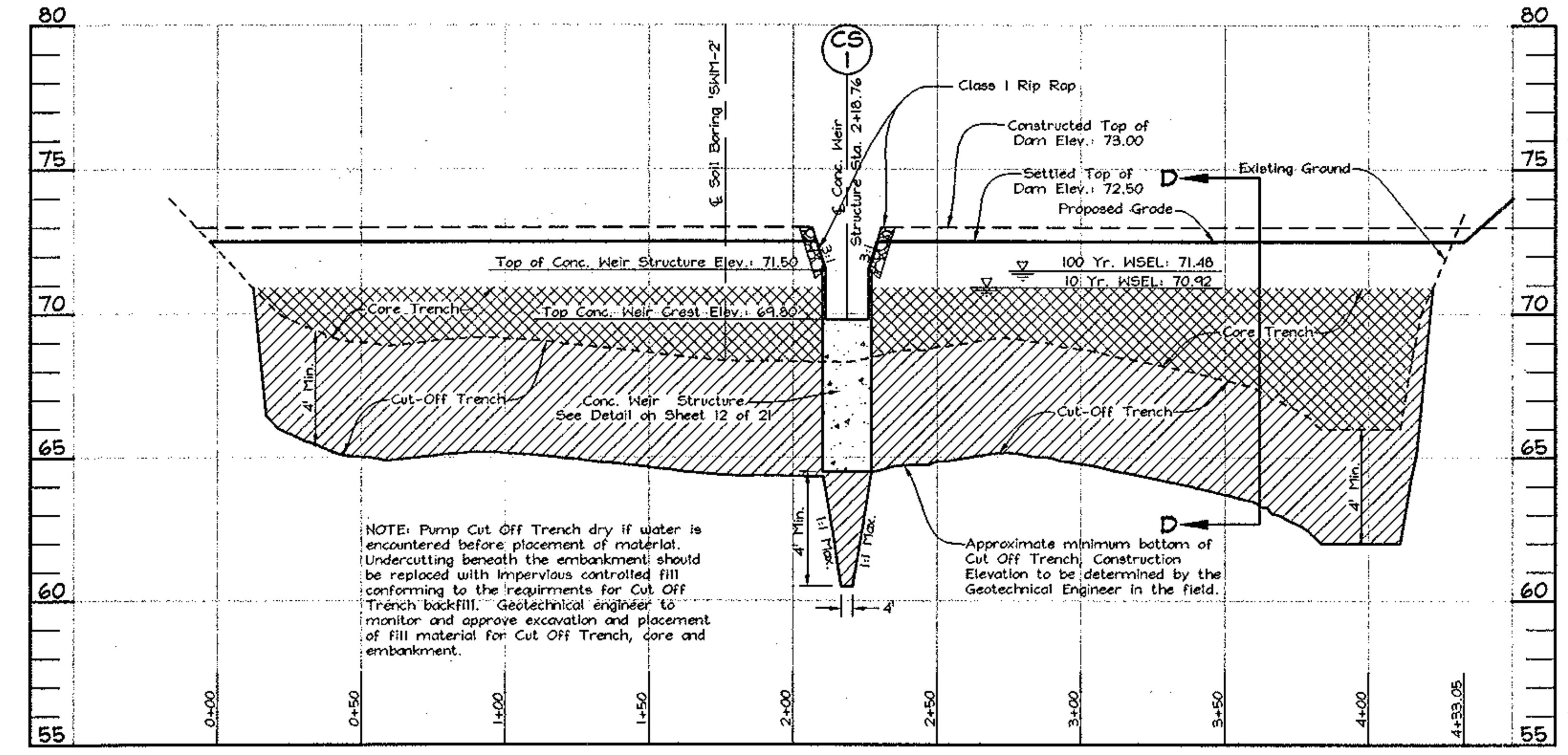
To prevent undesirable seepage through the basin and beaneath the embankment, compact the clay surface across the bottom of the basin and tie in to the embankment. Since the soils encountered within all borings at basin elevation are CL clay soil, it would be possible in most areas to form the liner by recompacting the inplace materials. The exposed basin surface should be examined after mass grading and any sand deposits undercut 1 foot below proposed basin grade. This undercut area should be backfilled with CL clay soils compacted to a minimum 98 percent of the AASHTO T-99 maximum dry density. In the remaining clay areas, the basin bottom should be thoroughly rolled to a minimum 98 percent of the AASHTO T-99 maximum dry density.

Recharge Obligation (Total Site)
Rev Req'd: N/A*
Rea Req'd: 0.99 Ac
Rea Prov'd.: 1.0 Ac.

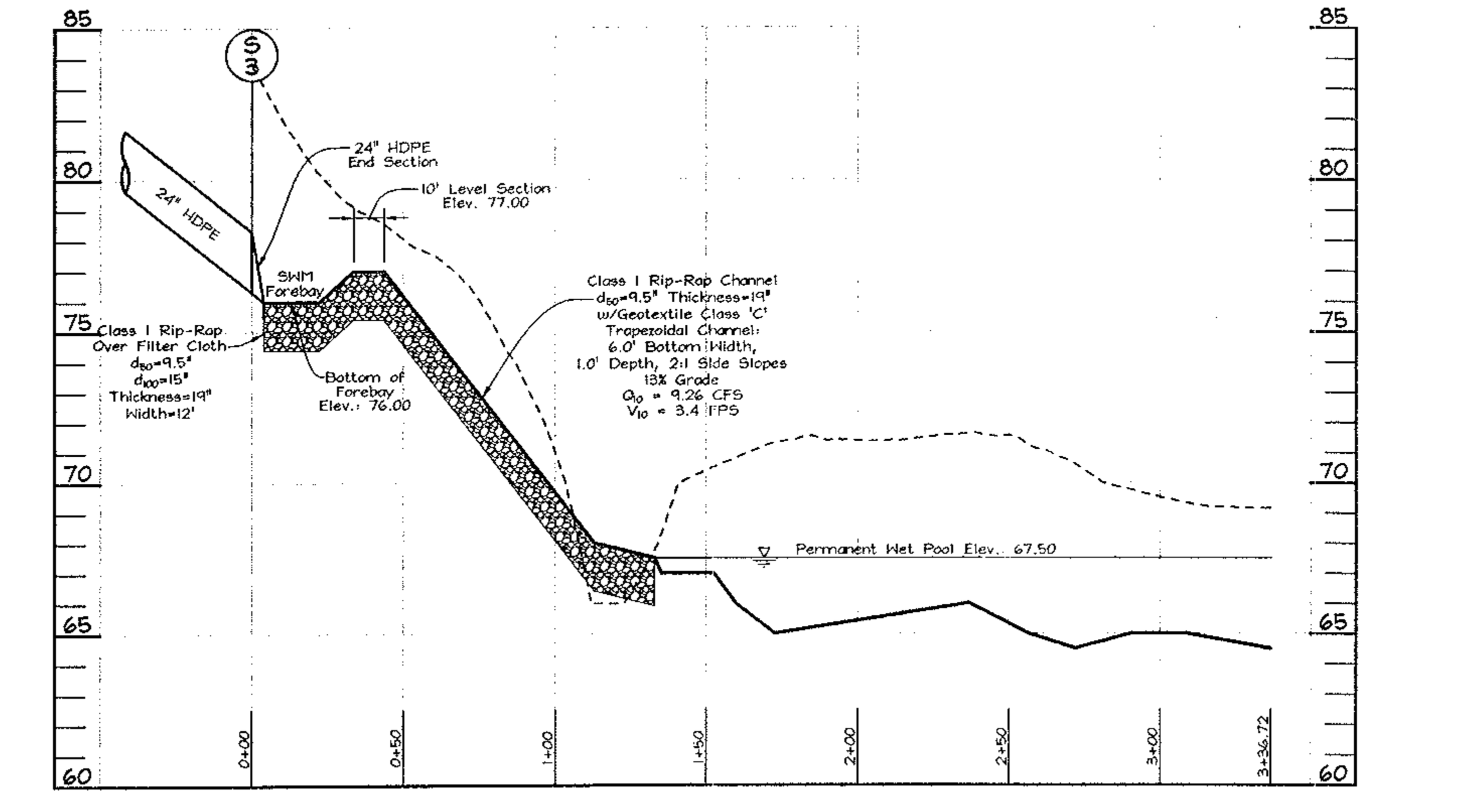
POND SUMMARY	1YEAR(CPv)	10 YEAR**	100 YEAR
Flow Into Pond	21.4 cfs	74.84 cfs	123.17 cfs
Flow Out of Pond	0.51 cfs	56.46 cfs	101.76 cfs
WS Elevation	69.7	70.92	71.48
Storage Volume	0.25 ac.ft		

WATER QUALITY FOR AREA TO POND**
WQv Req'd: 0.50 ac.ft
WQv Prov'd: 0.36 ac.ft(wet pool) 0.25 ac.ft(extended detention)
Total Provided: 0.61 ac.ft

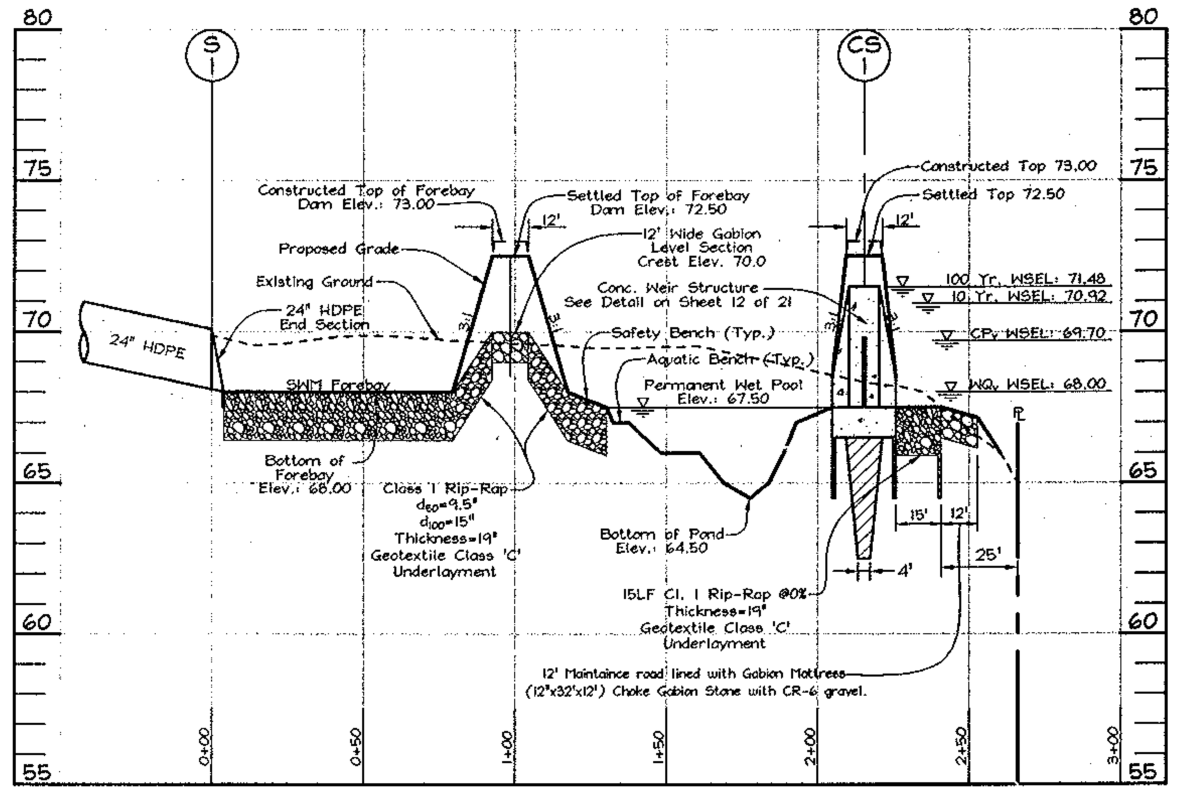
* Recharge is met through the Percent Area Method.
** Assumes clogged Low Flow Orifices.



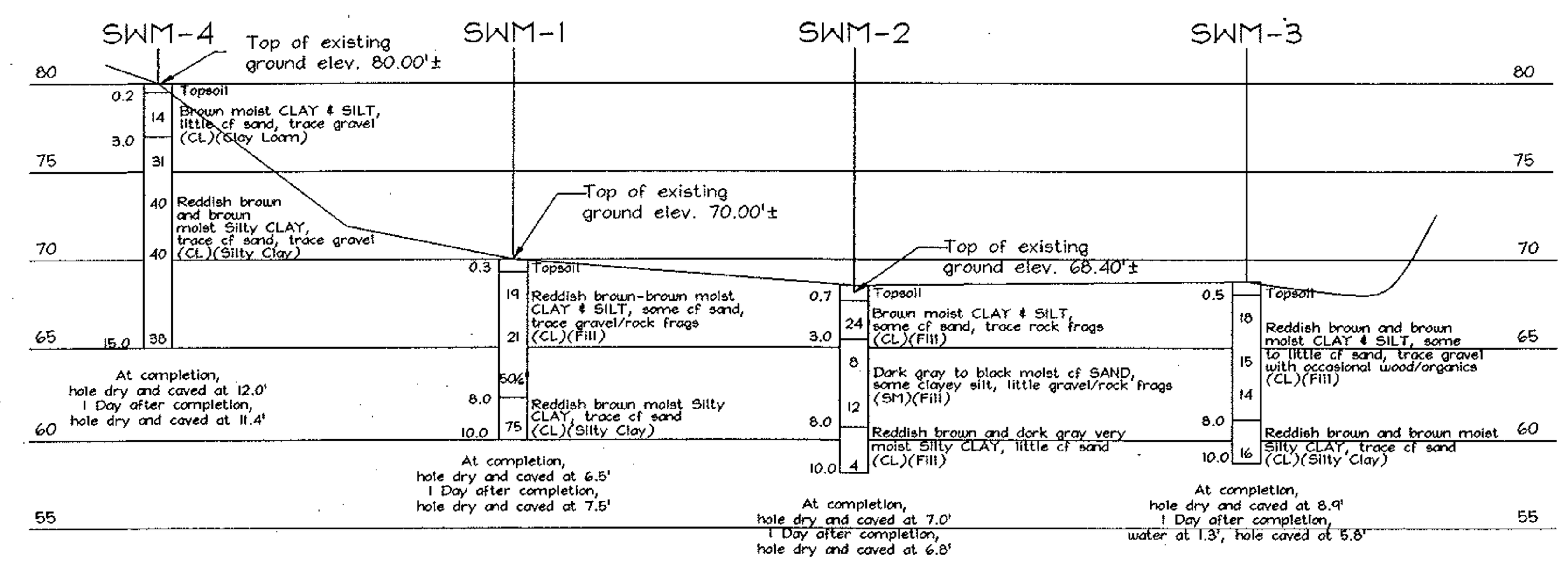
SECTION 'A'-'A'
(Along Top of Embankment)
SCALE: Hor.: 1"=50'
Vert.: 1"=5'



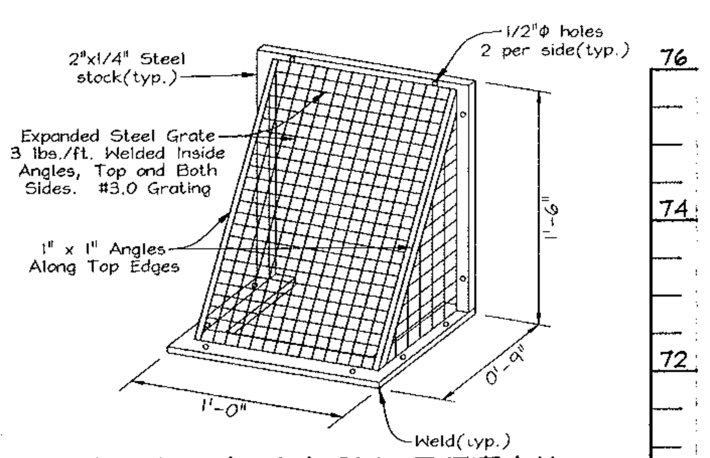
SECTION 'C'-'C'
(From S-3 thru Pond)
SCALE: Hor.: 1"=50'
Vert.: 1"=5'



SECTION 'B'-'B'
(From S-1 thru Weir)
SCALE: Hor.: 1"=50'
Vert.: 1"=5'

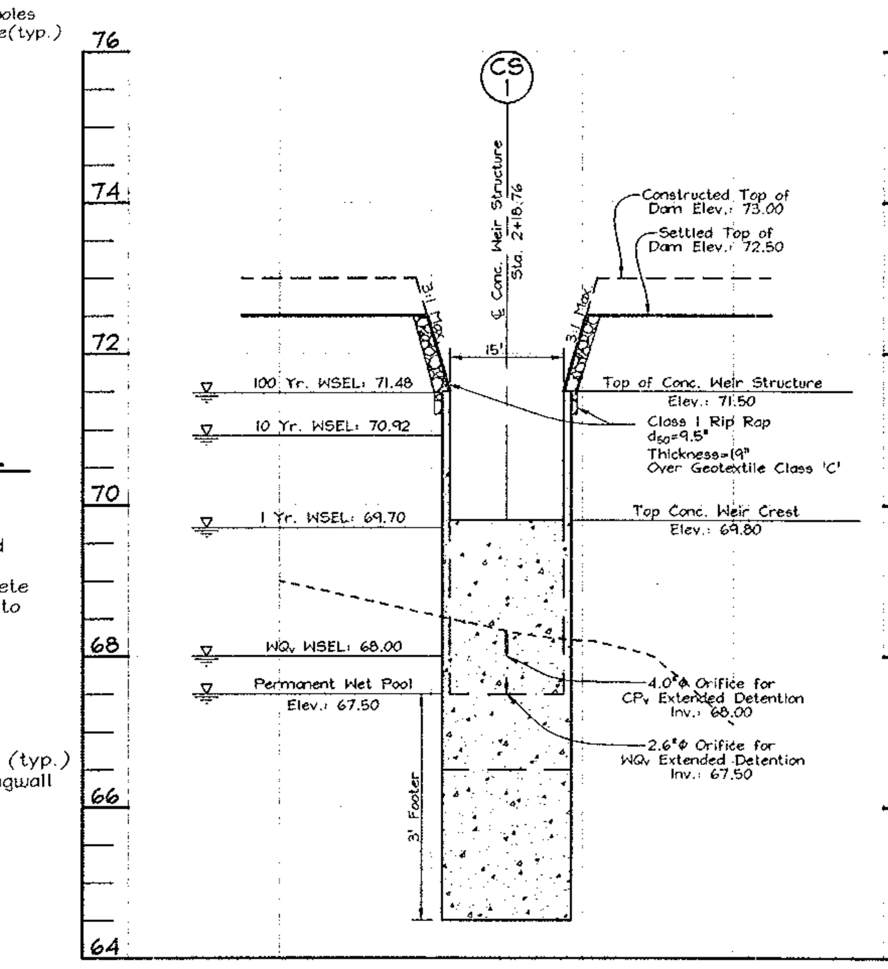


S.W.M. BORING PROFILE
NOT TO SCALE

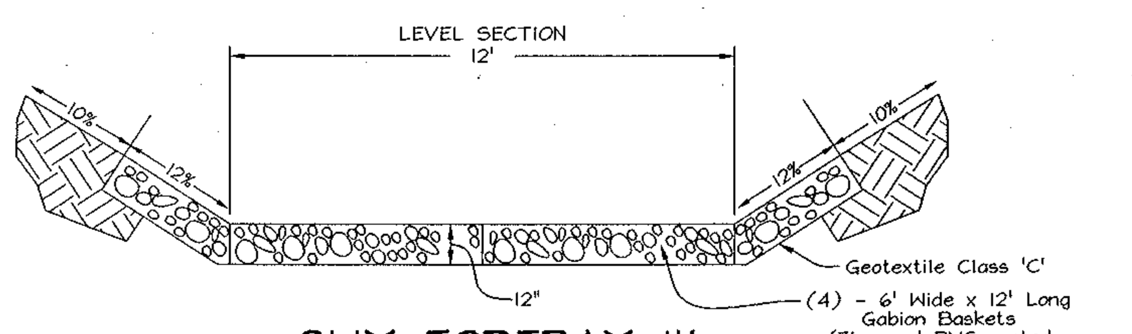


TRASH RACK DETAIL
NOT TO SCALE

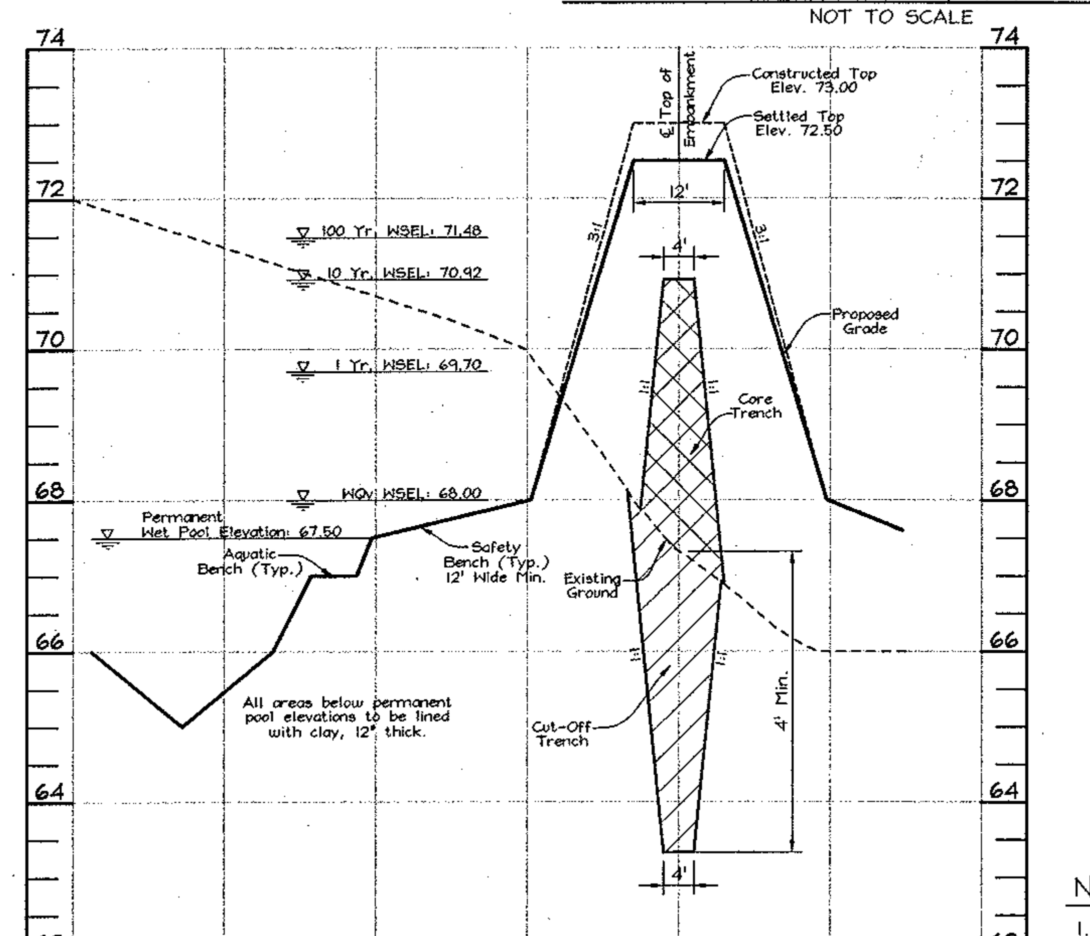
NOTES:
1. Steel to conform to ASTM A-36.
2. All surfaces to be coated with ZRC cold galvanizing compound after welding.
3. Trash rack to be fastened to the concrete with 1/2" masonry anchors. Trash rack to be removeable.



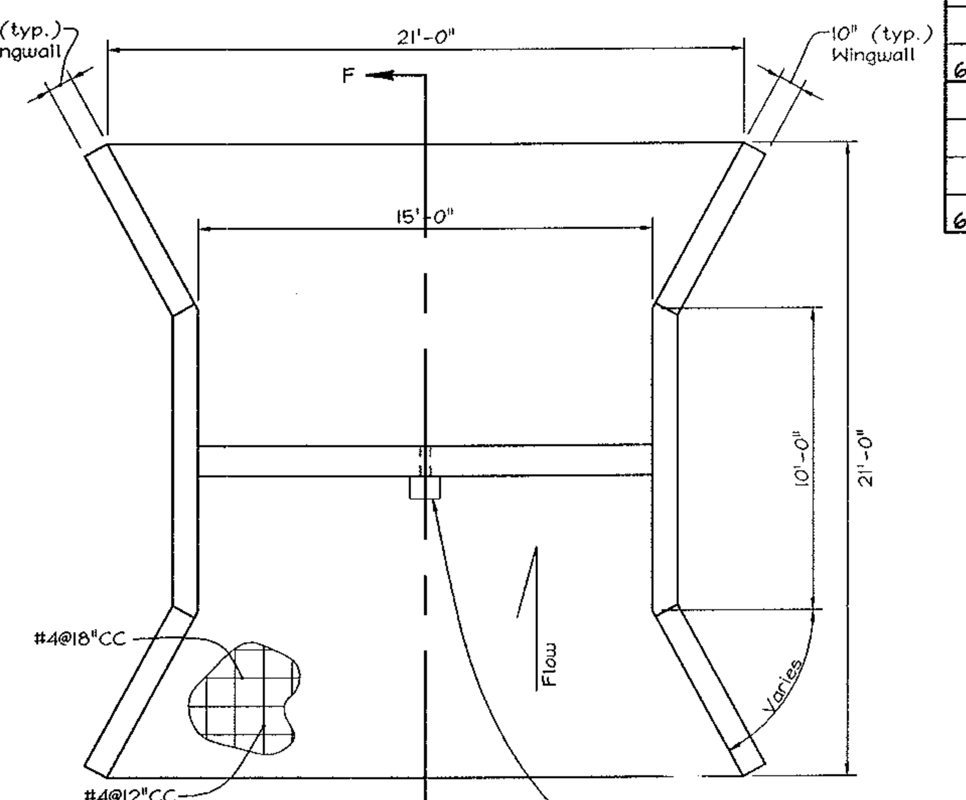
WEIR DETAIL
SCALE: Hor.: 1"=20'
Vert.: 1"=2'



SWM FOREBAY #1
GABION OUTLET LEVEL SECTION
TYPICAL CROSS-SECTION
NOT TO SCALE



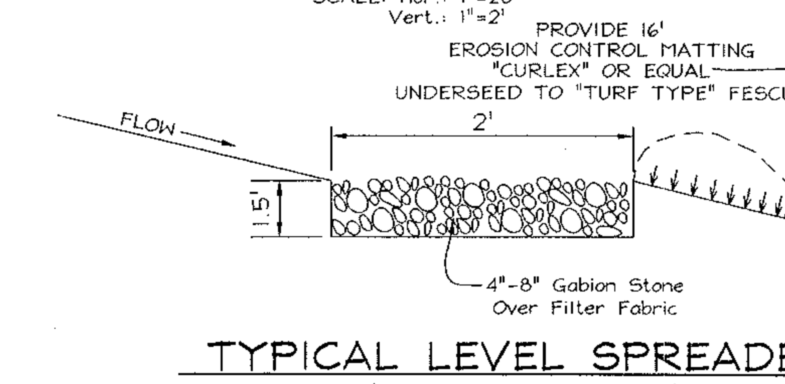
SECTION 'D'-'D'
(Thru Embankment)
SCALE: Hor.: 1"=20'
Vert.: 1"=2'



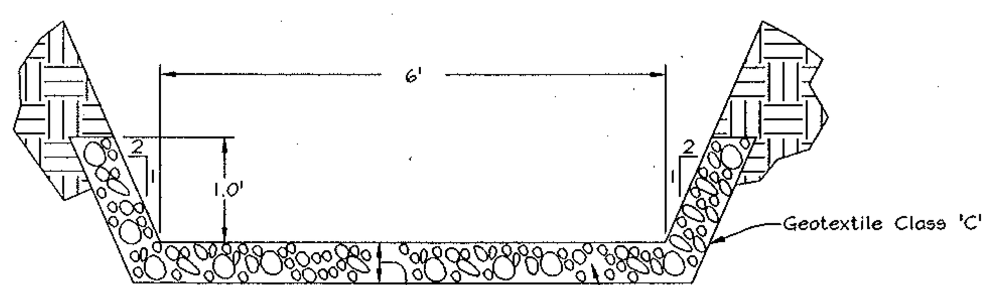
PLAN VIEW
Not to Scale

Trash Rack (See detail this sheet)

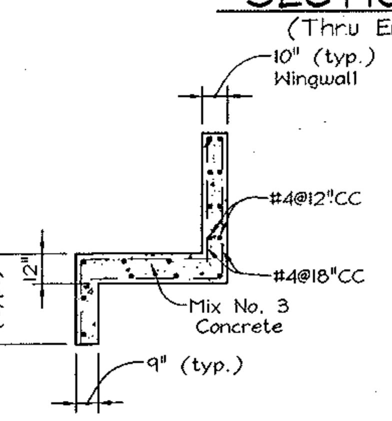
NOTES:
1. All exposed edges to have a 3/4"x3/4" chamfer or as directed.
2. Concrete shall be SHA mix #3(fc=3500 psi @ 28 days)
3. Reinforcing steel shall be ASTM A-615 grade 60.
4. See section thru weir structure details sheet 17 of 20 for all inverts and elevations of structures



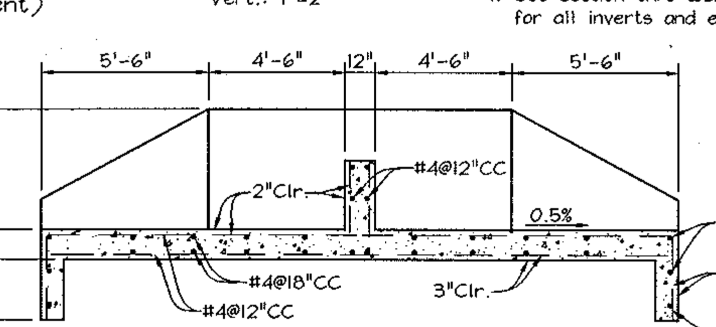
TYPICAL LEVEL SPREADER
(LOTS 11 & 19)
CROSS-SECTION
NOT TO SCALE



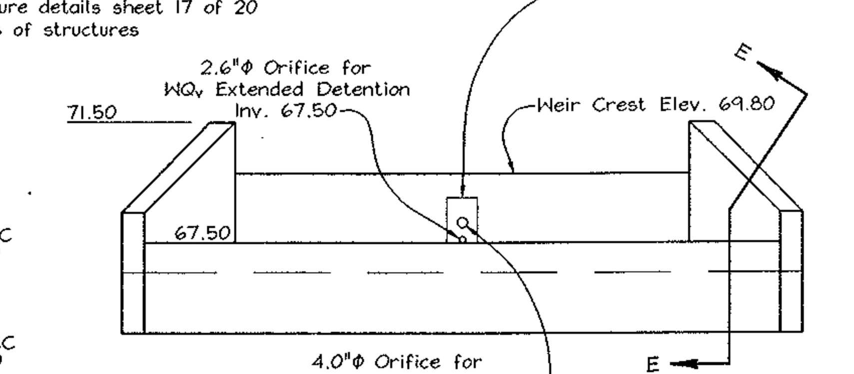
SWM FOREBAY #2
RIP RAP OUTLET LEVEL SECTION
TYPICAL CROSS-SECTION
NOT TO SCALE



SECTION E-E
Not to Scale



SECTION F-F
Not to Scale



FRONT ELEVATION
Not to Scale

CS-1 CONCRETE WEIR CONTROL STRUCTURE
NOT TO SCALE

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

STORMWATER MANAGEMENT NOTES AND DETAILS
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 PARCEL 163
1ST ELECTION DISTRICT HOWARD COUNTY, MARYLAND

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cindy Hamilton 10/19/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

10/15/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

10-11-04
CHIEF, BUREAU OF HIGHWAYS DATE

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS

9/23/04
USDA-NATURAL RESOURCES CONSERVATION SERVICE DATE

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

9/23/04
HOWARD SCD DATE

ENGINEERS CERTIFICATE

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

Zacharia Y. Fisch 9/15/04
SIGNATURE OF ENGINEER DATE
ZACHARIA Y. FISCH

DEVELOPER'S CERTIFICATE

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

PROJECT MGR 9/15/04
SIGNATURE OF DEVELOPER DATE
RICHMOND AMERICAN HOMES OF MARYLAND, INC.

STATE OF MARYLAND ZACHARIA YOSEF FISCH 22418 PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street, Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410 750-7350
E-mail: FSHAssoc...com

DESIGN BY:	KO
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F-04-111

LEGEND

Existing Contour	-382
Proposed Contour	82
Existing Spot Elevation	382.3
Proposed Spot Elevation	+82.53
Direction of Flow	
Existing Trees to Remain	
Walk Out Basement	WOB
Shade Tree	
Street Tree	
Evergreen Tree	
Shrub	
Landscape Perimeter	PERIMETER ONE

STREET TREE SCHEDULE

STREET NAME	LF REQUIRED	TREES REQUIRED	PROVIDED
Fairlee Road	880	22	22
Joseph Scott Drive	2,170	54	54
Mary Ann Lane	776	19	19

STREET TREE LANDSCAPE SCHEDULE

KEY	QUAN.	BOTANICAL NAME	SIZE	NOTE
AR	27	Acer rubrum, Shade Trees (Street Trees) 'October Glory Red Maple'	2 1/2"-3" Cal.	B & B
PA	27	Platanus x acerifolia, Shade Trees (Street Trees) 'Bloodgood' 'London Plane'	2 1/2"-3" Cal.	B & B
ZS	22	Zelkova serrata, Shade Trees (Street Trees) 'Village Green' 'Japanese Zelkova'	2 1/2"-3" Cal.	B & B
QC	19	Quercus Coccinea Scarlet Oak	2 1/2"-3" Cal.	B & B

LANDSCAPE SCHEDULE

KEY	QUAN.	BOTANICAL NAME	SIZE	NOTE
AR	32	Acer rubrum (Shade Trees) 'October Glory Red Maple'	2 1/2"-3" Cal.	B & B
QR	33	Quercus rubra (Shade Trees) 'Red Oak'	2 1/2"-3" Cal.	B & B
PS	13	Pinus strobus 'Eastern White Pine'	6'-8' Ht.	B & B
TO	10	Thuja occidentalis 'Nigra' 'Dark American Arborvitae'	5'-6' Ht.	B & B
IV	10	Ilex Verticillata Winterberry	3'-4' Ht.	Cont.

NOTES:

1. At the time of plant installation, all shrubs and trees listed and approved on the Landscape Plan shall comply with the proper height requirements in accordance with the Howard County Landscape Manual. In addition, no substitutions or relocations of the required plantings may be made without prior review and approval from the Department of Planning and Zoning. Any deviation from the approved Landscape Plan may result in denial or delay in the release of Landscape Surety until such time as all required materials are planted and/or revision are made to the applicable plans.
2. Landscape surety is based on the required landscaping of 65 shade trees, 23 evergreen trees and the Private Access Place street trees (19) and refuse pad shrubs (10) in the amount of $28,950.00.

SCHEDULE D : STORMWATER MANAGEMENT AREA LANDSCAPING

Linear Feet of Perimeter	1,261 LF
Credit for Existing Vegetation (No, Yes and Linear Feet)	Yes, *364 LF (Remaining Perimeter: 897 LF)
Credit for Wall, Fence or Berm (No, Yes and %)	N/A
Number of Trees Required Shade Trees Evergreen Trees	1:50 = 18 Shade Trees 1:40 = 23 Evergreen Trees
Number of Trees Provided Shade Trees Evergreen Trees Other Trees(2:1 Substitution)	18 Shade Trees 23 Evergreen Trees 0 Trees(0 Substitution Trees)

* Existing trees to remain

SCHEDULE A PERIMETER LANDSCAPE EDGE

CATEGORY	ADJACENT TO ROADWAYS			ADJACENT TO PERIMETER PROPERTIES				
Perimeter/Frontage Designation Landscape Type	1 B	2 B		3 A	4 A	5 A	6 A	7 A
Linear Feet of Roadway Frontage/Perimeter	93	35		1054	717	2079	963	314
Credit for Existing Vegetation (Yes, No, Linear Feet) Remaining Perimeter Length	No	No		No	*Yes 440 277	***Yes 1,888 191	*Yes 90 873	No
Credit for Wall, Fence or Berm (Yes, No, Linear Feet) Remaining Perimeter Length	No	No		No	No	No	No	No
Number of Plants Required Shade Trees Evergreen Trees Shrubs	1:50 2 1:40 3 -	1:50 1 1:40 1 -		1:60 18 - -	1:60 5 - -	1:60 4 - -	1:60 15 - -	1:60 5 - -
Number of Plants Provided Shade Trees Evergreen Trees Other Trees (2:1 Substitution) Shrubs (10:1 Substitution) (Describe Plant Substitution Credits Below if needed)	2** 3** - -	1** 1** - -		18 - - -	5 - - -	4 - - -	15 - - -	5 - - -

* Existing woods to remain
** Perimeter landscaping for Lot 25 and Lot 54 will be provided at SDP stage
*** Credit taken for existing woods and the shared boundary with the SWM Perimeter

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 4/19/07
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

[signature] 4/19/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

[signature] 4-16-07
CHIEF, BUREAU OF HIGHWAYS — DATE

DEVELOPER'S/BUILDER'S CERTIFICATE

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A LETTER OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE(1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

[signature] 3-23-07
SIGNATURE OF DEVELOPER — DATE
RICHMOND AMERICAN HOMES OF MARYLAND, INC.

Note: THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

No.	Revisions	Date
3	UPDATE GRADING & REMOVE GUARDRAIL	9/23/2013
2	Revised Lots and Lot Numbers. Deleted Retaining Walls. Revised Pipestems. Revised Perimeter Landscaping. Moved Street Light. Revised and Relabeled Easements. Re-Subdivided Lot 5.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

LANDSCAPE PLAN

HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

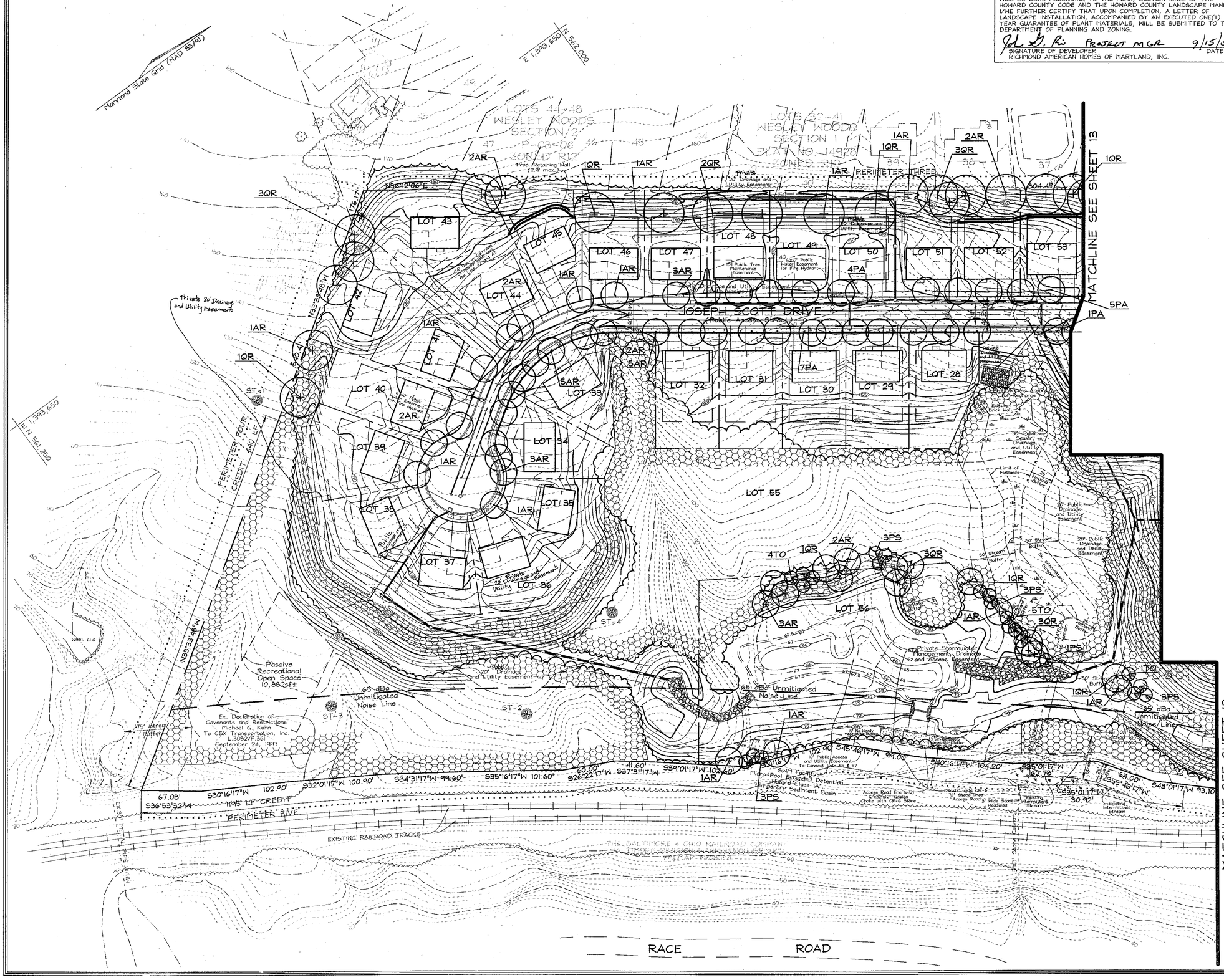
TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — ZACHARIA YOSEF FISCH — 22413 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: 1"=50'
DATE: Mar. 21, 2007
W.O. No.: 3018
SHEET No.: 13 OF 20

F-04-111



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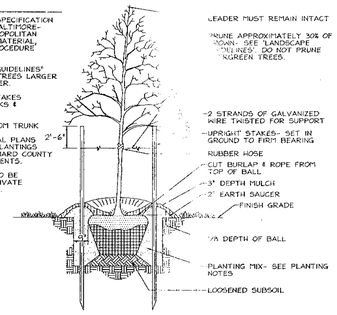
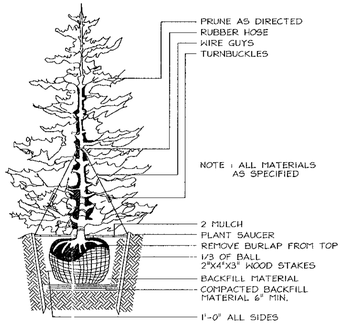
John G. Ri PROJECT MGR 9/15/04
SIGNATURE OF DEVELOPER DATE
RICHMOND AMERICAN HOMES OF MARYLAND, INC.

NOTES

1. SEE "LANDSCAPE SPECIFICATION GUIDELINES FOR BALTIMORE-WASHINGTON METROPOLITAN AREAS" FOR ALL MATERIAL, PRODUCT, AND PROCEDURE SPECIFICATIONS.
2. SEE "LANDSCAPE GUIDELINES" FOR SUPPORTING TREES LARGER THAN 2-1/2" CALIPER.
3. PLACE UPRIGHT STAKES PARALLEL TO WALKS & BUILDINGS.
4. KEEP MULCH 1" FROM TRUNK
5. SEE ARCHITECTURAL PLANS FOR ADDITIONAL PLANTINGS WHICH EXCEED HOWARD COUNTY MINIMUM REQUIREMENTS.
6. TREES ARE NOT TO BE PLANTED OVER PRIVATE SEWAGE EASEMENT.



TYPICAL TREE PLANTING AND STAKING
DECIDUOUS TREES UP TO 2-1/2" CALIPER NOT TO SCALE



TYPICAL EVERGREEN TREE PLANTING DETAIL
NOT TO SCALE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Indy Hamilton 10/19/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[signature] 10/15/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

William J. Mahler 10-4-04
CHIEF, BUREAU OF HIGHWAYS DATE

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

LANDSCAPE PLAN, NOTES & DETAILS

HUNTERS RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 PARCEL 163
1ST ELECTION DISTRICT HOWARD COUNTY, MARYLAND

STATE OF MARYLAND
ZACHARIA YOSEF FISCH
22418
PROFESSIONAL ENGINEER

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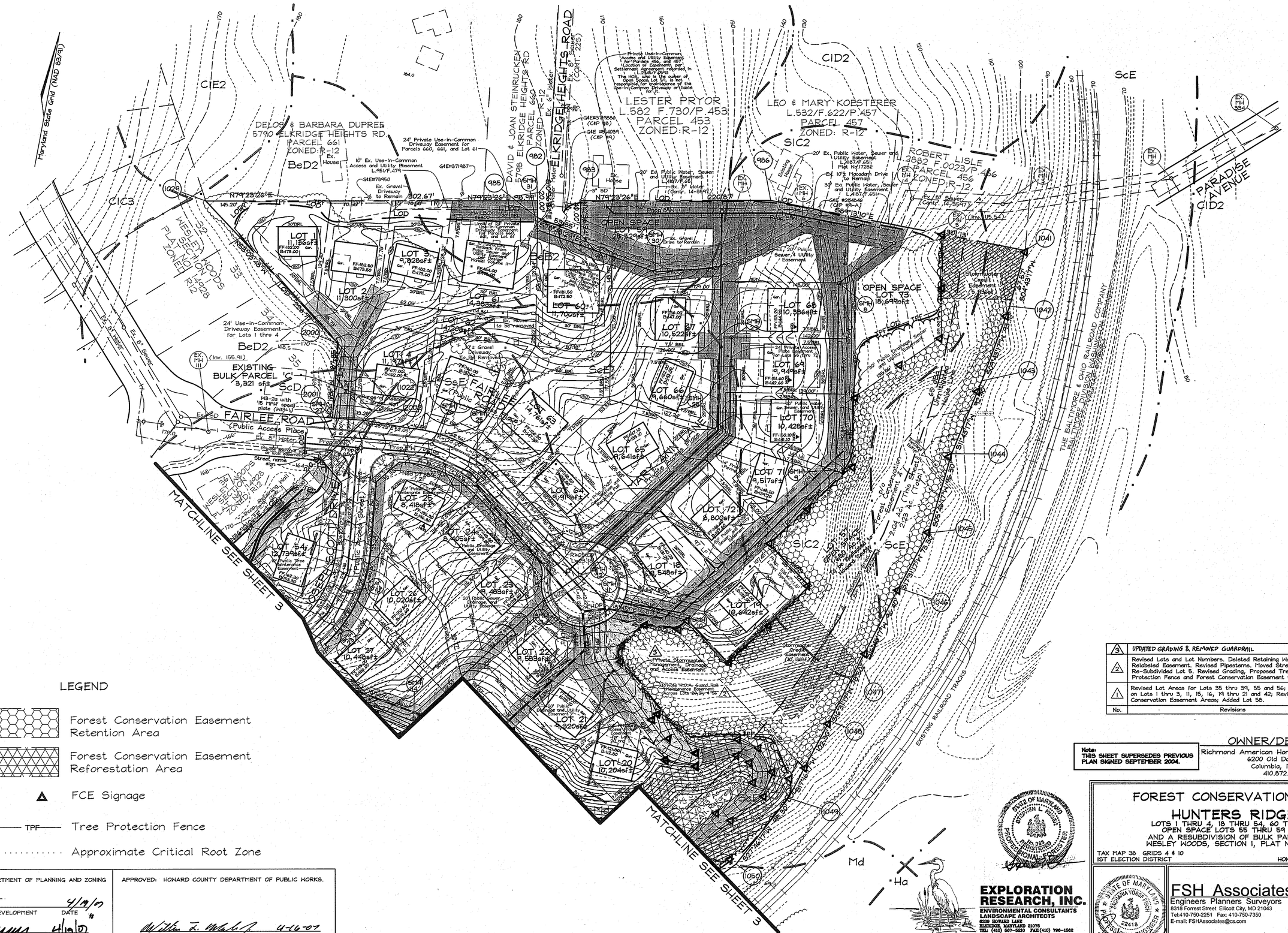
DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: 1"=50'
DATE: Sept. 15, 2004
W.O. No.: 3018
SHEET No.: 14 OF 20

F-04-111



LEGEND

- Forest Conservation Easement Retention Area
- Forest Conservation Easement Reforestation Area
- FCE Signage
- —— TPF —— Tree Protection Fence
- ..... Approximate Critical Root Zone

No.	Revisions	Date
3	UPDATED GRADING & REMOVED GUARDRAIL	9/23/2013
2	Revised Lots and Lot Numbers. Deleted Retaining Walls and Relabeled Easement. Revised Pipestems. Moved Street Light. Re-Subdivided Lot 5. Revised Grading, Proposed Tree Line, Tree Protection Fence and Forest Conservation Easement #4 Areas.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

Note:
THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

FOREST CONSERVATION PLAN

HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10
1ST ELECTION DISTRICT

PARCEL 163
HOWARD COUNTY, MARYLAND

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/19/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/19/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 4-16-07

STATE OF MARYLAND — STEPHEN L. HEBER — No. 383 — REGISTERED PROFESSIONAL FORESTER

EXPLORATION RESEARCH, INC.
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS
6330 HOWARD LANE
ELKRIDGE, MARYLAND 21075
TEL: (410) 567-5210 FAX: (410) 796-1562

STATE OF MARYLAND — ACHARIA YOSEF FISCH — 22418 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY: PS/KO
DRAWN BY: MM/RAB
CHECKED BY: ZYF/SLH
SCALE: 1"=50'
DATE: Mar. 21, 2007
W.O. No.: 3018
SHEET No.: 15 OF 20

F-04-111

LEGEND

- Forest Conservation Easement Retention Area
- Forest Conservation Easement Reforestation Area
- FCE Signage
- TPF — Tree Protection Fence
- Approximate Critical Root Zone

MATCHLINE SEE SHEET 2

MATCHLINE SEE SHEET 2

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/19/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-4-04

EXPLORATION RESEARCH, INC.
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS
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FOREST CONSERVATION PLAN
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — JOSHUA YOSEF FSH — 22418 — PROFESSIONAL ENGINEER

FSH Associates
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DESIGN BY: FS/KD
DRAWN BY: MM/RAB
CHECKED BY: ZYF/SLH
SCALE: 1"=50'
DATE: Sept. 15, 2004
W.O. No.: 3018
SHEET No.: 16 OF 20

F-04-111

FOREST CONSERVATION WORKSHEET

Net Tract Area	Acres
A. Total Tract Area	25.66
B. Area Within 100 Year Floodplain	0
C. Other deductions (Area p/o FCP for F-00-115)	0.08
D. Net Tract Area	25.58
Zoning Use Category: Residential	
Land Use Category	
E. Afforestation Minimum (15 % x D)	3.84
F. Conservation Threshold (20 % x D)	5.12
Existing Forest Cover	
G. Existing Forest on Net Tract Area	24.10
H. Forest Area Above Conservation Threshold	18.98
Breakeven Point	
I. Forest Retention Above Threshold with no Mitigation	8.92
J. Clearing Permitted without Mitigation	15.18
Proposed Forest Clearing	
K. Forest Areas to be Cleared	17.84
L. Forest Areas to be Retained	6.26
Planting Requirements	
M. Reforestation for Clearing Above Threshold	4.46
N. Reforestation for Clearing Below the Threshold	0
P. Credit for Retention Above Conservation Threshold	1.14
Q. Total Reforestation Required	3.32
R. Total Afforestation Required	0
S. Total Reforestation and Afforestation Requirement	3.32

FOREST CONSERVATION NARRATIVE

This Forest Conservation Plan has been developed in accordance with the Howard County Forest Conservation Act of 1991. The total tract area consists of 25.66 acres of land, including a 0.08 ac area on the adjacent Wesley Woods subdivision which has been included in the forest conservation plan for F-00-115. This area was deducted for a net tract of 25.58 ac. The site contains 24.10 acres of forest cover on the net tract. Forest retained in easements will total 6.26 acres. A total of 1.72 acres of reforestation planting is proposed. Four forest conservation easements will be established. Total area contained within easements is 7.99 acres. All easements contain wetlands, streams and their buffers, and steep slopes. For the remaining 1.60 acres of obligation, we propose a fee-in-lieu payment of $34,848.00.

New on-site plantings will be 2-3' containerized whip stock planted at 350 stems/acre with tree shelters.

FOREST CONSERVATION EASEMENT TABLE

EASMENT	TYPE	AREA (ACRES)	BOND RATE	BOND PRICE
1	Reforestation Retention	0.60 1.65	$0.50 /S.F. $0.20 /S.F.	$13,068.00 $14,374.80
2	Reforestation Retention Uncredited	0.47 2.60 0.01	$0.50 /S.F. $0.20 /S.F.	$10,236.60 $22,651.20
3	Reforestation	0.43	$0.50 /S.F.	$9,365.50
4	Reforestation Retention	0.22 2.01	$0.50 /S.F. $0.20 /S.F.	$4,791.50 $17,511.20
TOTAL		7.97		$91,998.80
	Reforestation Retention	1.72 6.26		$37,461.60 $54,537.20

Forest Retention Area Protection Signage

Min. 11" × Min 15"

FOREST RETENTION AREA

MACHINERY, DUMPING OR STORAGE OF ANY MATERIALS IS PROHIBITED

VIOLATORS ARE SUBJECT TO FINES AS IMPOSED BY THE MARYLAND FOREST CONSERVATION ACT OF 1991

Reforestation and Afforestation Area Protection Signage

Min. 11" × Min 15"

Forest Conservation Area

REFORESTATION PROJECT

Trees for Your Future

FOREST CONSERVATION EASEMENT #1
Reforestation Area 1 : 0.60 Ac. (210 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
35	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
35	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
35	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
35	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
35	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
35	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 2 : 0.04 Ac. (14 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
2	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
2	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
2	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
2	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
3	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
3	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 3 : 0.19 Ac. (67 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
12	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
11	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
11	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
11	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
11	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
11	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 4 : 0.13 Ac. (46 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
7	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
7	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
8	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
8	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
8	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
8	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 5 : 0.03 Ac. (11 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
1	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
2	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
2	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
2	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
2	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
2	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 6 : 0.08 Ac. (28 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
5	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
5	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
5	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
5	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
4	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
4	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #3
Reforestation Area 8 : 0.43 Ac. (151 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
25	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
26	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
25	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
25	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
25	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
25	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #4
Reforestation Area 9 : 0.22 Ac. (77 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
14	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
13	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
13	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
13	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
12	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
12	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

MANAGEMENT NOTES FOR FOREST RETENTION AREAS

1. All proposed activities shall adhere to the conditions, schedules and terms of an approved sediment control and erosion plan.
2. After the boundaries of the retention area have been staked and flagged and before any disturbance has taken place on-site, a preconstruction meeting at the construction site shall take place. The developer, contractor or project manager, and appropriate County inspectors shall attend.
3. Tree protection for all retained areas:
   a. All retention areas within 50 feet of proposed construction activities shall be protected by highly visible, well anchored temporary protection devices (silt fence or blaze orange plastic mesh).
   b. All protection devices shall be in place prior to any grading or land clearing.
   c. All protection devices shall be properly maintained and shall remain in place until construction has ceased.
   d. Attachment of signs, fencing or other objects to trees is prohibited.
   e. No equipment, machinery, vehicles, materials or excessive pedestrian traffic shall be allowed within protected areas.
4. If the critical root zone (see detail) is affected by construction activities such as grade change, digging for foundations and roads or utility installation:
   a. Prune roots with a clean cut using proper pruning equipment (see root pruning detail)
   b. Water and fertilize as needed.
5. During construction phase, monitor and correct condition of retained trees for: soil compaction, root injury, flood conditions, drought conditions and other stress signs.
6. Post-Construction Phase
   a. Inspect existing trees around the perimeter of disturbed limits for evidence of soil compaction, root injury, limb injury, or other stress signs and correct with proper management techniques such as root or limb pruning, soil aeration, fertilization, crown reduction or watering. Inspection and evaluation shall be performed by a licensed arborist.
   b. Inspect for dead or dying trees or limbs which may pose safety hazard and remove.
   c. No burial of discarded materials will occur onsite within the conservation areas.
   d. No burning within 100 feet of wooded area.
   e. All temporary forest protection structures will be removed after construction. Temporary signage shall be replaced with permanent signage on posts in locations shown.
   f. Following completion of construction, prior to use, the County inspector shall inspect the entire area.

Soil Protection Zone Notes

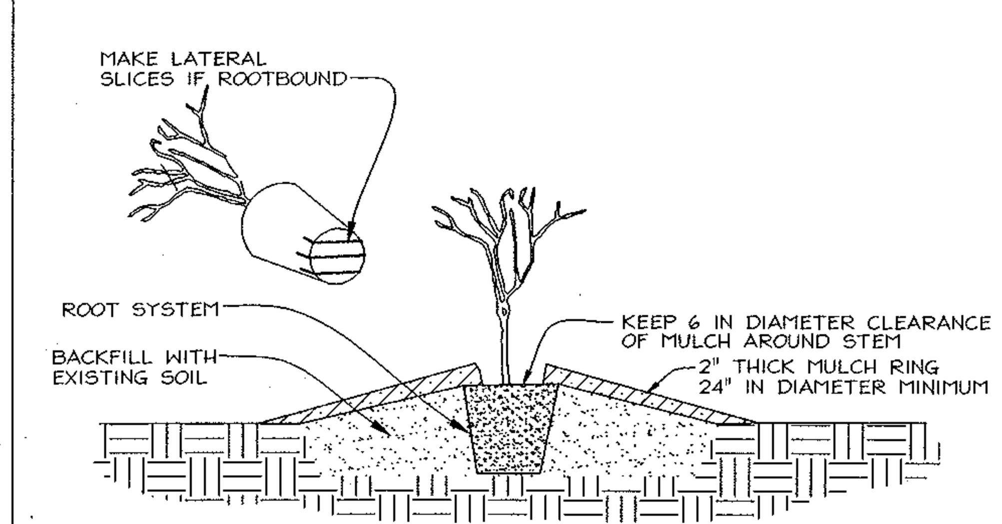
1. The Soil Protection Zone shall include all areas contained inside the Limit of Disturbance.
2. Where possible, the Soil Protection Zone shall extend to the drip line of specimen trees. For other groups of trees, the zone shall be the drip line or 40% of the height of the tree, whichever is greater.
3. No construction activity is permitted within the Soil Protection Zone.
4. If soil has been compacted or grading has taken place in the vicinity of the Soil Protection Zone, root pruning shall be implemented per Root Pruning detail, shown on this plan.
5. Root pruning shall occur prior to the beginning of construction.
6. Where the Soil Protection Zone must encroach inside the Critical Root Zone of a tree, soil disturbance shall be mitigated with vertical mulching, radial trenching, or another method approved by the ERI Forest Conservation Professional.
7. Prior to construction, the Limits of Disturbance shall be marked and the ERI Professional shall determine which trees will need preventative treatment or removal.
8. Tree maintenance and removal shall be undertaken by a qualified MD Tree Expert to ensure damage to surrounding trees is minimized.
9. Brush and limbs removed for construction shall be chipped and spread at the edge of the Soil Protection Zone to a depth of 6 inches. This shall occur outside the Soil Protection Zone where compaction could impact otherwise unprotected Critical Root Zone.

Reforestation Area Monitoring Notes

1. Monthly visits during the first growing season are to assess the success of the plantings and to determine if supplemental watering, pest control or other actions are necessary. Early spring visits will document winter kill and autumn visits will document summer kill.
2. The minimum survival rate shall be 75% of the total number of trees planted per acre at the end of the two year maintenance period. Wild tree seedlings from natural regeneration on the planting site may be counted up to 50% toward the total survival number if they are healthy native species at least 12 inches tall.
   Certification at the end of the two-year post construction period must indicate that the survival rates will result in a 100 tree per acre ratio for a forest and the 3 to 4 foot height standard for whips by the end of the two growing season post construction period, with at least 50% of those trees having the potential of attaining a 2" caliper DBH within 7 years.
3. Survival will be determined by a stratified random sample of the plantings. The species composition of the sample population should be proportionate to the amount of each species in the entire planting to be sampled.
4. Effective monitoring will assess plant survivability during the first growing season and make recommendations for reinforcement planting if required at that time.

Reforestation Area Planting Notes

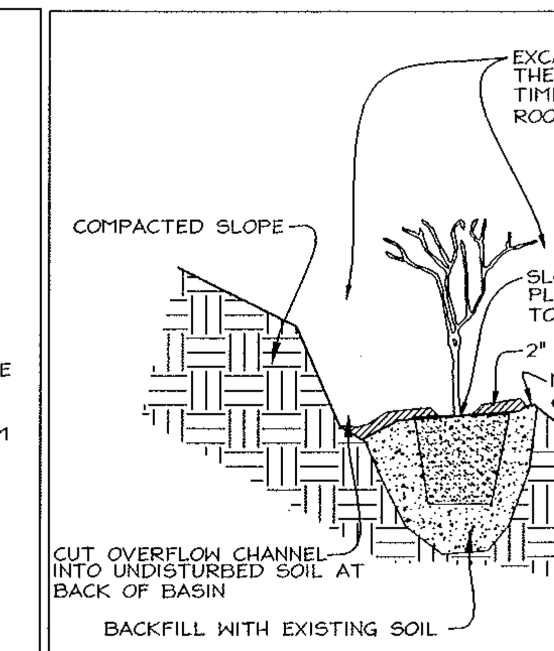
1. Initial planting inspection and certification required. Planting contractor to notify ERI qualified professional 24 hours in advance of planting.
2. Reforestation areas may be planted as soon as reasonable to do so. Late winter- early spring plantings are preferred. Earliest planting dates will vary from year to year but planting may generally begin as soon as the ground is no longer frozen. Alternate planting dates may be considered as conditions warrants.
3. Soil amendments and fertilization recommendations will be made based upon the results of soil analysis for nitrogen, phosphorus, potassium, organic matter content and pH. If required, fertilizer will be provided using a slow release, soluble 16-8-16 analysis designed to last 5-8 years contained in polyethylene perforated bags such as manufactured by ADCO Works, P.O. Box 310 Hollins, N.Y. 11423 or approved equal.
4. Plant materials shall be planted in accordance with the planting diagram, planting details and planting schedule.
5. Plant stock must be protected from desiccation at all times prior to planting. Materials held for planting shall be moistened and placed in cool shaded areas until ready for placement.
6. Planting materials shall be nursery grown and inspected prior to planting. Plants not conforming to the American Standards for Nursery Stock specifications for size, form, vigor, or roots, or due to trunk wounds, breakage, desiccation, insect or disease must be replaced.
7. Newly planted trees may require watering at least once per week during the first growing season depending on rainfall in order to get established. The initial planting operation should allow for watering during installation to completely soak backfill materials.
8. Mulch shall be applied in accordance with the diagram provided and shall consist of composted, shredded hardwood bark mulch, free of wood alcohol.
9. Planting holes should be excavated to a minimum diameter of 2.5 to 3 times the diameter of the root ball or container. Mechanical angering is preferred with scarification of the sides of each hole.



CONTAINER PLANTING
NOT TO SCALE

PLANTING PROCEDURE FOR CONTAINER GROWN PLANTS

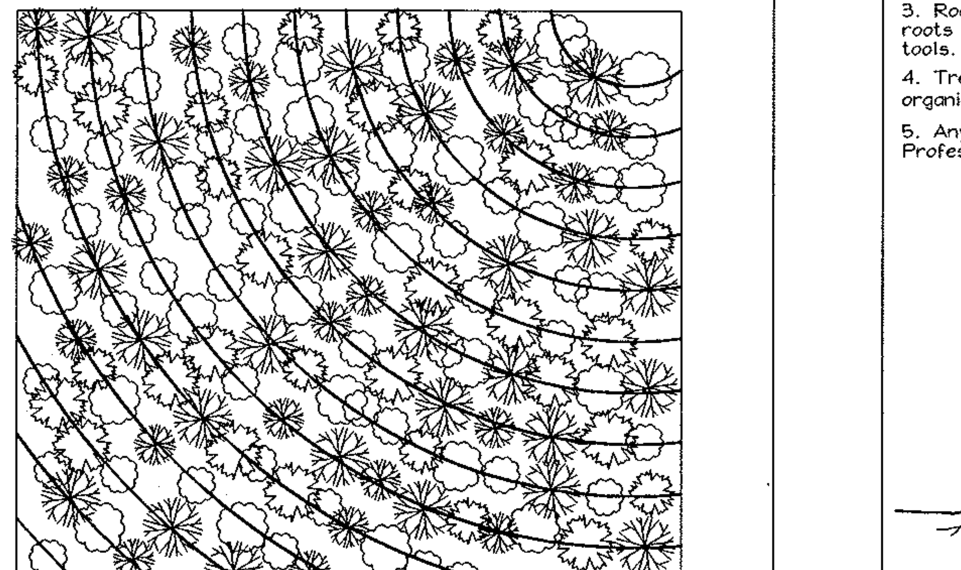
1. REMOVE THE PLANT EITHER BY CUTTING OR INVERTING THE CONTAINER
2. USE A KNIFE TO CUT THROUGH BOTTOM HALF OF THE ROOT BALL.
3. PLANT SHRUBS ON FORMED UP MOUNDS 4" ABOVE THE EXISTING GRADE WHEN HIGH WATER TABLE CONDITIONS EXIST,OTHERWISE PLANT FLUSH WITH EXISTING GRADE.
4. PLANTING HOLE TO BE 2-3 TIMES THE DIAMETER OF THE CONTAINER.
5. INSERT FERTILIZER TABLET, BACKFILL 2/3 OF THE ROOT BALL AND WATER.
6. AFTER WATER PERCOLATES, BACKFILL HOLE TO TOP OF ROOT BALL AND GENTLY TAMP SOIL TO FIRM CONTACT WITH PLANT.
7. APPLY MULCH RING AROUND PLANT KEEPING A 6 IN CLEARANCE FROM STEM.



PLANTING ON STEEP SLOPES
NOT TO SCALE

1. PLANT AS PER CONTAINER PLANTING DETAIL EXCEPT PREP OF PLANTING AREA
2. A BASIN FOR PLANTING IS CUT INTO THE SLOPE WITH PLANT BEING PLACED NEAR THE DOWNHILL EDGE OF THE BASIN.
3. BASIN SHOULD SLOPE TOWARD UPHILL SIDE TO ALLOW RAIN TO BE CAPTURED AND INFILTRATE.
4. AN OVERFLOW CHANNEL SHALL BE CUT INTO UNDISTURBED SOIL AT THE REAR OF THE BASIN TO ALLOW EXCESS RUNOFF AND SEDIMENT TO ESCAPE WITHOUT DAMAGING THE BASIN.
5. MULCH AROUND PLANT IN BASIN.

CURVEILINEAR RANDOMIZED PLANTING

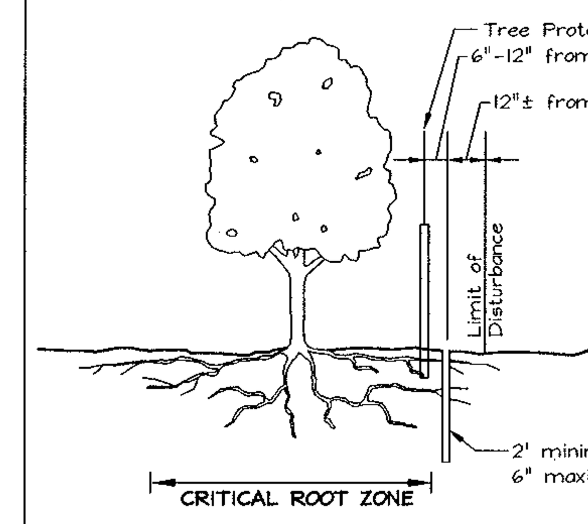


PLANT PLACEMENT DETAIL
NOT TO SCALE

1. MIX TREE AND SHRUB SPECIES IN THE STAGING AREA.
2. SET THE GUIDE CURVILINEAR LINE AS CLOSE TO CONTOUR AS POSSIBLE

ROOT PRUNING

1. Retention areas shall be set prior to construction
2. Boundaries of retention areas shall be flagged, and location of trench shall be specified by ERI Qualified Professional.
3. Roots shall be cut cleanly with root pruning equipment. Where roots >1" are found, trenching shall be done by air spade or hand tools. Roots >1" shall be cut with a hand saw.
4. Trench shall be immediately backfilled with soil removed or high organic content soil.
5. Any other techniques shall be approved by the ERI Qualified Professional before implementation.



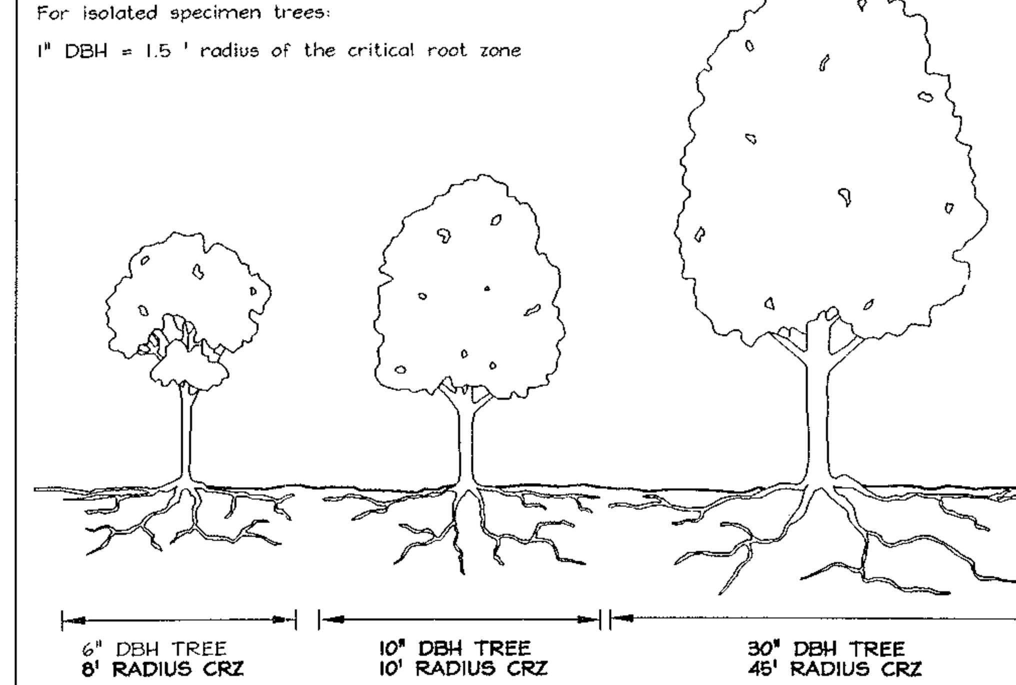
CRITICAL ROOT ZONE

For the edge of large areas, use the greater of the two choices below:

1" DBH of the tree = 1' radius of the critical root zone or 8 ft radius circle around the trunk of the tree

For isolated specimen trees:

1" DBH = 1.5 ' radius of the critical root zone



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

STATE OF MARYLAND STEPHEN L. HUBER No. 363 REGISTERED PROFESSIONAL FORESTER

EXPLORATION RESEARCH, INC.
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS
8318 FORREST STREET
ELLICOTT CITY, MARYLAND 21043
TEL: (410) 750-1150 FAX:(410) 750-7350
EMAIL: EXPLORATIONRES@CS.COM

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

10/19/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

10/15/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

10-4-04
CHIEF, BUREAU OF HIGHWAYS DATE

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

FOREST CONSERVATION NOTES AND DETAILS
HUNTERS RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

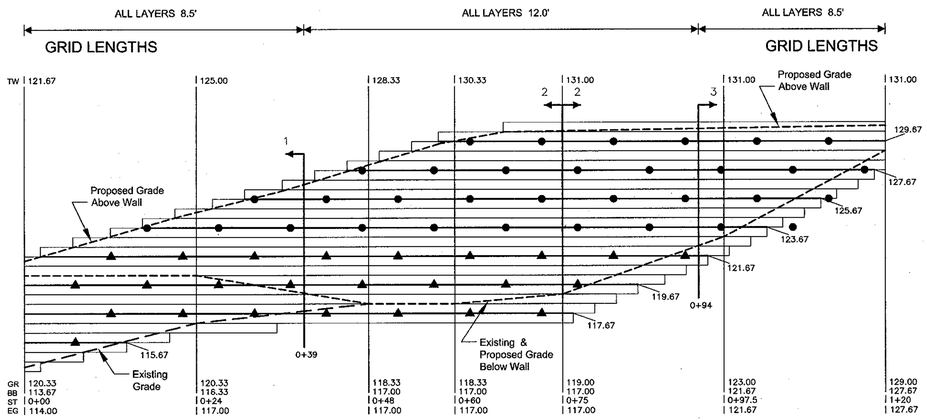
STATE OF MARYLAND ZACHARIA YOSEF FISCH 22418 PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street ... MD 21043
Tel:410-750-2251 Fax ...350
E-mail: FSHAssociates...

DESIG BY:	PS/KO
DRAWN BY:	MM/RAB
CHECKED BY:	ZYF/SLH
SCALE:	1"=50'
DATE:	Sept. 15, 2004
W.O. No.:	3018
SHEET No.:	17 OF 20

F-04-111

WALL #1 (between Lots 21 & 58)

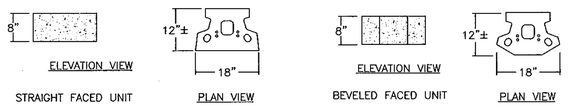


GRID KEY: MIRAFI 3XT ●
MIRAFI 5XT ▲

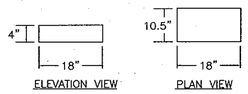
TW = TOP OF WALL (NOT INCLUDING CAP)
GR = PROPOSED FINISHED GRADE AT BASE OF WALL
BB = BOTTOM OF BLOCK / TOP OF LEVELING PAD
ST = WALL STATION
EG = EXISTING GRADE

Scale:
Horizontal 1" = 10'
Vertical 1" = 5'

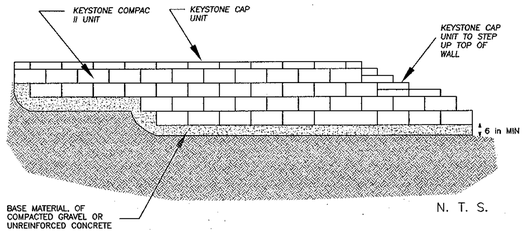
KEYSTONE COMPAC II DIMENSIONS



CAP UNIT



N. T. S.

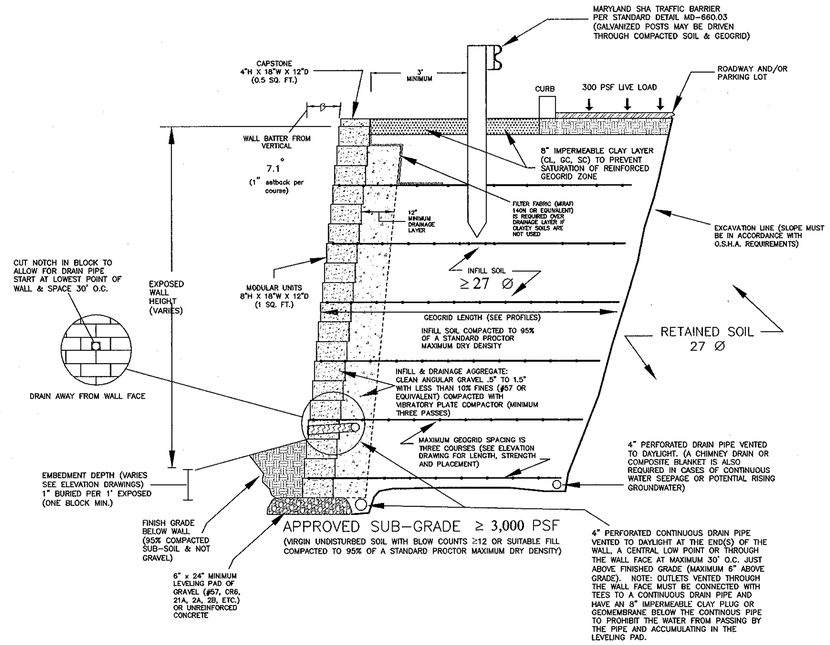


N. T. S.

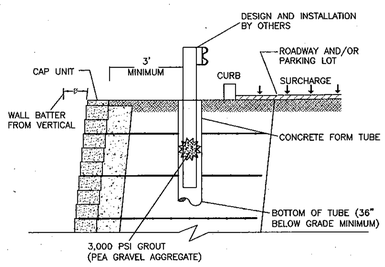
KEYSTONE STEP DOWN TYPICAL DETAIL

KEYSTONE COMPAC II

WALL SECTION

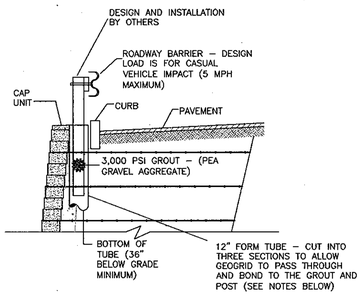


N. T. S.



NOTE:
1. GALVANIZED POSTS MAY BE DRIVEN DIRECTLY THROUGH THE COMPACTED SOIL AND GEOGRID (SEE DETAIL ABOVE RIGHT)
2. IF POSTS ARE SQUARE (SUCH AS 4X4 WOOD) CONCRETE FORM TUBES MUST BE PLACED DURING WALL CONSTRUCITON AND THE POSTS GROUTED IN LATER.
3. BLUNT POSTS MAY NOT BE DRIVEN INTO GEOGRID AFTER WALL CONSTRUCTION IS COMPLETE.

GUARDRAIL DETAIL
N.T.S.



NOTE: THE CONCRETE FORM TUBE SHALL:
- BE 12" IN DIAMETER MINIMUM
- INTERSECT TWO GEOGRID LAYERS VERTICALLY
- BE CUT INTO SEGMENTS TO ALLOW THE GEOGRID TO PASS CONTINUOUSLY FROM THE FACE OF THE WALL, THROUGH THE FORM TUBE, THROUGH THE 12" DRAINAGE LAYER AND INTO THE REINFORCED SOIL ZONE – BE A MINIMUM OF 36" BELOW GRADE TO ELIMINATE ANY FROST CONCERNS
- BE GROUTED WITH 3,000 PSI CONCRETE (WITH PEA GRAVEL AGGREGATE) AFTER THE POST INSTALLATION

THE GEOGRID SHALL:
- PASS CONTINUOUSLY THROUGH THE CUT SECTION OF THE CONCRETE FORM TUBE
- BE CUT TO ALLOW THE POST TO BE INSTALLED AFTER THE WALL IS CONSTRUCTED (THE GEOGRID LEFT PENETRATING THE TUBE WILL BOND WITH THE GROUT TO CREATE A UNIFIED MASS WITH THE POST AND TRANSFER THE LOAD TO THE REINFORCED SOIL)
- BE KEPT TAUT WITHOUT ANY SLACK

GUARDRAIL WITH IMPACT LOAD
N.T.S.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/19/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE

RYAN & ASSOCIATES
A Division of WKR Consulting, Inc.
RETAINING WALL DIVISION
717-477-8400 fax 717-477-8410
68 West King Street
Shippensburg, PA 17257-0006

STATE OF MARYLAND — WILLIAM K. RYAN — No. 21586 — PROFESSIONAL ENGINEER — 9/16/04

Professional Engr. No. 21586

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

RETAINING WALL PROFILE, DETAILS & WALL SECTION
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY:	JKS
DRAWN BY:	JWP
CHECKED BY:	WKR
SCALE:	AS SHOWN
DATE:	Jan. 07, 2004
W.O. No.:	3518
SHEET No.:	18 OF 20

GENERAL NOTES

1. SOIL PARAMETERS: Based on review of the "Geotechnical Engineering Study" dated 07/20/2001 for this site prepared by Hillis–Carnes Engineering Associates, Inc., an internal angle of friction of 27° was used for the soils in this design. This is for a worst case CL (lean clay) soil type and shall be verified during wall construction. CH (fat clay), MH (elastic silt) and OH/OL/PT (organic) soils are not acceptable for wall construction. If these unsuitable soils are encountered they shall be removed and replaced with soils that meet or exceed the design friction angle of 27°. The on site geotechnical engineer shall monitor this closely during the construction process. The site soils vary widely (in addition to CL there is also ML– silt, SC– clayey sand & SM– silty sand). If possible, the sandy soils should be stockpiled and used for backfilling the wall since they have a higher friction angle, are more free draining and it is easier to achieve 95% compaction (CL & ML are fine–grained and it is difficult to control the moisture level). The moisture level of the soils must be ±2% of optimum. Since proctor tests were not available for the CL soil, an assumed unit weight (maximum wet density) of 125 PCF was used. Fluctuations of 5 PCF higher or lower will not affect these designs, however if the unit weight varies by more than 5 PCF Ryan & Associates (RA) must be notified so that the cross sections can be rerun to verify that all factors of safety are still met. The site geotechnical shall run standard proctor tests of the proposed backfill soil (prior to wall construction) to verify the accuracy of this design assumption. No cohesion was used in any of the calculations.

2. CONSTRUCTION OVERSIGHT: The construction of this wall must be performed under the observation of a Maryland Registered Professional Engineer to ensure that it is built in accordance with the RA General Notes and Specifications.

3. GLOBAL STABILITY: A global stability analysis was done on G–Slope design software for the wall and a factor of safety of 1.3 was met. A copy of the global stability analysis has been included in the 81/2" X 11" calculations submittal.

4. BEARING CAPACITY: The wall's sub–grade (the soils under the wall's gravel leveling pad and the soils under the wall's reinforced geogrid zone) must be tested by the site geotechnical engineer prior to wall construction and have a minimum allowable bearing capacity of 3,000 PSF. The sub–grades must be virgin (natural undisturbed soil with blow counts greater than or equal to 12) or suitable fill (greater than or equal to 27°) compacted to 95% of a standard proctor maximum dry density. Any areas of the sub–grade that does not meet this maximum pressure will require undercutting and/or geogrid reinforcing.

5. DESIGN SOFTWARE: Internal and external wall calculations were performed with Keywall 2001 design software (version 3.1.6). A table has been included ("Cross Section Details and Factors of Safety") which has the following information: section location (area of wall referenced), total wall height, loads applied, factors of safety (for sliding, overturning, bearing capacity and global stability) and bearing pressure (the load exerted by the wall on the sub–grade). Factors of safety of 1.5 were also met for: geogrid pullout (from the soil and from the block), geogrid overstress (geogrid rupture) and connection (block to geogrid).

6. SPECIFICATIONS: Construction and materials must conform to the attached "Specifications for Retaining Wall Systems".

7. GEOGRIDS: Mirafi 3XT & 5XT geogrids, which have LTDS (Long Term Design Strengths) of 1558 and 2234 respectively, were used in this design. All geogrid substitutions must have prior approval of RA.

8. WALL PROFILE: The elevation drawing was done to represent the grade changes necessary on the civil drawings and was done in even block course increments of .667' (8"). Minor field changes may be necessary by the wall installer. Lineal footage may be added or subtracted as needed if the wall's height is equal to or less than the design heights. If the wall needs to be raised in height, RA shall be notified and new structural cross sections must be provided before the wall installer proceeds. The cap height of .333' (4") is not shown on the profile drawing however its height may have been used in some cases to achieve the desired TW elevations.

9. WALL BATTER: The 7.1° batter (1" setback per block course) was used for the Keystone blocks in this design. The 0.5° (near vertical: 1/16" setback per block course) may not be used for this wall. NOTE: it is important for the wall installer and the civil engineer/surveyor to predetermine the walls' batters during stake out. The wall will need to be moved forward at its base if there are critical dimensions that must be met on the high sides of the wall.

10. FACTORS OF SAFETY: The following factors of safety have been met in this design: Sliding 1.5, Overturning 2.0, Bearing Capacity 2.0, Geogrid Overstress 1.5, Geogrid Pullout 1.5 (from the block and from the soil) and Global Stability 1.3.

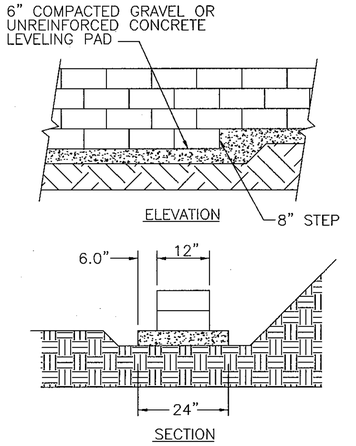
11. EMBEDMENT: The wall embedment varies from one to ten blocks. The exact amount of buried blocks may be determined by subtracting the "BB" elevations from the "GR" elevations on the RA profile drawing. Additional blocks were buried in some areas so that the wall will not be built on fill soils.

12. REAR DRAIN TILES: Rear drainpipes are required at the back of the wall's reinforced geogrid zone. This is in addition to the mandatory 4" drainpipe at the front of the wall (within the gravel leveling pad or behind the at grade courses– depending which drainpipe position is exercised). The rear drainpipe shall be surrounded by a minimum of 6" of clean gravel (#57 or equivalent) and shall have perpendicular solid pipes that run forward and connect to the front drainage system with crosses or tees.

13. BLOCK SYSTEM: This design is are valid only for the Keystone Compac II block system. Each segmental wall system has unique dimensions, connection devices and interacts differently with geogrids; therefore other block types may not be substituted.

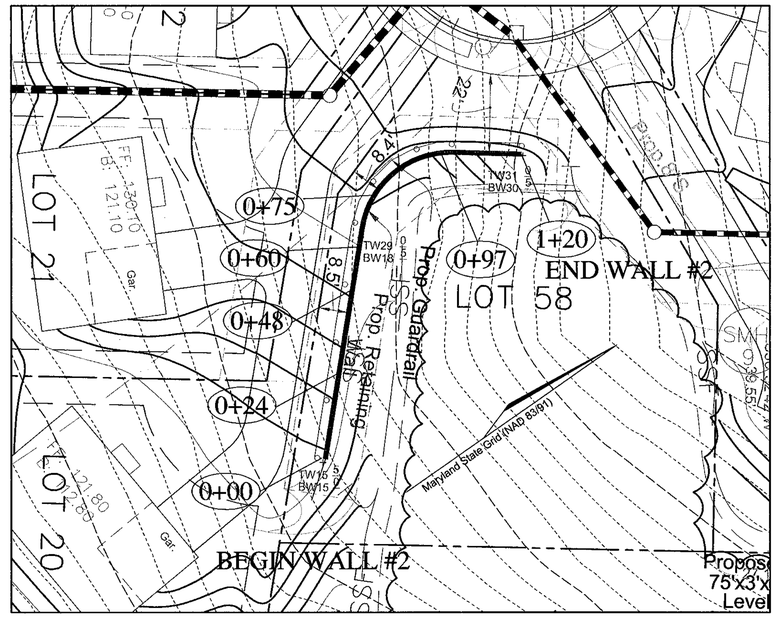
14. SEPARATE 81/2" X 11" SUBMITTAL: A separate 8 1/2" X 11" booklet has also been provided and includes: cover letter, General Notes, Keywall cross section calculations, G–Slope global stability calculations and RA Specifications.

15. SPECIAL HOWARD COUNTY RETAINING WALL SPECIFICATIONS:
a. Retaining walls shall only be constructed under the observation of a Registered Professional Engineer and a (NICET, WACEL, or equivalent) certified soils technician.
b. The required bearing pressure beneath the footing of the wall shall be verified in the field by a certified soils technician. Testing documentation shall be provided to the Howard County Inspector prior to the start of construction. The required test procedure shall be the Dynamic Cone Penetrometer Test ASTM STP–399.
c. The suitability of the fill material shall be confirmed by the on–site soils technician. Each eight inch lift must be compacted to 95% Standard Proctor Density and the testing report shall be made available to the Howard County Inspector upon completion of the construction.
d. For walls over ten feet in height, one soil boring is required every 100 feet along the length of the wall, copies of the boring reports shall be provided to the Howard County Inspector prior to the start of construction.



LEVELING PAD DETAIL

N. T. S.



WALL #2 (between Lots 21 & 58)
SCALE 1"=20'

CROSS SECTION DETAILS & FACTORS OF SAFETY:

SECTION	STATION	TOTAL WALL HEIGHT	LOAD APPLIED	SLIDING minimum 1.50	OVERTURNING minimum 2.00	BEARING CAPACITY minimum 2.50	BEARING PRESSURE PSF	GLOBAL STABILITY minimum 1.30
WALL #1								
1	0+00 TO 0+39	10.00'	300 PSF LIVE LOAD	1.63	3.78	6.78	1467	1.69
2	0+39 TO 0+94	14.00'	300 PSF LIVE LOAD	1.70	4.36	6.42	2008	1.69
3	0+94 TO 1+20	10.00'	300 PSF LIVE LOAD	1.63	3.78	6.78	1467	1.69

MATERIAL ESTIMATE: BLOCK : Keystone Compac II GEOGRID: Mirafi 3XT & 5XT

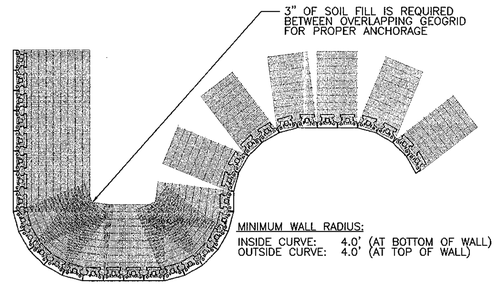
WALL	TOTAL SQ. FT.	(1.0 S.F.) BLOCK	(.5 S.F.) CAPS**	PINS	SQ. YDS. 3XT GRID	SQ. YDS. 5XT GRID	SQ. YDS. 7XT GRID	CU. YDS. DRAIN GRAVEL	LEVELING PAD GRAVEL	FT. WALL LENGTH
1	1,273	1,225	96	2,290	415	360	0	75	9	120

Totals include 2% extra for block and caps, 15% for geogrid and 5% for gravel.

* Ryan & Associates is not responsible for extras or shortages based on this take-off. It is the contractor's responsibility to verify the accuracy of this design by reviewing the site/ grading plan for this project.

** Includes one extra cap per step down on top of the wall for double capping.

REINFORCEMENT PLACEMENT FOR INSIDE AND OUTSIDE CURVES



MINIMUM WALL RADIUS:
INSIDE CURVE: 4.0' (AT BOTTOM OF WALL)
OUTSIDE CURVE: 4.0' (AT TOP OF WALL)

GEOGRID INSTALLATION ON CURVES

N. T. S.

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cindy Hanratta 10/8/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

10/15/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS DATE

RYAN & ASSOCIATES
A Division of WKR Consulting, Inc.
RETAINING WALL DIVISION
717–477–8400 fax 717–477–8410
68 West King Street
Shippensburg, PA 17257–0006

STATE OF MARYLAND — WILLIAM K. RYAN — No. 21586 — PROFESSIONAL ENGINEER

Professional Engr. No. 21586

RETAINING WALL TABLES, DETAILS & CIVIL PLAN
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1

TAX MAP 38 GRIDS 4 & 10 PARCEL 163
1ST ELECTION DISTRICT HOWARD COUNTY, MARYLAND

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7359
E-mail: FSHAssociates@cs.com

DESIGN BY: DKS
DRAWN BY: JWP
CHECKED BY: WKR
SCALE: AS SHOWN
DATE: Jan. 07, 2004
W.O. No.: 3018
SHEET No.: 19 OF 20

SPECIFICATIONS FOR SEGMENTAL RETAINING WALL SYSTEMS

PART 1: GENERAL

1.01 Description

A. Work includes furnishing and installing segmental retaining wall (SRW) Units to the lines and grades designated on the Final Design prepared by Ryan & Associates (RA). Also included are furnishing and installing appurtenant materials required for construction of the retaining wall as shown on the RA Final Design.

1.02 Reference Standards

A. ASTM C 140— Sampling and Testing Concrete Masonry Units
B. ASTM D 4595— Tensile Properties of Geotextiles by the Wide-Width Strip Method.
C. ASTM D 5262— Test Method for Evaluating the Unconfined Creep Behavior of Geo- Grids
D. GRI:GG1— Single Rib Geogrid Tensile Strength
E. GRI:GG5— Geogrid Pullout
F. ASTM D 698— Moisture Density Relationship for Soils, Standard Method
G. ASTM D 422— Gradation of Soils
H. ASTM 4318— Atterberg Limits of Soil
I. ASTM 3034— Specification for Polyvinyl Chloride (PVC) Plastic Pipe
J. ASTM D 1248— Specification for Corrugated Plastic Pipe

1.03 Design Standards

A. The following factors of safety must have been met in this design: Sliding 1.5, Overturning 2.0, Bearing Capacity 2.0, Geogrid Overstress 1.5, Geogrid Connection (between the block and the geogrid) and Geogrid Pullout 1.5 (from the block and from the soil).

PART 2: MATERIALS & DESIGN PARAMETERS

2.01 Segmental Retaining Wall Units

A. SRW Units shall be machine formed, Portland Cement concrete blocks specifically designed for retaining wall applications. The SRW Unit currently approved for this project is:

Keystone Compac II as manufactured by Betco Block & Products

NOTE: Where Keystone specifications and reference documents conflict with these specifications, the RA specifications hold precedence.

B. SRW Units shall be sound and free of cracks or other defects that would interfere with the proper placing of the units or significantly impair the strength or permanence of the structure. Cracking or excessive chipping may be grounds for rejection. Units showing cracks longer than 1/2 inch shall not be used within the wall. Units showing chips visible at a distance of 30 feet from the wall shall not be used within the wall.

C. Concrete used to manufacture SRW Units shall have a minimum 28 days compressive strength of 3,000 PSI and a maximum moisture absorption rate, by weight, of 8% as determined in accordance with ASTM C 140. Compressive strength test specimens shall conform to the saw-cut coupon provisions of Section 5.2.4 of ASTM C 140 with the following exception: Coupon shall be taken from the least dimension of the unit of a size and shape representing the geometry of the unit as a whole.

D. SRW Units molded dimensions shall not differ more than ± 1/8 inch from that specified, except height which shall be ± 1/16 inch as measured in accordance with ASTM C 140.

2.02 Geosynthetic Reinforcement

A. Geosynthetic reinforcement shall consist of geogrids as indicated on the RA Final Design. No geogrid substitutions shall be permitted without the prior approval of RA (a partial redesign may be necessary if geogrids are substituted). NOTE: it is always acceptable to substitute a higher strength geogrid (of the same manufacturer) for a lower strength geogrid.

2.03 Shear Connectors

A. Shear connectors shall be 1/2 inch diameter thermoset isopthalic polyester resin-pultruded fiberglass reinforcement rods or equivalents to provide connection between vertically and horizontally adjacent units. Strength of shear connectors between vertical adjacent units shall be applicable over a design temperature of 10 degrees F to +100 degrees F. These connectors shall be capable of holding the geogrid in the proper design position during geogrid pre-tensioning and backfilling.

2.04 Leveling Pad

A. Material for the leveling pad shall consist of compacted gravel or unreinforced concrete. Typical gravels used for this leveling pad are #57, CR6, 21A, 2A modified, 2B, RC6, RC57, etc. Lean un-reinforced concrete with a strength of 1,500 PSI may also be used for the leveling pad.

2.05 Drainage Aggregate

A. Drainage aggregate shall be clean angular gravel (#57 or equivalent) with a size of 1/2 inch to 1 1/2 inches and less than 10% fines (passing the #200 sieve). Rounded "pea gravel" type aggregate is not permissible since it does not have the necessary frictional properties. Recycled gravel may be used if it meets the above criterion.

2.06 Drainage Pipe

A. The drainage collection pipe shall be a 4 inch perforated or slotted PVC or corrugated HDPE pipe.

2.07 Infill Soil: within the reinforced geogrid zone

A. The soils used must meet or exceed the friction angle stated in the RA Final Design (in the General Notes, on the typical wall section and on the structural cross sections). The reinforced material shall be free of debris and organic material (i.e.— no plants, roots, sod, top soil, trash, wood, etc.). The infill soil shall not consist of CH (fat clay), MH (elastic silt) or OH/ OL/ PT (organic) soils.

B. Rocks may be used as infill material as long as they have a maximum size of 6 inches and a mean diameter of 3 inches. Recycled concrete is permissible for infill except with certain polyester geogrids in water applications. In the case of water applications the geogrid manufacturer shall be consulted to see if the alkali in the recycled material will cause corrosive damage to their geogrid.

C. Select gravel (classified by USCS as GP or GW) is always an acceptable substitution in the event suitable soils (those meeting RA's and the site geotechnical engineer's requirements) are not readily available.

2.08 Retained Soil: the area beyond the infill soil and extending to a distance that is twice the wall's exposed height

A. This soil must meet or exceed the friction angle stated in the RA Final Design (in the General Notes, on the typical wall section and on the structural cross sections). This soil must be virgin (natural undisturbed with blow counts ≥12) or suitable fill (friction angle ≥ the RA Final Design requirement) compacted to 95% of a standard proctor maximum dry density.

2.09 Foundation Soil: the soil under the wall's gravel leveling pad and the soil under the reinforced geogrid zone

A. The foundation soil must meet or exceed the minimum allowable bearing capacity stated in the RA Final Design (in the General Notes and on the typical wall section). The sub-grade must be virgin (natural undisturbed soil with blow counts ≥12) or suitable fill (friction angle ≥ the RA Final Design requirement) compacted to 95% of a standard proctor maximum dry density.

2.10 Soil Investigation

A. RA recommends that every retaining wall design be preceded by an in-situ soil investigation by a licensed geotechnical engineer. However, if the owner and/or wall installer elects not to have an investigation conducted RA may assume soil design parameters based on: published data by the Soil Conservation Service (soil maps), a verbal description by the owner and/or wall installer or by RA's previous experience in certain geographic areas. It must be understood that the owner and/or wall installer bears full responsibility to the election not to have an investigation performed.

2.11 Site History & Information

A. Many factors other than soil information affect the performance and design of the retaining wall. RA relies on information provided by the owner and/or wall installer when designing a retaining wall. RA bears no responsibility if the owner and/or wall installer omit critical information required to properly design the wall. Information critical to wall design from the site consist of: topographic features (such as slopes), soil types, utilities, storm water management, structures (including buildings, other existing or proposed walls, swimming pools, etc.), site geological phenomenon, groundwater, loads with the wall's zone of influence (such as driveways, patios, roadways, sidewalks, etc.) and any other readily known site factors that could potentially impact the RA Final Design.

PART 3: CONSTRUCTION

3.01 Inspection

A. RA considers all retaining walls to be critical structures, meaning most walls require a considerable financial investment by the owner and failure of a wall will negatively impact a property both financially and from a public safety perspective. The owner or owner's representative is responsible for verifying that the wall installer meets all of the requirements of the RA Final Design (as stated in these specifications and the project's General Notes). This includes all submittals for materials and design, qualifications and proper installation of the wall system. All walls with an exposed height of 6 feet or greater must have the construction certified by a licensed geotechnical/ structural engineer registered in the jurisdiction of the project. Additionally, after the wall has been completed it is highly recommended that it be surveyed to establish the wall's current horizontal and vertical alignment.

B. The wall installer's field construction supervisor shall have demonstrated experience and be qualified to direct all work at the site.

C. RA provides construction oversight on some retaining wall projects. RA verifies general compliance with the RA Final Design; however, it is the wall installer's ultimate responsibility to construct the structure properly in accordance with the RA Final Design. RA's liability is limited to the amount of our fees for the scope of work provided for the wall designs and construction oversight.

3.02 Excavation

A. The wall installer shall excavate to the lines and grades shown on the RA Final Design and the project's civil plans. The wall installer shall take precautions to minimize over-excavation. Over-excavation shall be filled with compacted soil (friction angle ≥ RA design parameters) or gravel as directed by the site geotechnical engineer.

B. The wall installer shall verify the location of existing structures and utilities prior to excavation. The wall installer shall ensure that all surrounding structures are protected from the effects of wall excavation. Excavation support (shoring), if required, is the responsibility of the wall installer. All excavation must be conducted in accordance with OSHA (federal) and state safety regulations. All work to construct the wall must be in accordance with 29CFR1926 sub-part P (OSHA Excavation Safety Requirements).

3.03 Foundation Preparation

A. Following excavation, the foundation soils (under the wall's gravel leveling pad and under the wall's reinforced geogrid zone) shall be examined by the site geotechnical engineer to assure that the actual foundation soil strength meets or exceeds the minimum allowable bearing capacity in the RA Final Design (stated in the General Notes and shown on the typical wall section). Soils that do not meet the required strength shall be removed and replaced with approved select structural fill or gravel and be compacted to 95% of a standard proctor maximum dry density for the full depth.

B. In cases of poor bearing capacity or fill soils, an enlarged geogrid reinforced leveling pad may be required. This typically consists of a 1 foot deep X 4 foot wide leveling pad with geogrid under (on the sub-grade) and within the gravel (6 inches above the sub-grade). The sub-grade must be compacted with a "J-Tamp" or "Jumping Jack" type compactor with a minimum of three passes prior to geogrid placement. These extra measures will increase the soil's bearing capacity by a minimum of 1,000 PSF (RA shall be consulted if the soil's bearing capacity needs to be increased by more than 1,000 PSF).

3.04 Leveling Pad Construction

A. The leveling pad shall be placed so that its top elevation is the same as the bottom of block ("BB") elevation on the RA Final Design profile drawing. It shall have a minimum thickness of 6 inches and a minimum width of 2 feet. The leveling pad should, at a minimum, extend laterally at least a distance of 6 inches from the toe and heel of the lower most SRW Unit.

B. The leveling pad material shall be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor to provide a firm level-bearing surface on which to place the first course of SRW Units. A thin layer (not to exceed 1/2 inch) of well-graded sand or stone dust may be used to smooth the top of the leveling pad.

3.05 SRW Unit Installation

A. All SRW Units shall be installed at the proper elevation and orientation as shown on the RA Final Design profile drawing and in conjunction with the project's civil plans. The SRW Units shall be installed in general accordance with the manufacturer's recommendations (RA's Final Design shall govern in any conflict between the two requirements).

B. The first course of SRW Units shall be placed on the leveling pad. The units shall be leveled side-to-side, front-to-rear and with adjacent units, and aligned to ensure intimate contact with the leveling pad. The first course is the most important for accurate and acceptable results. Alignment may be done by means of a string line or an offset from the base line to the backs of the blocks. SRW units shall have a minimum 4 inch overlap of units on each successive course so that the wall is interlocked and continuous. No horizontal gaps greater than 1/4 inch between the faces of adjacent units are permitted.

C. Because the wall has a setback, its batter must be predetermined during the stake out process by the civil engineer/surveyor and wall installer. If there are critical dimensions that must be met on the high side of the wall then the base (at the toe) will need to be moved forward to compensate.

D. Lay out of curves and corners shall be installed in accordance with the civil plans and the RA Final Design. Construction techniques for curves and corners shall be in general accordance with the SRW manufacturer's installation guidelines. In general, all tangent angles shown on the civil drawings should be changed into curves to enhance the wall's strength and appearance. Continuous vertical joints are not recommended. Inside and outside 90° corners may be constructed without compromising the wall's integrity if they are properly interlocked. Inside corners should be constructed so that the SRW Units interlock (according to manufacturer's recommendations) and outside corners should incorporate special corner blocks when possible. If special outside corner blocks are not available from the block manufacturer for this project then the manufacturer's guidelines for building structural outside corners shall be followed. If gluing is necessary only industrial grade adhesives or sealants designed for concrete-to-concrete applications may be used (adhesives designed for plastic or wood applications are not acceptable).

E. Clean all excess debris from the tops of the SRW Units and install the next course.

F. Repeat procedures to extent of wall height.

G. A ±2° tolerance is permitted horizontally for wall batter (block setback). In no case shall a wall go beyond vertical (have a negative batter). Walls shall be built level (not with grade), however a ±1.5 inch tolerance over a 10 foot distance is permitted vertically (as checked from left to right along the wall).

H. Embedment shall be a minimum of 1 inch buried for every 1 foot of wall exposed with one block minimum when the front slope is 4:1 or greater (more level). Walls constructed on 3:1 front slopes or less (more steep) require additional buried blocks. See the profile drawing in the RA Final Design for the exact amount of embedment (the amount of buried block can be determined at each wall station by subtracting the "BB" elevations from the "GR" elevations).

3.06 Geogrid Reinforcement Placement

A. All geogrid reinforcement shall be installed at the proper elevation, length and strength as shown on the profile and structural cross sections in the RA Final Design. Partial geogrid coverage is not acceptable: no gaps shall be present between geogrid layers. 100% coverage is required, however it is not necessary to overlap the geogrid pieces. The geogrid shall be laid horizontally on the compacted infill soil and on top of the concrete SRW Units. The geogrid must be embedded into the SRW Units to the face. The wall installer shall verify that the orientation of the geogrid is in accordance with the geogrid manufacturer's recommendations. The highest strength direction of the geogrid must be perpendicular to the wall face (the geogrid must not be laid parallel to the wall— cannot be rolled out with the wall).

B. Geogrid reinforcement layers shall be one continuous piece for their entire embedment length. Overlapping of the geogrid in the design strength direction (perpendicular to the wall face) is not permitted.

C. Tracked construction equipment shall not be operated directly on the geogrid. A minimum of 6 inches of backfill is required prior to operation of tracked vehicles over the geogrid. Turning should be kept to a minimum. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds (less than 5 MPH).

D. The geogrid shall be in tension and free of wrinkles prior to placement of the infill soil. Nominal tension shall be applied to the geogrid and secured in place with staples, stakes or by hand until it is covered by 6 inches of infill soil.

E. For inside & outside corners and inside & outside curves the geogrid shall be placed according to the manufacturer's instructions to provide total geogrid coverage. On outside corners the geogrid should be shifted up or down one course and alternated so that the geogrid comes into the reinforced geogrid zone from both legs of the 90° angle. Geogrid layers should never be placed on top of one another: there must be a minimum of 3 inches of compacted infill soil between geogrid layers.

3.07 Wall Drainage

A. Drainage aggregate (clean gravel such as #57 or equivalent) shall be installed behind the entire wall face from the first course below grade to one course from the top of the wall. The drainage gravel shall be placed to a minimum thickness of 12 inches behind the SRW Units. Drainage gravel shall also fill all voids between and within (if hollow) the SRW Units. SRW Units must be filled with drainage aggregate in one course lifts (SRW Units may not be stacked in two or three course lifts and then have the gravel dumped in from the top through multiple courses). An impermeable clay layer (CL, GC or SC) shall be placed on top of the 12" drainage layer. If clayey soils are not readily available, a layer of filter fabric (Mirafi 140N or equivalent) shall be placed on top of the gravel (below the topsoil) to prevent the downward migration of fines.

B. Drainpipes are mandatory and shall be vented to daylight at the end(s) of the wall, at a central low point of the wall, or through the wall face at maximum intervals of 30 feet on center (no more than 6 inches above finished grade when vented through the wall face). The pipe(s) must maintain gravity flow of water outside the reinforced geogrid zone. Water must drain to an outlet and have positive flow. If a continuous pipe is run, it shall daylight into a storm sewer manhole or along a slope at an elevation lower than the lowest point of the pipe within the drainage aggregate. When drainpipes are daylighted at the end(s) of a wall they must be visible and unobstructed. The drainpipes should be checked by the owner on a regular basis to ensure that they remain open (not blocked, filled in, grown over, pinched).

C. Rear drainpipes are required in the following situations: when groundwater can rise and approach within 1 foot of the leveling pad sub-grade, in "cut" situations where the potential exists for storm water to enter the interface between the reinforced geogrid zone and the retained zone and when low permeable soils (CL— lean clay & ML— silt) are used for infill soil. Retaining walls with low permeable soils in the reinforced geogrid zone are more susceptible to being negatively impacted by hydrostatic forces. The owner may elect to install a rear drainpipe to minimize or eliminate potential hydrostatic force buildup leading to potential wall movements. RA recommends a rear drainage system for all walls with these soil types in cut situations, however ultimately it is the owner's decision. This rear drainpipe shall be surrounded by a minimum of 12 inches of clean gravel (#57 or equivalent) and surrounded with filter fabric to prevent the migration of fines. This rear drainpipe must vent to daylight or be directed to a storm sewer manhole (see instructions for front drainpipe in section 3.07B above).

D. Chimney drains (a second 12 inch layer of drainage aggregate within the rear 1 foot of the reinforced geogrid zone or directly behind the reinforced geogrid zone) must be installed when groundwater is present or likely (to an elevation that is a minimum of 1 foot above predicted levels as given by the site geotechnical engineer), when stated in the RA Final Design or when required by the site geotechnical engineer.

E. All drainage zone aggregate shall be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor (minimum of three passes).

3.08 Backfill Placement

A. The infill soil shall be placed as shown in the RA Final Design in the maximum compacted lift thickness of 10 inches and shall be compacted to a minimum of 95% of a standard proctor maximum dry density (ASTM D 698) at a moisture content within 2% of optimum. The backfill shall be placed and spread in such a manner as to eliminate wrinkles or movement of the geogrid and the SRW units. Compaction testing shall be done at 25%, 50%, 75% and 100% of the wall height or as specified by the site geotechnical engineer.

B. Only a vibratory plate or small-scale vibratory smooth drum compactor equipment shall be allowed within 3 feet of the front of the wall face. Compaction within the 3 feet behind the wall face shall be achieved by at least three (3) passes of the lightweight mechanical plate compactor or roller. Heavy equipment (such as track hoes, ride on rollers, pans, etc.) must be kept back a minimum of 3 feet from the rear of the wall.

C. At the end of each day's operation, the wall installer shall slope the last level of backfill away from the wall facing to direct water runoff away from the wall face.

D. At completion of wall construction if final grading, paving, landscaping and/or storm drainage installation adjacent to the wall is not placed immediately after wall completion, temporary grading shall be provided to ensure that water runoff is not allowed to collect or pond behind the wall until final construction adjacent to the wall is completed.

E. Filter fabric (Mirafi 140N or equivalent) is required when the infill soil is classified as poorly graded sand (SP) or well graded sand (SW) since these soils are non-cohesive and could potentially slough, clogging the gravel drainage layer. Filter fabric is optional between the 12 inch gravel drainage layer and the compacted infill soil if the backfill soils are clayey (CL or SC), gravelly (GC, GM, GP or GW) or silty (ML or SM).

3.09 SRW Caps

A. SRW caps shall be properly aligned and glued (for safety reasons) to the underlying SRW Units with a flexible high-strength concrete adhesive or sealant designed for "concrete to concrete" applications (not for plastic or wood). Rigid adhesive or mortar is not acceptable.

3.10 Water Applications

A. When walls are installed in water applications (such as storm water ponds, streams, bulkheads, areas adjacent to flood plains, etc.) all clean gravel must be used as infill up to 1 foot above the 100 year flood elevation, the high water level or the top of berm/spillway. This gravel must be free draining and have less than 10% fines (#57 or equivalent). Filter fabric (Mirafi 140N or equivalent) must go in front of the buried block, under the leveling pad, behind the reinforced geogrid zone (vertically up to the extent of the gravel infill) and on top of the gravel infill (horizontally). This is required to prevent the migration of fines into the gravel infill. Rip rap is required in front of the bottom three courses on walls installed in tidal waters. Rip rap is also required when indicated on the civil plans and where pipes with active water flow exit through the wall.

3.11 Rails, Fences & Other Structures

A. The scope of RA for this project does not include fence or railing designs. Typical details have been given to provide general guidelines for the installation of fences, guardrails and railings behind walls. RA cannot give specific details because the type, placement and height of fences and rails vary widely and because the requirements are different depending on the municipality and regulatory authority. RA can provide a project specific fence or rail detail and structural design for an additional fee if given exact information (material type and size and manufacturer's specifications and installation guidelines).

B. Open fences and railings not subject to wind loads (minimum of 50% open and maximum of 50% solid) may be placed directly behind the wall or in the wall (can be placed in the blocks only if they are a hollow system and if the cores and web alignment will accept the posts) as long as they are not subject to vehicular impact. Solid or semi-solid fences that are subject to wind loads must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall.

C. Guardrails subject to vehicular impact must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall. Guardrails may be placed closer than this 3 foot minimum only if a barrier (such as curbing, wheel stops, etc.) is in place to prevent vehicular impact (the overhang of vehicles must be considered when determining this).

D. Light post foundations, sign foundations and similar structures subject to wind loads must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall.

E. In cases where these 3 foot minimum distances cannot be met due to restraints on the site, additional analyses will need to be done to determine methods of stabilization. RA can provide these designs for an additional fee.

3.12 Storm Structures & Utilities

A. Reinforced Concrete Pipes (RCP) may pass through the leveling pad or wall structure without compromising the design. The SRW units may be cut to fit around the pipe and the voids filled with non-shrink grout or type "M" mortar. A concrete collar may be cast around the structure if desired. When a collar is cast, the top of the collar shall line up with an even block course to maintain proper alignment and neat workmanship.

B. The wall may not bear on plastic or steel pipes (such as ADS, CMP, HDPE, PVC, SLCPP, etc.) or utilities (such as electric, gas, phone lines, sewer or water lines, etc.). Grade beams or lintels must be used to bridge these non-load bearing structures. If a specific grade beam or lintel is not specified in the RA Final Design, RA shall be consulted to determine the size, strength and reinforcing of the grade beam or lintel. If these non-load bearing pipes or utilities are located at minimum of 42 inches below the wall's leveling pad then a grade beam or lintel is not necessary.

C. Concrete storm structures may be located behind a wall and be within the reinforced geogrid zone as dictated by the project's civil drawings. If the structure(s) cannot be moved out of the reinforced geogrid zone and the geogrid cannot be installed to its full design length the following shall apply. On small structures (such as collection boxes, concrete pipes less than 18 inches, inlets, manholes, etc.) it is acceptable to shorten the geogrid from the design length and meet the structure. The area between the wall and structure where the geogrid has been shortened must be filled with gravel (#57 or equivalent) and not soil. The gravel must be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor. On large structures and in cases where pipes parallel the wall for long distances, RA shall be consulted to determine the impact on the wall before allowing this to be done.

D. The wall's integrity may be compromised if pipes or structures burst or develop leaks and allow water or fluids to saturate the reinforced geogrid zone. RA is not responsible for wall failure that results from pipes or structures that burst or leak and allow water or fluids to saturate the reinforced geogrid zone.

3.13 Construction Adjacent to Completed Wall

A. The owner or owner's representative is responsible for ensuring that construction adjacent to the wall by others does not disturb the wall or place temporary construction loads on the wall that exceed design loads, including loads such as water pressure, temporary grades, or equipment loading. Heavy paving or grading equipment shall be kept a minimum of three feet behind the back of the wall face. Equipment with wheel loads in excess of 150 PSF live load shall not be operated with 10 feet of the face of the retaining wall during construction adjacent to the wall. Care should be taken by the general contractor or owner to ensure water runoff is directed away from the wall structure until final grading and surface drainage collection systems are completed.

B. Care must be taken when installing appurtenances (such as generators, transformers, etc.) or utilities within the reinforced geogrid zone of the wall. The compaction integrity of the reinforced geogrid zone must be maintained, both below and beside (around) the appurtenance or utility. Neglecting to do so may cause hydrostatic pressure and wall failure.

3.14 Storm Water Management

A. The segmental retaining wall is not a storm water management structure. The wall can accommodate the rainfall above the reinforced geogrid zone but not the watershed (including the retained zone). Therefore it is absolutely essential that surface water be prevented from entering (and ultimately saturating) the reinforced geogrid zone. This is usually accomplished by the site engineer (owner's civil engineer) grading the surface behind the wall to direct surface water to swales that divert the water around the wall ends, to inlets or over the top of the wall through scuppers. If water is directed to the wall (such as applications with back slopes), the top 8 inches of compacted fill over the reinforced geogrid zone must have impermeable soil (such as CL, GC or SC). If clayey soils are not readily available an underlying geomembrane (geosynthetic liner) may also be used. This geomembrane shall be Mirafi G200N, Stratadrain or equivalent. It shall extend downward vertically a minimum of 3 feet behind the reinforced geogrid zone, be laid horizontally on top of the reinforced geogrid zone with a maximum slope of 10:1 and extend forward into the 12 inch gravel drainage layer.

3.15 Post Construction Responsibilities

A. Retaining walls are a substantial financial investment. Therefore it is in the owner's best interest that a wall maintenance budget be established within the overall property management budget to monitor and provide preventative maintenance. Retaining wall maintenance, at a minimum, should consist of: checking drainage, inspecting for settling and surveying to verify alignment and batter. This service should be by qualified personnel under the supervision of a licensed geotechnical/structural engineer. RA can provide this service for an additional fee.

B. RA SHOULD BE NOTIFIED AS SOON AS REASONABLY POSSIBLE IF THE RETAINING WALL EXHIBITS CONDITIONS CONTRARY TO THE RA FINAL DESIGN SO THAT RA MAY BE CONSULTED TO PROTECT THE OWNER'S INVESTMENT.

END OF SECTION Revised 01-07-04

The information contained herein is proprietary and is the sole property of RA. It is only intended for use on this project. Reuse of these drawings, sketches, and design computations in any manner is strictly prohibited pressure without written approval from RA. Any other use is subject to penalty of law. (c)

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cindy Hanaka 10/7/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

10/15/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS DATE

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STATE OF MARYLAND — JAMES M. RYAN — No. 21586 — REGISTERED PROFESSIONAL ENGINEER — 01/06/04

Professional Engr. No. 21586

RETAINING WALL SPECIFICATIONS
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 57
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

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DRAWN BY: WP
CHECKED BY: WKR
SCALE: AS SHOWN
DATE: JAN. 07, 2004
W.O. No.: 3018
SHEET No.: 20 OF 20

SPECIFICATIONS FOR SEGMENTAL RETAINING WALL SYSTEMS

PART 1: GENERAL

1.01 Description

A. Work includes furnishing and installing segmental retaining wall (SRW) Units to the lines and grades designated on the Final Design prepared by Ryan & Associates (RA). Also included are furnishing and installing appurtenant materials required for construction of the retaining wall as shown on the RA Final Design.

1.02 Reference Standards

A. ASTM C 140– Sampling and Testing Concrete Masonry Units
B. ASTM D 4595– Tensile Properties of Geotextiles by the Wide-Width Strip Method.
C. ASTM D 5262– Test Method for Evaluating the Unconfined Creep Behavior of Geo– Grids
D. GRI:GG1:– Single Rib Geogrid Tensile Strength
E. GRI:GG5– Geogrid Pullout
F. ASTM D 698– Moisture Density Relationship for Soils, Standard Method
G. ASTM D 422– Gradation of Soils
H. ASTM 4318– Atterberg Limits of Soil
I. ASTM 3034– Specification for Polyvinyl Chloride (PVC) Plastic Pipe
J. ASTM D 1248– Specification for Corrugated Plastic Pipe

1.03 Design Standards

A. The following factors of safety must have been met in this design: Sliding 1.5, Overturning 2.0, Bearing Capacity 2.0, Geogrid Overstress 1.5, Geogrid Connection (between the block and the geogrid) and Geogrid Pullout 1.5 (from the block and from the soil).

PART 2: MATERIALS & DESIGN PARAMETERS

2.01 Segmental Retaining Wall Units

A. SRW Units shall be machine formed, Portland Cement concrete blocks specifically designed for retaining wall applications. The SRW Unit currently approved for this project is:

Keystone Compac II as manufactured by Betco Block & Products

NOTE: Where Keystone specifications and reference documents conflict with these specifications, the RA specifications hold precedence.

B. SRW Units shall be sound and free of cracks or other defects that would interfere with the proper placing of the units or significantly impair the strength or permanence of the structure. Cracking or excessive chipping may be grounds for rejection. Units showing cracks longer than 1/2 inch shall not be used within the wall. Units showing chips visible at a distance of 30 feet from the wall shall not be used within the wall.

C. Concrete used to manufacture SRW Units shall have a minimum 28 days compressive strength of 3,000 PSI and a maximum moisture absorption rate, by weight, of 8% as determined in accordance with ASTM C 140. Compressive strength test specimens shall conform to the saw–cut coupon provisions of Section 5.2.4 of ASTM C 140 with the following exception: Coupon shall be taken from the least dimension of the unit of a size and shape representing the geometry of the unit as a whole.

D. SRW Units molded dimensions shall not differ more than ± 1/8 inch from that specified, except height which shall be ± 1/16 inch as measured in accordance with ASTM C 140.

2.02 Geosynthetic Reinforcement

A. Geosynthetic reinforcement shall consist of geogrids as indicated on the RA Final Design. No geogrid substitutions shall be permitted without the prior approval of RA (a partial redesign may be necessary if geogrids are substituted). NOTE: it is always acceptable to substitute a higher strength geogrid (of the same manufacturer) for a lower strength geogrid.

2.03 Shear Connectors

A. Shear connectors shall be 1/2 inch diameter thermoset isopthalic polyester resin–pultruded fiberglass reinforcement rods or equivalents to provide connection between vertically and horizontally adjacent units. Strength of shear connectors between vertical adjacent units shall be applicable over a design temperature of 10 degrees F to +100 degrees F. These connectors shall be capable of holding the geogrid in the proper design position during geogrid pre–tensioning and backfilling.

2.04 Leveling Pad

A. Material for the leveling pad shall consist of compacted gravel or unreinforced concrete. Typical gravels used for this leveling pad are #57, CR6, 21A, 2A modified, 2B, RC6, RC57, etc. Lean un–reinforced concrete with a strength of 1,500 PSI may also be used for the leveling pad.

2.05 Drainage Aggregate

A. Drainage aggregate shall be clean angular gravel (#57 or equivalent) with a size of 1/2 inch to 1 1/2 inches and less than 10% fines (passing the #200 sieve). Rounded "pea gravel" type aggregate is not permissible since it does not have the necessary frictional properties. Recycled gravel may be used if it meets the above criterion.

2.06 Drainage Pipe

A. The drainage collection pipe shall be a 4 inch perforated or slotted PVC or corrugated HDPE pipe.

2.07 Infill Soil: within the reinforced geogrid zone

A. The soils used must meet or exceed the friction angle stated in the RA Final Design (in the General Notes, on the typical wall section and on the structural cross sections). The reinforced material shall be free of debris and organic material (i.e.– no plants, roots, sod, top soil, trash, wood, etc.). The infill soil shall not consist of CH (fat clay), MH (elastic silt) or OH/ OL/ PT (organic) soils.

B. Rocks may be used as infill material as long as they have a maximum size of 6 inches and a mean diameter of 3 inches. Recycled concrete is permissible for infill except with certain polyester geogrids in water applications. In the case of water applications the geogrid manufacturer shall be consulted to see if the alkali in the recycled material will cause corrosive damage to their geogrid.

C. Select gravel (classified by USCS as GP or GW) is always an acceptable substitution in the event suitable soils (those meeting RA's and the site geotechnical engineer's requirements) are not readily available.

2.08 Retained Soil: the area beyond the infill soil and extending to a distance that is twice the wall's exposed height

A. This soil must meet or exceed the friction angle stated in the RA Final Design (in the General Notes, on the typical wall section and on the structural cross sections). This soil must be virgin (natural undisturbed with blow counts ≥12) or suitable fill (friction angle ≥ the RA Final Design requirement) compacted to 95% of a standard proctor maximum dry density.

2.09 Foundation Soil: the soil under the wall's gravel leveling pad and the soil under the reinforced geogrid zone

A. The foundation soil must meet or exceed the minimum allowable bearing capacity stated in the RA Final Design (in the General Notes and on the typical wall section). The sub–grade must be virgin (natural undisturbed soil with blow counts ≥12) or suitable fill (friction angle ≥ the RA Final Design requirement) compacted to 95% of a standard proctor maximum dry density.

2.10 Soil Investigation

A. RA recommends that every retaining wall design be preceded by an in–situ soil investigation by a licensed geotechnical engineer. However, if the owner and/or wall installer elects not to have an investigation conducted RA may assume soil design parameters based on: published data by the Soil Conservation Service (soil maps), a verbal description by the owner and/or wall installer or by RA's previous experience in certain geographic areas. It must be understood that the owner and/or wall installer bears full responsibility to the election not to have an investigation performed.

2.11 Site History & Information

A. Many factors other than soil information affect the performance and design of the retaining wall. RA relies on information provided by the owner and/or wall installer when designing a retaining wall. RA bears no responsibility if the owner and/or wall installer omit critical information required to properly design the wall. Information critical to wall design from the site consist of: topographic features (such as slopes), soil types, utilities, storm water management, structures (including buildings, other existing or proposed walls, swimming pools, etc.), site geological phenomenon, groundwater, loads with the wall's zone of influence (such as driveways, patios, roadways, sidewalks, etc.) and any other readily known site factors that could potentially impact the RA Final Design.

PART 3: CONSTRUCTION

3.01 Inspection

A. RA considers all retaining walls to be critical structures, meaning most walls require a considerable financial investment by the owner and failure of a wall will negatively impact a property both financially and from a public safety perspective. The owner or owner's representative is responsible for verifying that the wall installer meets all of the requirements of the RA Final Design (as stated in these specifications and the project's General Notes). This includes all submittals for materials and design, qualifications and proper installation of the wall system. All walls with an exposed height of 6 feet or greater must have the construction certified by a licensed geotechnical/ structural engineer registered in the jurisdiction of the project. Additionally, after the wall has been completed it is highly recommended that it be surveyed to establish the wall's current horizontal and vertical alignment.

B. The wall installer's field construction supervisor shall have demonstrated experience and be qualified to direct all work at the site.

C. RA provides construction oversight on some retaining wall projects. RA verifies general compliance with the RA Final Design; however, it is the wall installer's ultimate responsibility to construct the structure properly in accordance with the RA Final Design. RA's liability is limited to the amount of our fees for the scope of work provided for the wall designs and construction oversight.

3.02 Excavation

A. The wall installer shall excavate to the lines and grades shown on the RA Final Design and the project's civil plans. The wall installer shall take precautions to minimize over–excavation. Over–excavation shall be filled with compacted soil (friction angle ≥ RA design parameters) or gravel as directed by the site geotechnical engineer.

B. The wall installer shall verify the location of existing structures and utilities prior to excavation. The wall installer shall ensure that all surrounding structures are protected from the effects of wall excavation. Excavation support (shoring), if required, is the responsibility of the wall installer. All excavation must be conducted in accordance with OSHA (federal) and state safety regulations. All work to construct the wall must be in accordance with 29CFR1926 sub–part P (OSHA Excavation Safety Requirements).

3.03 Foundation Preparation

A. Following excavation, the foundation soils (under the wall's gravel leveling pad and under the wall's reinforced geogrid zone) shall be examined by the site geotechnical engineer to assure that the actual foundation soil strength meets or exceeds the minimum allowable bearing capacity in the RA Final Design (stated in the General Notes and shown on the typical wall section). Soils that do not meet the required strength shall be removed and replaced with approved select structural fill or gravel and be compacted to 95% of a standard proctor maximum dry density for the full depth.

B. In cases of poor bearing capacity or fill soils, an enlarged geogrid reinforced leveling pad may be required. This typically consists of a 1 foot deep X 4 foot wide leveling pad with geogrid under (on the sub–grade) and within the gravel (6 inches above the sub–grade). The sub–grade must be compacted with a "J–Tamp" or "Jumping Jack" type compactor with a minimum of three passes prior to geogrid placement. These extra measures will increase the soil's bearing capacity by a minimum of 1,000 PSF (RA shall be consulted if the soil's bearing capacity needs to be increased by more than 1,000 PSF).

3.04 Leveling Pad Construction

A. The leveling pad shall be placed so that its top elevation is the same as the bottom of block ("BB") elevation on the RA Final Design profile drawing. It shall have a minimum thickness of 6 inches and a minimum width of 2 feet. The leveling pad should, at a minimum, extend laterally at least a distance of 6 inches from the toe and heel of the lower most SRW Unit.

B. The leveling pad material shall be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor to provide a firm level–bearing surface on which to place the first course of SRW Units. A thin layer (not to exceed 1/2 inch) of well–graded sand or stone dust may be used to smooth the top of the leveling pad.

3.05 SRW Unit Installation

A. All SRW Units shall be installed at the proper elevation and orientation as shown on the RA Final Design profile drawing and in conjunction with the project's civil plans. The SRW Units shall be installed in general accordance with the manufacturer's recommendations (RA's Final Design shall govern in any conflict between the two requirements).

B. The first course of SRW Units shall be placed on the leveling pad. The units shall be leveled side–to–side, front–to–rear and with adjacent units, and aligned to ensure intimate contact with the leveling pad. The first course is the most important for accurate and acceptable results. Alignment may be done by means of a string line or an offset from the base line to the backs of the blocks. SRW units shall have a minimum 4 inch overlap of units on each successive course so that the wall is interlocked and continuous. No horizontal gaps greater than 1/4 inch between the faces of adjacent units are permitted.

C. Because the wall has a setback, its batter must be predetermined during the stake out process by the civil engineer/surveyor and wall installer. If there are critical dimensions that must be met on the high side of the wall then the base (at the toe) will need to be moved forward to compensate.

D. Lay out of curves and corners shall be installed in accordance with the civil plans and the RA Final Design. Construction techniques for curves and corners shall be in general accordance with the SRW manufacturer's installation guidelines. In general, all tangent angles shown on the civil drawings should be changed into curves to enhance the wall's strength and appearance. Continuous vertical joints are not recommended. Inside and outside 90° corners may be constructed without compromising the wall's integrity if they are properly interlocked. Inside corners should be constructed so that the SRW Units interlock (according to manufacturer's recommendations) and outside corners should incorporate special corner blocks when possible. If special outside corner blocks are not available from the block manufacturer for this project then the manufacturer's guidelines for building structural outside corners shall be followed. If gluing is necessary only industrial grade adhesives or sealants designed for concrete–to–concrete applications may be used (adhesives designed for plastic or wood applications are not acceptable).

E. Clean all excess debris from the tops of the SRW Units and install the next course.

F. Repeat procedures to extent of wall height.

G. A ±2° tolerance is permitted horizontally for wall batter (block setback). In no case shall a wall go beyond vertical (have a negative batter). Walls shall be built level (not with grade), however a ±1.5 inch tolerance over a 10 foot distance is permitted vertically (as checked from left to right along the wall).

H. Embedment shall be a minimum of 1 inch buried for every 1 foot of wall exposed with one block minimum when the front slope is 4:1 or greater (more level). Walls constructed on 3:1 front slopes or less (more steep) require additional buried blocks. See the profile drawing in the RA Final Design for the exact amount of embedment (the amount of buried block can be determined at each wall station by subtracting the "BB" elevations from the "GR" elevations).

3.06 Geogrid Reinforcement Placement

A. All geogrid reinforcement shall be installed at the proper elevation, length and strength as shown on the profile and structural cross sections in the RA Final Design. Partial geogrid coverage is not acceptable: no gaps shall be present between geogrid layers. 100% coverage is required, however it is not necessary to overlap the geogrid pieces. The geogrid shall be laid horizontally on the compacted infill soil and on top of the concrete SRW Units. The geogrid must be embedded into the SRW Units to the face. The wall installer shall verify that the orientation of the geogrid is in accordance with the geogrid manufacturer's recommendations. The highest strength direction of the geogrid must be perpendicular to the wall face (the geogrid must not be laid parallel to the wall– cannot be rolled out with the wall).

B. Geogrid reinforcement layers shall be one continuous piece for their entire embedment length. Overlapping of the geogrid in the design strength direction (perpendicular to the wall face) is not permitted.

C. Tracked construction equipment shall not be operated directly on the geogrid. A minimum of 6 inches of backfill is required prior to operation of tracked vehicles over the geogrid. Turning should be kept to a minimum. Rubber–tired equipment may pass over the geogrid reinforcement at slow speeds (less than 5 MPH).

D. The geogrid shall be in tension and free of wrinkles prior to placement of the infill soil. Nominal tension shall be applied to the geogrid and secured in place with staples, stakes or by hand until it is covered by 6 inches of infill soil.

E. For inside & outside corners and inside & outside curves the geogrid shall be placed according to the manufacturer's instructions to provide total geogrid coverage. On outside corners the geogrid should be shifted up or down one course and alternated so that the geogrid comes into the reinforced geogrid zone from both legs of the 90° angle. Geogrid layers should never be placed on top of one another: there must be a minimum of 3 inches of compacted infill soil between geogrid layers.

3.07 Wall Drainage

A. Drainage aggregate (clean gravel such as #57 or equivalent) shall be installed behind the entire wall face from the first course below grade to one course from the top of the wall. The drainage gravel shall be placed to a minimum thickness of 12 inches behind the SRW Units. Drainage gravel shall also fill all voids between and within (if hollow) the SRW Units. SRW Units must be filled with drainage aggregate in one course lifts (SRW Units may not be stacked in two or three course lifts and then have the gravel dumped in from the top through multiple courses). An impermeable clay layer (CL, GC or SC) shall be placed on top of the 12" drainage layer. If clayey soils are not readily available, a layer of filter fabric (Mirafi 140N or equivalent) shall be placed on top of the gravel (below the topsoil) to prevent the downward migration of fines.

B. Drainpipes are mandatory and shall be vented to daylight at the end(s) of the wall, at a central low point of the wall, or through the wall face at maximum intervals of 30 feet on center (no more than 6 inches above finished grade when vented through the wall face). The pipe(s) must maintain gravity flow of water outside the reinforced geogrid zone. Water must drain to an outlet and have positive flow. If a continuous pipe is run, it shall daylight into a storm sewer manhole or along a slope at an elevation lower than the lowest point of the pipe within the drainage aggregate. When drainpipes are daylighted at the end(s) of a wall they must be visible and unobstructed. The drainpipes should be checked by the owner on a regular basis to ensure that they remain open (not blocked, filled in, grown over, pinched).

C. Rear drainpipes are required in the following situations: when groundwater can rise and approach within 1 foot of the leveling pad sub–grade, in "cut" situations where the potential exists for storm water to enter the interface between the reinforced geogrid zone and the retained zone and when low permeable soils (CL– lean clay & ML– silt) are used for infill soil. Retaining walls with low permeable soils in the reinforced geogrid zone are more susceptible to being negatively impacted by hydrostatic forces. The owner may elect to install a rear drainpipe to minimize or eliminate potential hydrostatic force buildup leading to potential wall movements. RA recommends a rear drainage system for all walls with these soil types in cut situations, however ultimately it is the owner's decision. This rear drainpipe shall be surrounded by a minimum of 12 inches of clean gravel (#57 or equivalent) and surrounded with filter fabric to prevent the migration of fines. This rear drainpipe must vent to daylight or be directed to a storm sewer manhole (see instructions for front drainpipe in section 3.07B above).

D. Chimney drains (a second 12 inch layer of drainage aggregate within the rear 1 foot of the reinforced geogrid zone or directly behind the reinforced geogrid zone) must be installed when groundwater is present or likely (to an elevation that is a minimum of 1 foot above predicted levels as given by the site geotechnical engineer), when stated in the RA Final Design or when required by the site geotechnical engineer.

E. All drainage zone aggregate shall be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor (minimum of three passes).

3.08 Backfill Placement

A. The infill soil shall be placed as shown in the RA Final Design in the maximum compacted lift thickness of 10 inches and shall be compacted to a minimum of 95% of a standard proctor maximum dry density (ASTM D 698) at a moisture content within 2% of optimum. The backfill shall be placed and spread in such a manner as to eliminate wrinkles or movement of the geogrid and the SRW units. Compaction testing shall be done at 25%, 50%, 75% and 100% of the wall height or as specified by the site geotechnical engineer.

B. Only a vibratory plate or small–scale vibratory smooth drum compactor equipment shall be allowed within 3 feet of the front of the wall face. Compaction within the 3 feet behind the wall face shall be achieved by at least three (3) passes of the lightweight mechanical plate compactor or roller. Heavy equipment (such as track hoes, ride on rollers, pans, etc.) must be kept back a minimum of 3 feet from the rear of the wall.

C. At the end of each day's operation, the wall installer shall slope the last level of backfill away from the wall facing to direct water runoff away from the wall face.

D. At completion of wall construction if final grading, paving, landscaping and/or storm drainage installation adjacent to the wall is not placed immediately after wall completion, temporary grading shall be provided to ensure that water runoff is not allowed to collect or pond behind the wall until final construction adjacent to the wall is completed.

E. Filter fabric (Mirafi 140N or equivalent) is required when the infill soil is classified as poorly graded sand (SP) or well graded sand (SW) since these soils are non–cohesive and could potentially slough, clogging the gravel drainage layer. Filter fabric is optional between the 12 inch gravel drainage layer and the compacted infill soil if the backfill soils are clayey (CL or SC), gravelly (GC, GM, GP or GW) or silty (ML or SM).

3.09 SRW Caps

A. SRW caps shall be properly aligned and glued (for safety reasons) to the underlying SRW Units with a flexible high–strength concrete adhesive or sealant designed for "concrete to concrete" applications (not for plastic or wood). Rigid adhesive or mortar is not acceptable.

3.10 Water Applications

A. When walls are installed in water applications (such as storm water ponds, streams, bulkheads, areas adjacent to flood plains, etc.) all clean gravel must be used as infill up to 1 foot above the 100 year flood elevation, the high water level or the top of berm/spillway. This gravel must be free draining and have less than 10% fines (#57 or equivalent). Filter fabric (Mirafi 140N or equivalent) must go in front of the buried block, under the leveling pad, behind the reinforced geogrid zone (vertically up to the extent of the gravel infill) and on top of the gravel infill (horizontally). This is required to prevent the migration of fines into the gravel infill. Rip rap is required in front of the bottom three courses on walls installed in tidal waters. Rip rap is also required when indicated on the civil plans and where pipes with active water flow exit through the wall.

3.11 Rails, Fences & Other Structures

A. The scope of RA for this project does not include fence or railing designs. Typical details have been given to provide general guidelines for the installation of fences, guardrails and railings behind walls. RA cannot give specific details because the type, placement and height of fences and rails vary widely and because the requirements are different depending on the municipality and regulatory authority. RA can provide a project specific fence or rail detail and structural design for an additional fee if given exact information (material type and size and manufacturer's specifications and installation guidelines).

B. Open fences and railings not subject to wind loads (minimum of 50% open and maximum of 50% solid) may be placed directly behind the wall or in the wall (can be placed in the blocks only if they are a hollow system and if the cores and web alignment will accept the posts) as long as they are not subject to vehicular impact. Solid or semi–solid fences that are subject to wind loads must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall.

C. Guardrails subject to vehicular impact must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall. Guardrails may be placed closer than this 3 foot minimum only if a barrier (such as curbing, wheel stops, etc.) is in place to prevent vehicular impact (the overhang of vehicles must be considered when determining this).

D. Light post foundations, sign foundations and similar structures subject to wind loads must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall.

E. In cases where these 3 foot minimum distances cannot be met due to restraints on the site, additional analyses will need to be done to determine methods of stabilization. RA can provide these designs for an additional fee.

3.12 Storm Structures & Utilities

A. Reinforced Concrete Pipes (RCP) may pass through the leveling pad or wall structure without compromising the design. The SRW units may be cut to fit around the pipe and the voids filled with non–shrink grout or type "M" mortar. A concrete collar may be cast around the structure if desired. When a collar is cast, the top of the collar shall line up with an even block course to maintain proper alignment and neat workmanship.

B. The wall may not bear on plastic or steel pipes (such as ADS, CMP, HDPE, PVC, SLCPP, etc.) or utilities (such as electric, gas, phone lines, sewer or water lines, etc.). Grade beams or lintels must be used to bridge these non–load bearing structures. If a specific grade beam or lintel is not specified in the RA Final Design, RA shall be consulted to determine the size, strength and reinforcing of the grade beam or lintel. If these non–load bearing pipes or utilities are located at minimum of 42 inches below the wall's leveling pad then a grade beam or lintel is not necessary.

C. Concrete storm structures may be located behind a wall and be within the reinforced geogrid zone as dictated by the project's civil drawings. If the structure(s) cannot be moved out of the reinforced geogrid zone and the geogrid cannot be installed to its full design length the following shall apply. On small structures (such as collection boxes, concrete pipes less than 18 inches, inlets, manholes, etc.) it is acceptable to shorten the geogrid from the design length and meet the structure. The area between the wall and structure where the geogrid has been shortened must be filled with gravel (#57 or equivalent) and not soil. The gravel must be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor. On large structures and in cases where pipes parallel the wall for long distances, RA shall be consulted to determine the impact on the wall before allowing this to be done.

D. The wall's integrity may be compromised if pipes or structures burst or develop leaks and allow water or fluids to saturate the reinforced geogrid zone. RA is not responsible for wall failure that results from pipes or structures that burst or leak and allow water or fluids to saturate the reinforced geogrid zone.

3.13 Construction Adjacent to Completed Wall

A. The owner or owner's representative is responsible for ensuring that construction adjacent to the wall by others does not disturb the wall or place temporary construction loads on the wall that exceed design loads, including loads such as water pressure, temporary grades, or equipment loading. Heavy paving or grading equipment shall be kept a minimum of three feet behind the back of the wall face. Equipment with wheel loads in excess of 150 PSF live load shall not be operated with 10 feet of the face of the retaining wall during construction adjacent to the wall. Care should be taken by the general contractor or owner to ensure water runoff is directed away from the wall structure until final grading and surface drainage collection systems are completed.

B. Care must be taken when installing appurtenances (such as generators, transformers, etc.) or utilities within the reinforced geogrid zone of the wall. The compaction integrity of the reinforced geogrid zone must be maintained, both behind and beside (around) the appurtenance or utility. Neglecting to do so may cause hydrostatic pressure and wall failure.

3.14 Storm Water Management

A. The segmental retaining wall is not a storm water management structure. The wall can accommodate the rainfall above the reinforced geogrid zone but not the watershed (including the retained zone). Therefore it is absolutely essential that surface water be prevented from entering (and ultimately saturating) the reinforced geogrid zone. This is usually accomplished by the site engineer (owner's civil engineer) grading the surface behind the wall to direct surface water to swales that divert the water around the wall ends, to inlets or over the top of the wall through scuppers. If water is directed to the wall (such as applications with back slopes), the top 8 inches of compacted fill over the reinforced geogrid zone must have impermeable soil (such as CL, GC or SC). If clayey soils are not readily available an underlying geomembrane (geosynthetic liner) may also be used. This geomembrane shall be Mirafi G200N, Stratadrain or equivalent. It shall extend downward vertically a minimum of 3 feet behind the reinforced geogrid zone, be laid horizontally on top of the reinforced geogrid zone with a maximum slope of 10:1 and extend forward into the 12 inch gravel drainage layer.

3.15 Post Construction Responsibilities

A. Retaining walls are a substantial financial investment. Therefore it is in the owner's best interest that a wall maintenance budget be established within the overall property management budget to monitor and provide preventative maintenance. Retaining wall maintenance, at a minimum, should consist of: checking drainage, inspecting for settling and surveying to verify alignment and batter. This service should be by qualified personnel under the supervision of a licensed geotechnical/structural engineer. RA can provide this service for an additional fee.

B. RA SHOULD BE NOTIFIED AS SOON AS REASONABLY POSSIBLE IF THE RETAINING WALL EXHIBITS CONDITIONS CONTRARY TO THE RA FINAL DESIGN SO THAT RA MAY BE CONSULTED TO PROTECT THE OWNER'S INVESTMENT.

END OF SECTION Revised 01–07–04

The information contained herein is proprietary and is the sole property of RA. It is only intended for use on this project. Reuse of these drawings, sketches, and design computations in any manner is strictly prohibited pressure without written approval from RA. Any other use is subject to penalty of law. (c)

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/19/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE

No.	REVISION	Date
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; revised Lot Lines for Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 42, revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

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RETAINING WALL SPECIFICATIONS
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58 ⚠
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

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GENERAL NOTES

1. SOIL PARAMETERS: Based on review of the "Geotechnical Engineering Study" dated 07/20/2001 for this site prepared by Hillis-Carnes Engineering Associates, Inc., an internal angle of friction of 27° was used for the soils in this design. This is for a worst case CL (lean clay) soil type and shall be verified during wall construction. CH (fat clay), MH (elastic silt) and OH/OL/PT (organic) soils are not acceptable for wall construction. If these unsuitable soils are encountered they shall be removed and replaced with soils that meet or exceed the design friction angle of 27°. The on site geotechnical engineer shall monitor this closely during the construction process. The site soils vary widely (in addition to CL there is also ML- silt, SC- clayey sand & SM- silty sand). If possible, the sandy soils should be stockpiled and used for backfilling the wall since they have a higher friction angle, are more free draining and it is easier to achieve 95% compaction (CL & ML are fine-grained and it is difficult to control the moisture level). The moisture level of the soils must be ±2% of optimum. Since proctor tests were not available for the CL soil, an assumed unit weight (maximum wet density) of 125 PCF was used. Fluctuations of 5 PCF higher or lower will not affect these designs, however if the unit weight varies by more than 5 PCF Ryan & Associates (RA) must be notified so that the cross sections can be rerun to verify that all factors of safety are still met. The site geotechnical shall run standard proctor tests of the proposed backfill soil (prior to wall construction) to verify the accuracy of this design assumption. No cohesion was used in any of the calculations.

2. CONSTRUCTION OVERSIGHT: The construction of this wall must be performed under the observation of a Maryland Registered Professional Engineer to ensure that it is built in accordance with the RA General Notes and Specifications.

3. GLOBAL STABILITY: A global stability analysis was done on G-Slope design software for the wall and a factor of safety of 1.3 was met. A copy of the global stability analysis has been included in the 81/2" X 11" calculations submittal.

4. BEARING CAPACITY: The wall's sub-grade (the soils under the wall's gravel leveling pad and the soils under the wall's reinforced geogrid zone) must be tested by the site geotechnical engineer prior to wall construction and have a minimum allowable bearing capacity of 3,000 PSF. The sub-grades must be virgin (natural undisturbed soil with blow counts greater than or equal to 12) or suitable fill (greater than or equal to 27°) compacted to 95% of a standard proctor maximum dry density. Any areas of the sub-grade that does not meet this maximum pressure will require undercutting and/or geogrid reinforcing.

5. DESIGN SOFTWARE: Internal and external wall calculations were performed with Keywall 2001 design software (version 3.1.6). A table has been included ("Cross Section Details and Factors of Safety") which has the following information: section location (area of wall referenced), total wall height, loads applied, factors of safety (for sliding, overturning, bearing capacity and global stability) and bearing pressure (the load exerted by the wall on the sub-grade). Factors of safety of 1.5 were also met for: geogrid pullout (from the soil and from the block), geogrid overstress (geogrid rupture) and connection (block to geogrid).

6. SPECIFICATIONS: Construction and materials must conform to the attached "Specifications for Retaining Wall Systems".

7. GEOGRIDS: Mirafi 3XT & 5XT geogrids, which have LTDS (Long Term Design Strengths) of 1558 and 2234 respectively, were used in this design. All geogrid substitutions must have prior approval of RA.

8. WALL PROFILE: The elevation drawing was done to represent the grade changes necessary on the civil drawings and was done in even block course increments of .667' (8"). Minor field changes may be necessary by the wall installer. Lineal footage may be added or subtracted as needed if the wall's height is equal to or less than the design heights. If the wall needs to be raised in height, RA shall be notified and new structural cross sections must be provided before the wall installer proceeds. The cap height of .333' (4") is not shown on the profile drawing however its height may have been used in some cases to achieve the desired TW elevations.

9. WALL BATTER: The 7.1° batter (1" setback per block course) was used for the Keystone blocks in this design. The 0.5° (near vertical: 1/16" setback per block course) may not be used for this wall. NOTE: it is important for the wall installer and the civil engineer/surveyor to predetermine the walls' batters during stake out. The wall will need to be moved forward at its base if there are critical dimensions that must be met on the high sides of the wall.

10. FACTORS OF SAFETY: The following factors of safety have been met in this design: Sliding 1.5, Overturning 2.0, Bearing Capacity 2.0, Geogrid Overstress 1.5, Geogrid Pullout 1.5 (from the block and from the soil) and Global Stability 1.3.

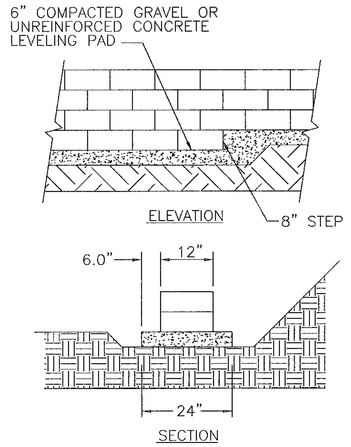
11. EMBEDMENT: The wall embedment varies from one to ten blocks. The exact amount of buried blocks may be determined by subtracting the "BB" elevations from the "GR" elevations on the RA profile drawing. Additional blocks were buried in some areas so that the wall will not be built on fill soils.

12. REAR DRAIN TILES: Rear drainpipes are required at the back of the wall's reinforced geogrid zone. This is in addition to the mandatory 4" drainpipe at the front of the wall (within the gravel leveling pad or behind the at grade courses- depending which drainpipe position is exercised). The rear drainpipe shall be surrounded by a minimum of 6" of clean gravel (#57 or equivalent) and shall have perpendicular solid pipes that run forward and connect to the front drainage system with crosses or tees.

13. BLOCK SYSTEM: This design is are valid only for the Keystone Compac II block system. Each segmental wall system has unique dimensions, connection devices and interacts differently with geogrids; therefore other block types may not be substituted.

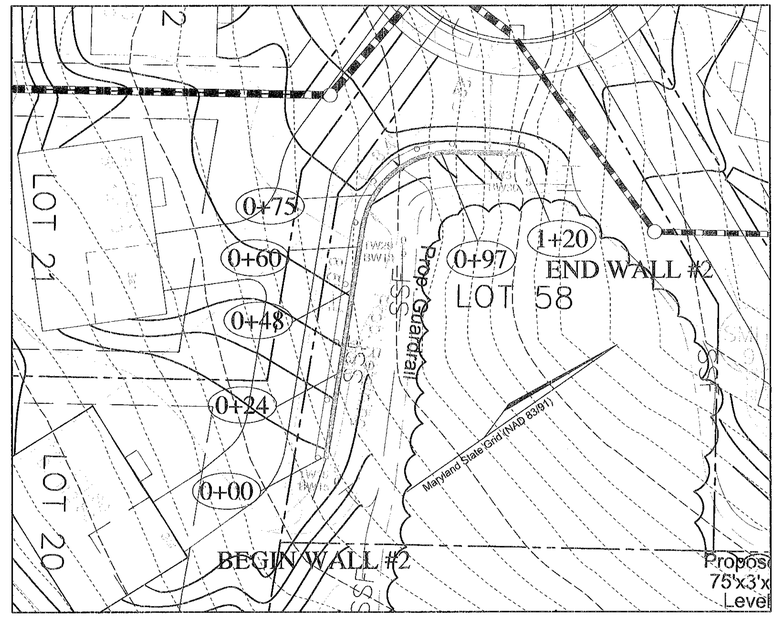
14. SEPARATE 81/2" X 11" SUBMITTAL: A separate 8 1/2" X 11" booklet has also been provided and includes: cover letter, General Notes, Keywall cross section calculations, G-Slope global stability calculations and RA Specifications.

15. SPECIAL HOWARD COUNTY RETAINING WALL SPECIFICATIONS:
a. Retaining walls shall only be constructed under the observation of a Registered Professional Engineer and a (NICET, WACEL, or equivalent) certified soils technician.
b. The required bearing pressure beneath the footing of the wall shall be verified in the field by a certified soils technician. Testing documentation shall be provided to the Howard County Inspector prior to the start of construction. The required test procedure shall be the Dynamic Cone Penetrometer Test ASTM STP-399.
c. The suitability of the fill material shall be confirmed by the on-site soils technician. Each eight inch lift must be compacted to 95% Standard Proctor Density and the testing report shall be made available to the Howard County Inspector upon completion of the construction.
d. For walls over ten feet in height, one soil boring is required every 100 feet along the length of the wall, copies of the boring reports shall be provided to the Howard County Inspector prior to the start of construction.



LEVELING PAD DETAIL

N. T. S.



WALL #2 (between Lots 21 & 58)
SCALE 1"=20'

CROSS SECTION DETAILS & FACTORS OF SAFETY:

SECTION	STATION	TOTAL WALL HEIGHT	LOAD APPLIED	SLIDING minimum 1.50	OVERTURNING minimum 2.00	BEARING CAPACITY minimum 2.50	BEARING PRESSURE PSF	GLOBAL STABILITY minimum 1.30
WALL #1								
1	0+00 TO 0+39	10.00'	300 PSF LIVE LOAD	1.63	3.78	6.78	1467	1.69
2	0+39 TO 0+94	14.00'	300 PSF LIVE LOAD	1.70	4.36	6.42	2038	1.69
3	0+94 TO 1+20	10.00'	300 PSF LIVE LOAD	1.63	3.78	6.78	1467	1.69

MATERIAL ESTIMATE: BLOCK : Keystone Compac II GEOGRID: Mirafi 3XT & 5XT

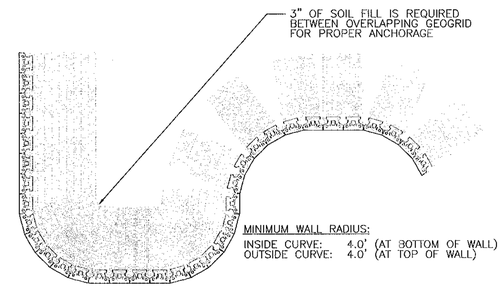
WALL	TOTAL SQ. FT.	(1.0 S.F.) BLOCK	(.5 S.F.) CAPS**	PINS	SQ. YDS. 3XT GRID	SQ. YDS. 5XT GRID	SQ. YDS. 7XT GRID	CU. YDS. DRAIN GRAVEL	LEVELING PAD GRAVEL	FT. WALL LENGTH
1	1,273	1,225	96	2,290	415	360	0	75	9	120

Totals include 2% extra for block and caps, 15% for geogrid and 5% for gravel.

* Ryan & Associates is not responsible for extras or shortages based on this take-off. It is the contractor's responsibility to verify the accuracy of this design by reviewing the site/ grading plan for this project.

** Includes one extra cap per step down on top of the wall for double capping.

REINFORCEMENT PLACEMENT FOR INSIDE AND OUTSIDE CURVES



GEOGRID INSTALLATION ON CURVES

N. T. S.

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/19/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE

No.	REVISION	Date
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; revised BRL on Lots 1 thru 3, 11, 15, 19, 19 thru 21, and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.20.05

RYAN & ASSOCIATES
A Division of WKR Consulting, Inc.
RETAINING WALL DIVISION
717-477-8400 fax 717-477-8410
68 West King Street
Shippensburg, PA 17257-0006

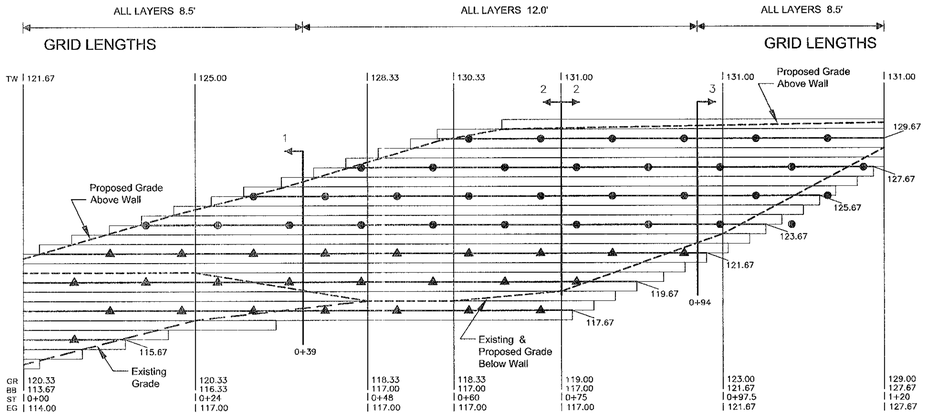
Professional Engr. No. 21586

RETAINING WALL TABLES, DETAILS & CIVIL PLAN
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

WALL #1 (between Lots 21 & 58)

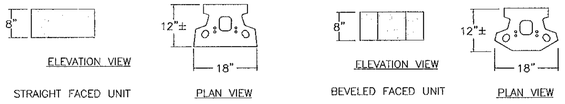


GRID KEY: MIRAFI 3XT
MIRAFI 5XT

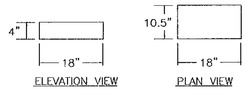
TW = TOP OF WALL (NOT INCLUDING CAP)
GR = PROPOSED FINISHED GRADE AT BASE OF WALL
BB = BOTTOM OF BLOCK / TOP OF LEVELING PAD
ST = WALL STATION
EG = EXISTING GRADE

Scale:
Horizontal 1" = 10'
Vertical 1" = 5'

KEYSTONE COMPAC II DIMENSIONS



CAP UNIT



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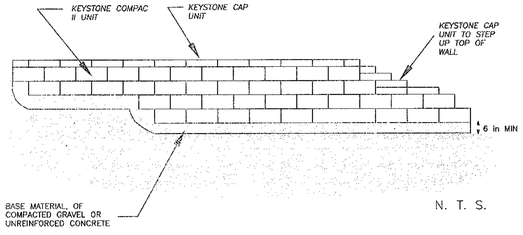
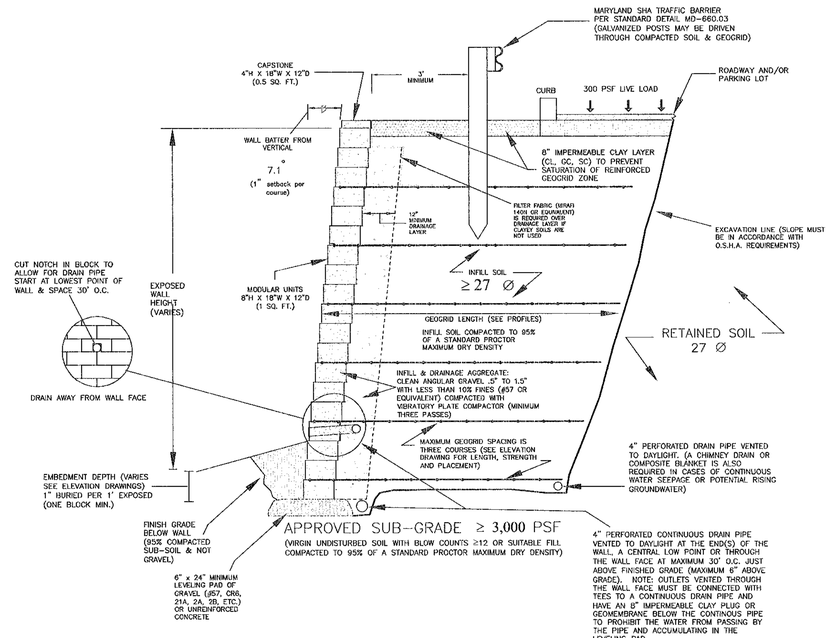


N. T. S.

KEYSTONE STEP DOWN TYPICAL DETAIL

KEYSTONE COMPAC II

WALL SECTION



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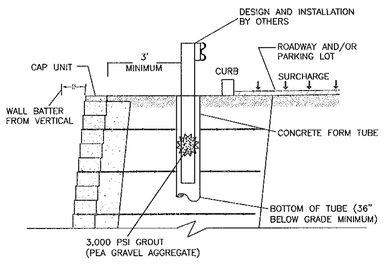
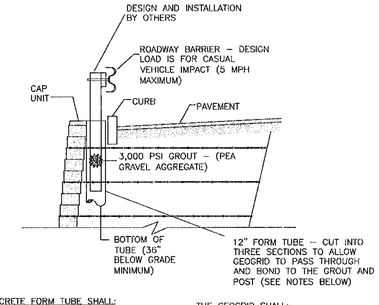


NOTE:
1. GALVANIZED POSTS MAY BE DRIVEN DIRECTLY THROUGH THE COMPACTED SOIL AND GEOGRID (SEE DETAIL ABOVE RIGHT)
2. IF POSTS ARE SQUARE (SUCH AS 4X4 WOOD) CONCRETE FORM TUBES MUST BE PLACED DURING WALL CONSTRUCITON AND THE POSTS GROUTED IN LATER.
3. BLUNT POSTS MAY NOT BE DRIVEN INTO GEOGRID AFTER WALL CONSTRUCTION IS COMPLETE.

GUARDRAIL DETAIL

N.T.S.



NOTE:

THE CONCRETE FORM TUBE SHALL:
- BE 12" IN DIAMETER MINIMUM
- INTERSECT TWO GEOGRID LAYERS VERTICALLY
- BE CUT INTO SEGMENTS TO ALLOW THE GEOGRID TO PASS CONTINUOUSLY FROM THE FACE OF THE WALL, THROUGH THE FORM TUBE, THROUGH THE 12" DRAINAGE LAYER AND INTO THE REINFORCED SOIL ZONE -- BE A MINIMUM OF 36" BELOW GRADE TO ELIMINATE ANY FROST CONCERNS
- BE GROUTED WITH 3,000 PSI CONCRETE (WITH PEA GRAVEL AGGREGATE) AFTER THE POST INSTALLATION

THE GEOGRID SHALL:
- PASS CONTINUOUSLY THROUGH THE CUT SECTION OF THE CONCRETE FORM TUBE
- BE CUT TO ALLOW THE POST TO BE INSTALLED AFTER THE WALL IS CONSTRUCTED (THE GEOGRID LEFT PENETRATING THE TUBE WILL BOND WITH THE GROUT TO CREATE A UNIFIED MASS WITH THE POST AND TRANSFER THE LOAD TO THE REINFORCED SOIL)
- BE KEPT TAUT WITHOUT ANY SLACK

GUARDRAIL WITH IMPACT LOAD

N.T.S.

No.	Revision	Date
1	Revised Lot Areas for Lots 35 thru 39, 58 and 59; revised plat on Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

OWNER / DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/14/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE

RYAN & ASSOCIATES
A Division of WKR Consulting, Inc.
RETAINING WALL DIVISION
717-477-8400 fax 717-477-8410
68 West King Street
Shippensburg, PA 17257-0006

Professional Engr. No. 21586

RETAINING WALL PROFILE, DETAILS & WALL SECTION

HUNTERS RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

FOREST CONSERVATION WORKSHEET

Net Tract Area	Acres
A. Total tract area	25.66
B. Area within 100 Year Floodplain	0
C. Other deductions (Area previously used for F-00-115)	0.08
D. Net Tract Area	25.58
Zoning Use Category: Residential	
Land Use Category	
E. Afforestation Minimum (15 % x D)	3.84
F. Conservation Threshold (20 % x D)	5.12
Existing Forest Cover	
G. Existing Forest on Net Tract Area	24.10
H. Forest Area Above Conservation Threshold	18.98
Breakeven Point	
I. Forest Retention Above Threshold with no Mitigation	8.92
J. Clearing Permitted without Mitigation	15.18
Proposed Forest Clearing	
K. Forest Area to be Cleared	17.84
L. Forest Area to be Retained	6.26
Planting Requirements	
M. Reforestation for Clearing Above Threshold	4.46
N. Reforestation for Clearing Below the Threshold	0
P. Credit for Retention Above Conservation Threshold	1.14
Q. Total Reforestation Required	3.32
R. Total Afforestation Required	0
S. Total Reforestation and Afforestation Requirement	3.32

FOREST CONSERVATION NARRATIVE

This Forest Conservation Plan has been developed in accordance with the Howard County Forest Conservation Act of 1991. The total tract area consists of 25.66 acres of land, including a 0.08 acre area on the adjacent Wesley Woods subdivision which has been included in the forest conservation plan for F-00-115. This area has been deducted for a net tract of 25.58 ac. The site contains 24.10 acres of forest cover on the net tract. Forest retained in easements will total 6.26 acres. A total of 1.71 acres of reforestation planting is proposed. Four forest conservation easements will be established. Total area contained within easements is 7.97 acres. All easements contain wetlands, streams and their buffers, and steep slopes. For the remaining 1.61 acres of obligation, we propose a fee-in-lieu payment of $35,065.80. ⚠1

New on-site plantings will be 2' - 3' containerized whip stock planted at 350 stems/acre with tree shelters.

FOREST CONSERVATION EASEMENT TABLE

EASEMENT	TYPE	AREA (ACRES)	BOND RATE	BOND PRICE
1	Reforestation Retention	0.60 1.65	$0.50 /S.F. $0.20 /S.F.	$13,068.00 $14,374.80
2	Reforestation Retention No credit	0.46 ⚠1 2.60 0.01	$0.50 /S.F. $0.20 /S.F.	$10,018.84 $22,651.20
3	Reforestation	0.43	$0.50 /S.F.	$9,365.50
4	Reforestation Retention	0.22 2.01	$0.50 /S.F. $0.20 /S.F.	$4,791.50 $17,511.20
TOTAL		7.97		$91,999.00 ⚠1
	Reforestation Retention	1.71 6.26		$37,243.95 $54,537.20

Forest Retention Area Protection Signage

Min. 11"

FOREST RETENTION AREA

MACHINERY, DUMPING OR STORAGE OF ANY MATERIALS IS PROHIBITED

VIOLATORS ARE SUBJECT TO FINES AS IMPOSED BY THE MARYLAND FOREST CONSERVATION ACT OF 1991

Min. 15"

Reforestation and Afforestation Area Protection Signage

Min. 11"

Forest Conservation Area

REFORESTATION PROJECT

Trees for Your Future

Min. 15"

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/17/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-11-07

FOREST CONSERVATION EASEMENT #1
Reforestation Area 1 : 0.60 Ac. (210 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
35	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
35	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
35	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
35	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
35	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
35	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 2 : 0.04 Ac. (14 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
2	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
2	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
2	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
2	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
3	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
3	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 3 : 0.19 Ac. (67 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
12	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
11	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
11	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
11	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
11	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
11	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 4 : 0.13 Ac. (46 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
7	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
7	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
8	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
8	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
8	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
8	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 5 : 0.03 Ac. (11 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
1	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
2	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
2	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
2	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
2	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
2	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 6 : 0.08 Ac. (28 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
5	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
5	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
5	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
5	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
4	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
4	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #3
Reforestation Area 8 : 0.43 Ac. (151 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
25	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
26	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
25	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
25	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
25	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
25	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #4
Reforestation Area 9 : 0.22 Ac. (77 trees @ 350 TPA)

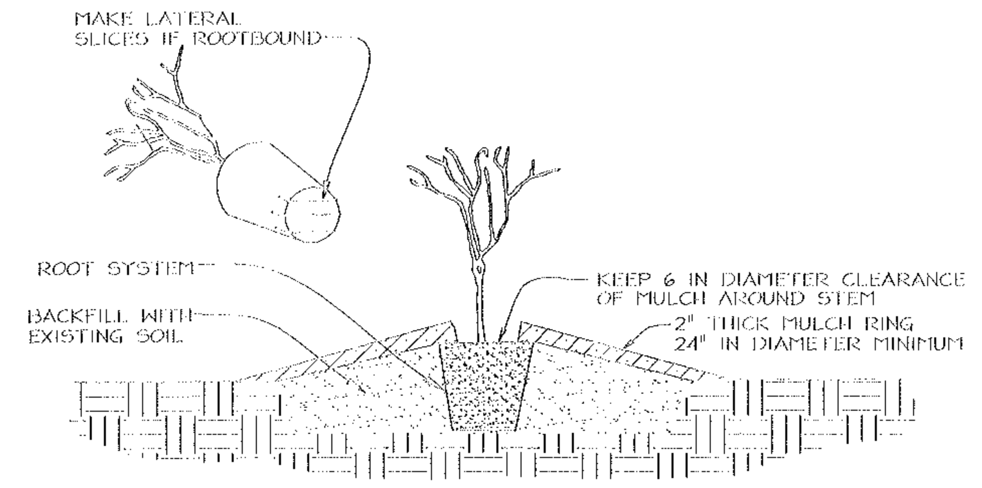
Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
14	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
13	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
13	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
13	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
12	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
12	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

MANAGEMENT NOTES FOR FOREST RETENTION AREAS

1. All proposed activities shall adhere to the conditions, schedules and terms of an approved sediment control and erosion plan.
2. After the boundaries of the retention area have been staked and flagged and before any disturbance has taken place on-site, a preconstruction meeting at the construction site shall take place. The developer, contractor or project manager and appropriate County inspectors shall attend.
3. Tree protection for all retained areas:
   a. All retention areas within 50 feet of proposed construction activities shall be protected by highly visible, well anchored temporary protection devices (silt fence or blaze orange plastic mesh).
   b. All protection devices shall be in place prior to any grading or land clearing.
   c. All protection devices shall be properly maintained and shall remain in place until construction has ceased.
   d. Attachment of signs, fencing or other objects to trees is prohibited.
   e. No equipment, machinery, vehicles, materials or excessive pedestrian traffic shall be allowed within protected areas.
4. If the critical root zone (see detail) is affected by construction activities such as grade change, digging for foundations and roads or utility installation:
   a. Prune roots with a clean cut using proper pruning equipment (see root pruning detail)
   b. Water and fertilize as needed.
5. During construction phase, monitor and correct condition of retained trees for soil compaction, root injury, flood conditions, drought conditions and other stress signs.
6. Post-Construction Phase
   a. Inspect existing trees around the perimeter of disturbed limits for evidence of soil compaction, root injury, limb injury, or other stress signs and correct with proper management techniques such as root or limb pruning, soil aeration, fertilization, crown reduction or watering. Inspection and evaluation shall be performed by a licensed arborist.
   b. Inspect for dead or dying trees or limbs which may pose safety hazard and remove.
   c. No burial of discarded materials will occur onsite within the conservation areas.
   d. No burning within 100 feet of wooded area.
   e. All temporary forest protection structures will be removed after construction. Temporary signage shall be replaced with permanent signage on posts in locations shown.
   f. Following completion of construction, prior to use, the County inspector shall inspect the entire area.

Soil Protection Zone Notes

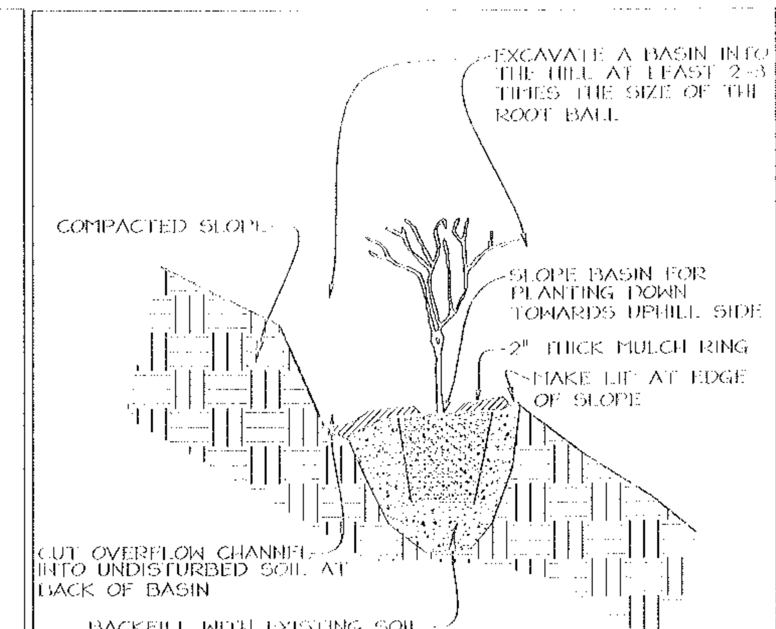
1. The Soil Protection Zone shall include all areas contained inside the Limit of Disturbance.
2. Where possible the Soil Protection Zone shall extend to the drip line of specimen trees. For other groups of trees, the zone shall be the drip line or 40% of the height of the tree, whichever is greater.
3. No construction activity is permitted within the Soil Protection Zone.
4. If soil has been compacted or grading has taken place in the vicinity of the Soil Protection Zone, root pruning shall be implemented per Root Pruning detail, shown on this plan.
5. Root pruning shall occur prior to the beginning of construction.
6. Where the Soil Protection Zone must encroach inside the Critical Root Zone of a tree, soil disturbance shall be mitigated with vertical mulching, radial trenching, or another method approved by the ERI Forest Conservation Professional.
7. Prior to construction, the Limits of Disturbance shall be marked and the ERI Professional shall determine which trees will need preventative treatment or removal.
8. Tree maintenance and removal shall be undertaken by a qualified MD Tree Expert to ensure damage to surrounding trees is minimized.
9. Brush and limbs removed for construction shall be chipped and spread at the edge of the Soil Protection Zone to a depth of 6 inches. This shall occur outside the Soil Protection Zone where compaction could impact otherwise unprotected Critical Root Zone.



CONTAINER PLANTING
NOT TO SCALE

PLANTING PROCEDURE FOR CONTAINER GROWN PLANTS

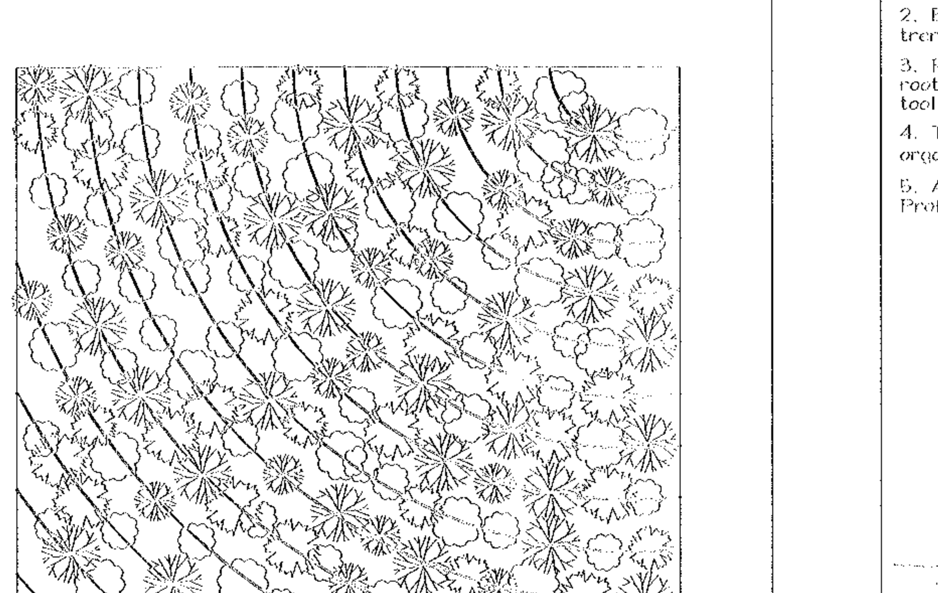
1. REMOVE THE PLANT EITHER BY CUTTING OR INVERTING THE CONTAINER
2. USE A KNIFE TO CUT THROUGH BOTTOM HALF OF THE ROOT BALL.
3. PLANT SHRUBS ON FORMED UP MOUNDS 4" ABOVE THE EXISTING GRADE WHEN HIGH WATER TABLE CONDITIONS EXIST, OTHERWISE PLANT FLUSH WITH EXISTING GRADE.
4. PLANTING HOLE TO BE 2-3 TIMES THE DIAMETER OF THE CONTAINER.
5. INSERT FERTILIZER TABLET, BACKFILL 2/3 OF THE ROOT BALL AND WATER.
6. AFTER WATER PERCOLATES, BACKFILL HOLE TO TOP OF ROOT BALL AND GENTLY TAMP SOIL TO FIRM CONTACT WITH PLANT.
7. APPLY MULCH RING AROUND PLANT KEEPING A 6 IN CLEARANCE FROM STEM.



PLANTING ON STEEP SLOPES
NOT TO SCALE

1. PLANT AS PER CONTAINER PLANTING DETAIL EXCEPT PREP OF PLANTING AREA
2. A BASIN FOR PLANTING IS CUT INTO THE SLOPE WITH PLANT BEING PLACED NEAR THE DOWNHILL EDGE OF THE BASIN.
3. BASIN SHOULD SLOPE TOWARD UPHILL SIDE TO ALLOW RAIN TO BE CAPTURED AND INFILTRATE.
4. AN OVERFLOW CHANNEL SHALL BE CUT INTO UNDISTURBED SOIL AT THE REAR OF THE BASIN TO ALLOW EXCESS RUNOFF AND SEDIMENT TO ESCAPE WITHOUT DAMAGING THE BASIN.
5. MULCH AROUND PLANT IN BASIN.

CURVEILINEAR RANDOMIZED PLANTING

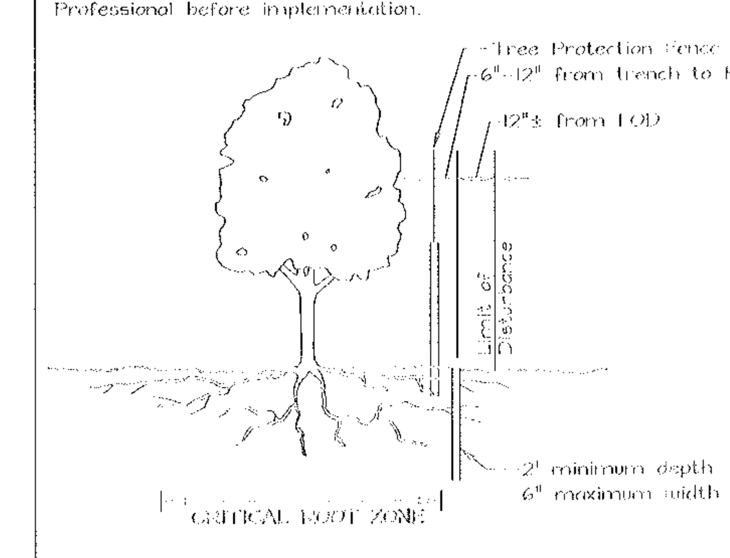


PLANT PLACEMENT DETAIL
NOT TO SCALE

1. MIX TREE AND SHRUB SPECIES IN THE STAGING AREA.
2. SET THE GUIDE CURVILINEAR LINE AS CLOSE TO CONTOUR AS POSSIBLE

ROOT PRUNING

1. Retention areas shall be set prior to construction
2. Boundaries of retention areas shall be flagged, and location of trench shall be specified by ERI Qualified Professional.
3. Roots shall be cut cleanly with root pruning equipment. Where roots >1" are found, trenching shall be done by air spade or hand tools. Roots >1" shall be cut with a hand saw.
4. Trench shall be immediately backfilled with soil removed or high organic content soil.
5. Any other techniques shall be approved by the ERI Qualified Professional before implementation.



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

Reforestation Area Monitoring Notes

1. Monthly visits during the first growing season are to assess the success of the plantings and to determine if supplemental watering, pest control or other actions are necessary. Early spring visits will document winter kill and autumn visits will document summer kill.
2. The minimum survival rate shall be 75% of the total number of trees planted per acre at the end of the two year maintenance period. Seedlings from natural regeneration on the planting site may be counted toward the total survival number if they are healthy native species at least 12 inches tall.
3. Certification at the end of the two-year post construction period and indicate that the survival rates will result in a 100 tree per acre stand, or a forest and the 3 to 4 foot height standard by the end of the second of the two growing season post construction period, with at least 50 trees having the potential of attaining a 2" diameter in 7 years.
4. Survival will be determined by a stratified random sample of the plantings. The species composition of the sample points should be proportionate to the amount of each species in the entire planting.
5. Effective monitoring will assess plant survival during the first growing season and make recommendations for replanting if required at that time.

Reforestation Area Planting Notes

1. Initial planting inspection and certification required. Planting contractor to notify ERI qualified professional 24 hours in advance of planting.
2. Reforestation areas may be planted as soon as reasonable to do so. Late winter - early spring plantings are preferred. Earliest planting dates will vary from year to year but planting may generally begin as soon as the ground is no longer frozen. Alternate planting dates may be considered as conditions warrant.
3. Soil amendments and fertilization recommendations will be made based upon the results of soil analysis for nitrogen, phosphorus, potassium, organic matter content and pH. If required, fertilizer will be provided using a slow release, soluble 16-8-16 analysis designed to last 5-8 years contained in polyethylene perforated bags such as manufactured by ADCO Works, P.O. Box 310 Hollins, N.Y. 11425 or approved equal.
4. Plant materials shall be planted in accordance with the planting diagram, planting details and planting schedule.
5. Plant stock must be protected from desiccation at all times prior to planting. Materials held for planting shall be moistened and placed in cool shaded areas until ready for placement.
6. Planting materials shall be nursery grown and inspected prior to planting. Plants not conforming to the American Standards for Nursery Stock specifications for size, form, vigor, or roots, or due to trunk wounds, breakage, desiccation, insect or disease must be replaced.
7. Newly planted trees may require watering at least once per week during the first growing season depending on rainfall in order to get established. The initial planting operation should allow for watering during installation to completely soak backfill materials.
8. Mulch shall be applied in accordance with the diagram provided and shall consist of composted, shredded hardwood bark mulch, free of wood alcohol.
9. Planting holes should be excavated to a minimum diameter of 2.5 to 3 times the diameter of the root ball or container. Mechanical augering is preferred with scarification of the sides of each hole.

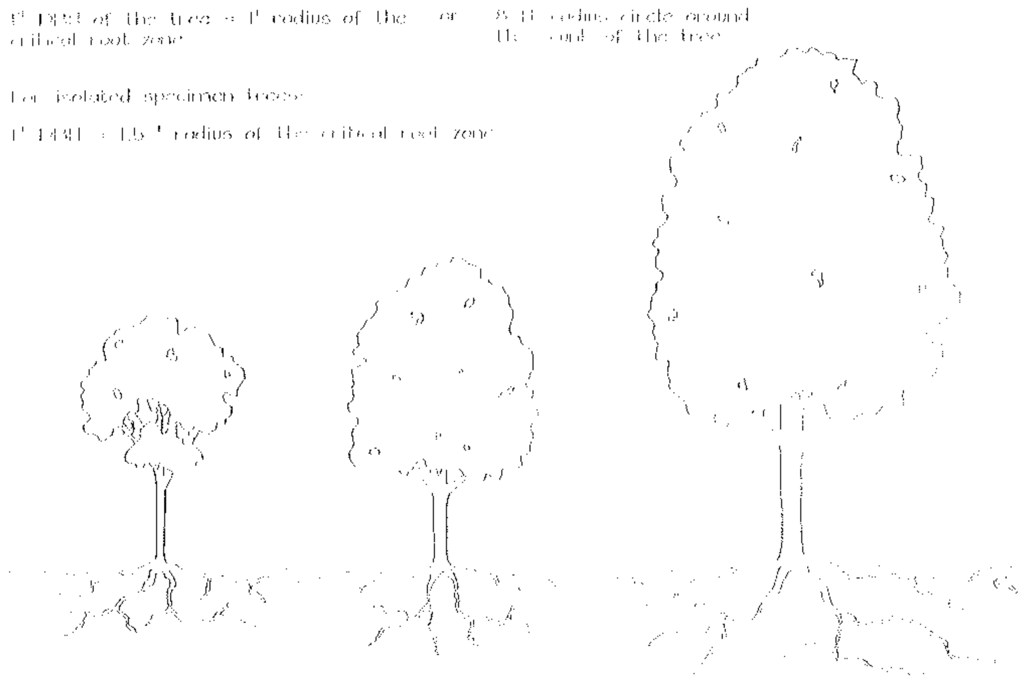
CRITICAL ROOT ZONE

For the edge of large areas, use the greater of the two choices below:

1" DBH of the tree = 1' radius of the critical root zone — or — 8 ft radius circle around the trunk of the tree

For isolated specimen trees:

1" DBH = 1.5' radius of the critical root zone



No.	Revision	Date
⚠1	Revised Lot Areas for Lots 35 thru 39, 55, and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410-872-0267

FOREST CONSERVATION NOTES AND DETAILS
HUNTERS CHASE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58 ⚠1
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14124

TAX MAP 38 GRIDS 4 & 10 — PARCEL 165
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

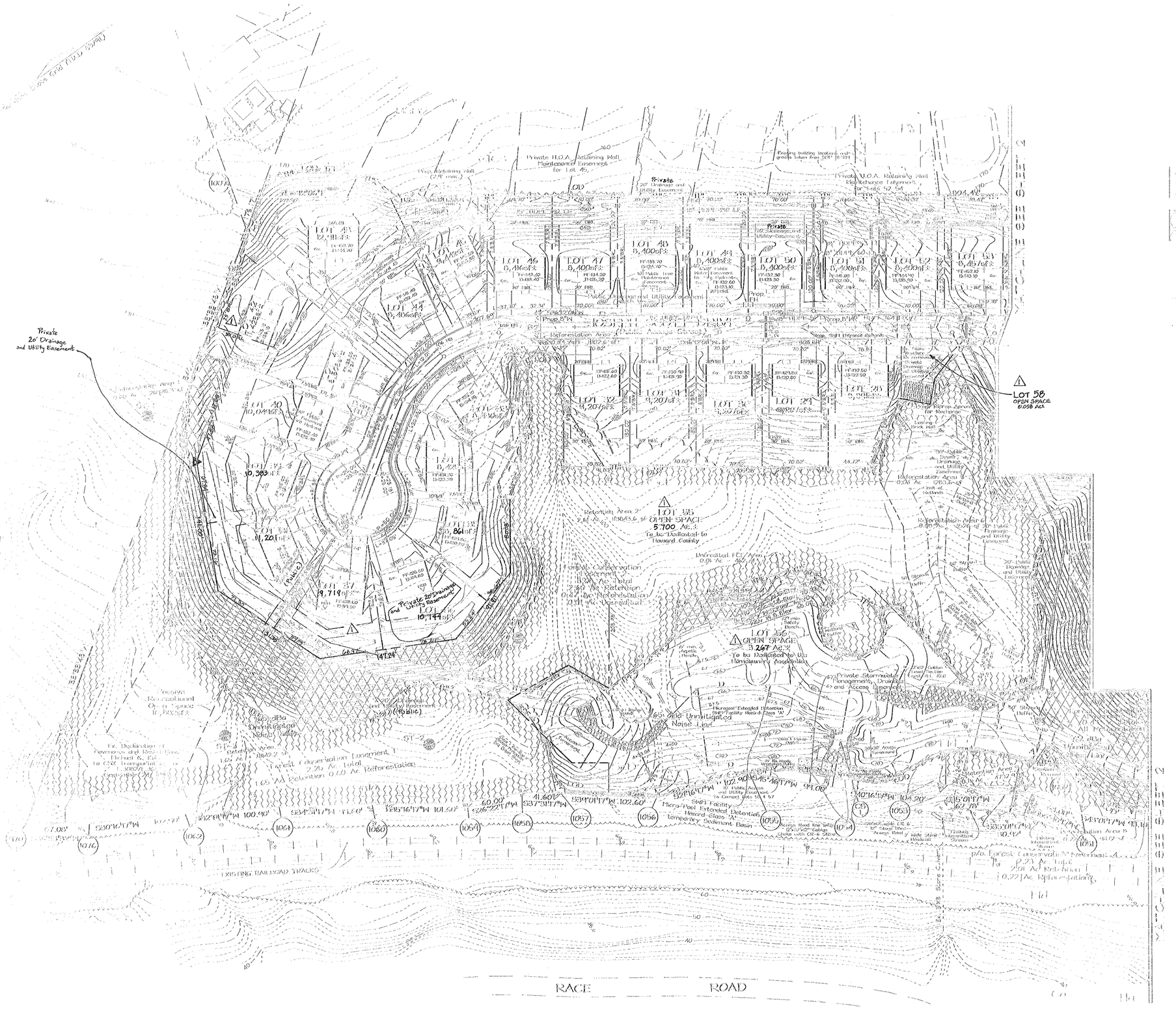
EXPLORATION RESEARCH, INC.
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS
8510 Forest Street
Ellicott City, Maryland 21043
Tel: (410) 750-1041 Fax (410) 750-7830

FSH Associates
Engineers Planners Surveyors
8318 Forest Street
Ellicott City, MD 21043
Tel: 410 750-2251

DESIGN BY: ES/KO
DRAWN BY: HM/EAD
CHECKED BY: AYF/SLH
SCALE: 1"=50'
DATE: Sept. 15, 2004
W.O. No.: 3018
SHEET No.: 17 OF 20

F-04-111

No.	REVISIONS	Date
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05



LEGEND

Forest Conservation Easement Retention Area

Forest Conservation Easement Reforestation Area

LCE Signage

Tree Protection Fence

Approximate Critical Root Zone

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/12/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/12/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 10-11-04

OWNER/DEVELOPER

National American Homes of Maryland, Inc.
6300 Old Dobbin Lane
Columbia, Md. 21045
(410) 997-0267

FOREST CONSERVATION PLAN

HUNT RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58

AND A RESUBDIVISION OF BULK PARCEL 'A'
WESLEY WOODS, SECTION 1, PLAT NO. 14946

TAX MAP 35 GRIDS 4 & 10
1ST ELECTION DISTRICT

PARCEL 10
HOWARD COUNTY, MARYLAND

DESIGN BY: [illegible]
DRAWN BY: [illegible]
CHECKED BY: [illegible]
SCALE: 1"=60'
DATE: Sept. 15, 2004
P.O. No.: [illegible]
SHEET No.: 16 of 20

1 of 111

LEGEND

Forest Conservation Easement Retention Area

Forest Conservation Easement Reforestation Area

FCE Signage

TPF Tree Protection Fence

Approximate Critical Root Zone

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-14-04

No.	REVISION	Date
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 42; revised Forest Conservation Easement Areas; add Lot 58.	02.28.05

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md. 21045
410-[illegible]

FOREST CONSERVATION PLAN

HUNTERS RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14626

TAX MAP 35 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

EXPLORATION RESEARCH, INC.
[illegible]

ESH Associates
Engineers Planners Surveyors
[illegible]

DESIGN BY: [illegible]
DRAWN BY: [illegible]
CHECKED BY: [illegible]
SCALE: 1" = 50'
DATE: [illegible]
P.O. No.: [illegible]
SHEET No.: [illegible]

F-04-111

DEVELOPER'S / BUILDER'S CERTIFICATE

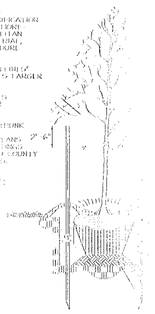
I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A LETTER OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE(1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

SIGNATURE OF DEVELOPER — PRESIDENT — DATE 7/15/04

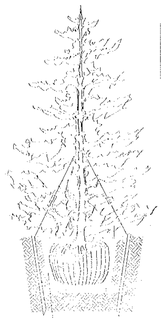
RICHMOND AMERICAN HOMES OF MARYLAND, INC.

NOTES:

1. SEE LANDSCAPE SPECIFICATION GUIDELINES FOR VALUABLE WASHINGTON METROPOLITAN AREA(S) FOR ALL PLANTING, PREPARATION, AND PROCEDURE SPECIFICATIONS.
2. SEE LANDSCAPE GUIDELINES FOR SUPPORTING TREES LARGER THAN 2-1/2" CALIPER.
3. PLACE MULCH SAUCER (MULCH TO RADIUS 3' MINIMUM).
4. KEEP MULCH 3" FROM TRUNK.
5. SEE ADDITIONAL LANDSCAPING FOR ADDITIONAL PLANTINGS REQUIRED BY HOWARD COUNTY PARKING REGULATIONS.
6. TREES ARE NOT TO BE PLANTED OVER SEWER, WATER, OR GAS LINES.



TYPICAL TREE PLANTING AND STAKING
DECIDUOUS TREES UP TO 2 1/2" CALIPER — NOT TO SCALE



TYPICAL EVERGREEN TREE PLANTING DETAIL
NOT TO SCALE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/19/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/18/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-14-04

No.	REVISION	Date
1	Revised Lot Areas for Lots 38 thru 39, 55, and 56; revised BRL on Lots 1 thru 5, 11, 15, 16, 19 thru 21 and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

DEVELOPER
Richmond American Homes of Maryland, Inc.
4200 Old Dobbin Lane
Columbia, MD 21045
(410) 772-0767

LANDSCAPE PLAN, NOTES & DETAILS

HUNTER'S RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58 — 8

AND A RESUBDIVISION OF PARCEL 'A' WESTERN WOODS, SECTION 1, PLAT NO. 6296

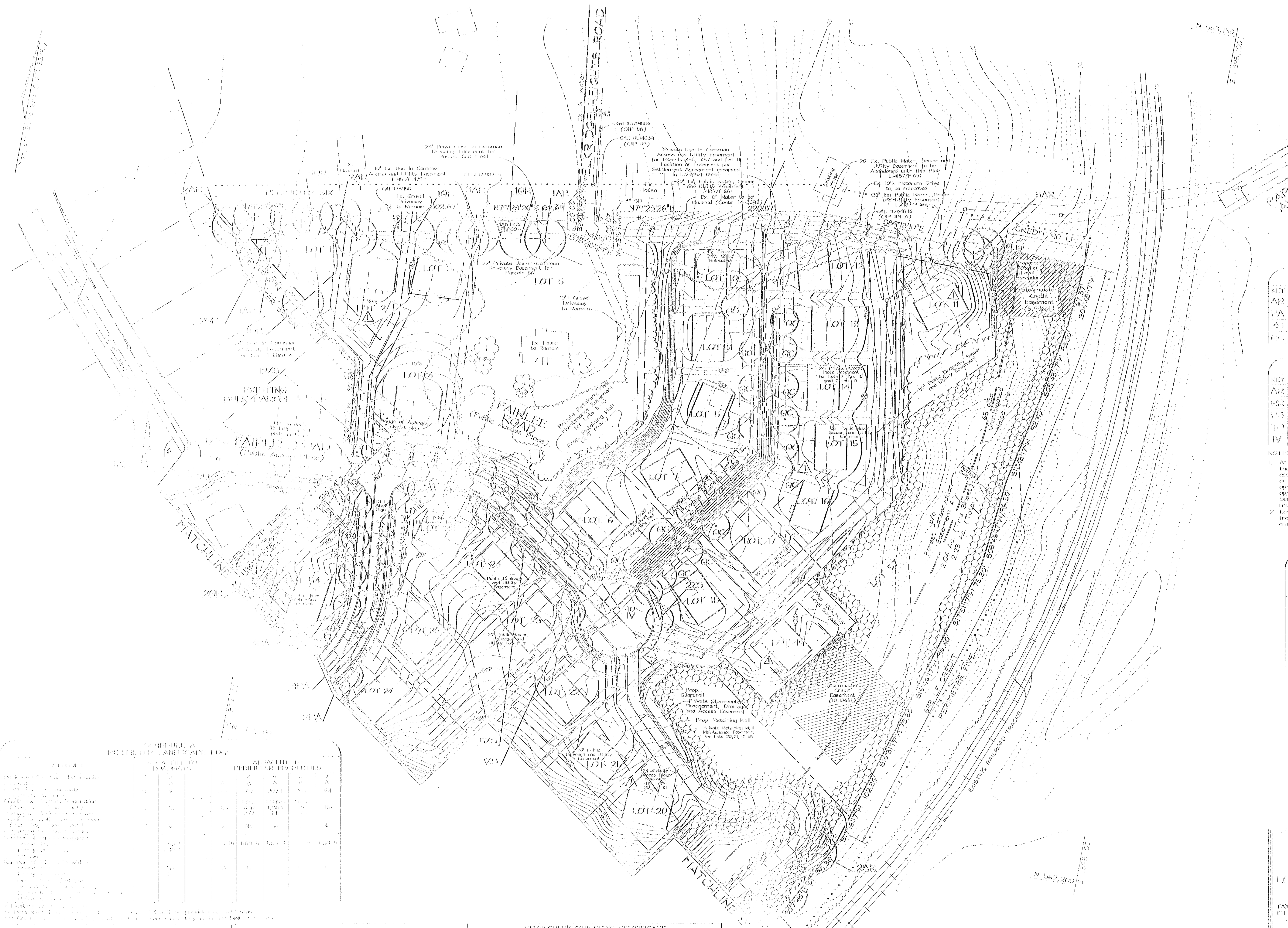
TAX MAP: 35 GRIDS: 4 & 10 — PARCEL: 243

1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

THE FRED ASSOCIATES
Landscape Architects - Planners
8318 Cross Keys Blvd. Suite 204, Baltimore, MD 21234
(410) 661-2254 Fax (410) 661-2256
E-mail: FREDASSOC@erols.com

SCALE: 1" = 50'
DESIGN BY: FRED
DRAWN BY: FRED
CHK'D: FRED
DATE: Sept. 15, 2004
FILE No.: 3018
REVISED: 10, 04, 10

1 OF 3



LEGEND

Existing Contour	382
Proposed Contour	(82)
Existing Spot Elevation	87.3
Proposed Spot Elevation	82.53
Direction of Flow	
Existing Trees to Remain	
Walk Out Basement	
Shade Tree	
Street Tree	
Evergreen Tree	
Shrub	
Landscape Perim.	

STREET TREE SCHEDULE

STREET NAME	LF REQUIRED	TREES REQUIRED	PROVIDED
Fairlee Road	880		22
Joseph Scott Drive	2,170	54	54
Mary Ann Lane	776	19	19

STREET TREE LANDSCAPE SCHEDULE

KEY	QUAN.	BOTANICAL NAME	SIZE	NOTE
AR	27	Acer rubrum, Shade Trees (Street Trees) 'October Glory Red Maple'	2 1/2"-3" Cal.	B & B
PA	27	Platanus x acerifolia, Shade Trees (Street Trees) 'Bloodgood' 'London Plane'	2 1/2"-3" Cal.	B & B
ZS	22	Zelkova serrata, Shade Trees (Street Trees) 'Village Green' 'Japanese Zelkova'	2 1/2"-3" Cal.	B & B
QC	19	Quercus Coccinea Scarlet Oak	2 1/2"-3" Cal.	B & B

LANDSCAPE SCHEDULE

KEY	QUAN.	BOTANICAL NAME	SIZE	NOTE
AR	32	Acer rubrum (Shade Trees) 'October Glory Red Maple'	2 1/2"-3" Cal.	B & B
QR	33	Quercus rubra (Shade Trees) 'Red Oak'	2 1/2"-3" Cal.	B & B
PS	13	Pinus strobus 'Eastern White Pine'	6'-8' Ht.	B & B
TO	10	Thuja occidentalis 'Nigra' 'Dark American Arborvitae'	5'-6' Ht.	B & B
IV	10	Ilex Verticillata Winterberry	3'-4' Ht.	Cont.

NOTES:

1. At the time of plant installation, all shrubs and trees listed and approved on the Landscape Plan shall comply with the proper height requirements in accordance with the Howard County Landscape Manual. In addition, no substitutions or relocations of the required plantings may be made without prior review and approval from the Department of Planning and Zoning. Any deviation from the approved Landscape Plan may result in denial or delay in the release of Landscape Surety until such time as all required materials are planted and/or revision are made to the applicable plans.
2. Landscape surety is based on the required landscaping of 65 shade trees, 23 evergreen trees and the Private Access Place street trees (19) and refuse pad shrubs (10) in the amount of $28,950.00.

SCHEDULE D : STORMWATER MANAGEMENT AREA LANDSCAPING

Linear Feet of Perimeter	1,261 LF
Credit for Existing Vegetation (No, Yes and Linear Feet)	Yes, 336 LF (Remaining Perimeter 925 LF)
Credit for Wall, Fence or Berm (No, Yes and %)	N/A
Number of Trees Required Shade Trees Evergreen Trees	 1:50 = 18 Shade Trees 1:40 = 23 Evergreen Trees
Number of Trees Provided Shade Trees Evergreen Trees Other Trees (2:1 Substitution)	 18 Shade Trees 23 Evergreen Trees 0 Trees (0 Substitution Trees)

* Existing trees to remain

SCHEDULE A PERIMETER LANDSCAPE EDGE

CATEGORY	ADJACENT TO ROADWAYS		ADJACENT TO PERIMETER PROPERTIES				
	1	2	3	4	5	6	7
Landscape Type	[illegible]	A	A	A	A	A	A
Linear Feet of Perimeter	[illegible]	[illegible]	[illegible]	717	2071	[illegible]	314
Credit for Existing Vegetation (Yes, No, Linear Feet)	[illegible]	No	[illegible]	Yes 440 277	Yes 1,883 191	Yes [illegible]	No
Credit for Wall, Fence or Berm (Yes, No, Linear Feet)	[illegible]	No	[illegible]	No	No	[illegible]	No
Number of Plants Required Shade Trees Evergreen Trees Shrubs		[illegible]	[illegible]	1:60 [illegible]	[illegible]	[illegible]	1:60 [illegible]
Number of Plants Provided Shade Trees Evergreen Trees Other Trees (2:1 Substitution) Shrubs (10:1 Substitution)		[illegible]	16	[illegible]	[illegible]	[illegible]	[illegible]

* Existing trees to remain
** Perimeter [illegible] to be provided on SDP stage
[illegible]

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cindy Hamilton 1/7/05
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[signature] 10/5/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

[signature] 10-11-04
CHIEF, BUREAU OF HIGHWAYS DATE

DEVELOPER'S/BUILDER'S CERTIFICATE

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A LETTER OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE(1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

J.A. D. Rice Project Mgr. 9/15/04
SIGNATURE OF DEVELOPER DATE
RICHMOND AMERICAN HOMES OF MARYLAND, INC

No.	REVISION	Date
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6700 Old Dobbin Lane
Columbia, MD 21045
410-720-0567

LANDSCAPE PLAN

HUNTERS RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58

AND A RESUBDIVISION OF BULK PARCEL "A"
WESLEY WOODS, SECTION 1, PLAT NO. 14964

TAX MAP 38 GRIDS 4 & 10 PARCEL 163
1ST ELECTION DISTRICT HOWARD COUNTY, MARYLAND

Engineers
8318 Forest Glen
Tel: 410-750-2251
E-mail: [illegible]

DESIGN BY: PS/RG
DRAWN BY: MM/RG
CHECKED BY: ZTF
SCALE: 1"=50'
DATE: Sept. 15, 2004
W.O. No.: 3018
SHEET No. 13 OF 20

F-04-111

MARYLAND 378
STORMWATER MANAGEMENT FACILITY CONSTRUCTION SPECIFICATIONS

[illegible]

Pipe Conduits

All pipes shall be circular in cross section.

Corrugated Steel Pipe – All of the following criteria shall apply for corrugated metal pipe:

[illegible]

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:

[illegible]

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:

[illegible]

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 Materials, Section 311.

Geotextile shall be placed under all riprap and shall meet 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 various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works. The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom required excavations and will allow satisfactory performance of all construction operations. During the placing and compacting of material in required excavations, the water level at the locations being refilled shall be maintained below the bottom of the excavation at such locations which may require draining the water sumps from which the water shall be pumped.

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 Resources 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.

OPERATION AND MAINTENANCE SCHEDULE FOR STORMWATER MANAGEMENT DETENTION FACILITY

STORMWATER MANAGEMENT FACILITY

ROUTINE MAINTENANCE BY H.O.A.

1. FACILITY WILL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHOULD BE PERFORMED DURING WET WEATHER TO DETERMINE IF IT IS FUNCTIONING PROPERLY.
2. 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.
3. DEBRIS AND LITTER NEXT TO THE OUTLET STRUCTURE SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
4. VISIBLE SIGNS OF EROSION IN THE POND AS WELL AS RIPRAP OUTLET AREAS SHALL BE REPAIRED AS SOON AS IT IS NOTICED.

NON-ROUTINE MAINTENANCE BY H.O.A.

1. STRUCTURAL COMPONENTS OF THE POND SUCH AS THE DAM, THE RISER, AND THE PIPES SHALL BE REPAIRED UPON DETECTION OF ANY DAMAGE. THE COMPONENTS SHOULD BE INSPECTED DURING ROUTINE MAINTENANCE OPERATIONS.
2. SEDIMENT SHOULD BE REMOVED WHEN ITS ACCUMULATION SIGNIFICANTLY REDUCES THE DESIGN STORAGE, INTERFERES WITH THE FUNCTION OF THE RISER, WHEN DEEMED NECESSARY FOR AESTHETIC REASONS, OR WHEN DEEMED NECESSARY BY THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

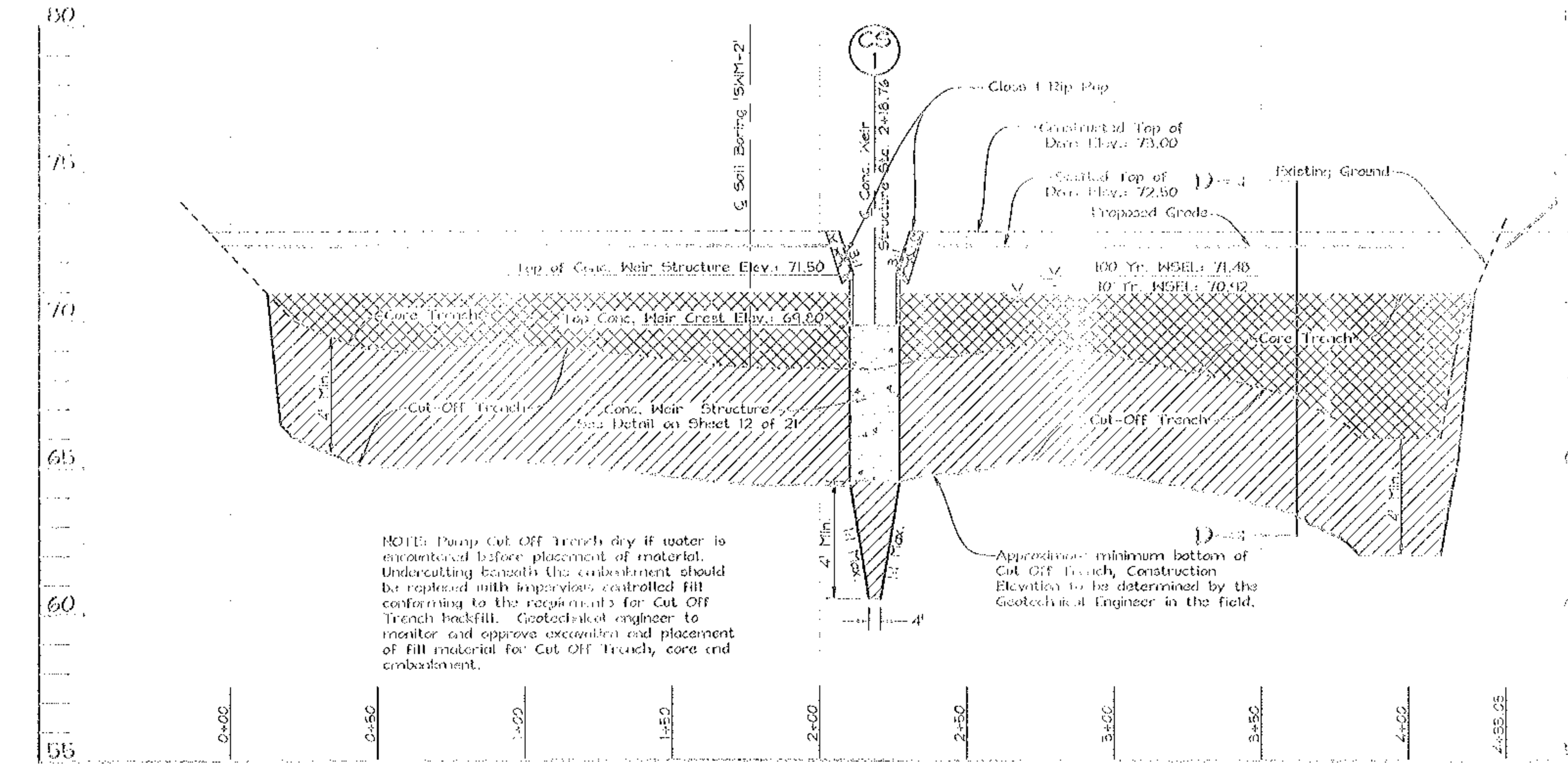
SPECIAL CONSTRUCTION METHODS FOR SEEPAGE CONTROLS

To prevent undesirable seepage through the basin and beneath the embankment, compact the clay surface across the bottom of the basin and tie in to the embankment. Since the soils encountered within all borings at basin elevation are CL clay soil, it would be possible in most areas to form the liner by recompacting the inplace materials. The exposed basin surface should be examined after mass grading and any sand deposits undercut 1 foot below proposed basin grade. This undercut area should be backfilled with CL clay soils compacted to a minimum 90 percent of the AASHTO T-99 maximum dry density. In the remaining clay areas, the basin bottom should be thoroughly rolled to a minimum 92 percent of the AASHTO T-99 maximum dry density.

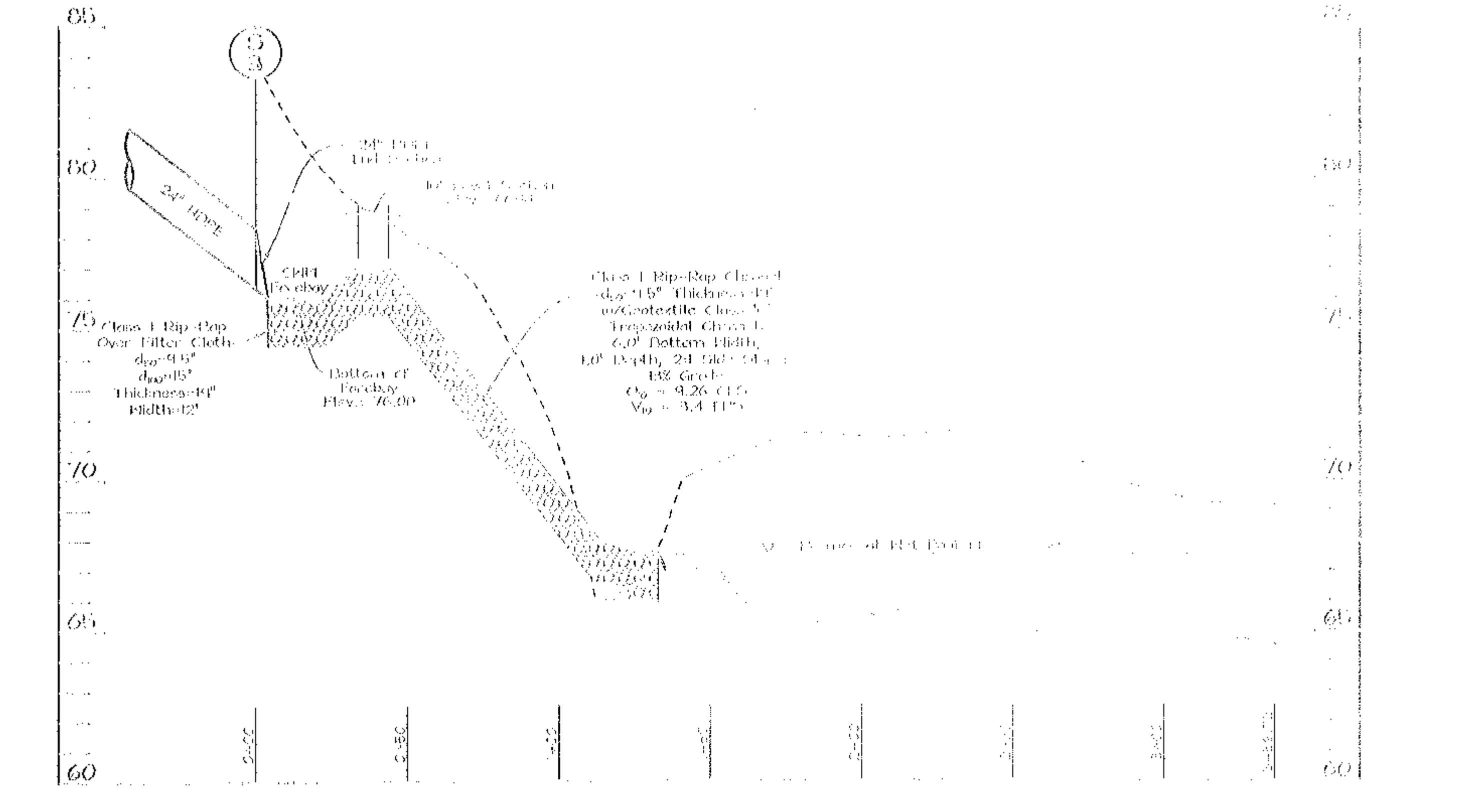
Forestry Obligation (Total Site)
Fwy Req'd: N/A*
Fwy Req'd: 0.99 Ac
Fwy Prov'd: 1.0 Ac

POND SUMMARY	1 YEAR(CPv)	10 YEAR**	100 YEAR	WATER QUALITY FOR AREA TO POND**
Flow Into Pond	21.4 cfs	74.84 cfs	123.17 cfs	WQv Req'd: 0.50 ac.ft
Flow Out of Pond	0.51 cfs	56.46 cfs	101.76 cfs	WQv Prov'd: 0.36 ac.ft(wet pool) 0.25 ac.ft(extended detention)
WS Elevation	69.7	70.92	71.48	Total Provided: 0.61 ac.ft
Storage Volume	0.25 ac.ft			

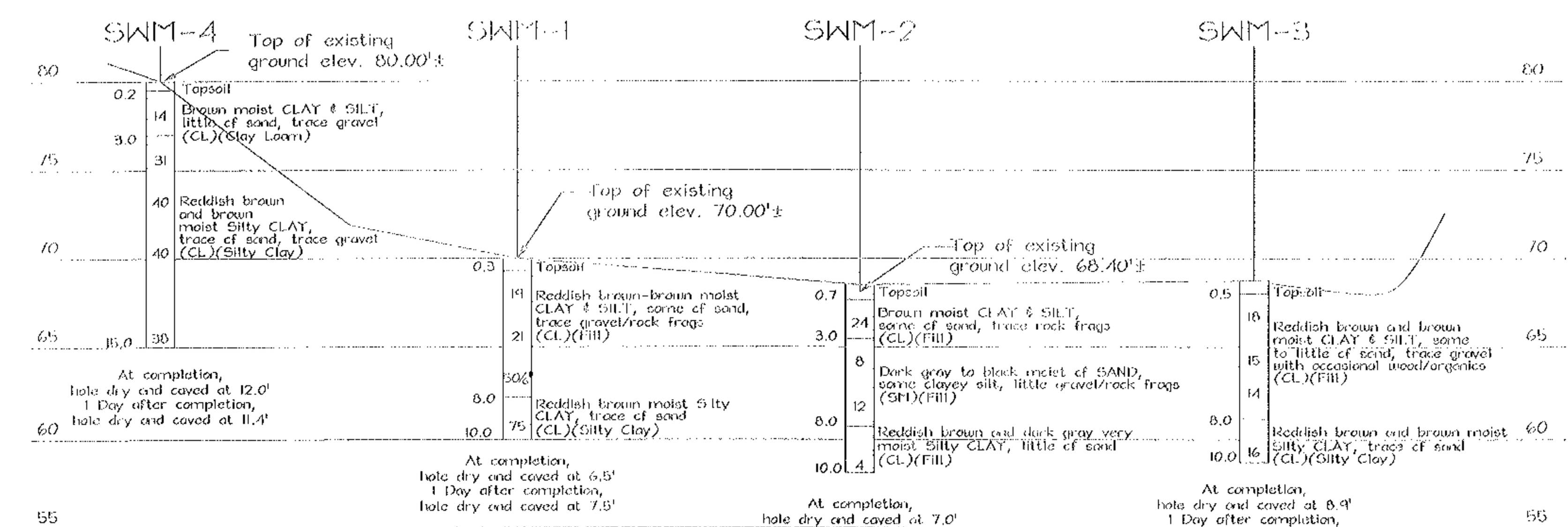
* Recharge is met through the Percent Area Method.
** Assumes clogged Low Flow Orifices.



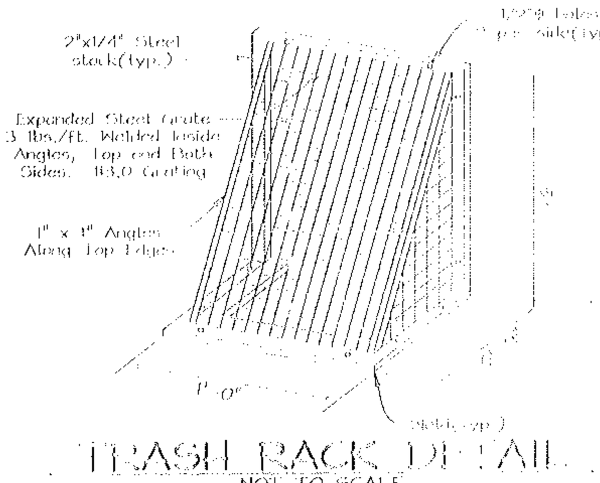
SECTION 'A'-'A'
(Along Top of Embankment)
SCALE: Hor.: 1"=50'
Vert.: 1"=5'



SECTION 'C'-'C'

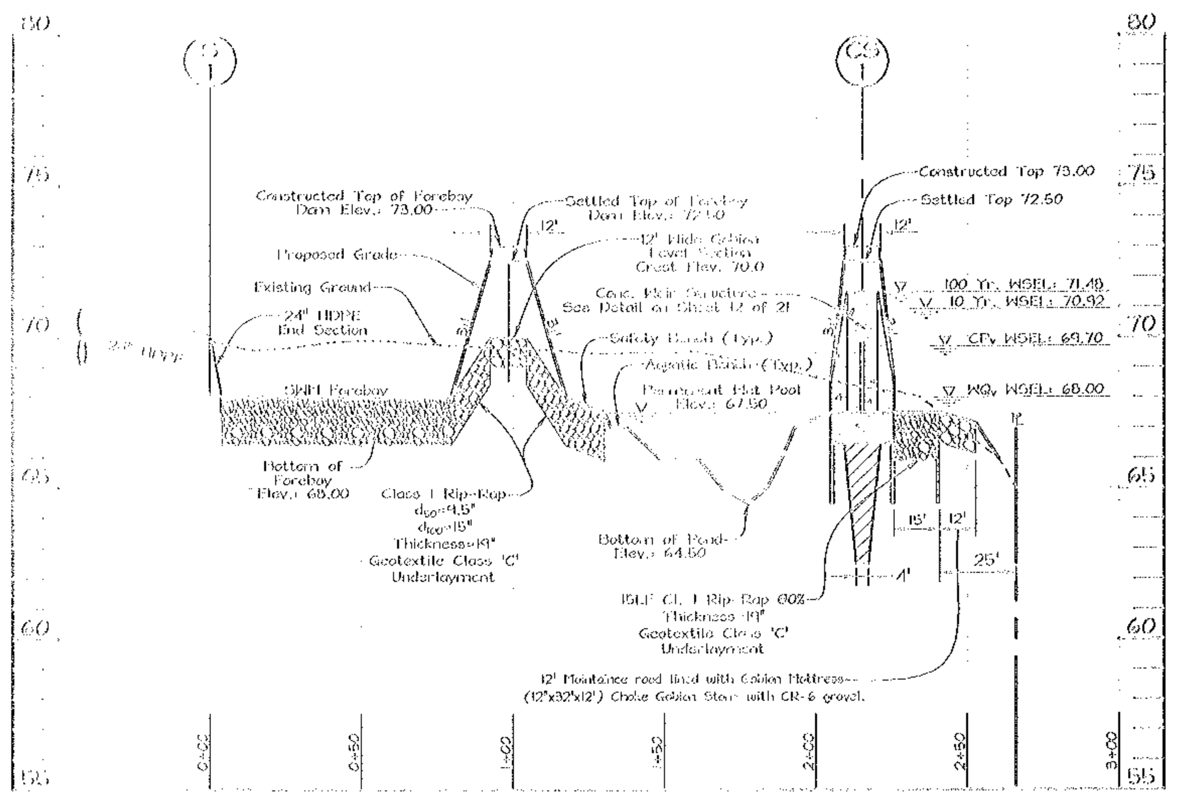


S.W.M. BORING PROFILE
NOT TO SCALE

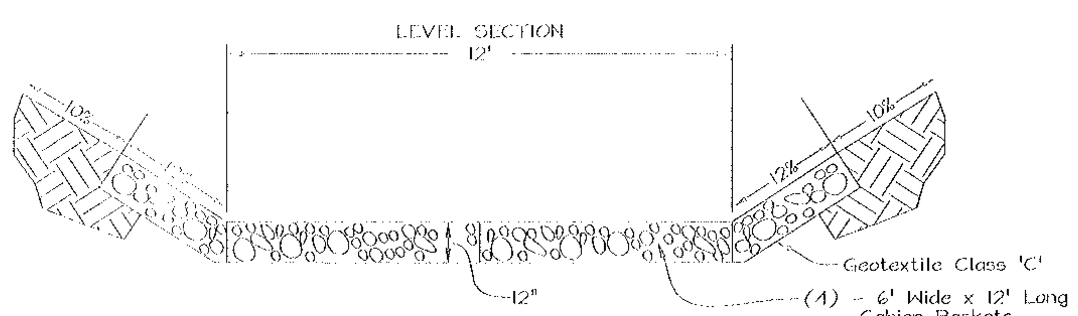


TRASH RACK DETAIL
NOT TO SCALE

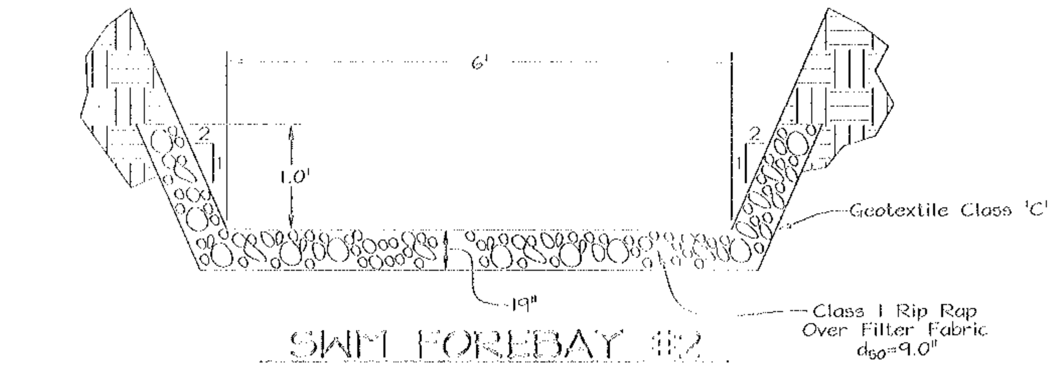
NOTES:
1. Steel to conform to ASTM A 36.
2. All surfaces to be coated with ZINC cold galvanizing compound after welding.
3. Trash rack to be fastened to the concrete with 1/2" masonry anchors. Trash rack to be removeable.



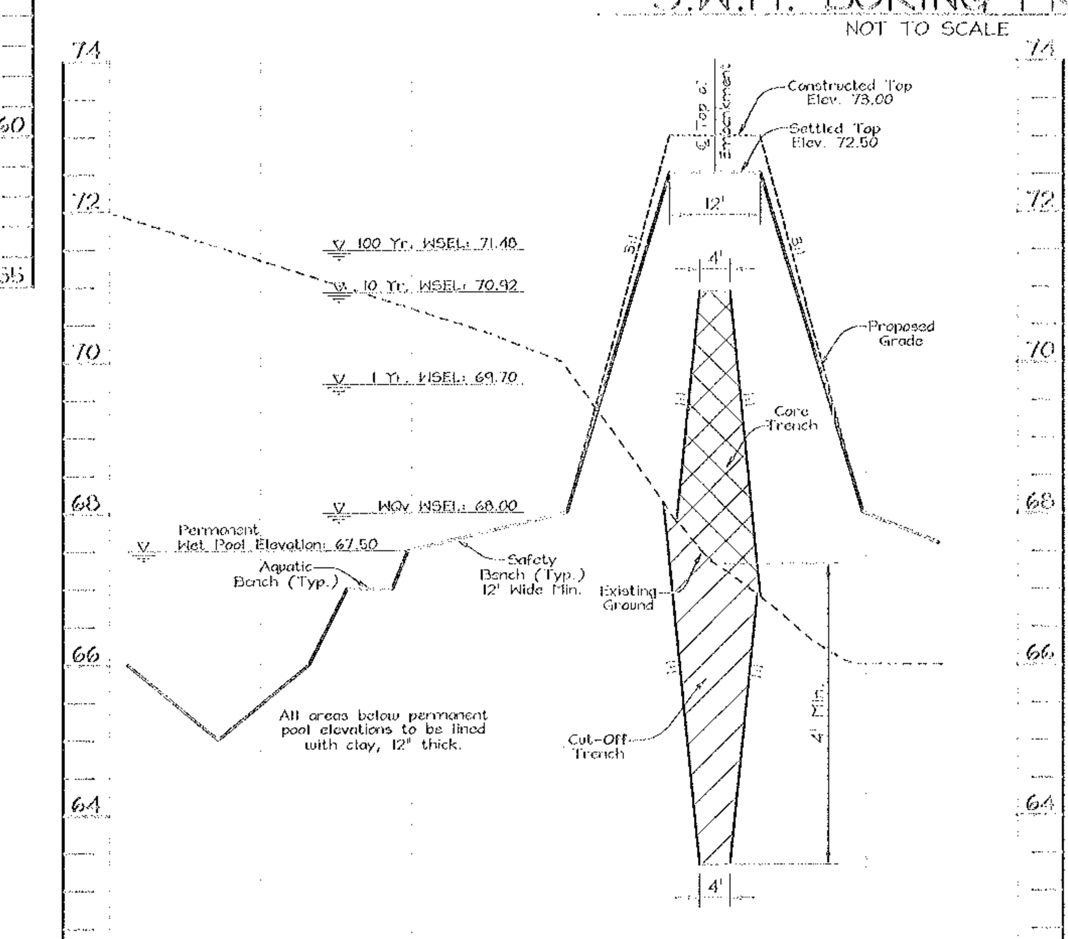
SECTION 'B'-'B'
(From S-1 thru Weir)
SCALE: Hor.: 1"=50'
Vert.: 1"=5'



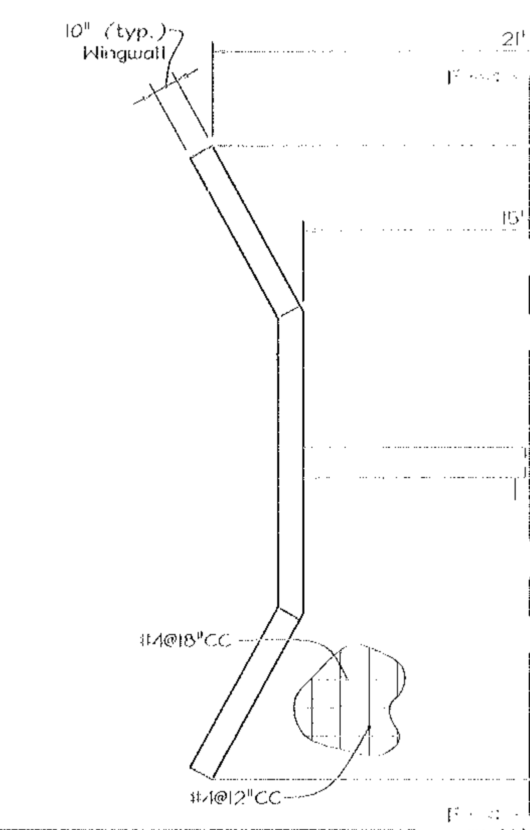
SWM FOREBAY #1
GABION OUTLET LEVEL SECTION
TYPICAL CROSS-SECTION
NOT TO SCALE



SWM FOREBAY #2
RIP RAP OUTLET LEVEL SECTION
TYPICAL CROSS-SECTION
NOT TO SCALE



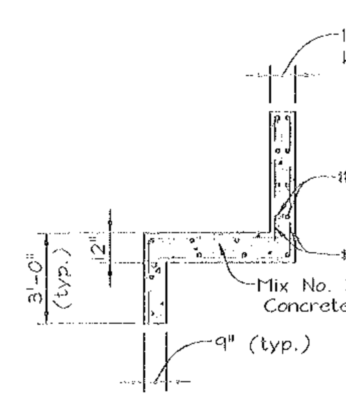
SECTION 'D'-'D'
(Thru Embankment)
SCALE: Hor.: 1"=20'
Vert.: 1"=2'



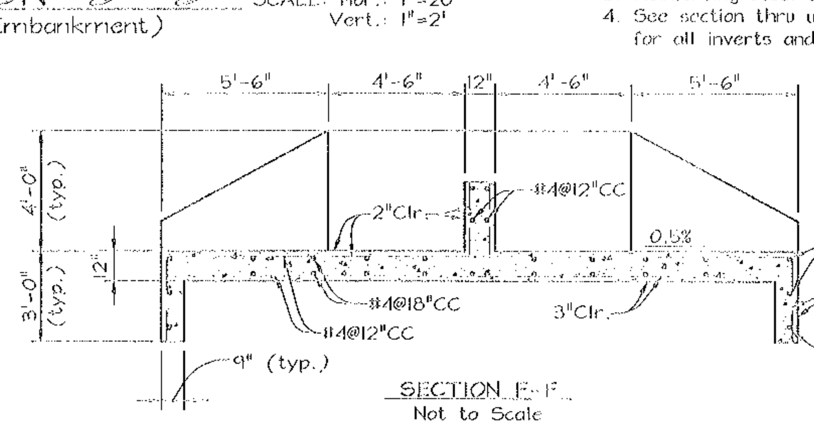
PLAN VIEW
Not to Scale

Trash Rack (See detail this sheet)

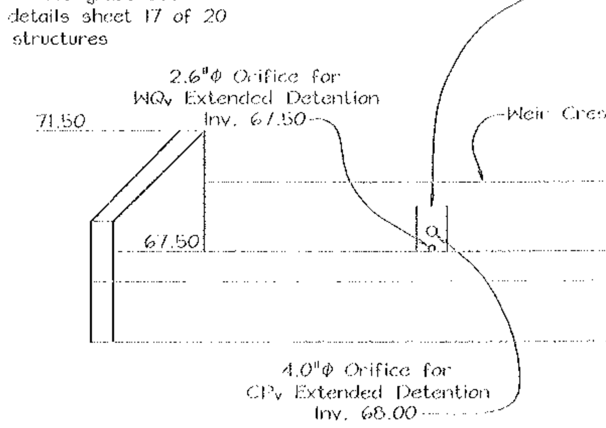
NOTES:
1. All exposed edges to have a 3/4"x3/4" chamfer or as directed.
2. Concrete shall be SHA mix #3(f'c=3500 psi @ 28 days)
3. Reinforcing steel shall be ASTM A-615 grade 60.
4. See section thru weir structure details sheet 17 of 20 for all inverts and elevations of structures



SECTION E-E
Not to Scale

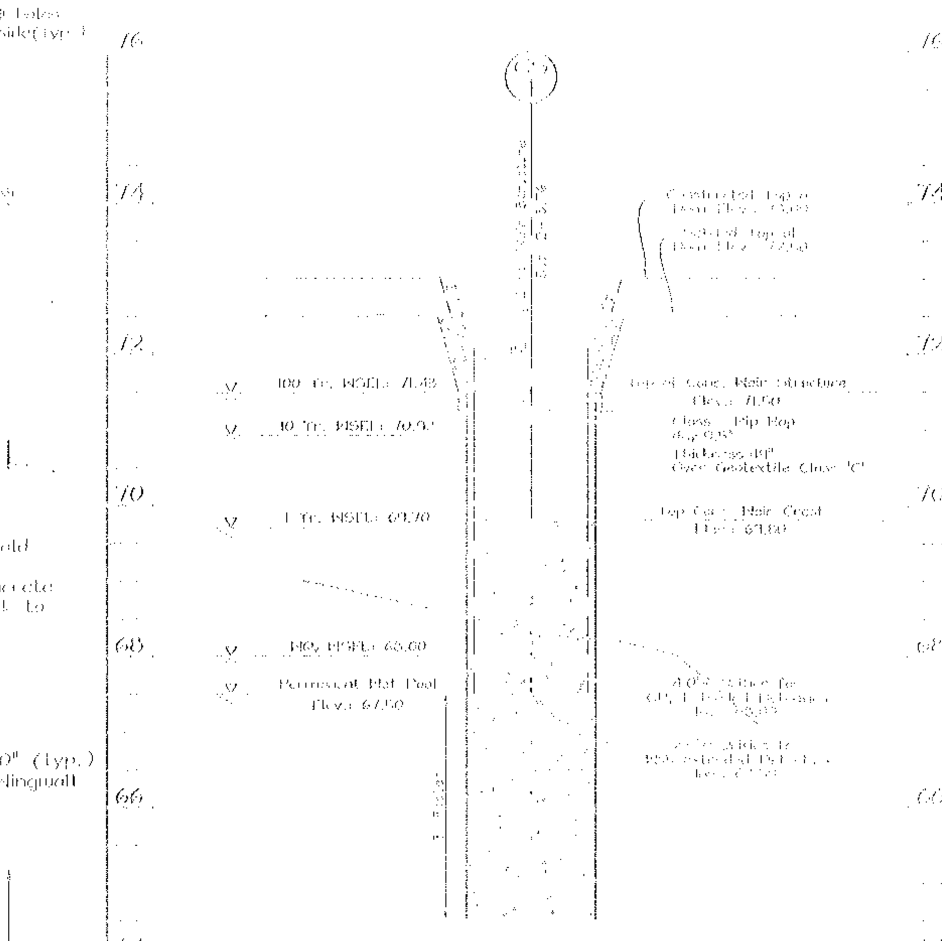


SECTION F-F
Not to Scale

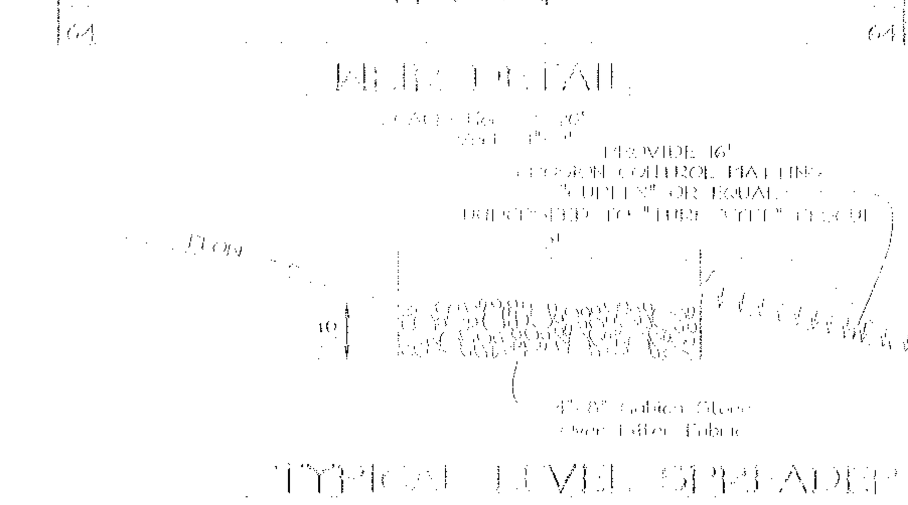


FRONT ELEVATION
Not to Scale

CS-1 CONCRETE WEIR CONTROL STRUCTURE
NOT TO SCALE



WEIR DETAIL



TYPICAL LEVEL SPREADER
(LOTS 11 & 19)
CROSS-SECTION
NOT TO SCALE

No.	Revision	Date
⚠	Revised Lot Areas for Lots 35 thru 39, 55, and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, MD 21045
410.872.0267

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

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.
CHIEF, BUREAU OF HIGHWAYS 10-11-04 DATE

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS
USDA-NATURAL RESOURCES CONSERVATION SERVICE — DATE
THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT
HOWARD SCD — DATE

ENGINEERS CERTIFICATE
"I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT."
SIGNATURE OF ENGINEER 9/15/04 DATE
ZACHARIA Y. FISCH

DEVELOPER'S CERTIFICATE
"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.
PROJECT MGR. 9/15/04
SIGNATURE OF DEVELOPER — DATE
RICHMOND AMERICAN HOMES OF MARYLAND, INC.

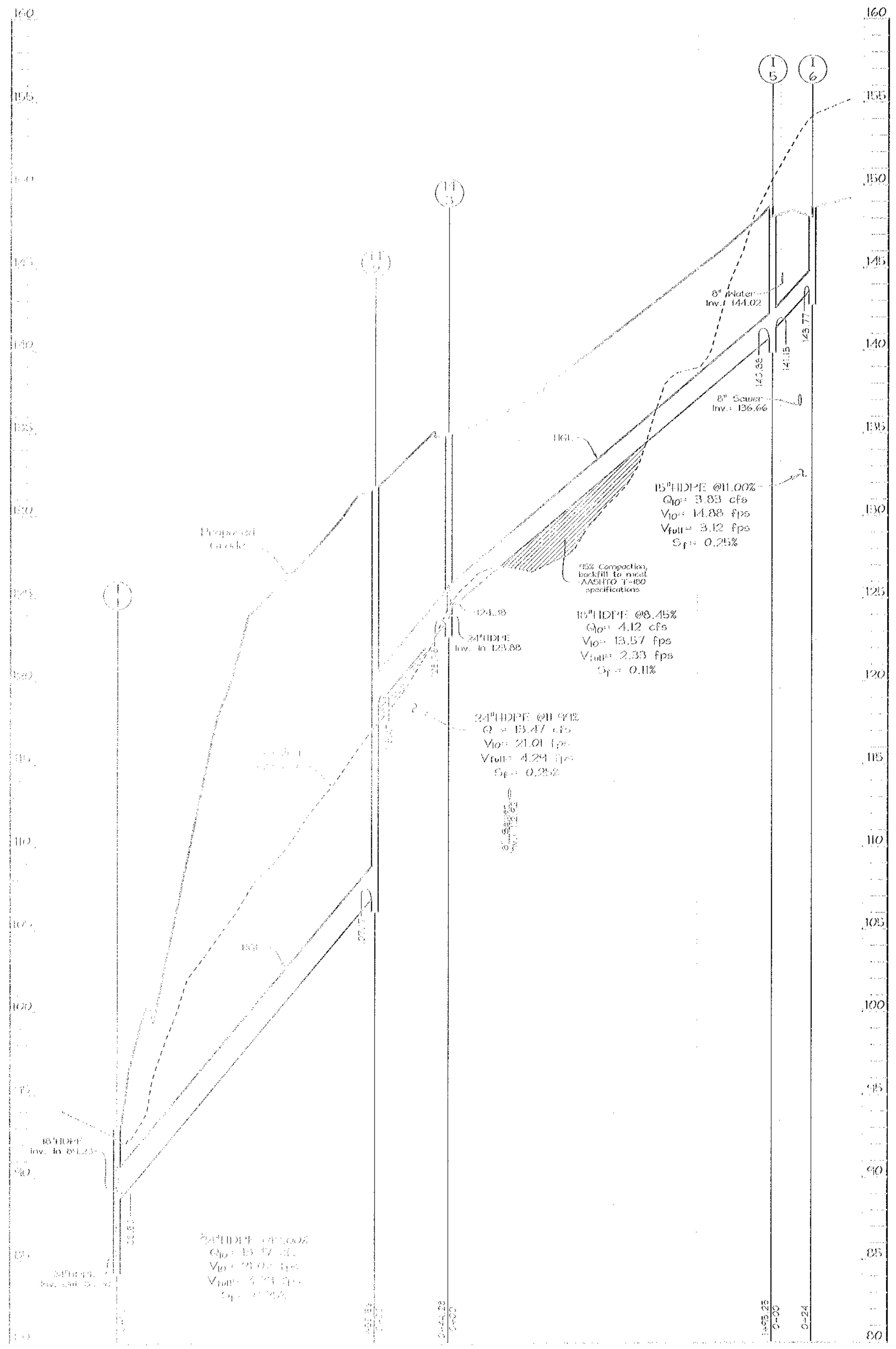
STORMWATER MANAGEMENT NOTES AND DETAILS
HUNTER'S RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, PLAT NO. 14926

TAX MAP 36 GRIDS 4 & 10 — PARCEL 168
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

FSH Engineers 8318 Forrest St. Ellicott City, MD 21043

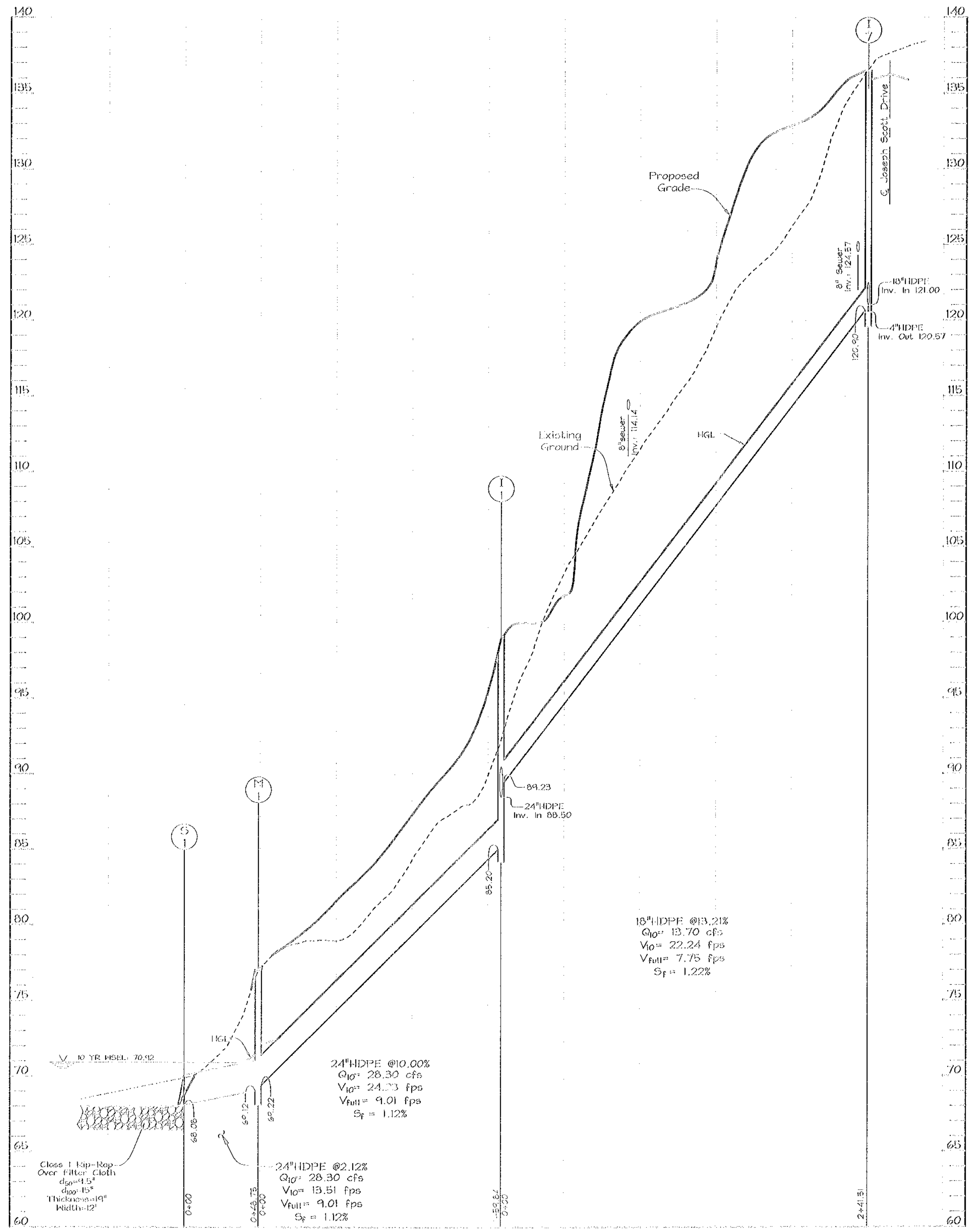
DESIGN BY:	RG
DRAWN BY:	RG
CHECKED BY:	ZYF
SCALE:	As Shown
DATE:	Sept. 15, 2004
W.O. No.:	3018
SHEET No.	13 OF 20

F-04-111



STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'



STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'

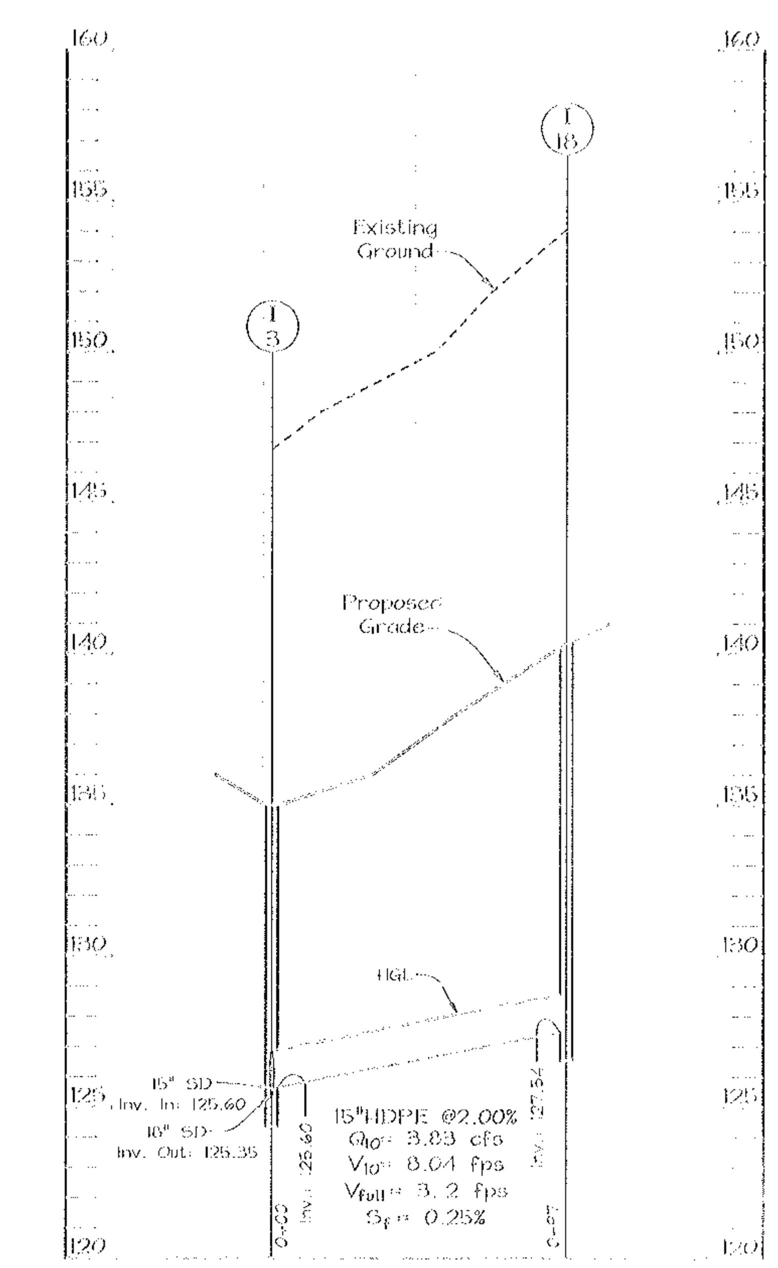
STRUCTURE SCHEDULE

NO.	TYPE	LOCATION		TOP ELEV.	INV. IN	INV. OUT	REMARKS
I-1	Single 'S' Inlet	N 562,195.31	E 1,394,475.28	91.00	89.23(18") 88.50(24")	85.20	SD 4.22
I-2	Single 'S' Inlet	N 562,373.40	E 1,394,582.73	134.56	124.52	124.02	SD 4.22
I-3	Single 'S' Inlet	N 562,440.31	E 1,394,699.57	[illegible]	125.60(15") 125.60(15")	[illegible]	SD 4.22
I-4	Single 'S' Inlet	N 562,605.52	E 1,394,820.50	[illegible]	-	[illegible]	SD 4.22
I-5	'A-5' Cast-In-Place Inlet	Fairlee Road Sta. 3+65.86	10.00' Right	148.75	141.13	140.88	SD 4.01
I-6	'A-10' Precast Inlet	Fairlee Road Sta. 3+65.86	10.00' Left	148.75	-	143.77	SD 4.41
I-7	'A-5' Cast-In-Place Inlet	Joseph Scott Drive Sta. 2+81.09	12.00' Left	136.41	121.00	120.57(4") 120.90(18")	SD 4.01
I-8	'A-10' Cast-In-Place Inlet	Joseph Scott Drive Sta. 2+81.09	12.00' Right	136.41	[illegible]	121.31	SD 4.02
I-9	'A-5' Precast Inlet	Joseph Scott Drive Sta. 4+95.67	12.00' Right	127.90	[illegible]	123.29	SD 4.40
I-10	'A-5' Precast Inlet	Joseph Scott Drive Sta. 6+70.69	12.00' Right	[illegible]	-	[illegible]	SD 4.40
I-11	'A-5' Precast Inlet	Joseph Scott Drive Sta. 4+95.67	12.00' Left	127.90	-	[illegible]	SD 4.40
I-12	Single 'S' Inlet	Joseph Scott Drive Sta. 4+44.64	77.23' Right	[illegible]	[illegible]	124.40	SD 4.22
I-13	Single 'S' Inlet	Joseph Scott Drive Sta. 4+44.64	130.00' Right	[illegible]	130.80	[illegible]	SD 4.22
I-14	Single 'S' Inlet	Joseph Scott Drive Sta. 6+54.64	130.00' Right	147.50	143.15	[illegible]	SD 4.22
I-15	Single 'S' Inlet	Joseph Scott Drive Sta. 7+76.86	132.49' Right	[illegible]	-	[illegible]	SD 4.22
I-16	Single 'S' Inlet	N 561,466.96	E 1,394,045.59	[illegible]	104.00	103.50	SD 4.22
I-17	Single 'S' Inlet	N 561,584.24	E 1,394,013.03	[illegible]		119.08	SD 4.22
I-18	Single 'S' Inlet	N 562,497.60	E 1,394,621.30	[illegible]	-	127.54	SD 4.22
M-1	Precast Manhole (4')	N 562,081.90	E 1,394,587.91	77.00	69.22	69.12	G 5.12
M-2	Precast Manhole (4')	N 562,320.84	E 1,394,567.16	133.50	118.47	107.17	G 5.12
M-3	Precast Manhole (4')	N 562,363.70	E 1,394,556.04	135.20	124.38(18") 123.88(24")	123.78	G 5.12
M-4	Precast Manhole (4')	N 562,372.98	E 1,394,650.29	138.53	124.96	124.86	G 5.12
M-5	Precast Manhole (4')	Joseph Scott Drive Sta. 4+44.64	17.00' Right	128.59	123.03(18") 123.03(18")	122.93	G 5.12
M-6	Precast Manhole (4')	N 561,489.09	E 1,394,106.93	115.00	102.85	97.75	G 5.12
M-7	Precast Manhole (4')	N 561,564.06	E 1,394,010.57	126.50	116.64	116.39	G 5.12
S-1	24" HDPE End Section	N 562,035.50	E 1,394,572.94	-	-	68.06	
S-2	6" HDPE End Section	N 562,173.80	E 1,394,244.95	-	-	120.25	
S-3	24" HDPE End Section	N 561,668.92	E 1,394,310.39		-	76.32	

NOTE: 1. Top elevations are to the center, top of grate inlet for all 'S' inlets; center, top of concrete slab @ curb line for A-5 and A-10; and center top of manhole cover for precast manholes.
2. Structures I-3, I-13 and M-2 to have granite bottoms.
3. See Grading plans, sheets 5 and 6, for top of structure slopes.

PIPE SCHEDULE

SIZE	TYPE	LENGTH
6"	HDPE	[illegible] LF
15"	HDPE	[illegible] LF
18"	HDPE	[illegible] LF
24"	HDPE	[illegible] LF



STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
[illegible]
Columbia, MD [illegible]
[illegible]

STORM DRAIN PROFILES
HUNTERS CREST
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58
AND A RESUBDIVISION OF BUILDABLE PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 36 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

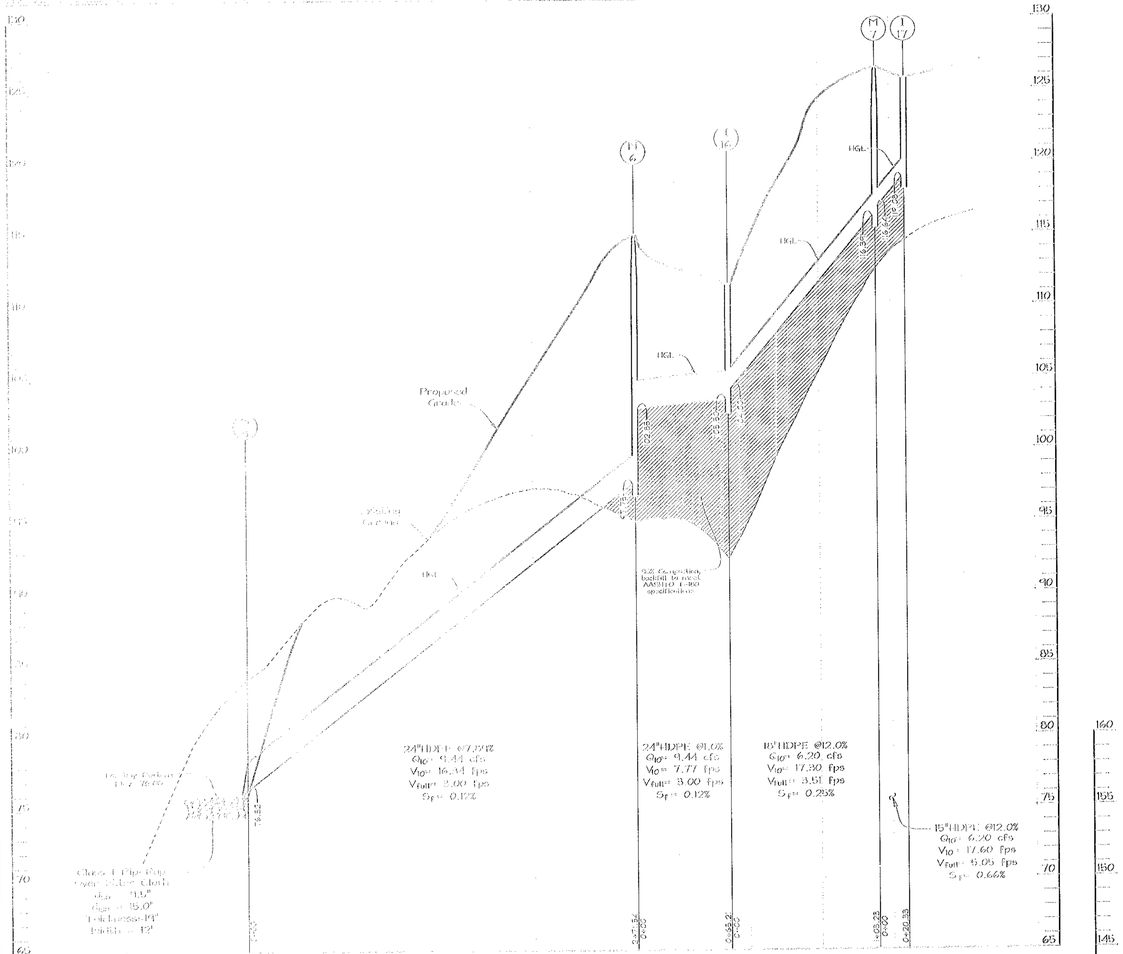
FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City
Tel:410-750-2251 Fax:410-750-[illegible]
E-mail: FSHAssociates@[illegible]

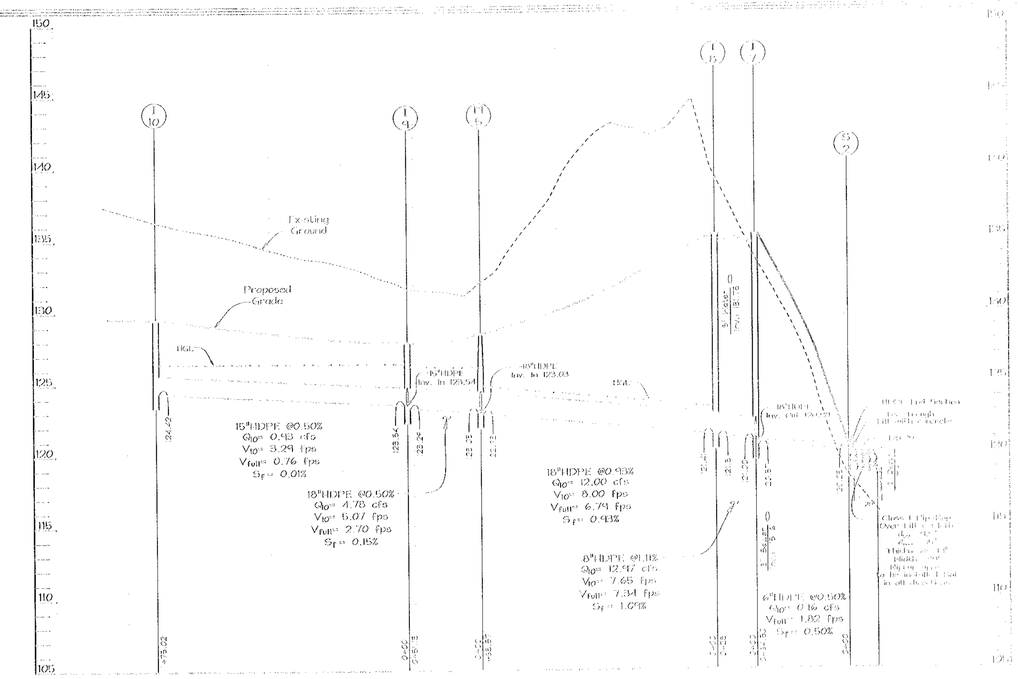
No.	REVISION	Date
1	Revised Lot Areas for Lots 35 thru 39, 55, and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

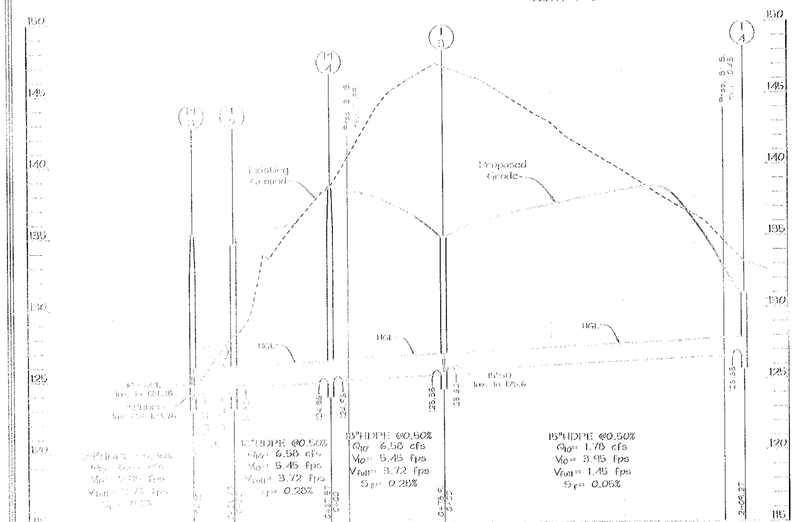
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

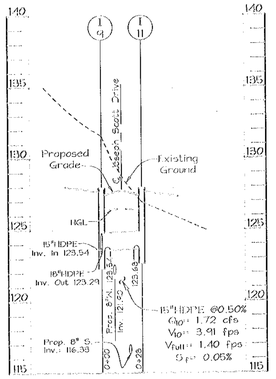
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 10-11-04

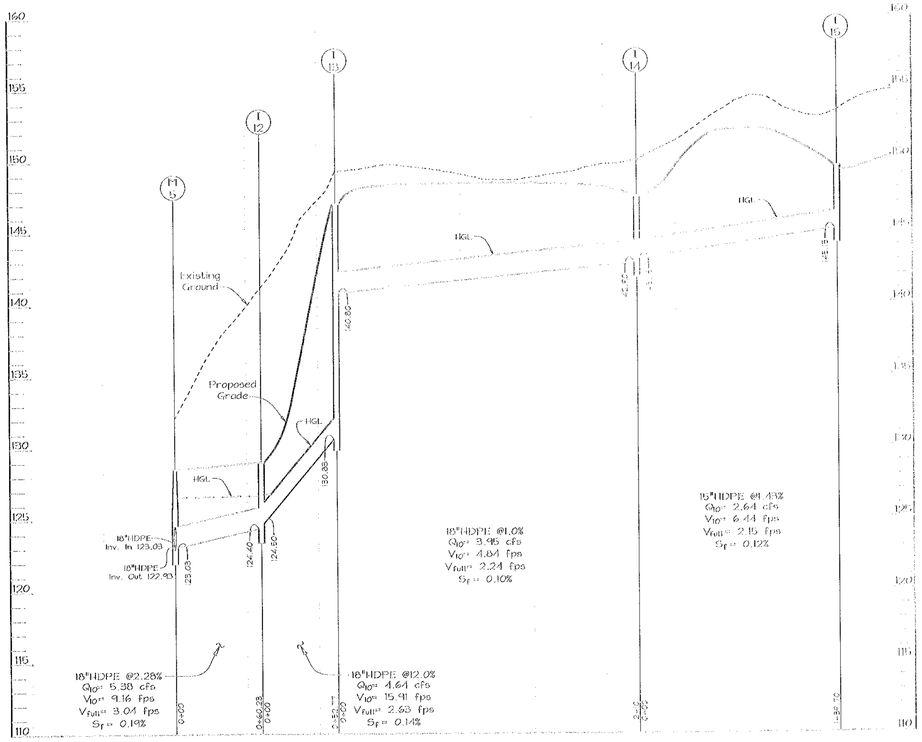
F-04-11











APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 5/5/05

CHIEF, DIVISION OF ENGINEERING, BUREAU — DATE 4/15/05

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

DIRECTOR — DATE 4/19/05

CHIEF, BUREAU OF HIGHWAYS — DATE

OWNER/DEVELOPER
Edward Associates Homes of Maryland, Inc.
9300 Old Baltimore Pike
College Park, MD 20740
(301) 927-0267

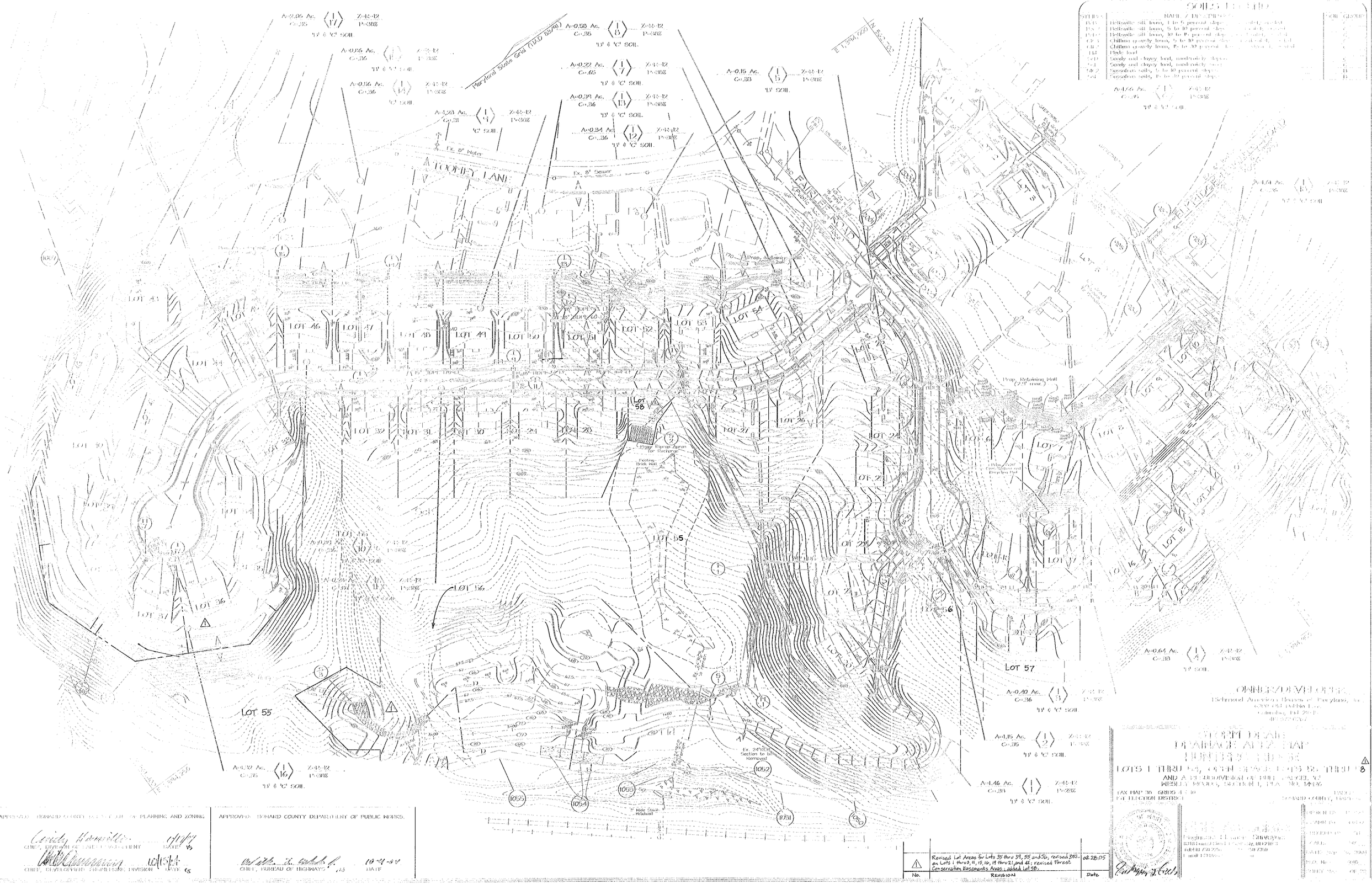
STORM DRAIN PROFILES
FOR
LOTS 1 THRU 24, 27 THRU 29, 55 AND 56 AND OPEN SPACE LOTS 25, 26 AND 57
AND A PART OF BUILDING PARCEL 'C'
WESTLEY MEADOWS — SECTION 1, PLAT NO. 14917

TAX MAP: 36 GRID: 4 & 10 — PARCEL: 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

No.	Revision	Date
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 45; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

DESIGNED BY: KO
DRAWN BY: KO
CHECKED BY: ZTF
SCALE: As Shown
DATE: Sept. 15, 2004
W.O. No.: 3089
SHEET No.: 10 OF 20

1-04-111



SOILS LEGEND		
SYMBOL	NAME / DESCRIPTION	SOIL GROUP
BaA	Bellefonte silt loam, 0 to 5 percent slopes	C
BaB2	Bellefonte silt loam, 5 to 10 percent slopes, eroded	C
BaC2	Bellefonte silt loam, 10 to 15 percent slopes, eroded	C
ChB	Chillum gravelly loam, 5 to 10 percent slopes	C
ChC	Chillum gravelly loam, 10 to 30 percent slopes	C
HkB	Hoke loam	C
SmB	Sandy and clayey loam, moderately sloping	C
SmC	Sandy and clayey loam, moderately steep	C
UcB2	Upperco soils, 5 to 10 percent slopes	D
UcC	Upperco soils, 10 to 30 percent slopes	D

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 11/9/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-14-04

No.	REVISION	Date
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56, revised BRL on Lots 1 thru 9, 11, 15, 16, 19 thru 21, and 41; revised Forest Conservation Easements Areas; added Lot 58.	02.28.05

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6704 Old Dobbin Lane
Columbia, MD 21045
(410)772-6767

GRADING AND DRAINAGE AREA MAP

HUNTER'S CHASE

LOTS 1 THRU 64, OPEN SPACE LOTS 65, THRU 68 AND A RESUBDIVISION OF THE PARCEL 'A' WESLEY MANOR, SECTION 1, PLAT NO. 14176

TAX MAP 39 GRIDS 4 & 10 — PARCEL 'A'

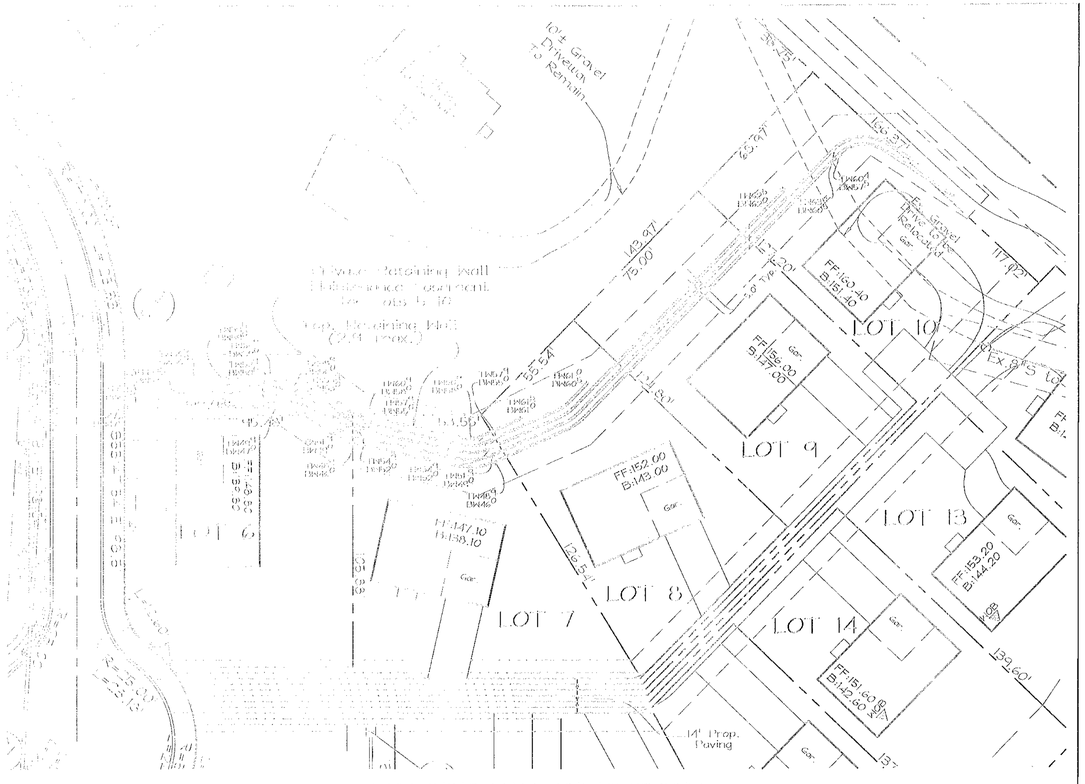
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

8

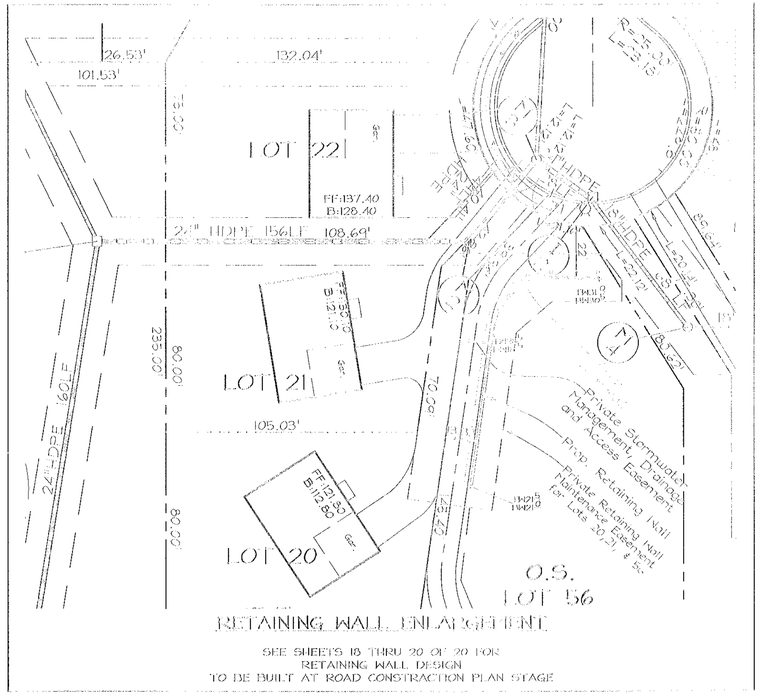
Engineer: Thomas Bibiana
8318 Main Street, Ellicott City, MD 21043
(410) 750-2525 — (410) 750-2530
E-mail: tbibiana@...

DESIGNED BY: TB
DRAWN BY: MEG
RECORDED BY: TB
CADD: MEG
DATE: SEPT. 30, 2004
P.O. No.: 2005
SHEET No.: 08 OF 08

F-04-111

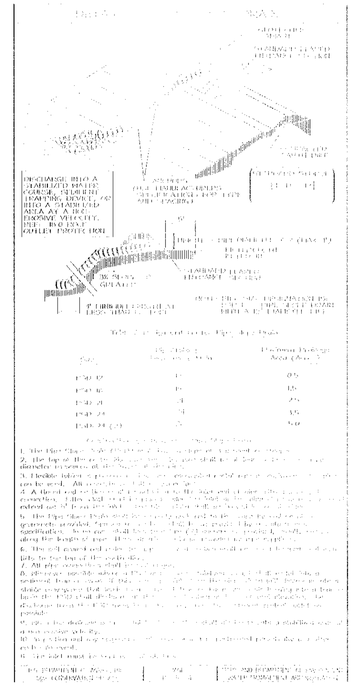


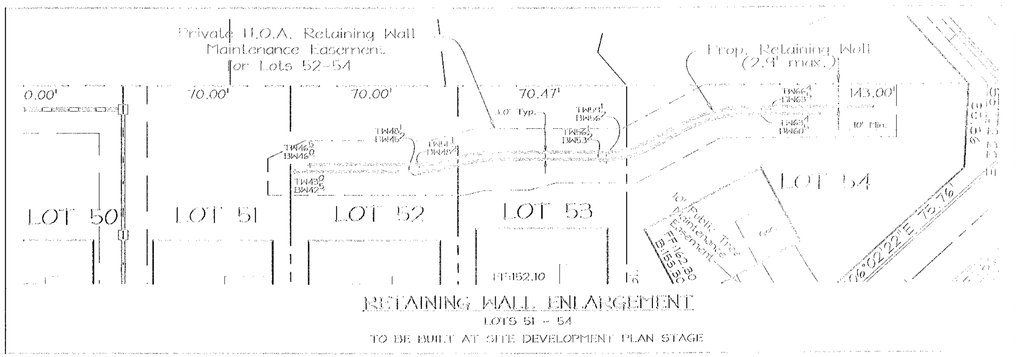
RETAINING WALL ENLARGEMENT
LOTS 6 - 10
TO BE BUILT AT SITE DEVELOPMENT PLAN STAGE



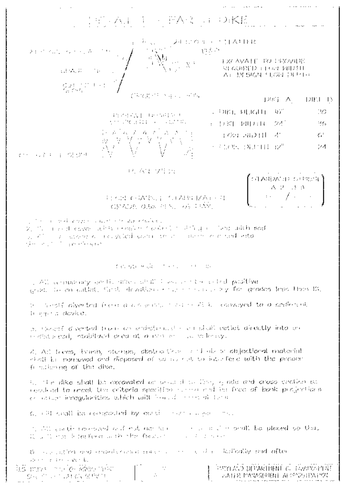
RETAINING WALL ENLARGEMENT

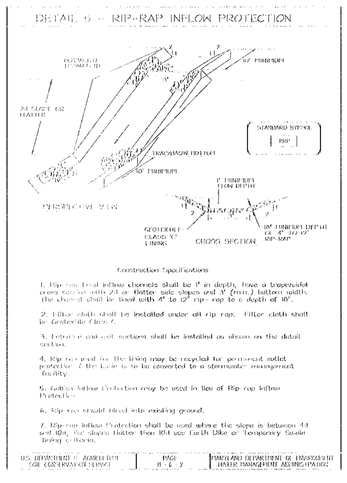
SEE SHEETS 18 THRU 20 OF 20 FOR
RETAINING WALL DESIGN
TO BE BUILT AT ROAD CONSTRACTION PLAN STAGE





RETAINING WALL ENLARGEMENT
LOTS 51 - 54
TO BE BUILT AT SITE DEVELOPMENT PLAN STAGE





Construction Specifications

1. Rip-rap inlet 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. Extensive cut and fill 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.

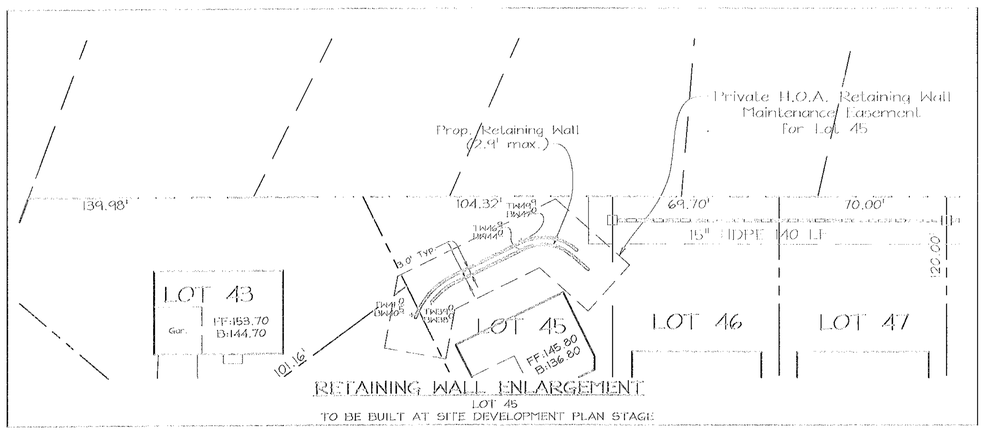
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE: 10/5/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE: 10/5/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE: 10-12-04



RETAINING WALL ENLARGEMENT
LOT 45
TO BE BUILT AT SITE DEVELOPMENT PLAN STAGE

No.	Revision	Date
1	Revised Lot Areas on Lots 35 thru 39, 85 and 86; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

OWNER/DEVELOPER
Edmund American Homes of Maryland, Inc.
10090 Old Columbia Road
Columbia, Md. 21045
(410) 772-2621

RETAINING WALL ENLARGEMENTS and SEDIMENT AND EROSION CONTROL DETAILS
VILLAGE OF HILLSBOROUGH
LOTS 1 THRU 94, 95TH STAGE, LOTS 85 THRU 88
AND A RESUBDIVISION OF PUBLIC TARGET NO. 1
WESLEY HOMES, SECTION 1, PLAT NO. 14926

TAX MAP 35 GRIDS 4 & 10 — PARCEL 534
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

DESIGNED BY: [illegible]
DRAWN BY: [illegible]
CHECKED BY: [illegible]
SCALE: 1"=50'
DATE: SEPT. 15, 2004
P.O. No.: 3018
SHEET No.: 6 OF 20

F-04-111

SEQUENCE OF CONSTRUCTION

1. Obtain grading permit [illegible] Howard County Sediment Control Inspector [illegible] (1 Day)
2. Install [illegible] (1 Day)
3. [illegible] sediment control [illegible] risers, slope drains, [illegible]
4. [illegible] for sediment [illegible] seeding and temporary [illegible] (2 weeks)
5. [illegible] slope drains [illegible] to be adjusted [illegible]
6. [illegible] (2 Weeks)
7. [illegible] storm drain system [illegible] conveyance to basin,* [illegible]
8. [illegible] all disturbed [illegible]
9. [illegible] silt fences [illegible]
10. [illegible] sediment/stormwater [illegible] remove accumulated [illegible] permanent weir to [illegible] grade bottom to proposed [illegible] mulching to disturbed [illegible]

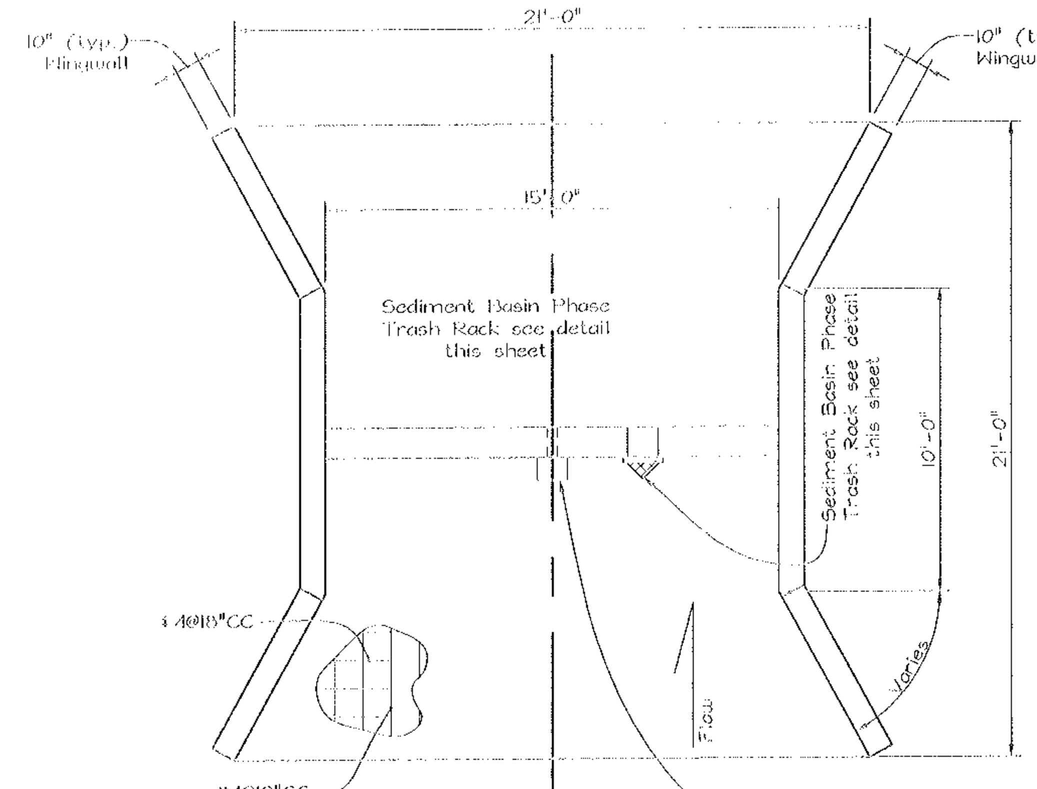
* [illegible] storm drains are [illegible]

* Contractor to provide [illegible] perimeter slopes within 7 days of grading [illegible] Howard County Sediment Control Inspector.

HUNTERS RIDGE SWM SUMMARY TABLE

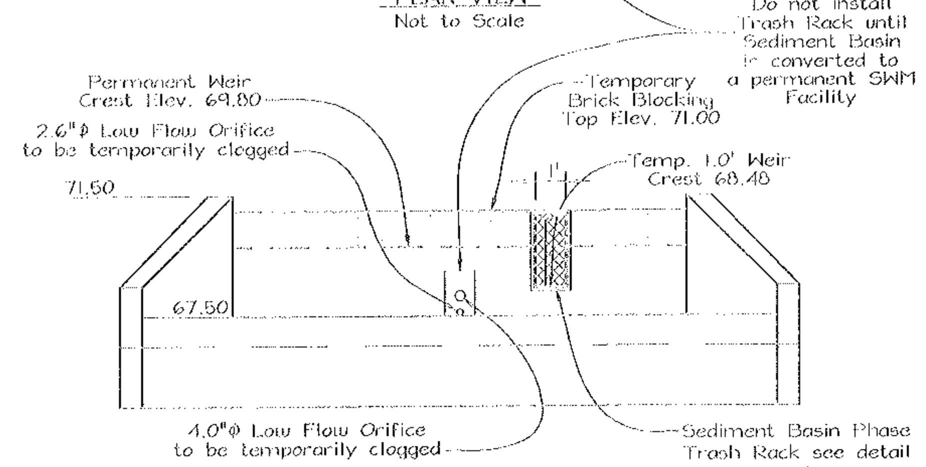
Category	Volume Required	Volume Provided	Notes
Water Quality Volume (WQv)	0.5 Ac. Ft.	0.86 Ac. Ft.	0.36 Ac. Ft. stored in micro pool with 0.25 Ac. Ft. of extended detention.
Recharge Volume (Rev)	0.92 Ac.Ft. 0.99 Ac.	1.0 Ac. Ft.	See Note below
Channel Protection Volume (Cpv)	33,106 cu. ft	33,106 cu. ft	1/2 incoming volume is detained for 18.48 hrs.
Overbank Flood Protection (Qp)	N/A	N/A	Not Required
Extreme Flood Volume (Qf)	N/A	N/A	Not Required

Notes:
Recharge area (Rea) treatment provided for lots 12-17, 1/2 lot 18, 1/2 lot 35 and all of lots 36-39 with grass channels at average slopes of 4%.
Sheet Flow to Buffer credit taken for lot 11 and 1/2 of lot 19
Dry well treatment provided for lots 43-54. (Dry wells at downspouts provided).



PLAN VIEW
Not to Scale

Do not install Trash Rack until Sediment Basin is converted to a permanent SWM Facility



FRONT ELEVATION
Not to Scale

CS-1 CONCRETE WEIR CONTROL STRUCTURE MODIFICATIONS FOR SEDIMENTCONTROL

NOT TO SCALE

NOTE:

Contractor shall form up a 1.0' wide temporary weir notch in the weir wall at crest elevation 68.48, providing a 2"x2" keyway. Contractor shall extend permanent weir crest to elevation 71.0 using brick and mortar, leaving a 1.0' wide opening to elevation 68.48. Once Sediment Control Measures are removed, these modifications shall be removed and the 1' wide weir shall be formed and poured to the permanent weir crest elevation (69.80).

LEGEND

(SWM Facility Hydrologic Zones & Planting Requirements)

Zone 1 - [illegible] s.f. - 12"-36" depth below normal pool elevation
Pickerelweed, Deep Water Duck Potato, Sago Pond Plant, Wild Celery, Redhead Grass. Plugs or bare root at 24" centers

Zone 2 - [illegible] s.f. - 0"-12" depth below normal pool elevation
[illegible] Flag Iris, Duck Potato, Flowering Bulrush, Softrush, Sedges, Lobelia, Pond Cypress, various asters. Plugs or bare root at 24" centers.

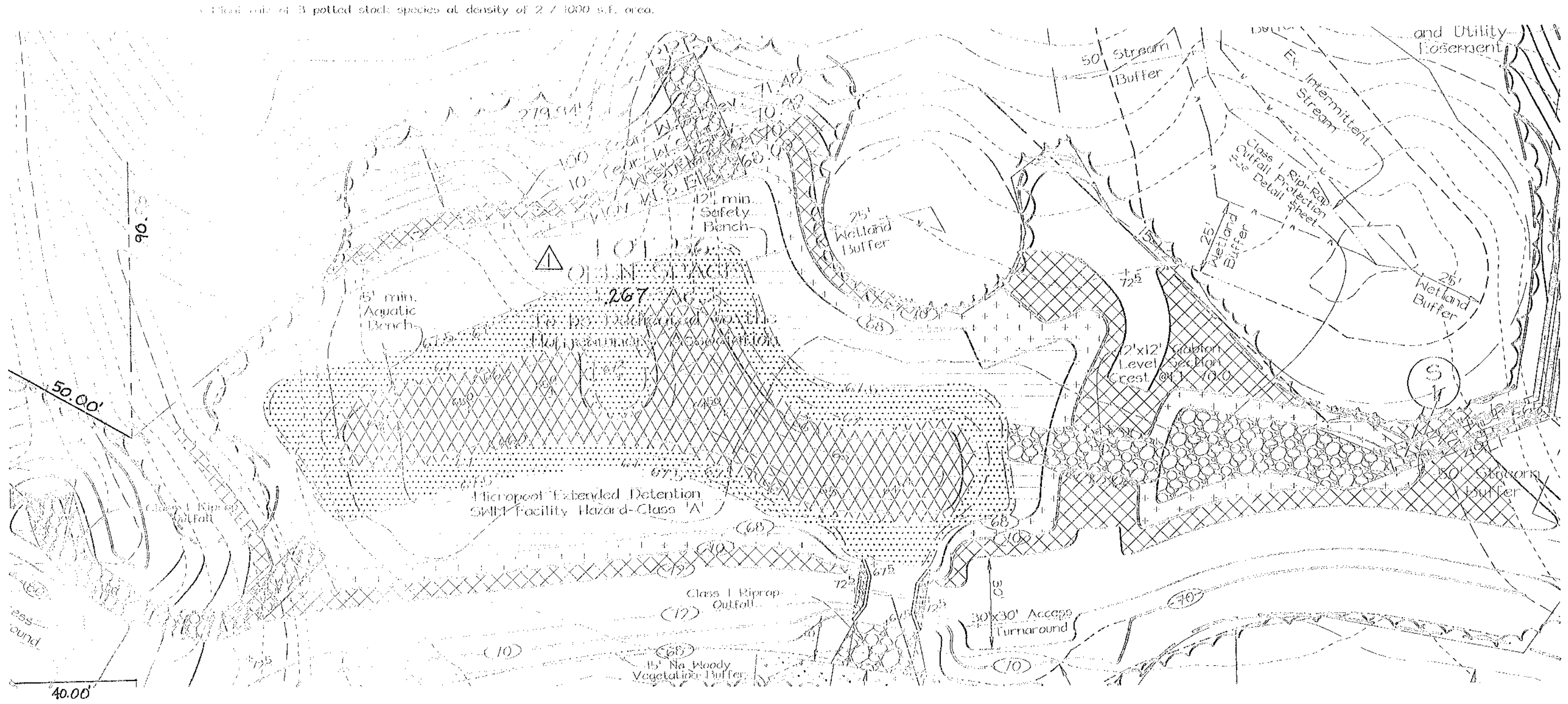
Zone 3 - [illegible] s.f. - 0"-12" elevation above normal pool elevation
New England Aster, Marsh Aster, Marsch Marigold (Appalachian Plateau), Tussock Sedge, Spotted Joe Pye Weed, Forget Me Nots, Inkberry, Purple, Red Osier Dogwood, Seed Mix Only

Zone 4 - 4480 s.f. - 1' to Cpv water surface elevation
Purple Cone Flower, Birds Foot Trefoil, Slender Rush, [illegible] Tongue Grass, Lespedeza, Switch Grass, Serviceberry, Gray Birch, [illegible]berry, Sweet Pepper, Bush (Coastal Plain), Gray Stem Dogwood, Red Osier Dogwood, Green Ash. Seed Mix with potted stock (No trees/shrubs on dam slopes).*

Zone 5 - Cpv to Qp100 water surface elevation
(many wildflowers and native grasses) American Holly, Witch Hazel, Ninebark, Red Oak, American Elderberry, American Hemlock, Lowbush, Blueberry, Maple Leaf Viburnum, Nannyberry, Blackhaw Viburnum Seed Mix with potted stock (No trees/shrubs on dam slopes).

Zone 6 - Qp100 water surface elevation and above
This area will be planted, where necessary, as part of forest conservation obligations. Many Natives. All species must be able to tolerate flood plain conditions.
Native Grasses, Seed Mix with potted stock (No trees/shrub on dam slopes).*

* [illegible] of 3 potted stock species at density of 2 / 1000 s.f. area.



SWM POND PLANTING DETAIL
Scale: 1" = 30'

21.0 STANDARDS 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 vegetable 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 a 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 that 1 and 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.

iii. 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 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 specified in 20.0 Vegetative Stabilization-Section - 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 place 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.

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, discing 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 acre dolomitic limestone (92 lbs/100 sq.ft.) and 600 lbs per acre 10-10-10 fertilizer (14 lbs./1000 sq.ft.) before seeding. Harrow or disc into upper three inches of soil. At the time of seeding, apply 400 lbs. per acre 30-0-0 ureaform fertilizer (9 lbs/1000 sq.ft.)

2) Acceptable Apply 2 tons per acre dolomatic limestone (92 lbs/1000 sq.ft.) and apply 1000 lbs. per acre 10-10-10- fertilizer (23 lbs./1000 sq.ft.) before seeding. Harrow or disc 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/1000 sq.ft.) of Turf Type Tall Fescue. For the period May 1 thru July 31, seed with 60 lbs. Turf Type Tall Fescue per acre and 2 lbs. per acre (.05 lbs./1000 sq.ft.) of weeping lovegrass. During the period of October 16 thru February 28, protect site by: Option (1) 2 tons per acre well anchored straw mulch and seed as soon as possible in the spring. Option (2) Use sod. Option (3) Seed with 60 lbs/acre Kentucky 31 Tall Fescue and mulch with 2 tons/acre well anchored straw.

MULCHING: Apply 1 1/2 to 2 tons per acre (70 to 90 lbs/1000 sq. 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/1000 sq.ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq.ft.) for anchoring.

MAINTENANCE: Inspect all seeded areas and make needed repairs, replacements and reseedings.

TEMPORARY SEEDING NOTES

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

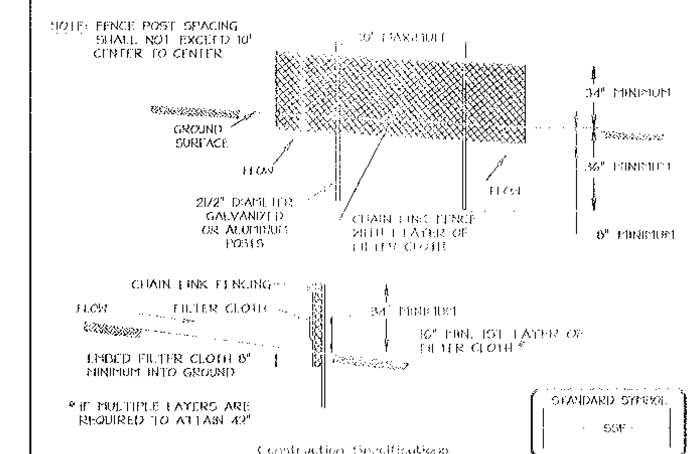
SOIL AMENDMENTS: Apply 600 lbs. per acre 10-10-10 fertilizer (14 lbs./1000 sq.ft.).

SEEDING: For periods March 1 thru April 30 and from August 15 thru November 15, seed with 2 1/2 bushel per acre of annual rye (3.2 lbs./1000 sq.ft.) For the period May 1 thru August 14, seed with 3 lbs. per acre of weeping lovegrass (.07 lbs./1000 sq.ft.). For the period November 1 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./1000 sq.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/1000 sq.ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq.ft.) for anchoring.

REFER TO THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR RATE AND METHODS NOT COVERED.

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.

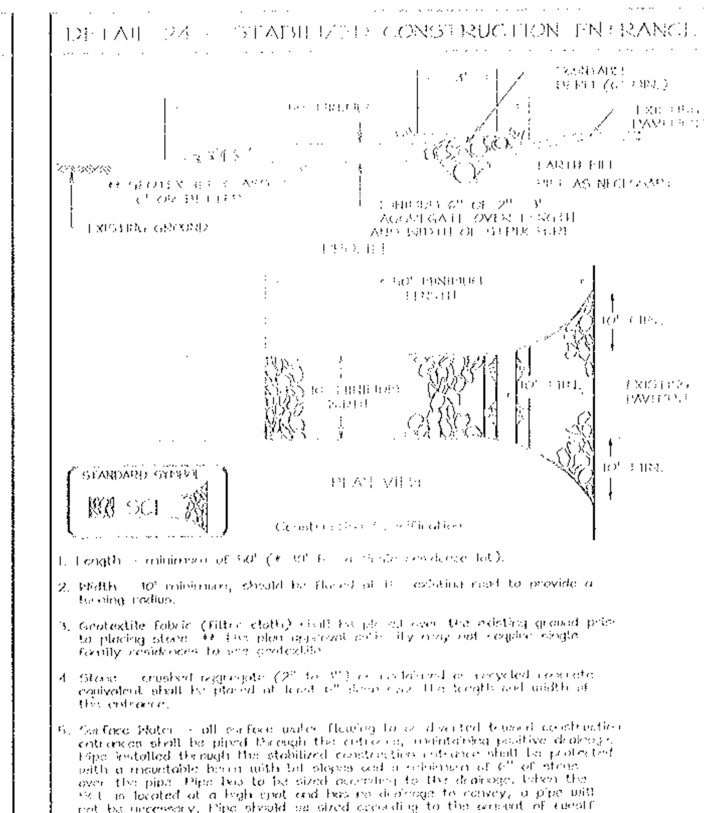
6. Maintenance shall be performed as needed and silt buildups removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height.

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 24 - STABILIZED CONSTRUCTION ENTRANCE



Construction Specification

1. Length - minimum of 50' (* 30' for a 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.

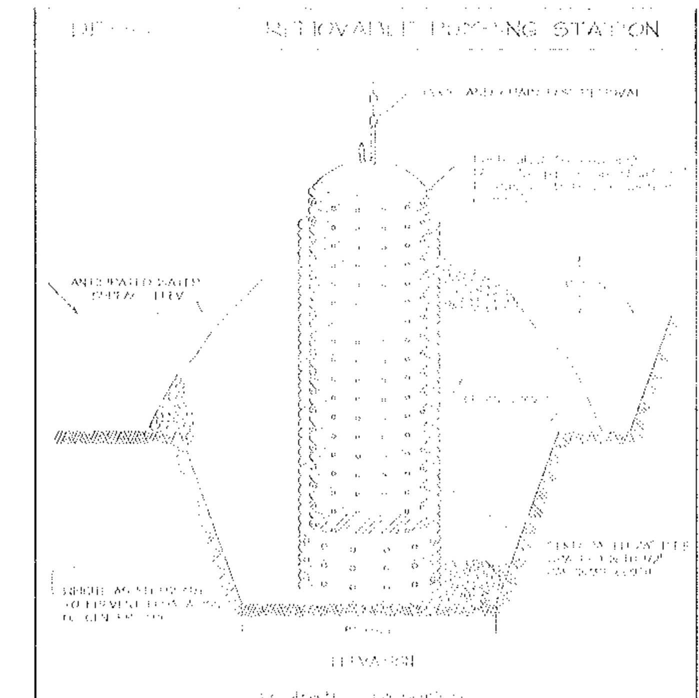
4. Stone - crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.

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.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE | PAGE F - 17 - 3 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

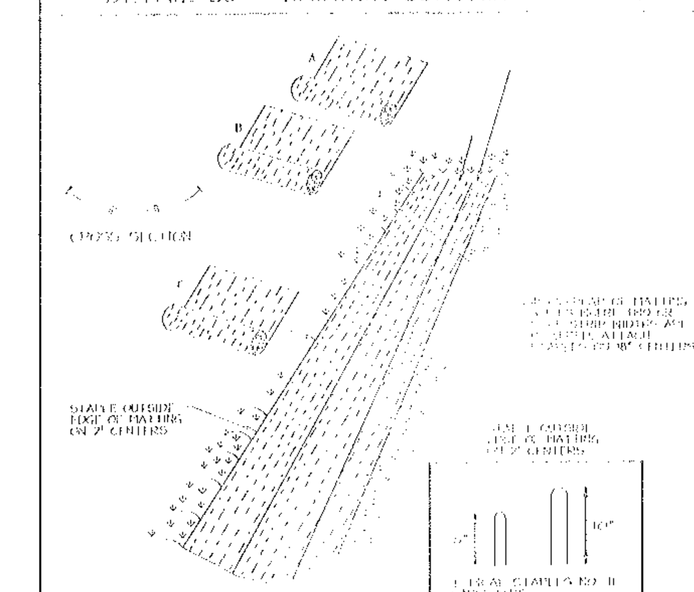
REMOVABLE PUMPING STATION



ELEVATION

[illegible]

DETAIL 30 - EROSION CONTROL MATTING



1. Key-in the matting by [illegible] of the matting in a narrow trench, 6" [illegible] the trench and tamp firmly to conform to the channel [illegible] with a row of staples about 4" down slope from the trench. Spacing between staples is 6".

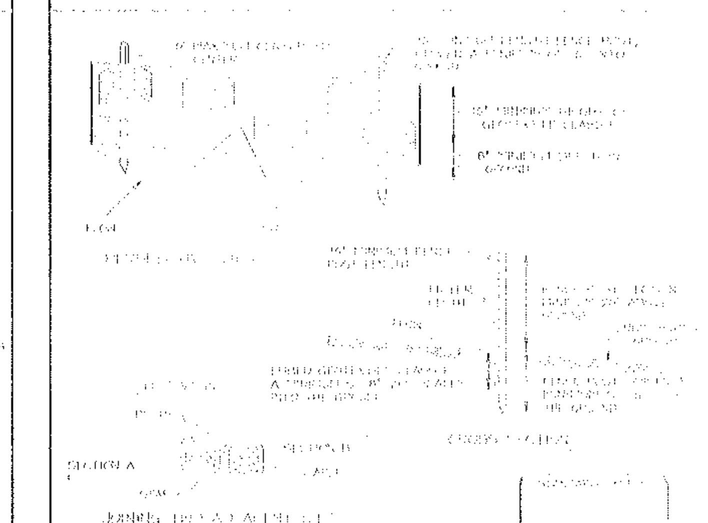
2. Staple the 4" [illegible] using an 18" spacing between staples.

3. Before stapling [illegible] of the matting, make sure the matting is [illegible] contact with the soil.

4. Staples shall [illegible] per strip, 2 outer rows, and 2 [illegible] the center.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE | PAGE G - 27 - 7 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL [illegible] - SILT FENCE



[illegible]

SEDIMENT CONTROL NOTES

1. A minimum of 48 hours notice must be given to the Howard County Department of Inspection, License and Permits Sediment Control Division prior to the start of any construction (313-1855)

2. All vegetation and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the 1994 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. I, Chapter 7, 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 for permanent seeding, sod, temporary seeding, and mulching (Sec. G). Temporary stabilization with mulch alone shall 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	25.66 Acres
Area Disturbed	17.68 Acres
Area to be roofed or paved	1.39 Acres
Area to be vegetatively stabilized	16.29 Acres
Total Cut	92,078 c.y. **
Total Fill	91,706 c.y. **
Offsite waste/borrow area location	*

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

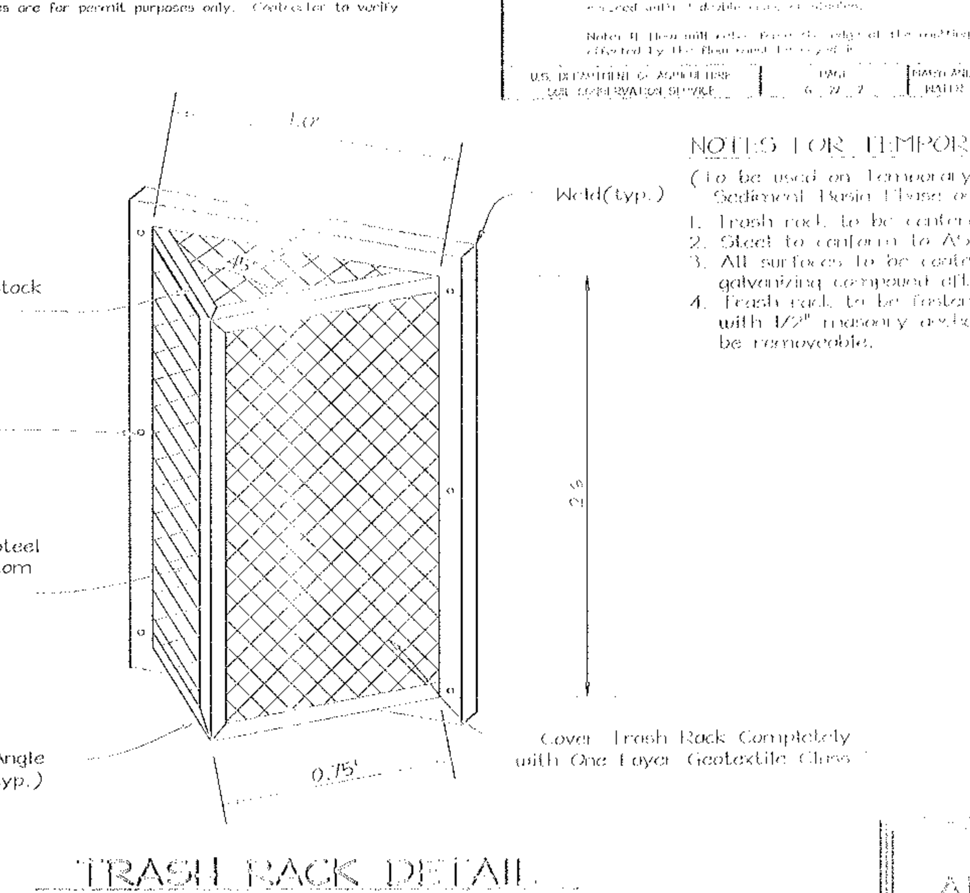
9. Additional sediment controls must be provided, if deemed necessary by the Howard County Sediment Control Inspector.

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 shall be back-filled and stabilized within one working day, whichever is shorter.

* To be determined by contractor, with pre-approval of the Sediment Control Inspector with an approved and active grading permit

** Total cut and fill quantities are for permit purposes only. Contractor to verify earthwork quantities.



TRASH RACK DETAIL
NOT TO SCALE

NOTES FOR TEMPORARY TRASH RACK

(To be used on Temporary Weir during Sediment Basin Phase only.)
1. Trash rack to be centered over opening
2. Steel to conform to ASTM A 36.
3. All surfaces to be coated with ZRC cold galvanizing compound after welding.
4. Trash rack to be fastened to the wall with 1/2" masonry anchors. Trash rack to be removeable.

SEDIMENT BASIN SCHEDULE (CS-1)

Drainage Area 22.23 Ac.
Storage Required 40,014 c.ft. wet + dry
Storage Provided 40,014 c.ft. wet + dry
Weir Length 2' tot.
Bottom Elevation 64.5
Cleanout Elevation 67.0
Embankment Elevation 73.0 (constructed)
Wet Storage Elevation 68.48
Dry Storage Elevation 70.50
Q_2 Existing 12.37 CFS
Q_2 Proposed 8.45 CFS @ elevation 70.44
Q_{10} Existing 66.64 CFS
Q_{10} Proposed 52.77 CFS @ elevation 71.35

	REVISION	Date
⚠	Revised Areas for Lots 35 thru 39, 55 and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05
No.	REVISION	Date

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6700 Old Dobbin Lane
Columbia, Md 21045
410-872-0267

SEDIMENT AND EROSION CONTROL AND SWM POND NOTES AND DETAILS
HUNTERS RIDGE
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58
AND A RESUBDIVISION OF BULK PARCEL "C"
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 36 GRIDS 4 & 10 — PARCEL [illegible]
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street, [illegible] MD 21043
Tel: 410-750-2251 [illegible]
E-mail: FSHAssoc[illegible]

DESIGN BY:	[illegible]
DRAWN BY:	[illegible]
CHECKED BY:	ZYF
SCALE:	As Shown
DATE:	Sept. 15, 2004
W.O. No.:	3018
SHEET No.	7 OF 20

F 04-111

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cindy Hamilton — 10/11/04
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE — KS

[signature] — 10/12/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE — CE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

[signature] — 10-11-04
CHIEF, BUREAU OF HIGHWAYS — DATE

DEVELOPER'S CERTIFICATE

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

[signature] Project Mgr — 9/15/04
SIGNATURE OF DEVELOPER — DATE
RICHMOND AMERICAN HOMES OF MARYLAND, INC.

ENGINEERS CERTIFICATE

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

Zacharia Y. Fisch — 9/15/04
SIGNATURE OF ENGINEER — DATE
ZACHARIA Y. FISCH

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

[signature] — 9/28/04
USDA-NATURAL RESOURCES CONSERVATION SERVICE — DATE

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

[signature] — [signature]
HOWARD SOIL CONSERVATION DISTRICT — DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/5/04

CHIEF, DEVELOPER'S ENGINEERING DIVISION — DATE 10/5/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF ENGINEERING — DATE 10-4-04

DECLARATION OF INTENT

"I/WE CERTIFY THAT ALL ENGINEERING AND SURVEYING PERFORMED IS DONE ACCORDING TO ACCEPTED PROFESSIONAL ENGINEERING PRACTICES AND THAT ALL FIELD MONUMENTS AND PROPERTY LINE MARKERS ON THIS PROJECT PLAT HAVE BEEN OR WILL BE PLACED AS REQUIRED BY THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS OR SECTION 3.191 OF THE REAL PROPERTY ARTICLE OF THE ANNOTATED CODE OF MARYLAND, AS AMENDED. I/WE ALSO AUTHORIZE PERIODIC INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT."

SIGNATURE OF DEVELOPER — DATE 9/15/04

RICHMOND AMERICAN HOMES OF MARYLAND, INC.

PROFESSIONAL CERTIFICATE

"I CERTIFY THAT THE PLAN SHOWN AND DESCRIBED HEREON IS IN COMPLIANCE WITH ALL APPLICABLE LAWS, REGULATIONS AND POLICIES BASED ON THE PRELIMINARY PLAN APPROVAL, AND THAT I WAS RESPONSIBLE FOR OR SUPERVISED THE PREPARATION OF THE PLAN."

SIGNATURE OF DESIGNER — DATE 9/16/04

ZACHARIA T. EYSSA

"I/WE HAVE READ THE HOWARD SOIL CONSERVATION DISTRICT STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL."

USDA NATURAL RESOURCES CONSERVATION SERVICE — DATE 9/21/04

"I/WE HAVE READ AND WILL COMPLY WITH THE SEQUENCE OF CONSTRUCTION AS SHOWN ON THIS PLAN."

DEVELOPER — DATE

"THESE PLANS FOR SOIL EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT HAVE BEEN REVIEWED AND APPROVED BY THE SOIL CONSERVATION DISTRICT."

HOWARD SOIL CONSERVATION DISTRICT — DATE

No.	REVISION	Date
	Revised lot Areas for Lots 35 thru 39, 93 and 126; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 23, and 42; revised Forest Conservation Easement Areas; added Lot 98.	12.28.05

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6300 Old Dobbin Lane
Columbia, Md 21045
410-772-0267

SEDIMENT AND EROSION CONTROL AND GRADING PLAN

HUNTER RIDGE

LOTS 1 THRU 94, OPEN SPACE LOTS 95, 96 THRU 98 AND A RESUBDIVISION OF PARCEL 'C' WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 35 GRID 5 & 10 — PARCEL 84
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

DESIGN BY	DMW
DRAWN BY	DMW
CHECKED BY	ZTE
SCALE	1"=50'
DATE	SEPT. 15, 2004
W.O. No.	3016
SHEET No.	6 OF 20

GLW Engineers, PA — 8318 Forest Street, Ellicott City, MD 21043 — 410-461-2855 — E-mail: GLWA@erols.com
GLW Surveyors — MD 21043 — 410-461-2855

F-04-111

LEGEND

Existing Contour

Proposed Contour

Spot Elevation

Direction

Tree Protection

Existing Tree Line

Silt Fence

Super Silt Fence

Earth Dike

Limit of Disturbance

Erosion Control Matting

Rip-Rap Inflow Protection

Gabion Inflow Protection

Removable Pumping Station

Grass Swale for Recharge

DEVELOPER'S CERTIFICATE

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

[signature] PROJECT MGR 2/15/04

SIGNATURE OF DEVELOPER — DATE

RICHMOND AMERICAN HOMES OF MARYLAND, INC.

ENGINEER'S CERTIFICATE

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

[signature] 1/15/04

SIGNATURE OF ENGINEER — DATE

ZACHARIA J. FISCH

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

[signature] — DATE

USDA-NATURAL RESOURCES CONSERVATION SERVICE

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

[signature] — DATE

HOWARD SOIL CONSERVATION DISTRICT

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 10/13/07

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE KB

[signature] 10/15/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE G

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

[signature] 10-4-04

CHIEF, BUREAU OF HIGHWAYS — DATE

No.	REVISION	Date
⚠	Revised Lot Areas for Lots 35 thru 39, 55 and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, MD 21045

SEDIMENT AND EROSION CONTROL AND GRADING PLAN
HUNTERS EDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58 ⚠

AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

Engineers · Planners · Surveyors
8318 Forrest [illegible]
Tel: 410 750 [illegible]
E-mail: FSHA[illegible]

DESIGNED BY: [illegible]
DRAWN BY: [illegible]
CHECKED BY: ZJF
SCALE: 1"=50'
DATE: Sept. 15, 2004
W.O. No.: 3018
SHEET No.: 5 OF 20

F-04-111

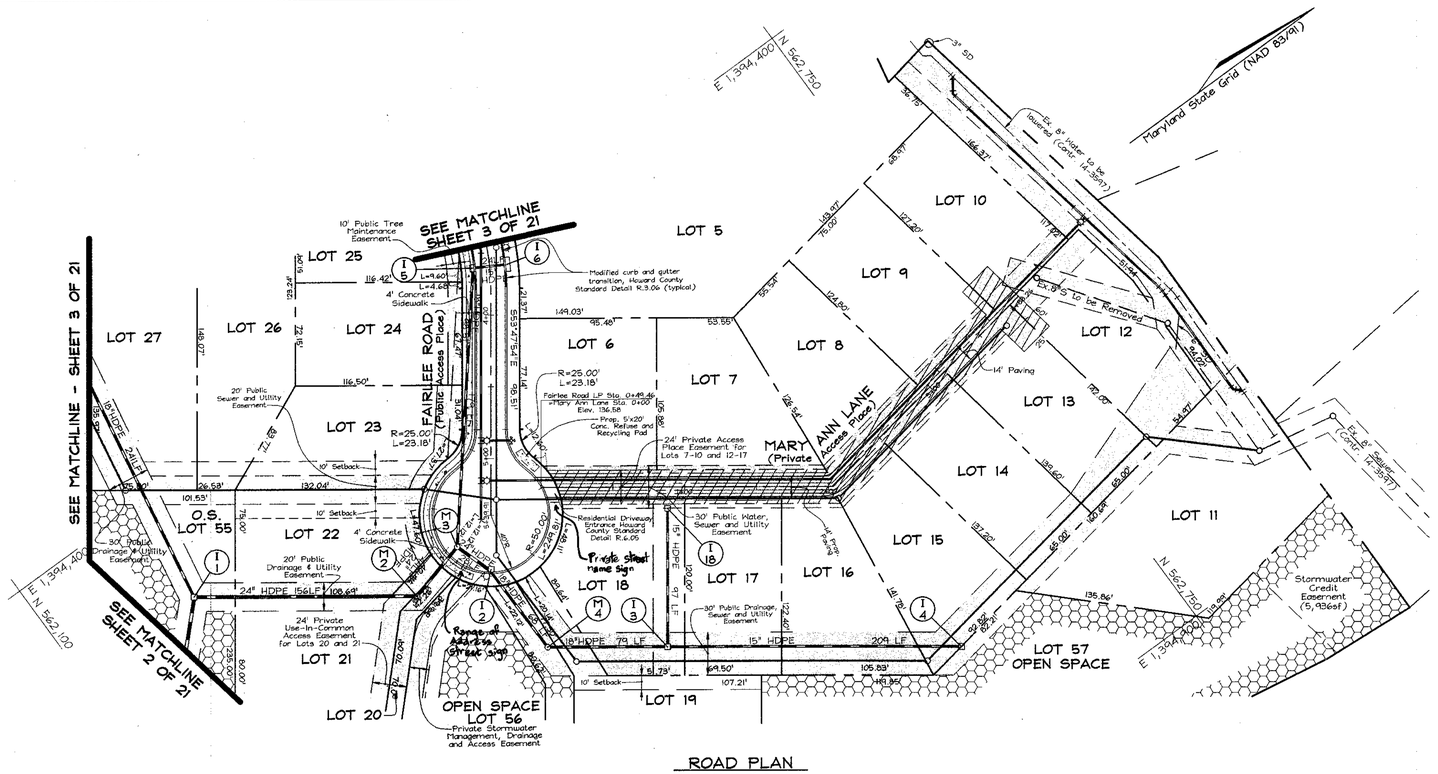
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/9/04

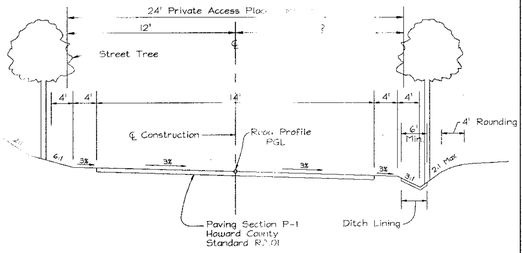
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-4-04



ROAD PLAN
SCALE: 1"=50'



TYPICAL ROADWAY SECTION
CLASSIFICATION : PRIVATE ACCESS PLACE
NOT TO SCALE

No.	Revision	Date
1	Revised Lot Areas for Lots 55 thru 58, 55 and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

ROAD PLAN AND PROFILE PRIVATE ACCESS PLACE
HUNTERS RIDGE

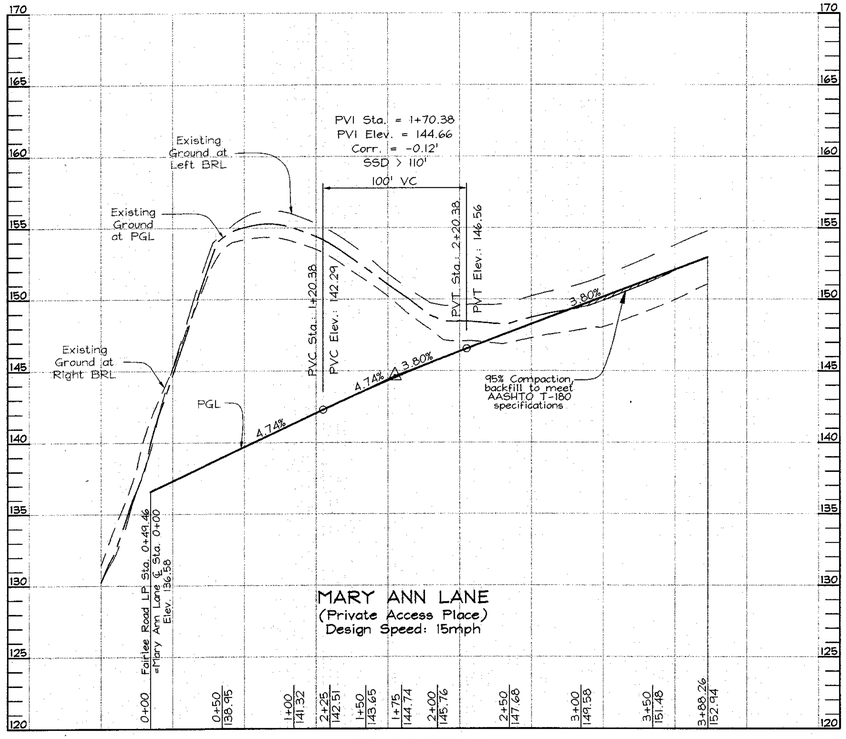
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — JOSHUA YORKE FISH — 22418 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

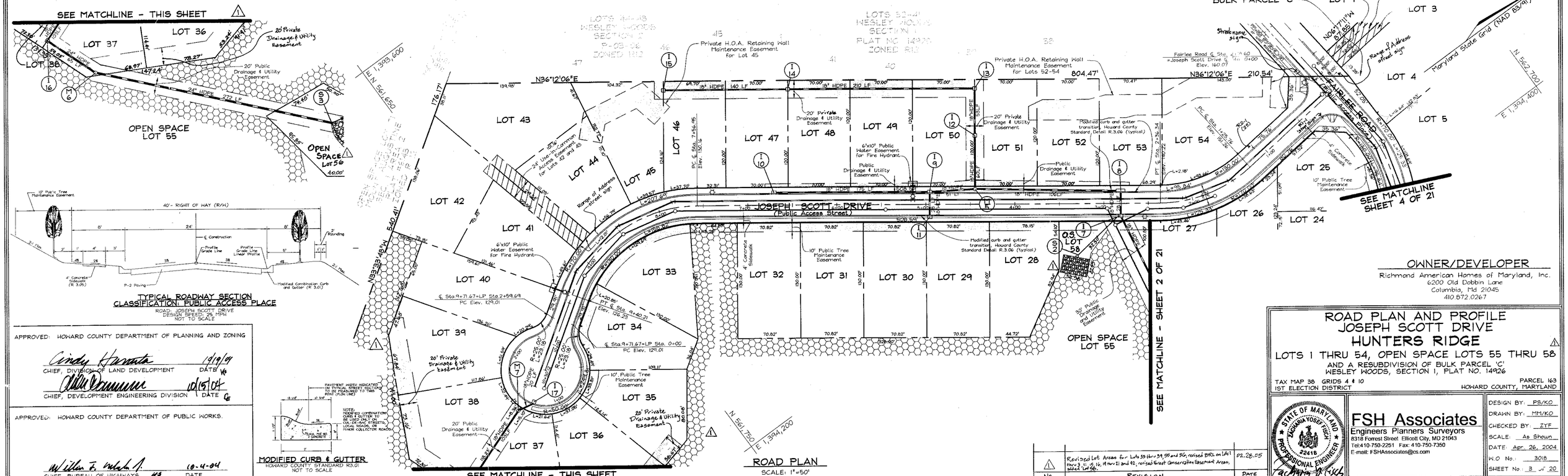
DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: As Shown
DATE: Apr. 26, 2004
W.O. No.: 3018
SHEET No. 4 OF 20



MARY ANN LANE
(Private Access Place)
Design Speed: 15mph

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

F-04-111



TYPICAL ROADWAY SECTION
CLASSIFICATION: PUBLIC ACCESS PLACE

ROAD: JOSEPH SCOTT DRIVE
DESIGN SPEED: 25 MPH
NOT TO SCALE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/9/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/5/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-4-04

MODIFIED CURB & GUTTER
HOWARD COUNTY STANDARD R3.01
NOT TO SCALE

ROAD PLAN
SCALE: 1"=50'

No.	REVISION	DATE
1	Revised Lot Areas for Lots 39 thru 34, 28 and 54; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42, revised Forest Conservation Easement Areas, added Lot 58.	02.28.05

ROAD PLAN AND PROFILE
JOSEPH SCOTT DRIVE
HUNTERS RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

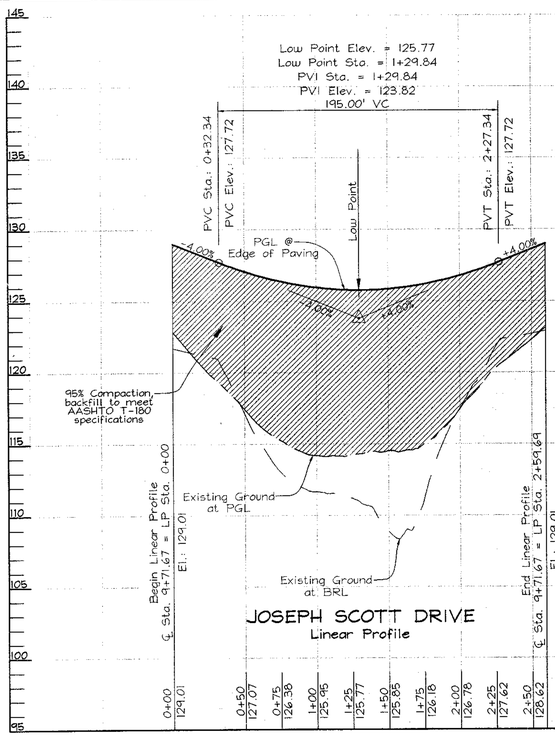
TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

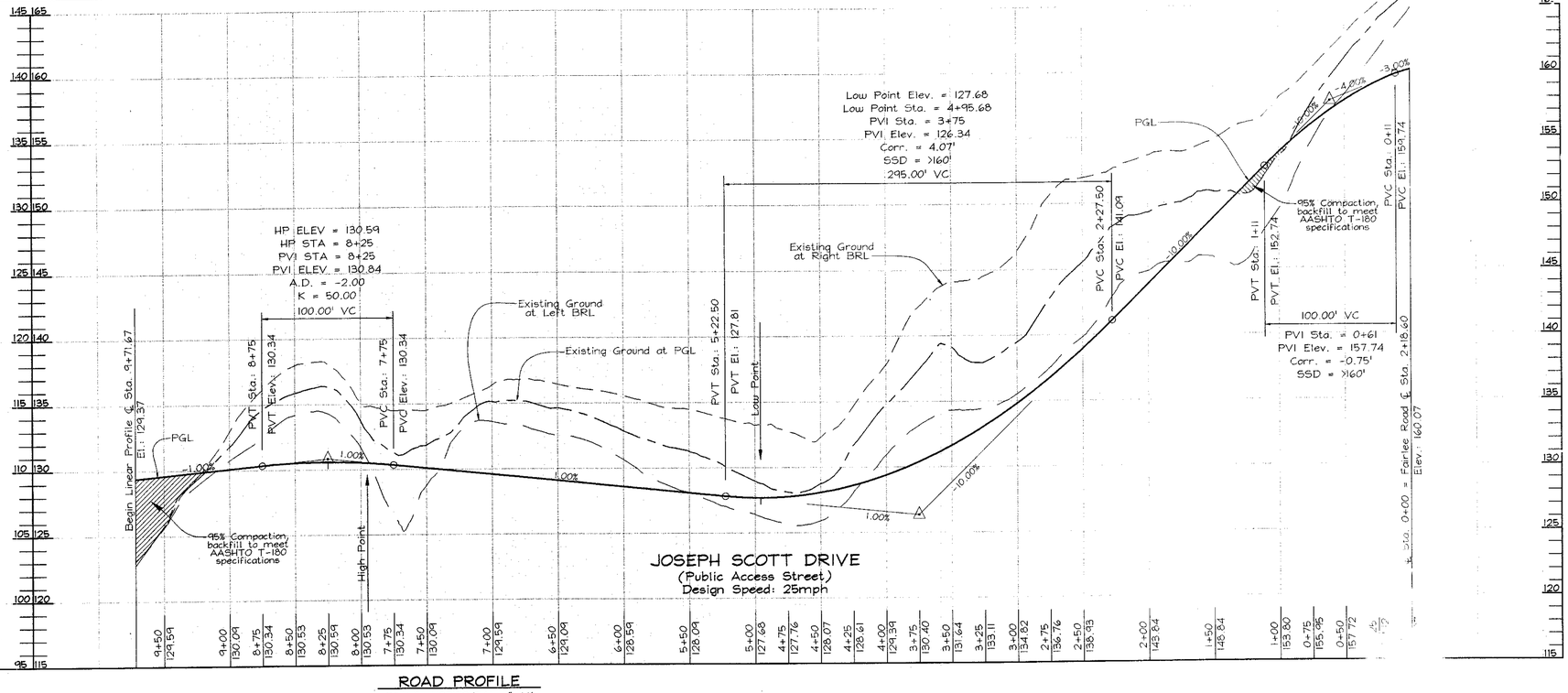
OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

STATE OF MARYLAND — VICTORIA YOSEF FSH — 22418 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

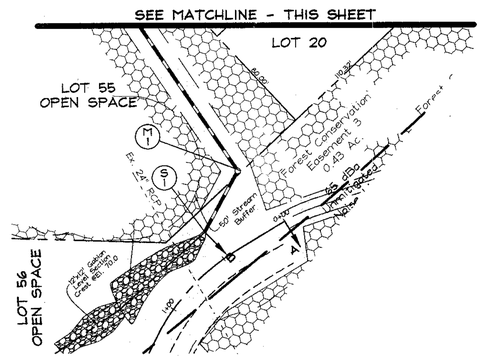
DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: As Shown
DATE: Apr. 26, 2004
W.O No.: 3018
SHEET No.: 3 of 20

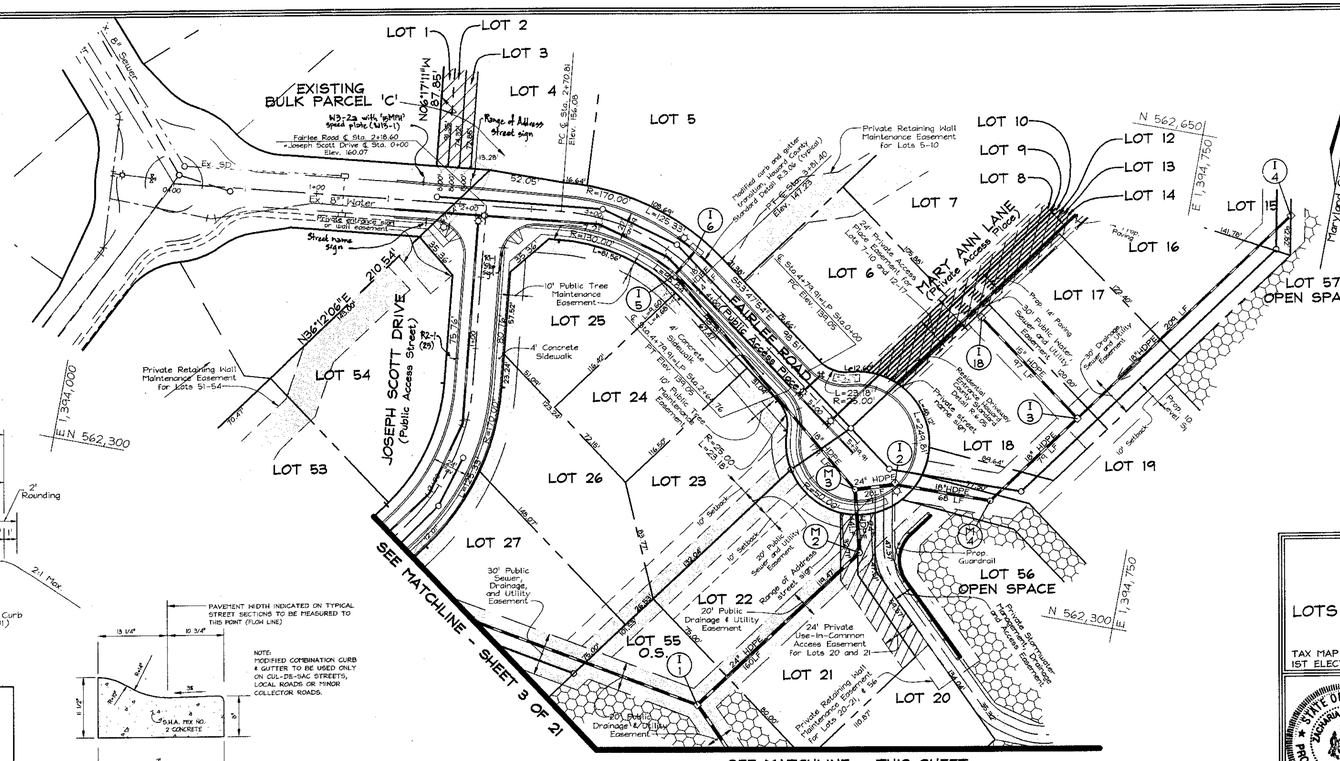


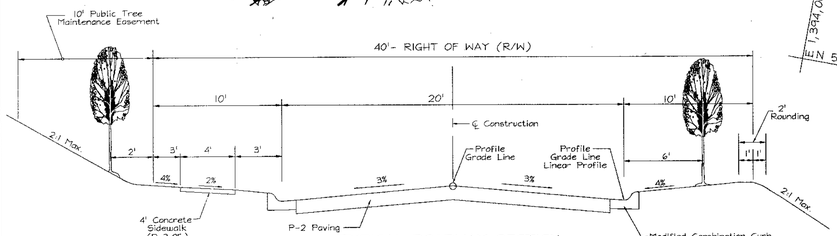


ROAD PROFILE
SCALE- HORIZONTAL: 1"=50'
VERTICAL: 1"=5'

F-04-111







TYPICAL ROADWAY SECTION
CLASSIFICATION: PUBLIC ACCESS PLACE

ROAD: FAIRLEE ROAD
DESIGN SPEED: 15 MPH
NOT TO SCALE

MODIFIED CURB & GUTTER
HOWARD COUNTY STANDARD R3.01
NOT TO SCALE

ROAD PLAN
SCALE: 1"=50'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/9/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/5/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 10-4-04

1" DUTY PAVING SECTION
N.T.S.

FULL DEPTH BIT. CONC.	ALTERNATE
1" BIT. CONC. SURFACE	1" BIT. CONC. SURFACE
4" BIT. CONC. BASE	2" BIT. CONC. BASE
	4" GRADED AGGREGATE BASE (GAB)
GRANULAR BASE ALTERNATES	

P-2 LIGHT DUTY PAVING SECTION
N.T.S.

FULL DEPTH BIT. CONC. ALTERNATE	
1 1/2" BIT. CONC. SURFACE	1 1/2" BIT. CONC. SURFACE
5" BIT. CONC. BASE	2 1/2" BIT. CONC. BASE
	6" GRADED AGGREGATE BASE (GAB)
GRANULAR BASE ALTERNATES	

Note:
The typical sections shown relate to C.B.R. value of 7.
Field conditions may require modifications to the above paving sections per on-site Geotechnical Engineer.

No.	Revision	Date
⚠	Revised Lot Areas for Lots 35 thru 39, 55 and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 46; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

ROAD PLAN AND PROFILE
FAIRLEE ROAD
HUNTERS RIDGE ⚠

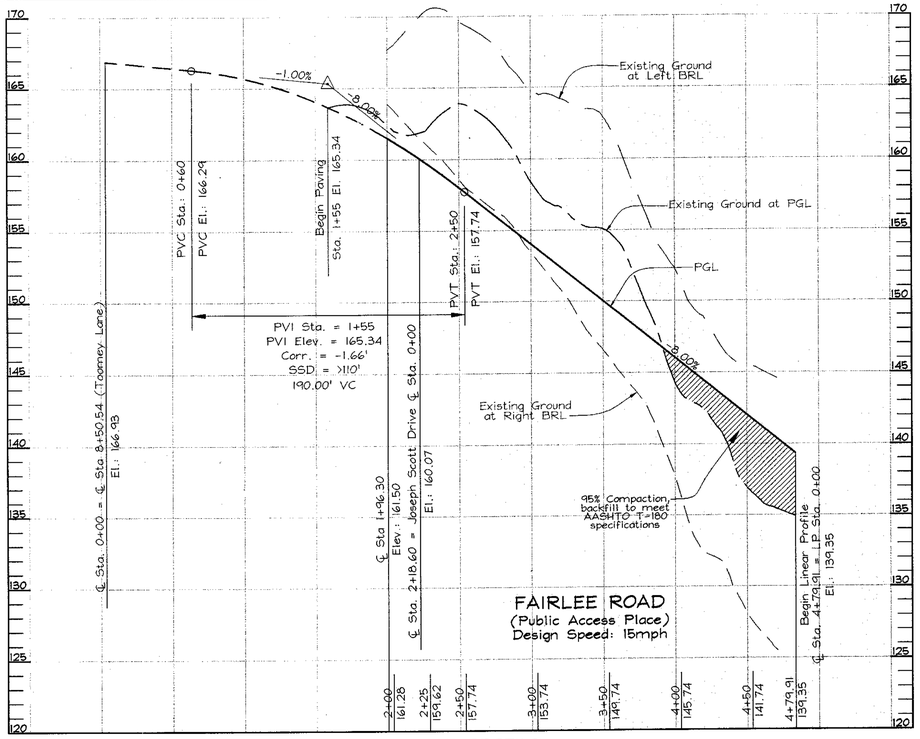
LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

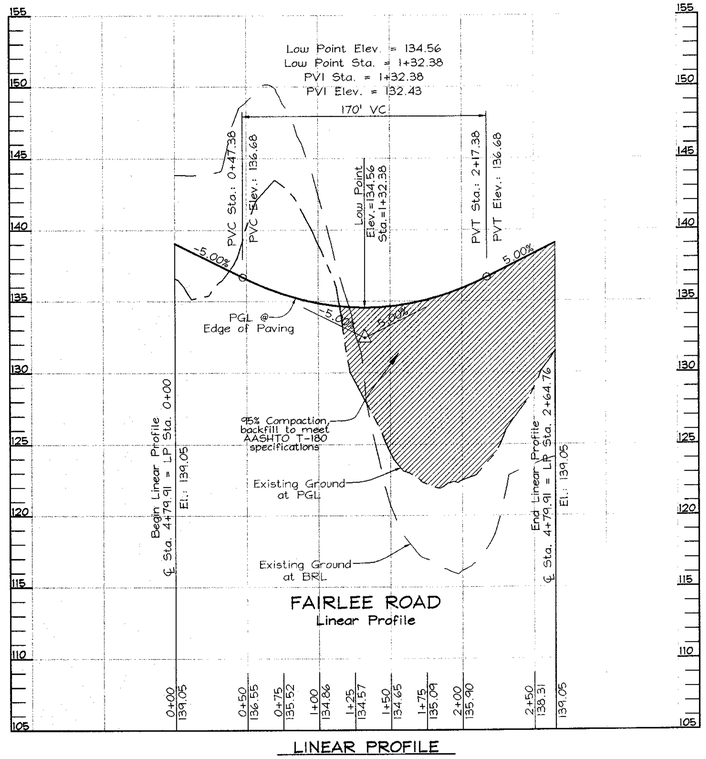
STATE OF MARYLAND — JOSHUA JOSEPH FSHON — 22418 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

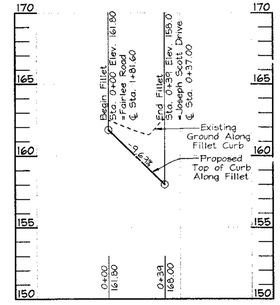
DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: As Shown
DATE: Apr. 26, 2004
W.O. No.: 3018
SHEET No.: 2 OF 20



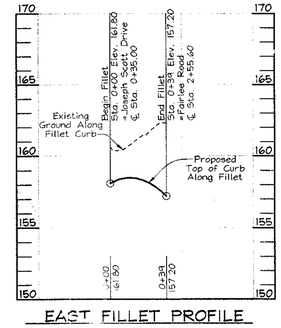
ROAD PROFILE
SCALE- HORIZONTAL: 1"=50'
VERTICAL: 1"=5'



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



WEST FILLET PROFILE
SCALE- HORIZONTAL: 1"=50'
VERTICAL: 1"=5'



EAST FILLET PROFILE
SCALE- HORIZONTAL: 1"=50'
VERTICAL: 1"=5'

F-04-111

FINAL ROAD CONSTRUCTION PLAN

HUNTERS RIDGE

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58 ⚠1 AND A RESUBDIVISION OF BULK PARCEL 'C' WESLEY WOODS, SECTION 1

HOWARD COUNTY, MARYLAND

GENERAL NOTES

1. Subject property zoned "R-12" per 2/2/04 Comprehensive Zoning Plan.
2. This site is located within the metropolitan district.
3. Public water and sewer will be used within this site.
4. Howard County Soils Map 26.
5. Gross area of site subject to subdivision
   a. Parcel 163: 25.58 ac.
   b. Bulk Parcel 'C': 3,321sf± or 0.08 ac.
   c. Total area: 25.66 ac.
6. Total area of steep slopes on site: 2.88 ac.±
7. Net area of site subject to subdivision: 22.78 ac.±
8. Area of proposed public r/w: 1.54 ac.±
9. Number of proposed buildable lots: 54
10. Area of proposed buildable lots: 13.30 ac.±
11. Number of proposed open space lots: 4
12. Area of proposed open space lots: 10.82 ac.±
13. Topography is based on a field run topography survey prepared by Fisher, Collins & Carter, inc. in Feb. of 2001 and aerial topography prepared by Harford Aerial Surveys, inc. in Feb. of 1999.
14. Field run boundary survey prepared by Fisher, Collins & Carter, inc. on April 2, 2001.
15. The coordinates shown hereon are based upon the Howard County Geodetic Control which is based on the Maryland State Plane Coordinate system. Howard County monument numbers 321A and 31BB were used for this project.
16. A.P.F.O. traffic study prepared by Street Traffic Studies L.T.D. and approved under S-01-24.
17. Wetlands delineation and report and forest stand delineation and report prepared by Exploration Research inc. and approved under S-01-24.
18. There are no floodplains, historic structures or cemeteries on-site.
19. No clearing, grading or construction is permitted within wetlands, streams or their required buffers, and steep slopes of 25% or greater containing a contiguous area of 20,000 SF or more, unless waivers have been approved. The steep slope disturbance for the construction of an access driveway for maintenance of the SWM facility located within Open Space Lot 56 determined to be necessary by DPZ in accordance with Section 16.116(c) of the Subdivision Regulations.
20. Open Space requirements:
   a. Open Space required (30%-8,400sf minimum lot size): 25.58ac.± x 0.30 = 7.67ac.±
   b. Open Space provided: 10.82 ac.±(0.2 ac.± non-credited)
21. Recreational open space requirements:
   a. Open Space required (200sf per buildable lot): 54 x 200 = 10,800 sf
   b. Open Space provided: 10,800 sf±
22. This plan is subject to the Fourth Edition of the Subdivision and Land Development Regulations and the Zoning Regulations as amended by Council Bill No. 50-2001. Development or construction on these lots must comply with setback and buffer regulations in effect at the time of submission of the site development plan, waiver petition, or building and grading permits.
23. The lots shown hereon comply with the minimum ownership width and lot area as required by the Maryland State Department of the Environment.
24. Internal landscaping for lots 25 and 54 will be shown at Site Development Plan stage.
25. For flag or pipestem lots, refuse collection, snow removal and road maintenance are provided to the junction of the flag or pipestem and road right-of-way line and not to the pipestem lot driveway.
26. Existing house on Lot 5 to remain.
27. Stormwater management & water quality is provided as necessary in accordance with the 2000 stormwater management manual. Pond to be a micro pool extended detention pond hazard class 'A'. Facility to be owned and maintained by the Homeowners Association. Stormwater Management recharge requirement will be provided by drywells located on lots 6 - 9, 18, 19, 28 - 32, 43 - 54. Soil borings for each drywell location shall be shown in accordance with H.B.A.M. Bulletin titled 'Disconnection of rooftop runoff credits using dry wells'. Level Spreaders will be provided on Lots 11 & 19.
28. All ditches and swales will have erosion control matting.
29. This project is subject to review and approval by the Maryland Aviation Administration (MAA) regarding confirmation that construction of proposed structures on this site will not penetrate any navigational airspace and that the proposed SWM landscaping will meet their approval requirements. Permit number 04-064 has been approved in a letter dated 6/23/04.
30. CPv management for a portion of Wesley Woods (3 ac.±) is provided in the stormwater management facility on site.
31. The retaining wall designed to construct the access to the stormwater management facility is privately owned and maintained by the homeowners association.
32. Soil borings for each drywell location have been shown in accordance with HBAM Bulletin titled, "Disconnection of Rooftop Runoff Credits Using Dry Wells."
33. A gravity sewer service waiver of Section 4.3.B.3.b of Volume II of the Howard County Design Manual has been approved by the Department of Public Works Bureau of Engineering for Lots 34-39 on June 18, 2004.
34. The contractor shall notify the following utility companies or agencies at least five(5) working days before starting work shown on these plans:

State Highway Administration	410.531.5533
BGE(contractor services)	410.850.4620
BGE(underground damage control)	410.787.9068
Miss Utility	1.800.257.7777
Colonial Pipeline Company	410.795.1390
Howard County, Dept. of Public Works, Bureau of Utilities	410.313.4900
Howard County Health Department	410.313.2640

35. The contractor shall notify Miss Utility at 1-800-257-7777 at least 48 hours prior to any excavation work being done.
36. The contractor shall notify the Department of Public Works/Bureau of Engineering Construction Inspection Division at (410) 313-1880 at least five (5) working days prior the start of work. All fills for public road surfaces require 95% compaction (AASHTO-T-180).
37. Landscape surety is based on the required landscaping of 65 shade trees, 23 evergreen trees and the Private Access Place street trees (19) and refuse pad shrubs (10) in the amount of $28,950.00.
38. This project complies with the requirements of section 16.1200 of the Howard County Code for Forest Conservation by retaining 1.65 acres of forest and planting 0.60 acres of reforestation within Forest Conservation Easement 1, retaining 2.60 acres of forest and planting 0.46 acres of reforestation within Forest Conservation Easement 2, planting 0.43 acres of reforestation within Forest Conservation Easement 3, and retaining 2.01 acres of forest and planting 0.22 acres of reforestation within Forest Conservation Easement 4. Total retention = 6.26 ac. Total reforestation provided = 1.71 ac. $91,999.00 surety to be posted with the Developer's Agreement. Requested Fee-in-lieu for 1.61 ac remaining obligation is $35,065.80. ⚠1
39. Previous Howard County file numbers: S-99-16; S-01-24; WP-99-87; P-03-12
40. All construction shall be in accordance with the latest standards and specifications of Howard County plus MSHA standards and specifications if applicable.
41. Traffic control devices, markings and signing shall be in accordance with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD). All street and regulatory signs shall be in place prior to the placement of any asphalt.
42. Open Space Lots 55 thru 57:
   a. Open Space Lots 55 and 57 to be dedicated to Howard County.
   b. Open Space Lot 56 to be dedicated to the Homeowners Association.
43. Per the geotechnical report, prepared by Herbst/Benson & Associates, the following procedures are recommended for basin and embankment construction:
   a. Along the area of the proposed embankment, strip all vegetation, topsoil and any surface organically contaminated soils to expose relatively clean existing fills or competent native soils.
   b. Proof roll the exposed surface with a loaded tandem dump truck to delineate unsuitable areas and cut out any soft yielding areas to expose firm underlying soils.
   c. Excavate the core trench to a minimum depth of 4 feet below the proposed basin elevation using a minimum 4-foot bottom trench width and side slopes no steeper than 1:1. Beneath the principal spillway, the core trench depth should extend at least 4 feet beyond the bottom of the pipe cradle and use similar bottom widths and side slopes. Compact the bottom of the trench excavation to firm, unyielding condition.
   d. Backfill the core trench excavation using the native CL cut soils from the west slope as represented by boring SWM-4. Judging from the moisture/compacted density test results shown of SHEET 1, COMPACTION TEST, the fill should be readily compactible at the existing moisture content.
   e. Prior to placing the principal spillway pipe and cradle, examine the founding soils along the pipe alignment outside the core trench area. Undercut any organic or otherwise unsuitable material and compact the exposed grade to a firm, unyielding condition. The existing fill soils and core trench fills are expected to adequately support principal spillway construction providing that the applied bearing pressures do not exceed 1,000 PSF. Backfill the principal spillway excavation and place embankment fill using the native cut soils from the western slope and approved existing CL clay fill soil from the basin excavation to form the embankment.

General Notes to be Continued

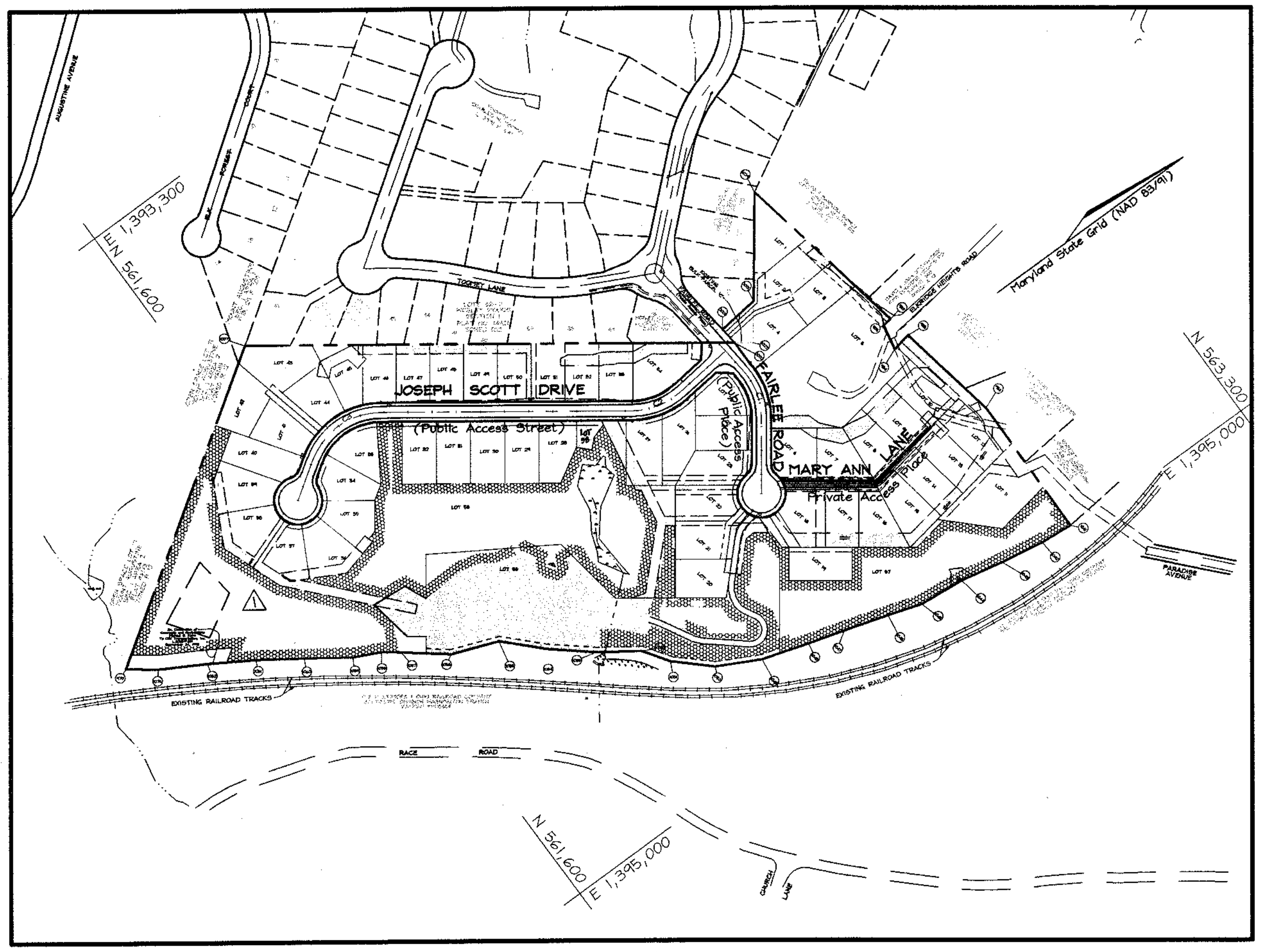
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 10/19/04
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

[signature] 10/15/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

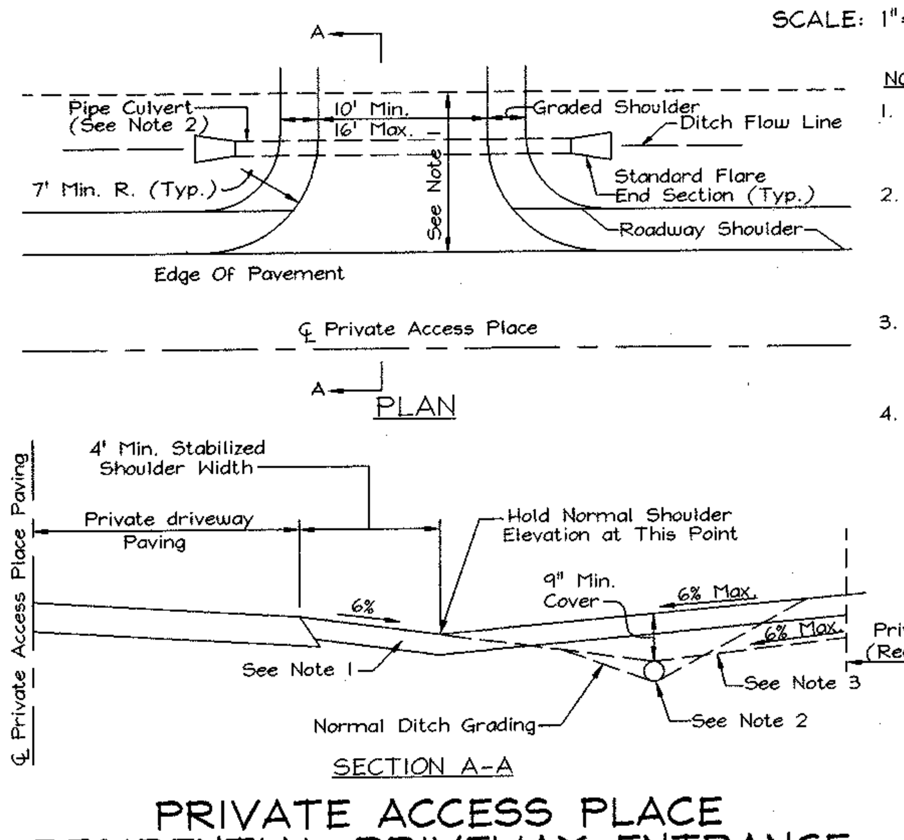
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

[signature] 10-4-04
CHIEF, BUREAU OF HIGHWAYS — DATE



LOCATION MAP

SCALE: 1"=200'



NOTES:

1. Driveway must be paved using standard paving section P-1 as shown on St'd. No. or alternate section equal to or better than P-1, as approved by D.P.W.
2. Drainage culvert shall be sized for a 10 year frequency storm and the minimum size shall be 12" dia. round or 14" x 9" arch pipe if larger pipe is required, ditch invert shall be lowered to provide min. ditch gradient of 0.5% and clearance shown.
3. Swale flow may be provided over driveway located at or near the crest of vertical curves on the public road where quantity of flow is small, as approved by D.P.W.
4. Tie-in grade of private driveway shall not exceed 14%.

DRIVEWAY CULVERT REQUIREMENTS
Lots 14 thru 17 : 12" CMP or equivalent

PRIVATE ACCESS PLACE RESIDENTIAL DRIVEWAY ENTRANCE

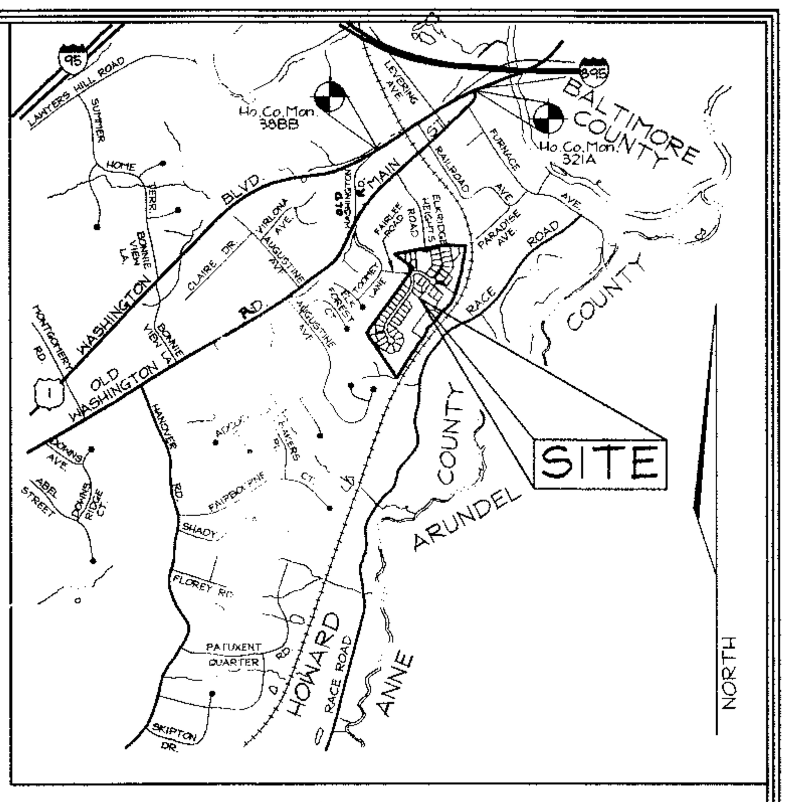
NOT TO SCALE

Continuation of General Notes

44. The 5'x20' concrete pad for the "Refuse and Recycle Collection Pad" located within the public right-of-way will be maintained by the owners of Lot 7-10 and 12-17. pursuant to the Declaration of Right of Access and Maintenance Obligations recorded among the land records of Howard County Maryland
45. For private driveway culverts for lots 14-17, see detail this sheet.
46. All Fill Areas within Public Right-Of-Ways to have 95% Compaction.
47. All street sign posts shall be 2" square metal tube posts (14 gauge) installed into a 3" sleeve (2.5" square metal tube, 12 gauge) with a cap on top.

LEGEND

- Existing Contour — 382
- Proposed Contour — 82
- Existing Spot Elevation — 382.3
- Proposed Spot Elevation — +82.53
- Direction of Flow
- Existing Trees to Remain
- 15-24.99% Slopes
- 25% and Greater Slopes
- Wetlands
- Utility Pole — Guy Wire, Pole
- Access Easement
- Access and Utility Easement
- Proposed Drainage Swale
- Proposed Dry Well
- Forest Conservation Easement



VICINITY MAP

SCALE:1=2000'

BENCHMARKS

Sta. 321A	N 172,232.2977	E 425,261.5439	El.: 8.4417 (meters)
	N 565,065.463	E 1,395,212.248	El.: 27.696 (feet)
Sta. 38BB	N 171,909.8745	E 424,785.3620	El. 19.6328 (meters)
	N 564,007.646	E 1,393,649.975	El 64.412 (feet)

SHEET INDEX

DESCRIPTION	SHEET No.
Cover Sheet	1 of 20
Road Plan and Profile - Fairlee Road	2 of 20
Road Plan and Profile - Joseph Scott Drive	3 of 20
Road Plan and Profile - Private Access Place	4 of 20
Sediment and Erosion Control and Grading Plan	5 of 20
Sediment and Erosion Control and Grading Plan	6 of 20
Sediment and Erosion Control and SWM Pond Notes and Details	7 of 20
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Forest Conservation Plan	16 of 20
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Retaining Wall Profile, Details & Wall Section	18 of 20
Retaining Wall Tables, Details & Civil Plan	19 of 20
Retaining Wall Specifications	20 of 20

CENTERLINE ROAD CURVE DATA

CURVE #	RADIUS	LENGTH	DELTA	TANGENT	CHORD BEARING	CHORD LENGTH
C1	150.00	110.59	42°14'27"	57.94	N74°55'08"W	108.10
C2	150.00	110.59	42°14'27"	57.94	N15°04'52"E	108.10
C3	150.00	183.26	70°00'00"	105.03	S01°12'06"W	172.07

ROAD CLASSIFICATION

ROAD NAME	CLASSIFICATION	R/W
Fairlee Road	Public Access Place	40'
Joseph Scott Drive	Public Access Street	40'
Mary Ann Lane	Private Access Place	min. 24' easement

STREET LIGHT TABLE

FIXTURE TYPE	POLE TYPE	LOCATION	STREET
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 1+90 17' right	Fairlee Road
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 3+55 13' left	Fairlee Road
100 watt HPS vapor Premier post top mounted	14' black fiberglass	N 562,368.0 E 1,394,584.8	Fairlee Road
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 3+04 15' left	Joseph Scott Drive
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 7+90 15' right	Joseph Scott Drive
100 watt HPS vapor Premier post top mounted	14' black fiberglass	N 561,566.3 E 1,393,998.8	Joseph Scott Drive

Note: Light pole location given at center of base

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

No.	REVISION	DATE
⚠1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

COVER SHEET

HUNTERS RIDGE ⚠1

LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — ZACHARIA YOSEF FISCH — 22418 — PROFESSIONAL ENGINEER [signature]

FSH Associates
Engineers Planners Surveyors
8318 Forrest Stre… , MD 21043
Tel:410-750-225… …50-7350
E-mail: FSHAss… m

DESIGN BY:	PS/KO
DRAWN BY:	MM/KO
CHECKED BY:	ZYF
SCALE:	As Shown
DATE:	Sept. 15, 2004
W.O. No.:	3018
SHEET No.:	1 OF 20

FOREST CONSERVATION WORKSHEET

	Acres
Net Tract Area	
A. Total Tract Area	25.66
B. Area Within 100 Year Floodplain	0
C. Other deductions (Area p/o FCP for F-00-115)	0.08
D. Net Tract Area	25.58
Zoning Use Category: Residential	
Land Use Category	
E. Afforestation Minimum (15 % x D)	3.84
F. Conservation Threshold (20 % x D)	5.12
Existing Forest Cover	
G. Existing Forest on Net Tract Area	24.10
H. Forest Area Above Conservation Threshold	18.98
Breakeven Point	
I. Forest Retention Above Threshold with no Mitigation	8.92
J. Clearing Permitted without Mitigation	15.18
Proposed Forest Clearing	
K. Forest Areas to be Cleared	17.85
L. Forest Areas to be Retained (2)	6.25
Planting Requirements	
M. Reforestation for Clearing Above Threshold	4.46
N. Reforestation for Clearing Below the Threshold	0
P. Credit for Retention Above Conservation Threshold	1.13
Q. Total Reforestation Required	3.33
R. Total Afforestation Required	0
S. Total Reforestation and Afforestation Requirement	3.33

FOREST CONSERVATION NARRATIVE

This Forest Conservation Plan has been developed in accordance with the Howard County Forest Conservation Act of 1991. The total tract area consists of 25.66 acres of land, including a 0.08 ac area on the adjacent Wesley Woods subdivision which has been included in the forest conservation plan for F-00-115. This area was deducted for a net tract of 25.58 ac. The site contains 24.10 acres of forest cover on the net tract. Forest retained in easements will total 6.25 acres. A total of 1.72 acres of reforestation planting is proposed. Four forest conservation easements will be established. Total area contained within easements is 7.98 acres. All easements contain wetlands, streams and their buffers, and steep slopes. For the remaining 1.60 acres of obligation, we propose a fee-in-lieu payment of $35,065.80. (1)

New on-site plantings will be 2-3' containerized whip stock planted at 350 stems/acre with tree shelters.

FOREST CONSERVATION EASEMENT TABLE

EASMENT	TYPE	AREA (ACRES)	BOND RATE	BOND PRICE
1	Reforestation Retention	0.60 1.65	$0.50 /S.F. $0.20 /S.F.	$13,068.00 $14,374.80
2	Reforestation Retention Uncredited	0.46 (1) 2.60 0.01	$0.50 /S.F. $0.20 /S.F.	$10,018.84 $22,651.20
3	Reforestation	0.43	$0.50 /S.F.	$9,365.50
4	Reforestation Retention	0.23 (2) 2.00	$0.50 /S.F. $0.20 /S.F.	$5,009.40 $17,424.00 (2)
TOTAL		7.98		$91,911.74
	Reforestation Retention Uncredited	1.72 6.25 0.01		$37,461.60 (1) $54,450.14 (2)

Forest Retention Area Protection Signage

Min. 11" / Min 15"

FOREST RETENTION AREA

MACHINERY, DUMPING OR STORAGE OF ANY MATERIALS IS PROHIBITED

VIOLATORS ARE SUBJECT TO FINES AS IMPOSED BY THE MARYLAND FOREST CONSERVATION ACT OF 1991

Reforestation and Afforestation Area Protection Signage

Min. 11" / Min 15"

Forest Conservation Area

REFORESTATION PROJECT

Trees for Your Future

FOREST CONSERVATION EASEMENT #1
Reforestation Area 1 : 0.60 Ac. (210 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
35	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
35	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
35	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
35	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
35	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
35	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 2 : 0.03 Ac. (14 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
2	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
2	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
2	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
2	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
3	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
3	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 3 : 0.19 Ac. (67 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
12	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
11	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
11	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
11	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
11	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
11	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 4 : 0.13 Ac. (46 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
7	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
7	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
8	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
8	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
8	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
8	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 5 : 0.03 Ac. (11 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
1	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
2	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
2	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
2	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
2	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
2	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #2
Reforestation Area 6 : 0.08 Ac. (28 trees @ 350 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
5	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
5	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
5	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
5	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
4	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
4	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #3
Reforestation Area 7 : 0.43 Ac. (151 trees @ 350 TPA)

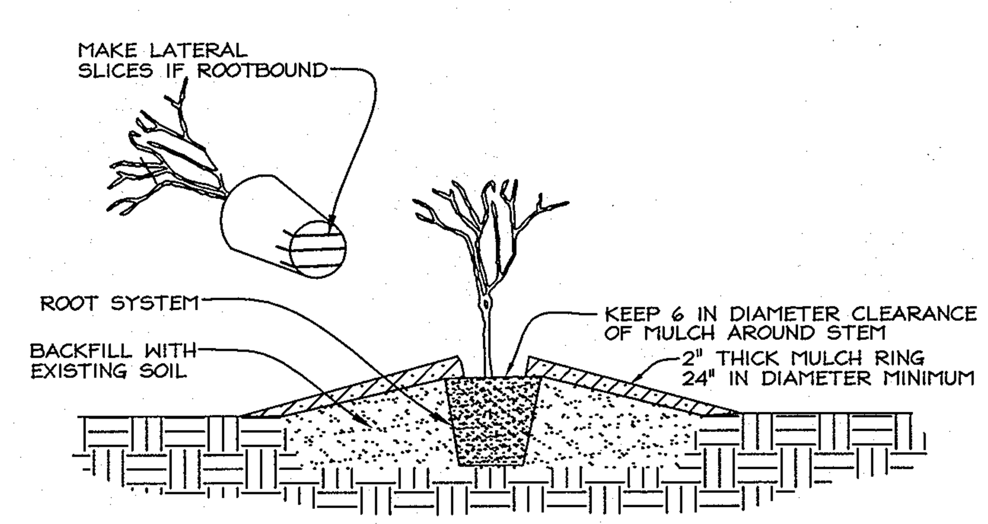
Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
25	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
26	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
25	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
25	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
25	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
25	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	

FOREST CONSERVATION EASEMENT #4
Reforestation Area 8 : 0.23 Ac. (77 trees @ 350 TPA & 4 trees @ 200 TPA)

Qty	Botanical Name	Common Name	Min. Size	Spacing	Notes
14	Acer rubrum	Red Maple	WHIP 2-3'	11' o.c.	1-3 Gallon Container Grown with tree shelters
13	Liriodendron tulipifera	Tulip Poplar	WHIP 2-3'	11' o.c.	
13	Quercus coccinea	Scarlet Oak	WHIP 2-3'	11' o.c.	
13	Quercus rubra	Red Oak	WHIP 2-3'	11' o.c.	
12	Cercis canadensis	Red bud	WHIP 2-3'	11' o.c.	
12	Acer negundo	Box-elder	WHIP 2-3'	11' o.c.	
4	Quercus rubra	Red Oak	1-1 1/2" Cal	15' o.c.	B&B

MANAGEMENT NOTES FOR FOREST RETENTION AREAS

1. All proposed activities shall adhere to the conditions, schedules and terms of an approved sediment control and erosion plan.
2. After the boundaries of the retention area have been staked and flagged and before any disturbance has taken place on-site, a preconstruction meeting at the construction site shall take place. The developer, contractor or project manager, and appropriate County inspectors shall attend.
3. Tree protection for all retained areas:
   a. All retention areas within 50 feet of proposed construction activities shall be protected by highly visible, well anchored temporary protection devices (silt fence or blaze orange plastic mesh).
   b. All protection devices shall be in place prior to any grading or land clearing.
   c. All protection devices shall be properly maintained and shall remain in place until construction has ceased.
   d. Attachment of signs, fencing or other objects to trees is prohibited.
   e. No equipment, machinery, vehicles, materials or excessive pedestrian traffic shall be allowed within protected areas.
4. If the critical root zone (see detail) is affected by construction activities such as grade change, digging for foundations and roads or utility installation:
   a. Prune roots with a clean cut using proper pruning equipment (see root pruning detail)
   b. Water and fertilize as needed.
5. During construction phase, monitor and correct condition of retained trees for: soil compaction, root injury, flood conditions, drought conditions and other stress signs.
6. Post-Construction Phase
   a. Inspect existing trees around the perimeter of disturbed limits for evidence of soil compaction, root injury, limb injury, or other stress signs and correct with proper management techniques such as root or limb pruning, soil aeration, fertilization, crown reduction or watering. Inspection and evaluation shall be performed by a licensed arborist.
   b. Inspect for dead or dying trees or limbs which may pose safety hazard and remove.
   c. No burial of discarded materials will occur onsite within the conservation areas.
   d. No burning within 100 feet of wooded area.
   e. All temporary forest protection structures will be removed after construction. Temporary signage shall be replaced with permanent signage on posts in locations shown.
   f. Following completion of construction, prior to use, the County inspector shall inspect the entire area.

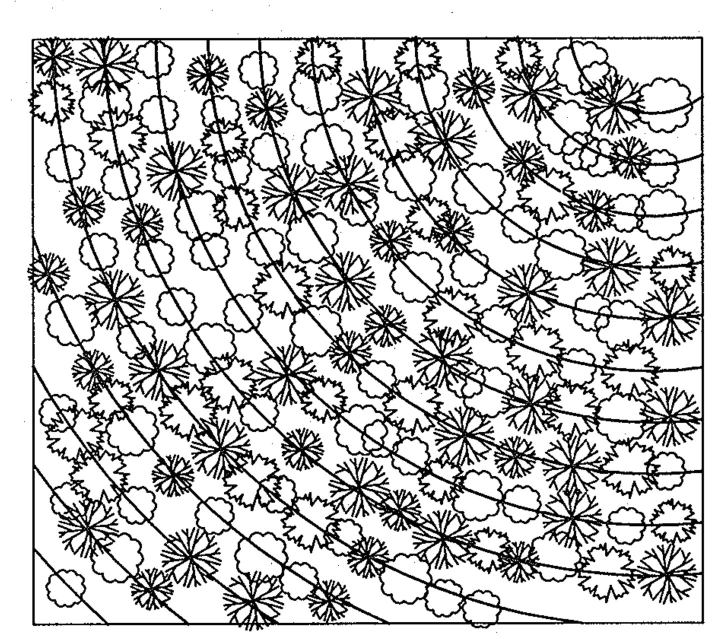


CONTAINER PLANTING
NOT TO SCALE

PLANTING PROCEDURE FOR CONTAINER GROWN PLANTS

1. REMOVE THE PLANT EITHER BY CUTTING OR INVERTING THE CONTAINER
2. USE A KNIFE TO CUT THROUGH BOTTOM HALF OF THE ROOT BALL.
3. PLANT SHRUBS ON FORMED UP MOUNDS 4" ABOVE THE EXISTING GRADE WHEN HIGH WATER TABLE CONDITIONS EXIST,OTHERWISE PLANT FLUSH WITH EXISTING GRADE.
4. PLANTING HOLE TO BE 2-3 TIMES THE DIAMETER OF THE CONTAINER.
5. INSERT FERTILIZER TABLET, BACKFILL 2/3 OF THE ROOT BALL AND WATER.
6. AFTER WATER PERCOLATES, BACKFILL HOLE TO TOP OF ROOT BALL AND GENTLY TAMP SOIL TO FIRM CONTACT WITH PLANT.
7. APPLY MULCH RING AROUND PLANT KEEPING A 6 IN CLEARANCE FROM STEM.

CURVEILINEAR RANDOMIZED PLANTING



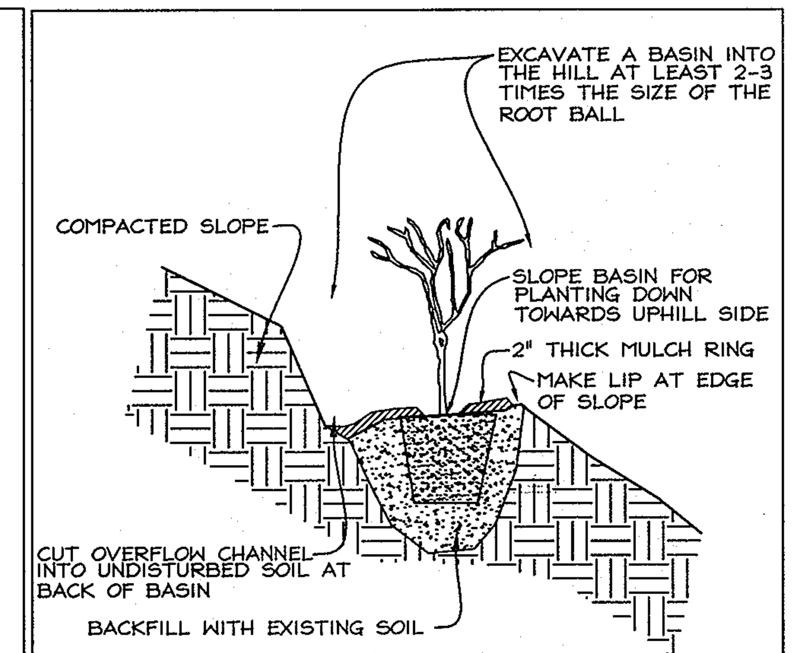
PLANT PLACEMENT DETAIL
NOT TO SCALE

1. MIX TREE AND SHRUB SPECIES IN THE STAGING AREA.
2. SET THE GUIDE CURVILINEAR LINE AS CLOSE TO CONTOUR AS POSSIBLE

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

Soil Protection Zone Notes

1. The Soil Protection Zone shall include all areas contained inside the Limit of Disturbance.
2. Where possible, the Soil Protection Zone shall extend to the drip line of specimen trees. For other groups of trees, the zone shall be the drip line or 40% of the height of the tree, whichever is greater.
3. No construction activity is permitted within the Soil Protection Zone.
4. If soil has been compacted or grading has taken place in the vicinity of the Soil Protection Zone, root pruning shall be implemented per Root Pruning detail, shown on this plan.
5. Root pruning shall occur prior to the beginning of construction.
6. Where the Soil Protection Zone must encroach inside the Critical Root Zone of a tree, soil disturbance shall be mitigated with vertical mulching, radial trenching, or another method approved by the ERI Forest Conservation Professional.
7. Prior to construction, the Limits of Disturbance shall be marked and the ERI Professional shall determine which trees will need preventative treatment or removal.
8. Tree maintenance and removal shall be undertaken by a qualified MD Tree Expert to ensure damage to surrounding trees is minimized.
9. Brush and limbs removed for construction shall be chipped and spread at the edge of the Soil Protection Zone to a depth of 6 inches. This shall occur outside the Soil Protection Zone where compaction could impact otherwise unprotected Critical Root Zone.

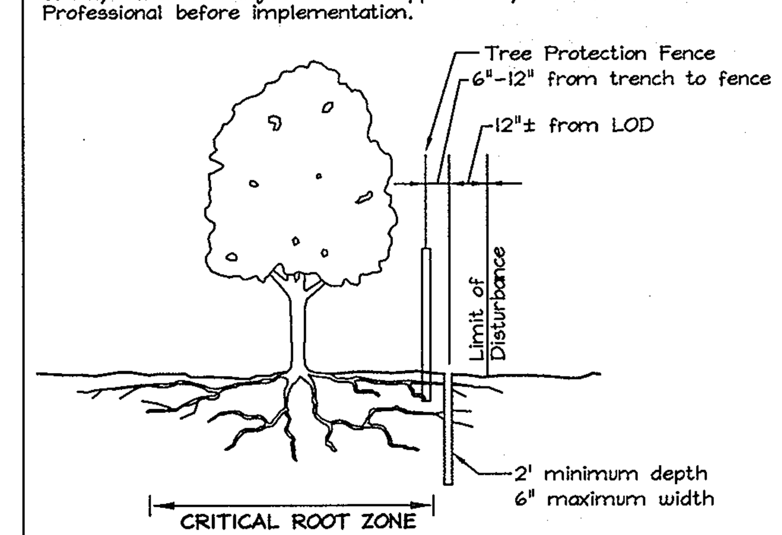


PLANTING ON STEEP SLOPES
NOT TO SCALE

1. PLANT AS PER CONTAINER PLANTING DETAIL EXCEPT PREP OF PLANTING AREA
2. A BASIN FOR PLANTING IS CUT INTO THE SLOPE WITH PLANT BEING PLACED NEAR THE DOWNHILL EDGE OF THE BASIN.
3. BASIN SHOULD SLOPE TOWARD UPHILL SIDE TO ALLOW RAIN TO BE CAPTURED AND INFILTRATE.
4. AN OVERFLOW CHANNEL SHALL BE CUT INTO UNDISTURBED SOIL AT THE REAR OF THE BASIN TO ALLOW EXCESS RUNOFF AND SEDIMENT TO ESCAPE WITHOUT DAMAGING THE BASIN.
5. MULCH AROUND PLANT IN BASIN.

ROOT PRUNING

1. Retention areas shall be set prior to construction
2. Boundaries of retention areas shall be flagged, and location of trench shall be specified by ERI Qualified Professional.
3. Roots shall be cut cleanly with root pruning equipment. Where roots >1" are found, trenching shall be done by air spade or hand tools. Roots >1" shall be cut with a hand saw.
4. Trench shall be immediately backfilled with soil removed or high organic content soil.
5. Any other techniques shall be approved by the ERI Qualified Professional before implementation.



Reforestation Area Monitoring Notes

1. Monthly visits during the first growing season are to assess the success of the plantings and to determine if supplemental watering, pest control or other actions are necessary. Early spring visits will document winter kill and autumn visits will document summer kill.
2. The minimum survival rate shall be 75% of the total number of trees planted per acre at the end of the two year maintenance period. Wild tree seedlings from natural regeneration on the planting site may be counted up to 50% toward the total survival number if they are healthy native species at least 12 inches tall.
   Certification at the end of the two-year post construction period must indicate that the survival rates will result in a 100 tree per acre ratio for a forest and the 3 to 4 foot height standard for whips by the end of the two growing season post construction period, with at least 50% of those trees having the potential of attaining a 2" caliper DBH within 7 years.
3. Survival will be determined by a stratified random sample of the plantings. The species composition of the sample population should be proportionate to the amount of each species in the entire planting to be sampled.
4. Effective monitoring will assess plant survivability during the first growing season and make recommendations for reinforcement planting if required at that time.

Reforestation Area Planting Notes

1. Initial planting inspection and certification required. Planting contractor to notify ERI qualified professional 24 hours in advance of planting.
2. Reforestation areas may be planted as soon as reasonable to do so. Late winter- early spring plantings are preferred. Earliest planting dates will vary from year to year but planting may generally begin as soon as the ground is no longer frozen. Alternate planting dates may be considered as conditions warrants.
3. Soil amendments and fertilization recommendations will be made based upon the results of soil analysis for nitrogen, phosphorus, potassium, organic matter content and pH. If required, fertilizer will be provided using a slow release, soluble 16-8-16 analysis designed to last 5-8 years contained in polyethylene perforated bags such as manufactured by ADCO Works, P.O. Box 310 Hollins, N.Y. 11423 or approved equal.
4. Plant materials shall be planted in accordance with the planting diagram, planting details and planting schedule.
5. Plant stock must be protected from desiccation at all times prior to planting. Materials held for planting shall be moistened and placed in cool shaded areas until ready for placement.
6. Planting materials shall be nursery grown and inspected prior to planting. Plants not conforming to the American Standards for Nursery Stock specifications for size, form, vigor, or roots, or due to trunk wounds, breakage, desiccation, insect or disease must be replaced.
7. Newly planted trees may require watering at least once per week during the first growing season depending on rainfall in order to get established. The initial planting operation should allow for watering during installation to completely soak backfill materials.
8. Mulch shall be applied in accordance with the diagram provided and shall consist of composted, shredded hardwood bark mulch, free of wood alcohol.
9. Planting holes should be excavated to a minimum diameter of 2.5 to 3 times the diameter of the root ball or container. Mechanical angering is preferred with scarification of the sides of each hole.

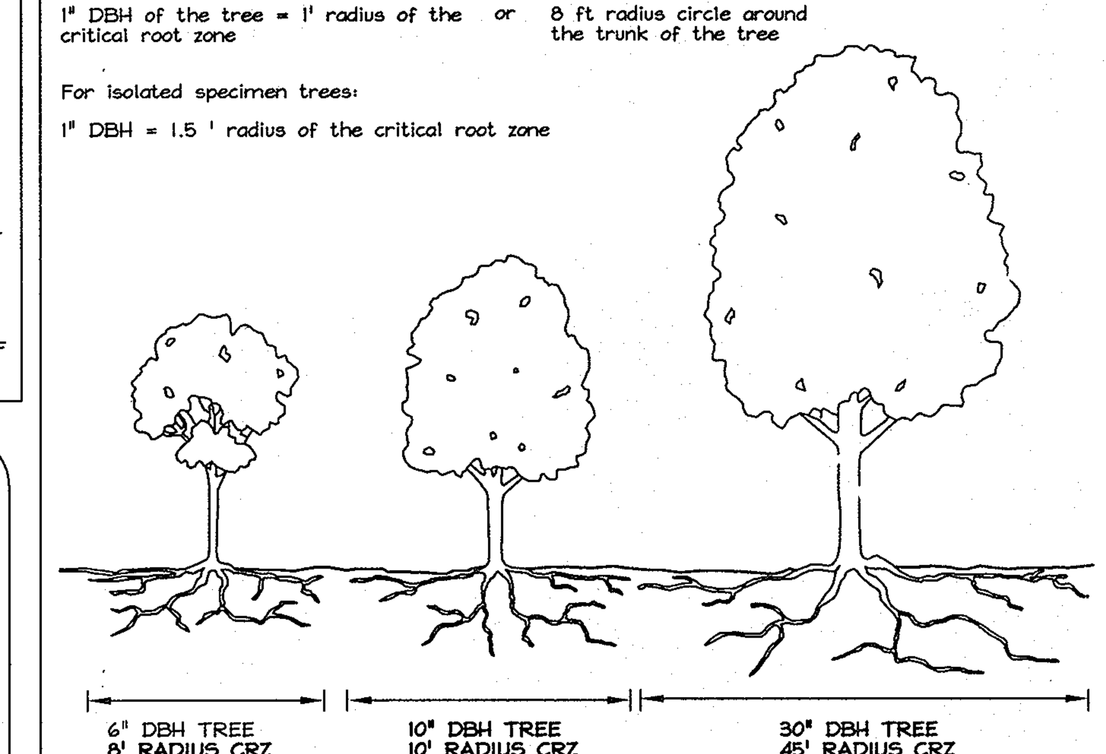
CRITICAL ROOT ZONE

For the edge of large areas, use the greater of the two choices below:

1" DBH of the tree = 1' radius of the critical root zone *or* 8 ft radius circle around the trunk of the tree

For isolated specimen trees:

1" DBH = 1.5 ' radius of the critical root zone



No.	Revisions	Date
2	Revised Forest Conservation Worksheet, Narrative, and Easement Table. Revised Title Block.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

Note: THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

FOREST CONSERVATION NOTES AND DETAILS
HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — STEPHEN L. HUBER — No. 363 REGISTERED PROFESSIONAL FORESTER

EXPLORATION RESEARCH, INC.
ENVIRONMENTAL CONSULTANTS
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6339 HOWARD LANE
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STATE OF MARYLAND — ZACHARIA YOSEF FISCH — 22418 — PROFESSIONAL ENGINEER

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DESIGN BY: PS/KO
DRAWN BY: MM/RAB
CHECKED BY: ZYF/SLH
SCALE: 1"=50'
DATE: Mar. 21, 2007
W.O. No.: 3018
SHEET No.: 17 OF 20

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/19/07

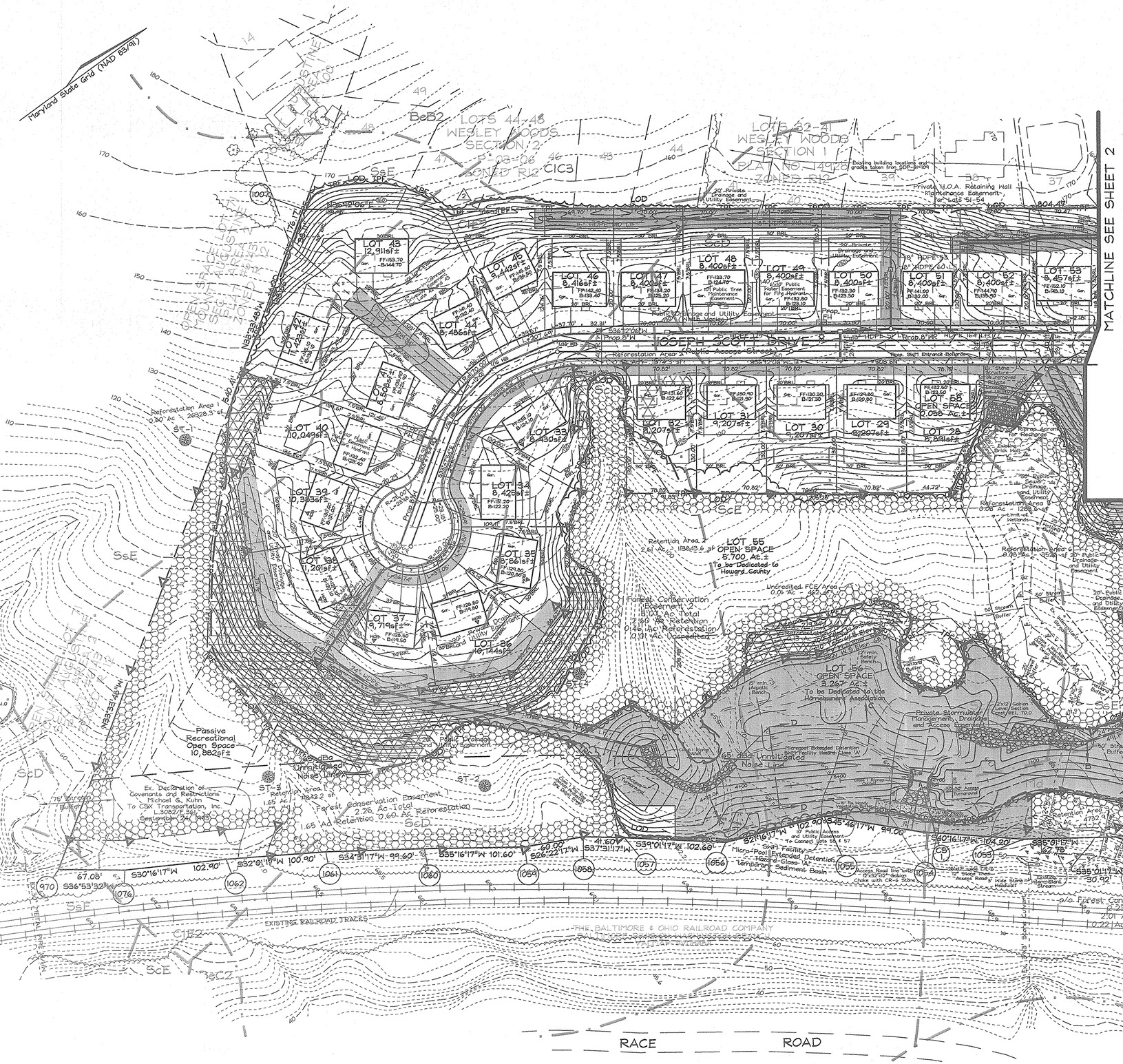
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/19/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 4-16-07

F-04-111

No.	Revisions	Date
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005
2	Deleted Retaining Walls and Easement on Lots 43-46.	02/12/2007



LEGEND

- Forest Conservation Easement Retention Area
- Forest Conservation Easement Reforestation Area
- FCE Signage
- TPF — Tree Protection Fence
- ..... Approximate Critical Root Zone

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/19/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/19/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 4-16-07

EXPLORATION RESEARCH, INC.
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS
6320 HOWARD LANE
ELKRIDGE, MARYLAND 21075
TEL (410) 579-2520 FAX (410) 796-1562

STATE OF MARYLAND — STEPHEN L. HESSE — No. 285 — REGISTERED PROFESSIONAL FORESTER

Note: THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

FOREST CONSERVATION PLAN

HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — VIRGINIA YOSHIKO FISCH — 22418 — PROFESSIONAL ENGINEER

FSH Associates
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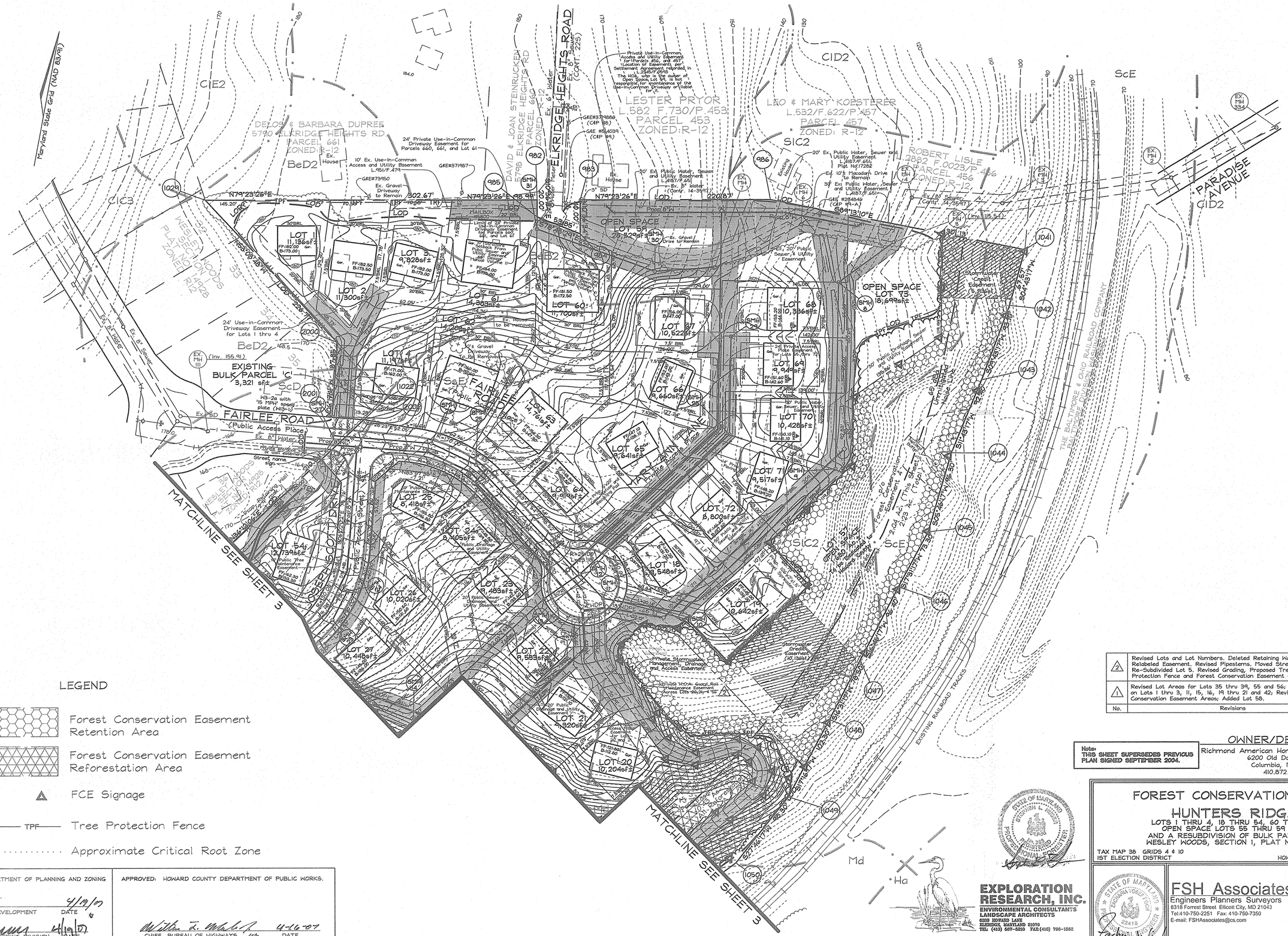
W.O. No.:	3018
SHEET No.:	16 OF 20

F-04-111



LEGEND

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- FCE Signage
- TPF Tree Protection Fence
- Approximate Critical Root Zone

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/9/07	CHIEF, BUREAU OF HIGHWAYS — DATE 4-16-07
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/9/07	

No.	Revisions	Date
2	Revised Lots and Lot Numbers. Deleted Retaining Walls and Relabeled Easement. Revised Pipesterns. Moved Street Light. Re-Subdivided Lot 5. Revised Grading, Proposed Tree Line, Tree Protection Fence and Forest Conservation Easement #4 Areas.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

Note: THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

OWNER/DEVELOPER
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6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

FOREST CONSERVATION PLAN

HUNTERS RIDGE

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OPEN SPACE LOTS 55 THRU 59 & 73
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WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

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SHEET No.:	15 OF 20

F-04-111

DEVELOPER'S BUILDER'S CERTIFICATE

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A LETTER OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE(1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

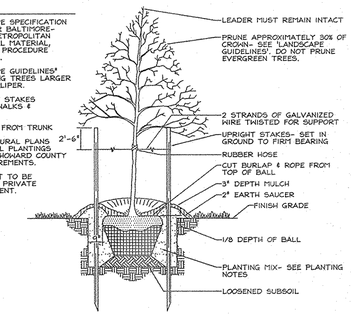
3.23.07

SIGNATURE OF DEVELOPER — DATE

RICHMOND AMERICAN HOMES OF MARYLAND, INC.

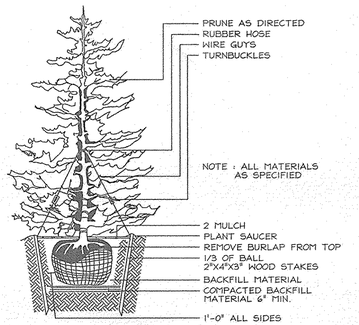
NOTES

1. SEE 'LANDSCAPE SPECIFICATION GUIDELINES FOR BALTIMORE-WASHINGTON METROPOLITAN AREAS' FOR ALL MATERIAL, PRODUCT, AND PROCEDURE SPECIFICATIONS.
2. SEE 'LANDSCAPE GUIDELINES' FOR SUPPORTING TREES LARGER THAN 2-1/2" CALIPER.
3. PLACE UPRIGHT STAKES PARALLEL TO WALKS & BUILDINGS.
4. KEEP MULCH 1" FROM TRUNK
5. SEE ARCHITECTURAL PLANS FOR ADDITIONAL PLANTINGS WHICH EXCEED HOWARD COUNTY MINIMUM REQUIREMENTS.
6. TREES ARE NOT TO BE PLANTED OVER PRIVATE SEWAGE EASEMENT.



TYPICAL TREE PLANTING AND STAKING

DECIDUOUS TREES UP TO 2-1/2" CALIPER — NOT TO SCALE



TYPICAL EVERGREEN TREE PLANTING DETAIL

NOT TO SCALE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/19/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/19/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 4-16-07

No.	Revisions	Date
2	Deleted Retaining Walls and Easement on Lots 43-46.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

Note: THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

Richmond American Homes

410.872.0267

HUNTERS RIDGE

OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

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Tel:410-750-2231 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

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SHEET No.:	14 OF 20

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LEGEND

Existing Contour	------------382
Proposed Contour	(82)
Existing Spot Elevation	382.3
Proposed Spot Elevation	+82.53
Direction of Flow	
Existing Trees to Remain	
Walk Out Basement	WOB
Shade Tree	
Street Tree	
Evergreen Tree	
Shrub	
Landscape Perimeter	PERIMETER ONE

STREET TREE SCHEDULE

STREET NAME	LF REQUIRED	TREES REQUIRED	PROVIDED
Fairlee Road	880	22	22
Joseph Scott Drive	2,170	54	54
Mary Ann Lane	776	19	19

STREET TREE LANDSCAPE SCHEDULE

KEY	QUAN.	BOTANICAL NAME	SIZE	NOTE
AR	27	Acer rubrum, Shade Trees (Street Trees) 'October Glory Red Maple'	2 1/2"-3" Cal.	B & B
PA	27	Platanus x acerifolia, Shade Trees (Street Trees) 'Bloodgood' 'London Plane'	2 1/2"-3" Cal.	B & B
ZS	22	Zelkova serrata, Shade Trees (Street Trees) 'Village Green' 'Japanese Zelkova'	2 1/2"-3" Cal.	B & B
QC	19	Quercus Coccinea Scarlet Oak	2 1/2"-3" Cal.	B & B

LANDSCAPE SCHEDULE

KEY	QUAN.	BOTANICAL NAME	SIZE	NOTE
AR	32	Acer rubrum (Shade Trees) 'October Glory Red Maple'	2 1/2"-3" Cal.	B & B
QR	33	Quercus rubra (Shade Trees) 'Red Oak'	2 1/2"-3" Cal.	B & B
PS	13	Pinus strobus 'Eastern White Pine'	6'-8' Ht.	B & B
TO	10	Thuja occidentalis 'Nigra' 'Dark American Arborvitae'	5'-6' Ht.	B & B
IV	10	Ilex Verticillata Winterberry	3'-4' Ht.	Cont.

NOTES:

1. At the time of plant installation, all shrubs and trees listed and approved on the Landscape Plan shall comply with the proper height requirements in accordance with the Howard County Landscape Manual. In addition, no substitutions or relocations of the required plantings may be made without prior review and approval from the Department of Planning and Zoning. Any deviation from the approved Landscape Plan may result in denial or delay in the release of Landscape Surety until such time as all required materials are planted and/or revision are made to the applicable plans.
2. Landscape surety is based on the required landscaping of 65 shade trees, 23 evergreen trees and the Private Access Place street trees (19) and refuse pad shrubs (10) in the amount of $28,950.00.

SCHEDULE D : STORMWATER MANAGEMENT AREA LANDSCAPING

Linear Feet of Perimeter	1,261 LF
Credit for Existing Vegetation (No, Yes and Linear Feet)	Yes, *364 LF (Remaining Perimeter: 897 LF)
Credit for Wall, Fence or Berm (No, Yes and %)	N/A
Number of Trees Required Shade Trees Evergreen Trees	1:50 = 18 Shade Trees 1:40 = 23 Evergreen Trees
Number of Trees Provided Shade Trees Evergreen Trees Other Trees(2:1 Substitution)	18 Shade Trees 23 Evergreen Trees 0 Trees(0 Substitution Trees)

* Existing trees to remain

SCHEDULE A PERIMETER LANDSCAPE EDGE

CATEGORY	ADJACENT TO ROADWAYS			ADJACENT TO PERIMETER PROPERTIES				
Perimeter/Frontage Designation Landscape Type	1 B	2 B		3 A	4 A	5 A	6 A	7 A
Linear Feet of Roadway Frontage/Perimeter	93	35		1054	717	2079	963	314
Credit for Existing Vegetation (Yes, No, Linear Feet) Remaining Perimeter Length	No	No		No	*Yes 440 277	***Yes 1,888 191	*Yes 90 873	No
Credit for Wall, Fence or Berm (Yes, No, Linear Feet) Remaining Perimeter Length	No	No		No	No	No	No	No
Number of Plants Required Shade Trees Evergreen Trees Shrubs	1:50 2 1:40 3 -	1:50 1 1:40 1 -		1:60 18 - -	1:60 5 - -	1:60 4 - -	1:60 15 - -	1:60 5 - -
Number of Plants Provided Shade Trees Evergreen Trees Other Trees (2:1 Substitution) Shrubs (10:1 Substitution) (Describe Plant Substitution Credits Below if needed)	2** 3** - -	1** 1** - -		18 - - -	5 - - -	4 - - -	15 - - -	5 - - -

* Existing woods to remain
** Perimeter landscaping for Lot 25 and Lot 54 will be provided at SDP stage
*** Credit taken for existing woods and the shared boundary with the SWM Perimeter

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 4/19/07
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

[signature] 4/19/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

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No.	Revisions	Date
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1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

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Columbia, Md 21045
410.872.0267

LANDSCAPE PLAN

HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
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TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — ZACHARIA YOSEF FISCH — 22418 — PROFESSIONAL ENGINEER [seal, signature]

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MARYLAND 378
STORMWATER MANAGEMENT FACILITY CONSTRUCTION SPECIFICATIONS
CONSTRUCTION SPECIFICATIONS (FOR SWM DETENTION FACILITY CS-1)

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 tow of the embankment.

Areas to be covered by the reservoir will be cleared of all trees, brush, logs, fences, rubbish and other objectionable material unless otherwise designated on the plans. Trees, brush, and stumps shall be cut approximately level with the ground surface. For dry stormwater management 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 placement of fill. Fill materials shall be placed in maximum 8 inch thick (before compaction) layers which are to be continuous over the entire length of the fill. The most permeable borrow material shall be placed in the downstream portions of the embankment. The 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

Structure Backfill

Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining fill material. The fill shall be placed in horizontal layers not to exceed four inches 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 operated closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless there is a compacted fill of 24" 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 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 the material. Adequate measures shall be taken (sand bags, etc.) to prevent floating the pipe. When using flowable fill, all metal pipe shall be bituminous coated. Any adjoining soil fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material shall completely fill all voids adjacent to the flowable fill zone. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of the structure. Under no circumstances shall equipment be driven over any part of a structure or pipe unless there is a compacted fill of 24" or greater over the structure or pipe. Backfill (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 coating 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 Specification M-196 or M-211 with watertight coupling bands or flanges. Aluminum Pipe, when used with flowable fill or when soil and/or water conditions warrant for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt. Hot dip galvanized bolts may be used for connections. The pH of the surrounding soils shall be between 4 and 9.

2. Coupling, bands, anti-seep collars, end sections, etc., must be composed of the same material and coatings as the pipe. Metals must be insulated from dissimilar materials with use of rubber or plastic insulating materials at least 24 mils in thickness.

3. Connections - All connections with pipes must be completely watertight. The drain pipe or barrel connection to the riser shall be welded all around when the pipe and riser are metal. Anti-seep collars shall be connected to the pipe in such a manner as to be completely 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 bandwidth. The following type connections are acceptable for pipes less than 24 inches diameter: flanges on both ends of the pipe with a circular 3/8 inch thick closed cell circular neoprene gasket; and a 12-inch wide hugger type band with o-ring gaskets having a minimum diameter of 1/2 inch greater than the corrugation depth. Pipes 24 inches in diameter and larger shall be connected by a 24 inch long annular corrugated band using a minimum of 4(four) rods and lugs, 2 on each connecting pipe end. A 24-inch wide by 3/8-inch thick closed cell circular neoprene gasket will be installed with 12 inches on the end of each pipe. Flanged joints with 3/8"inch closed cell gaskets the full width of the flange is also acceptable.

Helically corrugated pipe shall have either continuously welded seams or have lock seams with internal 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 PipeAll 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 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 the "Structure Backfill" section of this standard. Gravel bedding is not permitted.

3. Laying pipe - Bell and spigot pipe shall be placed with the bell end upstream. Joints shall be made in accordance with recommendations of the manufacturer of the material. After the joints are sealed for the entire line, 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 shown on the drawings.

Plastic PipeThe 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" inch pipe shall meet the requirements of AASHTO M252 Type S, and 12" through 24" inch 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 Materials, Section 311.

Geotexile shall be placed under all riprap and shall meet 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 to be occupied by the permanent works. The contractor shall also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the engineer for constructing each part of the work free from water as required or directed by the engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works. The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom required excavations and will allow satisfactory performance of all construction operations. During the placing and compacting of material in required excavations, the water level at the locations being refilled shall be maintained below the bottom of the excavation at such locations which may require draining the water sumps from which the water shall be pumped.

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 Resources 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.

No.	Revisions	Date
1	Revised Section 'B' -'B' Profile; Updated Recharge Obligation and Pond Summary.	01/15/2007

OPERATION AND MAINTENANCE SCHEDULE FOR STORMWATER MANAGEMENT DETENTION FACILITY

STORMWATER MANAGEMENT FACILITY
ROUTINE MAINTENANCE BY H.O.A.

1. FACILITY WILL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHOULD BE PERFORMED DURING WET WEATHER TO DETERMINE IF IT IS FUNCTIONING PROPERLY.
2. 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.
3. DEBRIS AND LITTER NEXT TO THE OUTLET STRUCTURE SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
4. VISIBLE SIGNS OF EROSION IN THE POND AS WELL AS RIPRAP OUTLET AREAS SHALL BE REPAIRED AS SOON AS IT IS NOTICED.

NON-ROUTINE MAINTENANCE BY H.O.A.

1. STRUCTURAL COMPONENTS OF THE POND SUCH AS THE DAM, THE RISER, AND THE PIPES SHALL BE REPAIRED UPON DETECTION OF ANY DAMAGE. THE COMPONENTS SHOULD BE INSPECTED DURING ROUTINE MAINTENANCE OPERATIONS.
2. SEDIMENT SHOULD BE REMOVED WHEN ITS ACCUMULATION SIGNIFICANTLY REDUCES THE DESIGN STORAGE, INTERFERE WITH THE FUNCTION OF THE RISER, WHEN DEEMED NECESSARY FOR AESTHETIC REASONS, OR WHEN DEEMED NECESSARY BY THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

SPECIAL CONSTRUCTION METHODS FOR SEEPAGE CONTROLS

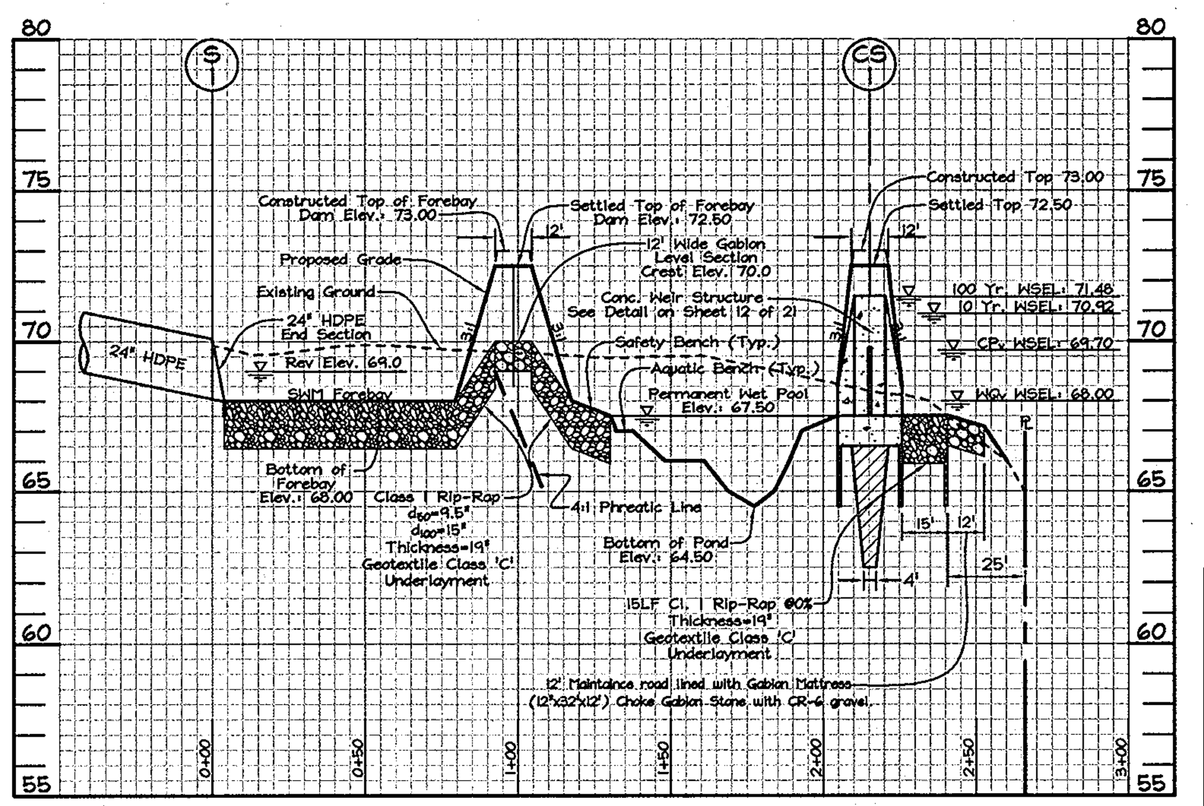
To prevent undesirable seepage through the basin and beaneath the embankment, compact the clay surface across the bottom of the basin and tie in to the embankment. Since the soils encountered within all borings at basin elevation are CL clay soil, it would be possible in most areas to form the liner by recompacting the inplace materials. The exposed basin surface should be examined after mass grading and any sand deposits undercut 1 foot below proposed basin grade. This undercut area should be backfilled with CL clay soils compacted to a minimum 98 percent of the AASHTO T-99 maximum dry density. In the remaining clay areas, the basin bottom should be thoroughly rolled to a minimum 98 percent of the AASHTO T-99 maximum dry density.

Recharge Obligation (Total Site)
Rev Req'd: 2,046 cu.ft.
Rea Req'd: 0.49 Ac
Rea Prov'd.: 0.49 Ac.
Rev Prov'd.: 3,887 cu. ft.

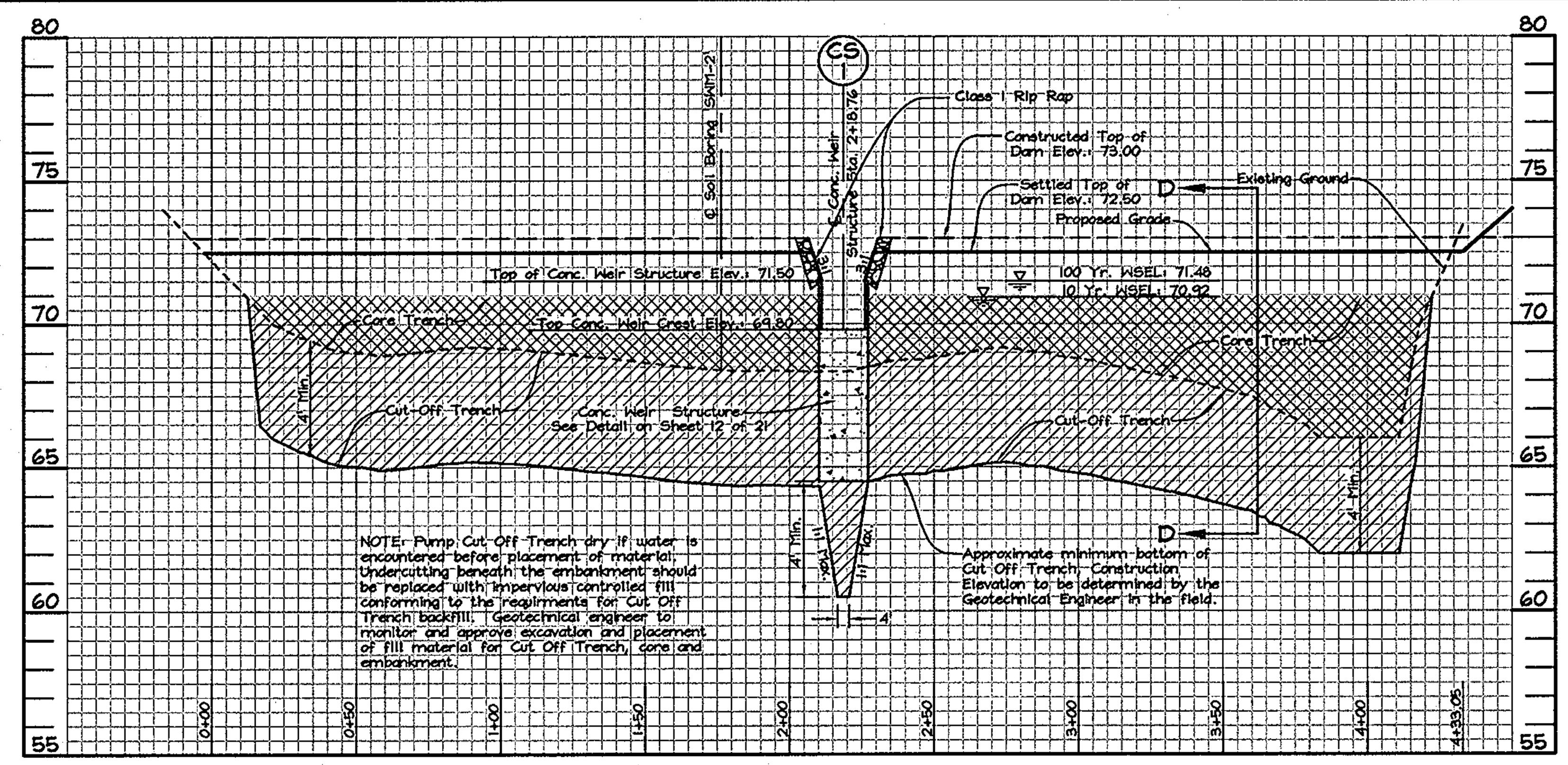
POND SUMMARY	1YEAR(CPv)	10 YEAR**	100 YEAR
Flow Into Pond	21.4 cfs	74.84 cfs	123.17 cfs
Flow Out of Pond	0.51 cfs	56.46 cfs	101.76 cfs
WS Elevation	69.7	70.92	71.48
Storage Volume	0.25 ac.ft		

WATER QUALITY FOR AREA TO POND**
WQv Req'd: 0.50 ac.ft
WQv Prov'd: 0.36 ac.ft(wet pool) 0.25 ac.ft(extended detention)
Total Provided: 0.61 ac.ft

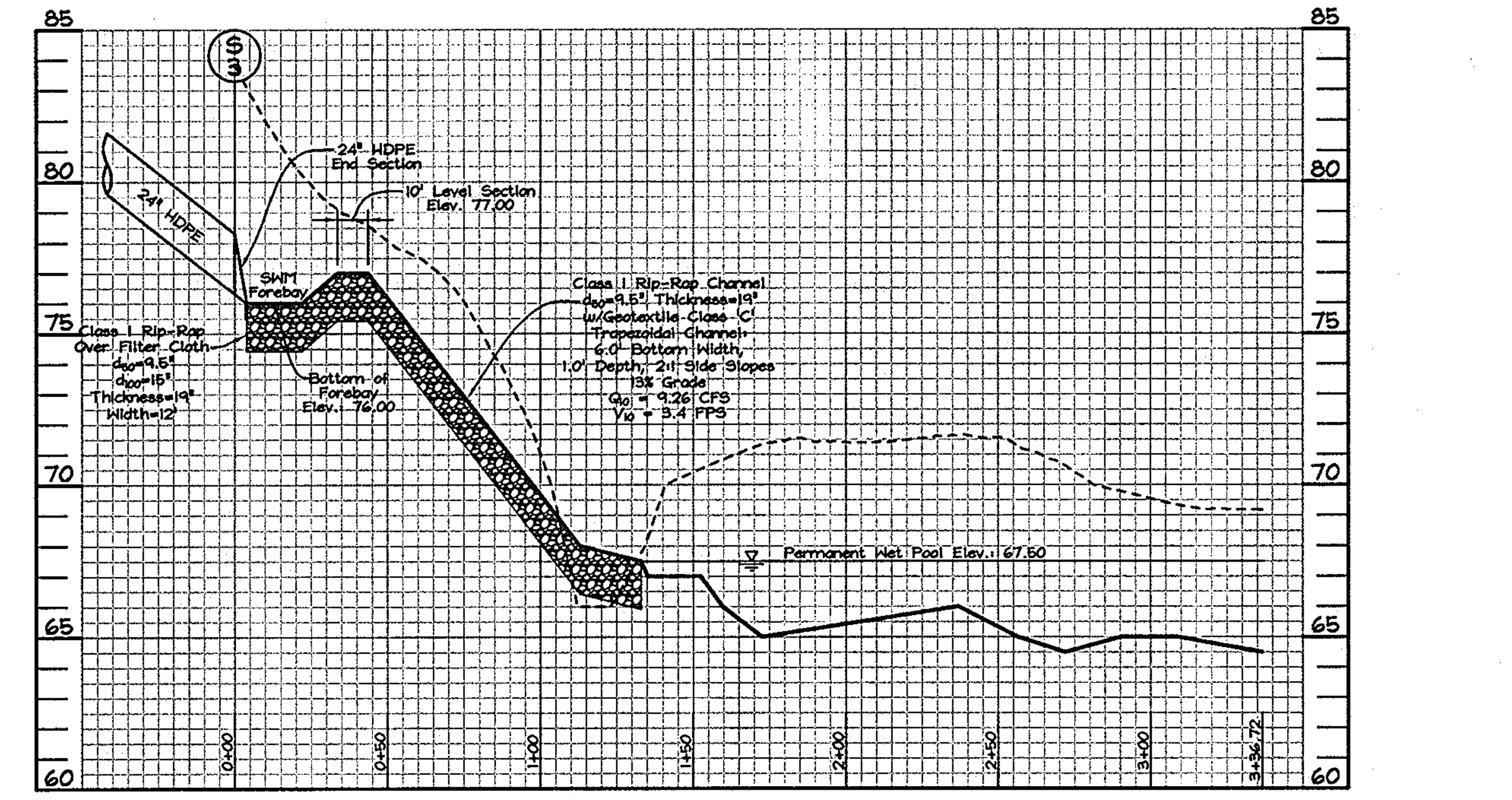
** Assumes clogged Low Flow Orifices.



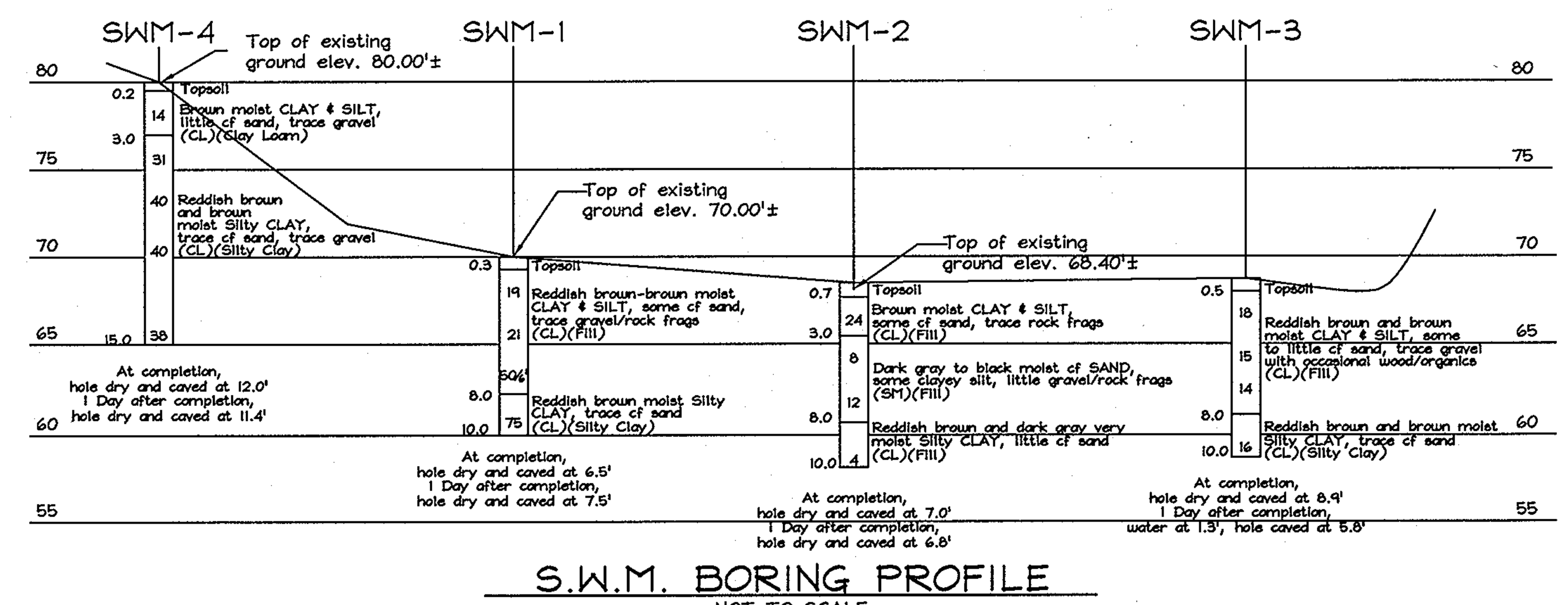
SECTION 'B'-'B'
(From S-1 thru Weir)
SCALE: Hor.: 1"=50'
Vert.: 1"=5'



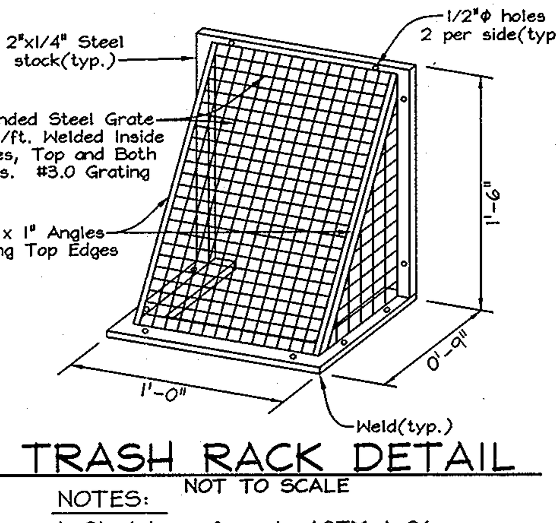
SECTION 'A'-'A'
(Along Top of Embankment)
SCALE: Hor.: 1"=50'
Vert.: 1"=5'



SECTION 'C'-'C'
(From S-3 thru Pond)
SCALE: Hor.: 1"=50'
Vert.: 1"=5'

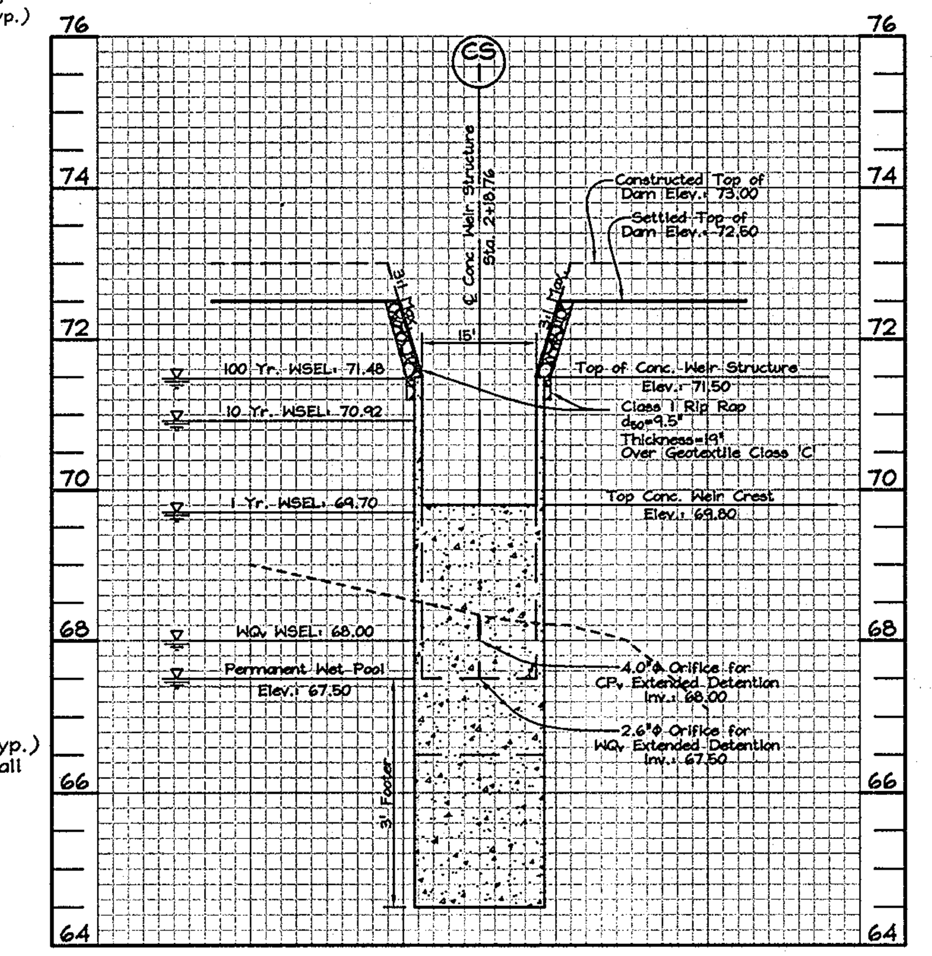


S.W.M. BORING PROFILE
NOT TO SCALE

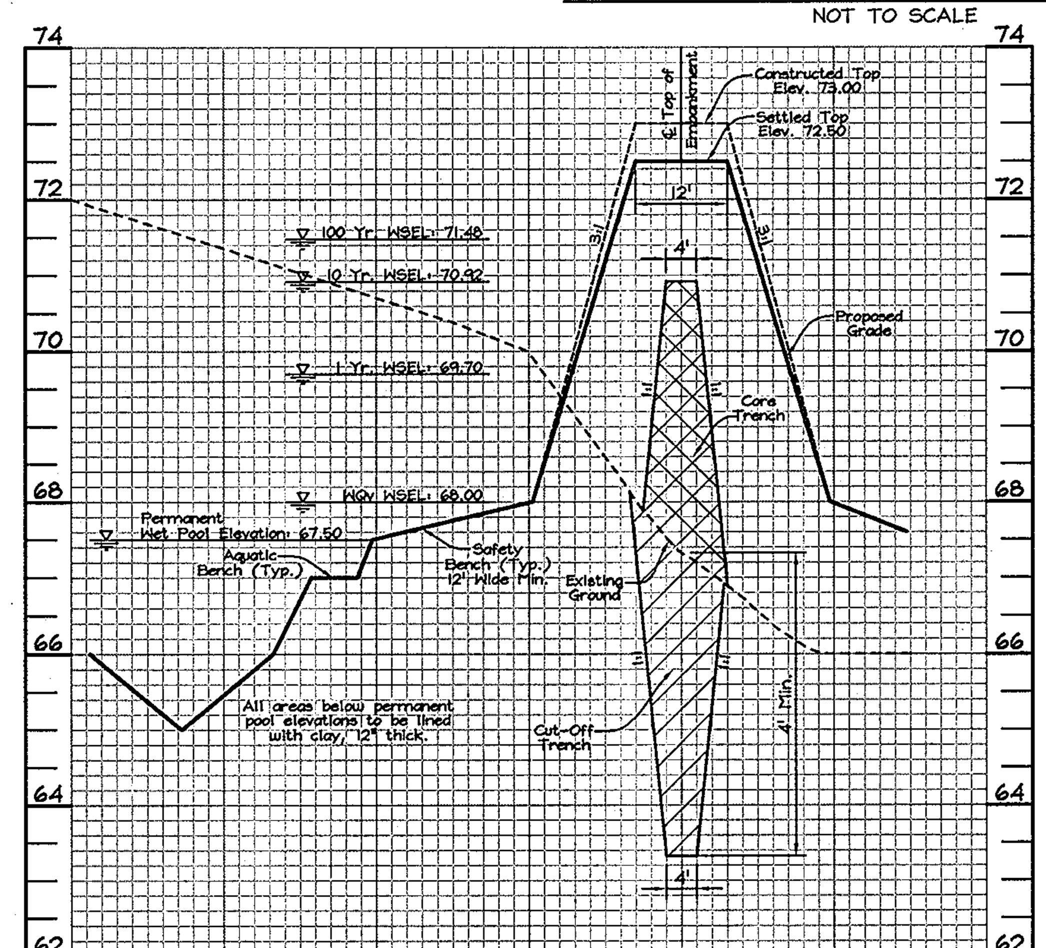


TRASH RACK DETAIL
NOT TO SCALE

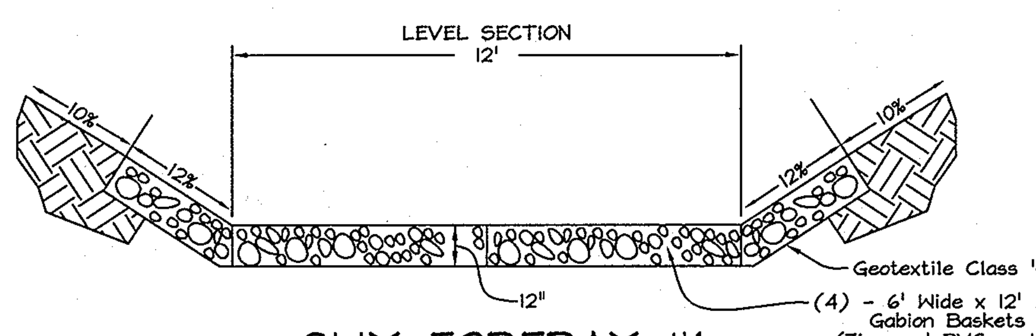
NOTES:
1. Steel to conform to ASTM A-36.
2. All surfaces to be coated with ZRC cold galvanizing compound after welding.
3. Trash rack to be fastened to the concrete with 1/2" masonry anchors. Trash rack to be removeable.



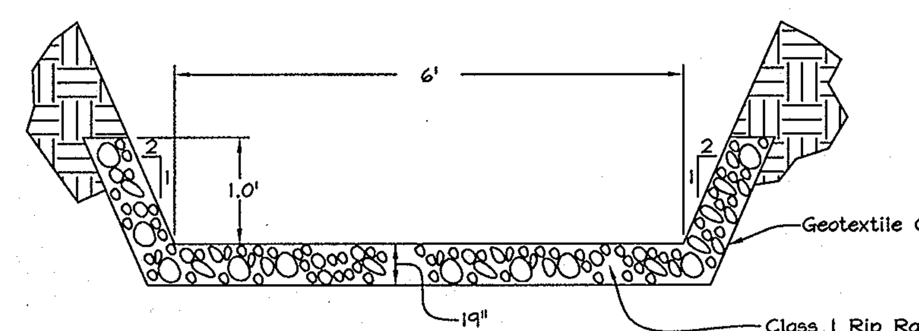
WEIR DETAIL
SCALE: Hor.: 1"=20'
Vert.: 1"=2'



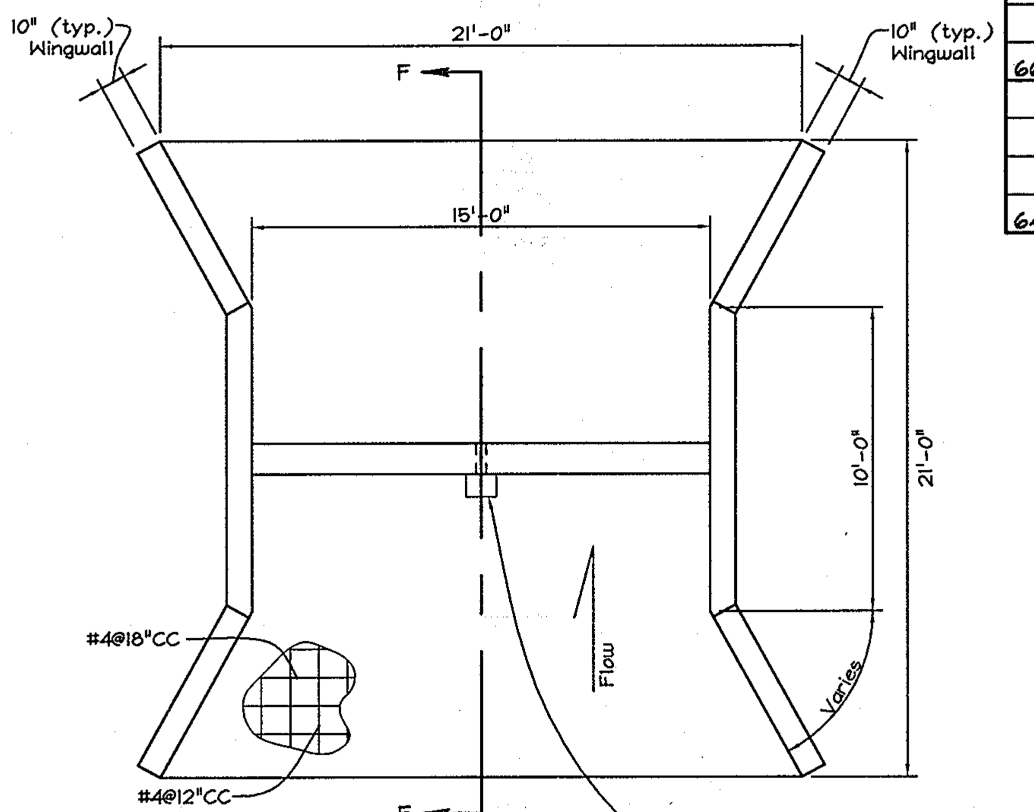
SECTION 'D'-'D'
(Thru Embankment)
SCALE: Hor.: 1"=20'
Vert.: 1"=2'



SWM FOREBAY #1
GABION OUTLET LEVEL SECTION
TYPICAL CROSS-SECTION
NOT TO SCALE

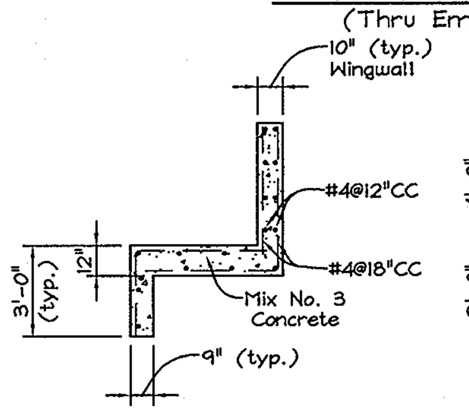


SWM FOREBAY #2
RIP RAP OUTLET LEVEL SECTION
TYPICAL CROSS-SECTION
NOT TO SCALE

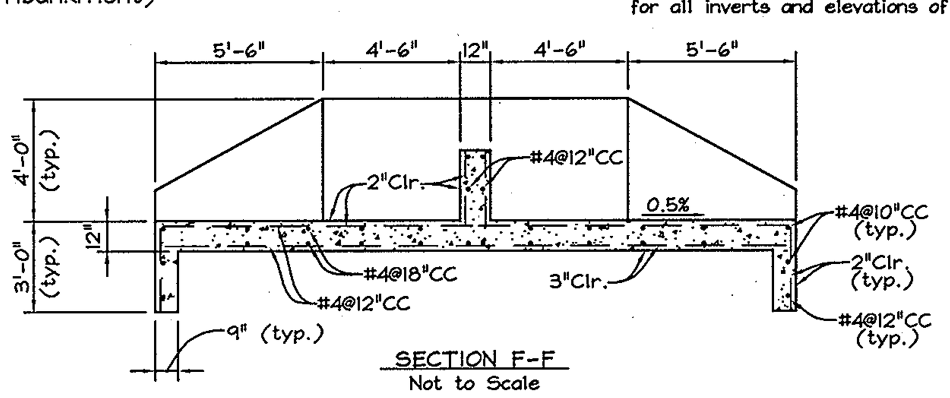


PLAN VIEW
Not to Scale

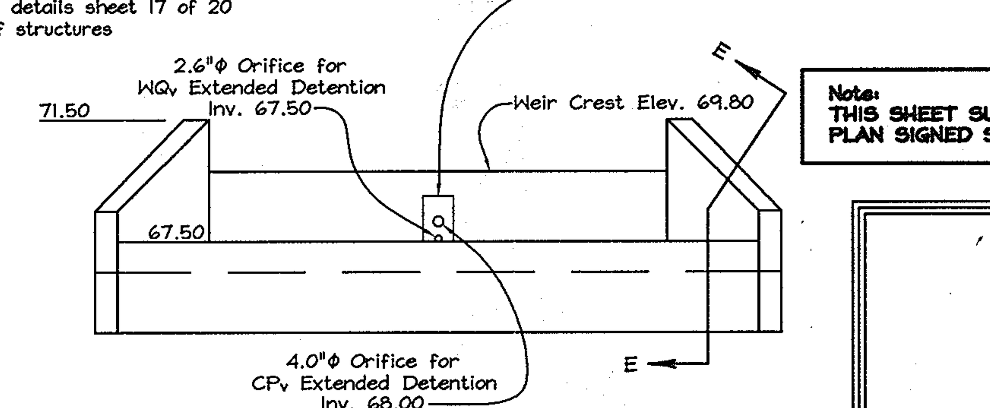
NOTES:
1. All exposed edges to have a 3/4"x3/4" chamfer or as directed.
2. Concrete shall be SHA mix #3(fc=3500 psi @ 28 days)
3. Reinforcing steel shall be ASTM A-615 grade 60.
4. See section thru weir structure details sheet 17 of 20 for all inverts and elevations of structures



SECTION E-E
Not to Scale

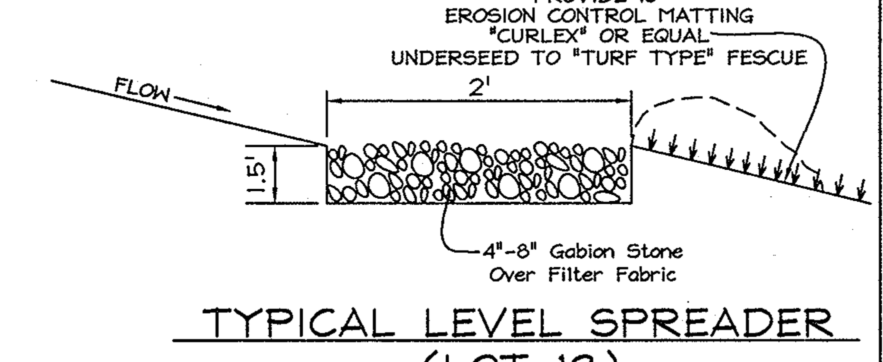


SECTION F-F
Not to Scale



FRONT ELEVATION
Not to Scale

CS-1 CONCRETE WEIR CONTROL STRUCTURE
NOT TO SCALE



TYPICAL LEVEL SPREADER
(LOT 19)
CROSS-SECTION
NOT TO SCALE

Note: THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

STORMWATER MANAGEMENT NOTES AND DETAILS
HUNTERS RIDGE
LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 PARCEL 163
1ST ELECTION DISTRICT HOWARD COUNTY, MARYLAND

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
4/19/07
CHIEF, DIVISION OF LAND DEVELOPMENT DATE
4/19/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.
4-16-07
CHIEF, BUREAU OF HIGHWAYS DATE

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS
4/10/07
USDA-NATURAL RESOURCES CONSERVATION SERVICE DATE
THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT
4/10/07
HOWARD SCD DATE

ENGINEERS CERTIFICATE
"I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.
3/12/07
SIGNATURE OF ENGINEER DATE
ZACHARIA Y. FISCH

DEVELOPER'S CERTIFICATE
"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.
3.12.07
SIGNATURE OF DEVELOPER DATE
RICHMOND AMERICAN HOMES OF MARYLAND, INC.

STATE OF MARYLAND — ZACHARIA YOSEF FISCH — 22413 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY:	KO
DRAWN BY:	KO
CHECKED BY:	ZYF
SCALE:	As Shown
DATE:	Jan. 23, 2007
W.O. No.:	3018
SHEET No.:	12 OF 20

F-04-111

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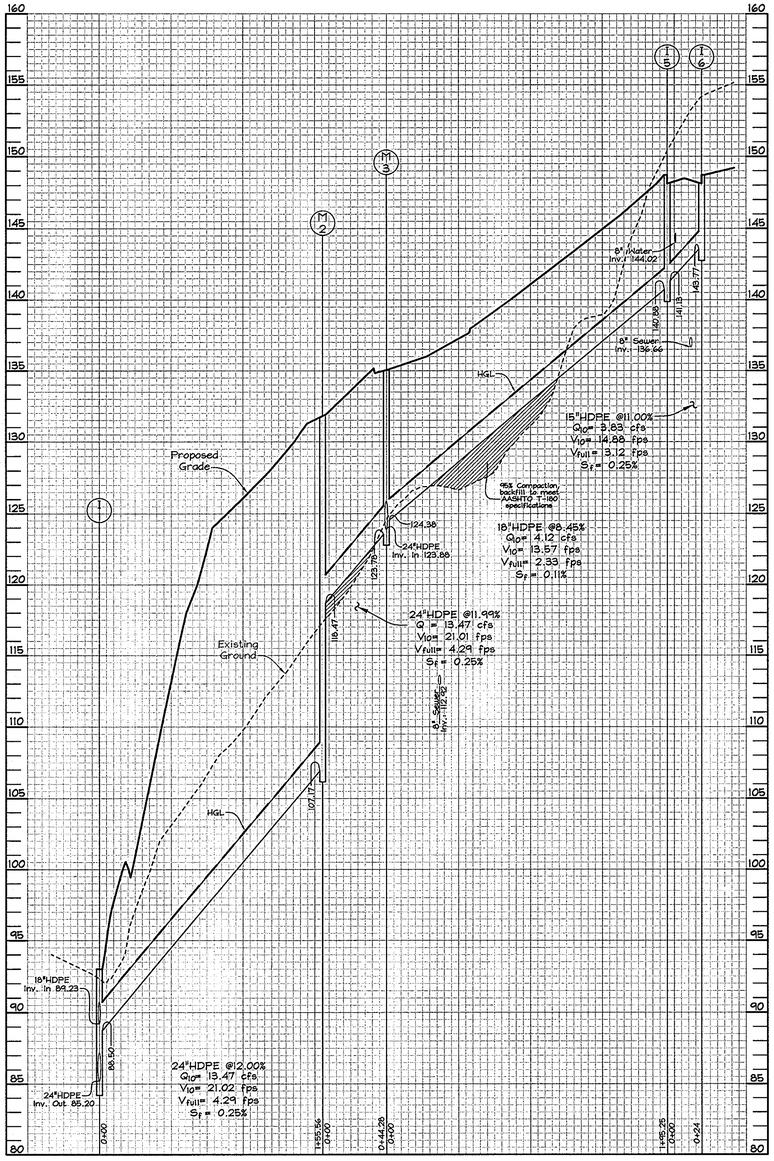
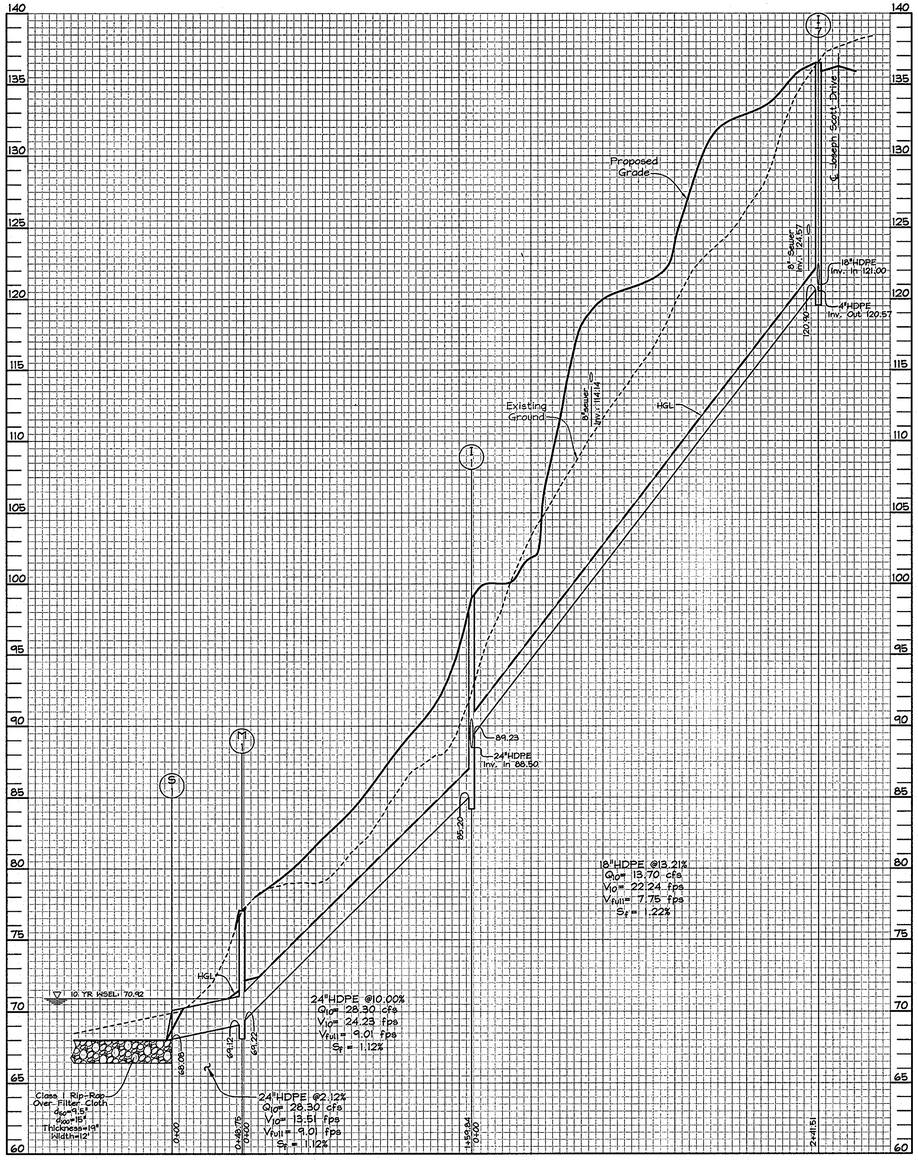


STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'



STORM DRAIN PROFILE

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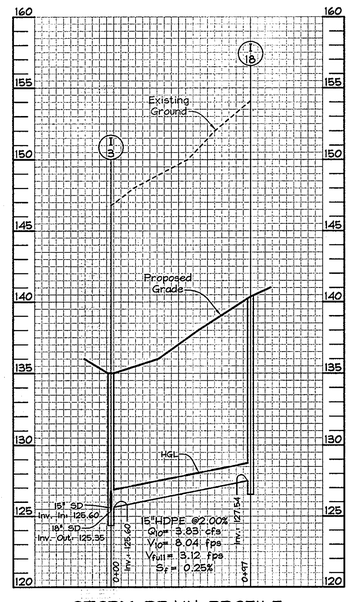

STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'

STRUCTURE SCHEDULE

NO.	TYPE	LOCATION		TOP ELEV.	INV. IN	INV. OUT	REMARKS
I-1	Single 'S' Inlet	N 562,195.31	E 1,394,475.28	99.00	84.23(18") 88.50(24")	85.20	SD 4.22
I-2	Single 'S' Inlet	N 562,373.40	E 1,394,582.73	134.56	124.52	124.02	SD 4.22
I-3	Single 'S' Inlet	N 562,440.31	E 1,394,699.57	135.0	125.60(15") 125.60(15")	125.35	SD 4.22
I-4	Single 'S' Inlet	N 562,605.52	E 1,394,820.50	131.0	-	126.65	SD 4.22
I-5	'A-5' Cast-In-Place Inlet	Fairlee Road Sta. 3+65.86	10.00' Right	148.75	141.13	140.88	SD 4.01
I-6	'A-10' Precast Inlet	Fairlee Road Sta. 3+65.86	10.00' Left	148.75	-	143.77	SD 4.41
I-7	'A-5' Cast-In-Place Inlet	Joseph Scott Drive Sta. 2+81.09	12.00' Left	136.49	121.00	120.57(14") 120.40(18")	SD 4.01
I-8	'A-10' Cast-In-Place Inlet	Joseph Scott Drive Sta. 2+81.09	12.00' Right	136.49	121.41	121.31	SD 4.02
I-9	'A-5' Precast Inlet	Joseph Scott Drive Sta. 4+95.67	12.00' Right	127.90	123.54(15") 123.54(15")	123.29	SD 4.40
I-10	'A-5' Precast Inlet	Joseph Scott Drive Sta. 6+70.69	12.00' Right	129.52	-	124.42	SD 4.40
I-11	'A-5' Precast Inlet	Joseph Scott Drive Sta. 4+95.67	12.00' Left	127.90	-	123.68	SD 4.40
I-12	Single 'S' Inlet	Joseph Scott Drive Sta. 4+44.64	77.23' Right	129.0	124.50	124.40	SD 4.22
I-13	Single 'S' Inlet	Joseph Scott Drive Sta. 4+44.64	130.00' Right	147.0	140.80	130.83	SD 4.22
I-14	Single 'S' Inlet	Joseph Scott Drive Sta. 6+54.64	130.00' Right	147.50	143.15	142.90	SD 4.22
I-15	Single 'S' Inlet	Joseph Scott Drive Sta. 7+76.86	132.49' Right	149.50	-	145.15	SD 4.22
I-16	Single 'S' Inlet	N 561,466.96	E 1,394,045.59	111.50	104.00	103.50	SD 4.22
I-17	Single 'S' Inlet	N 561,584.24	E 1,394,013.03	125.77	-	119.08	SD 4.22
I-18	Single 'S' Inlet	N 562,497.60	E 1,394,621.30	140.36	-	127.54	SD 4.22
M-1	Precast Manhole (4')	N 562,081.90	E 1,394,587.91	77.00	69.22	69.12	G 5.12
M-2	Precast Manhole (4')	N 562,320.84	E 1,394,567.16	133.30	118.47	107.17	G 5.12
M-3	Precast Manhole (4')	N 562,363.70	E 1,394,556.04	135.20	124.38(18") 123.88(24")	123.78	G 5.12
M-4	Precast Manhole (4')	N 562,372.98	E 1,394,650.29	138.53	124.96	124.86	G 5.12
M-5	Precast Manhole (4')	Joseph Scott Drive Sta. 4+44.64	17.00' Right	128.59	123.03(18") 123.03(18")	122.93	G 5.12
M-6	Precast Manhole (4')	N 561,489.09	E 1,394,106.93	115.00	102.85	97.75	G 5.12
M-7	Precast Manhole (4')	N 561,564.06	E 1,394,010.57	126.50	116.64	116.39	G 5.12
S-1	24" HDPE End Section	N 562,035.50	E 1,394,572.94	-	-	68.08	-
S-2	6" HDPE End Section	N 562,173.80	E 1,394,244.95	-	-	120.25	-
S-3	24" HDPE End Section	N 561,668.92	E 1,394,310.39	-	-	76.32	-

NOTE: 1. Top elevations are to the center, top of grate inlet for all 'S' inlets; center, top of concrete slab @ curb line for A-5 and A-10; and center top of manhole cover for precast manholes.
2. Structures I-3, I-13 and M-2 to have granite bottoms.
3. See Grading plans, sheets 5 and 6, for top of structure slopes.

PIPE SCHEDULE

SIZE	TYPE	LENGTH
6"	HDPE	64.5 LF
15"	HDPE	693 LF
18"	HDPE	1,225 LF
24"	HDPE	774 LF

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/19/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/19/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 4-16-07

Note:
THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

No.	Revisions	Date
2	Revised Title Block.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

STORM DRAIN PROFILES

HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY: KO
DRAWN BY: KO
CHECKED BY: ZYF
SCALE: As Shown
DATE: Jan. 23, 2007
W.O. No.: 3018
SHEET No.: 11 OF 20

F-04-111

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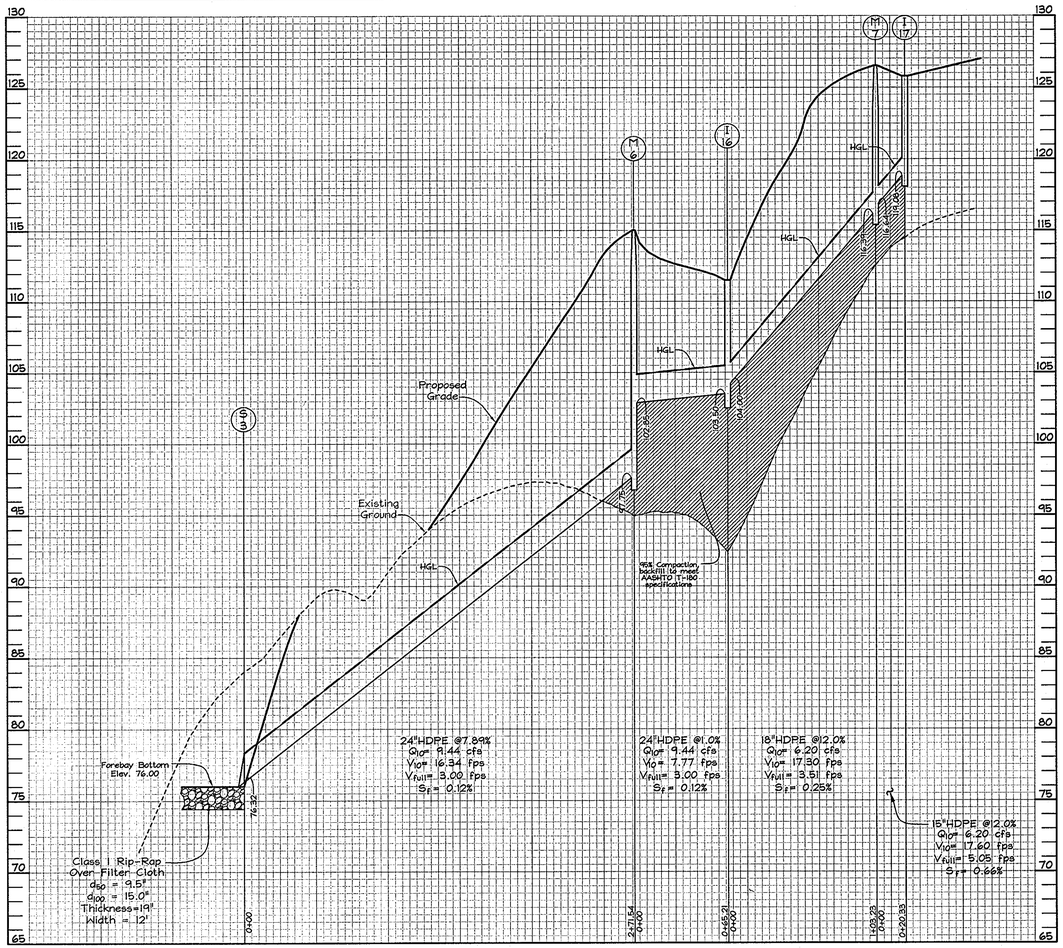
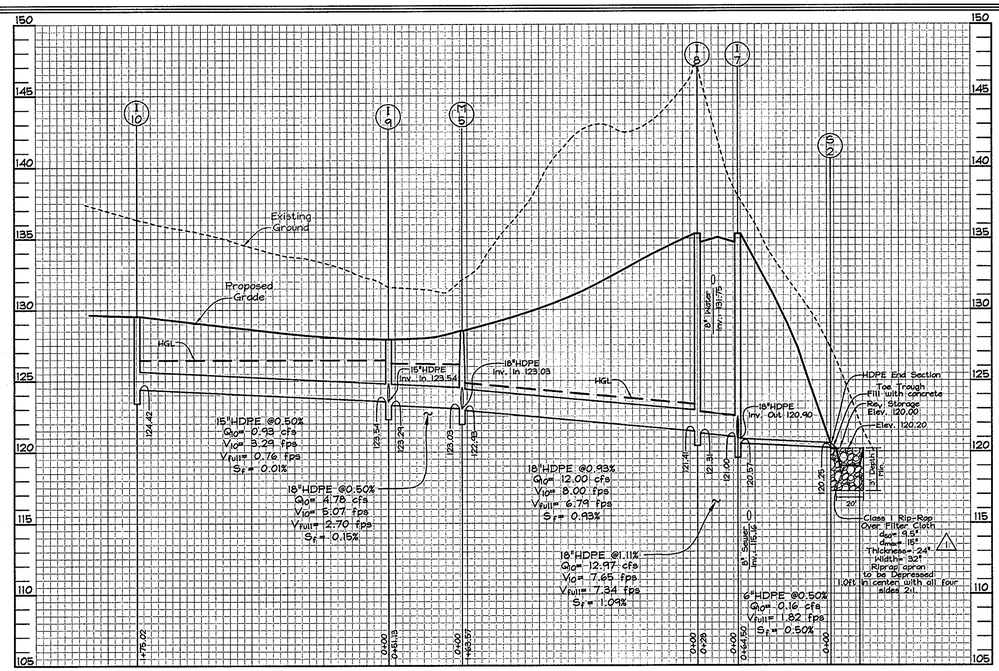


STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'



STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
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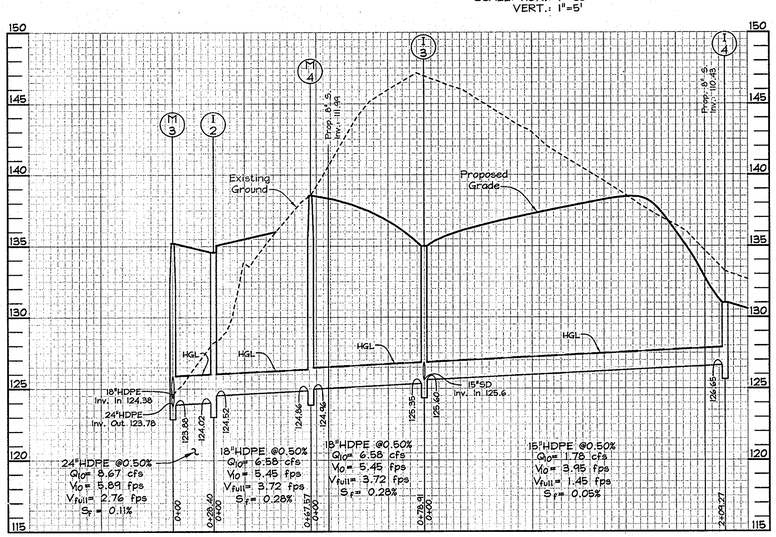
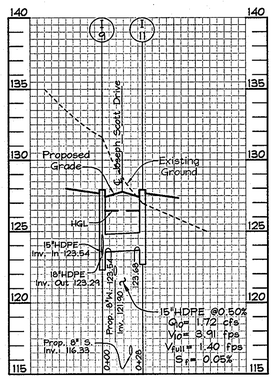


STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'



STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
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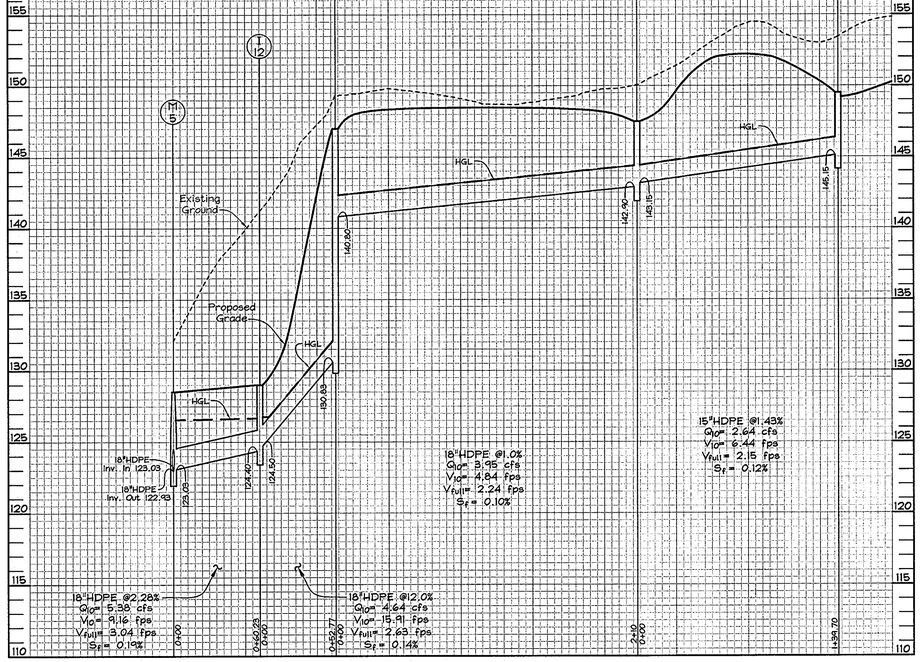

STORM DRAIN PROFILE

SCALE: HOR.: 1"=50'
VERT.: 1"=5'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/19/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/18/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 4-16-07

Note:
THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

No.	Revisions	Date
1	Revised Storm Drain Profile I-10 to S-2	02/12/2007

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

STORM DRAIN PROFILES
HUNTERS RIDGE
LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72 ⚠
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 168
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY:	KO
DRAWN BY:	KO
CHECKED BY:	ZYF
SCALE:	As Shown
DATE:	Jan. 23, 2007
W.O. No.:	3018
SHEET No.:	10 OF 20

F-04-111

SOILS LEGEND

SYMBOL	NAME / DESCRIPTION	SOIL GROUP
BeB2	Beltsville silt loam, 1 to 5 percent slopes, moderately eroded	C
BeC2	Beltsville silt loam, 5 to 10 percent slopes, moderately eroded	C
BeD2	Beltsville silt loam, 10 to 15 percent slopes, moderately eroded	C
ClC3	Chillum gravely loam, 5 to 10 percent slopes, moderately eroded	C
ClE2	Chillum gravely loam, 15 to 30 percent slopes, moderately eroded	C
Md	Made land	
ScD	Sandy and clayey land, moderately sloping	C
ScE	Sandy and clayey land, moderately steep	C
SlC2	Sassafras soils, 5 to 10 percent slopes	B
SsE	Sassafras soils, 15 to 40 percent slopes	B

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

STORM DRAIN DRAINAGE AREA MAP
HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

4/19/07
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

4/19/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

4-66-07
CHIEF, BUREAU OF HIGHWAYS — DATE

Note:
THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

No.	Revisions	Date
2	Revised Lots and Lot Numbers. Revised Drainage Divides. Deleted Retaining Walls and Easements. Re-Subdivided Lot 5. Revised Easements.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/25/2005

STATE OF MARYLAND — ZACHARIA YOSEF FISCH — 22418 — PROFESSIONAL ENGINEER

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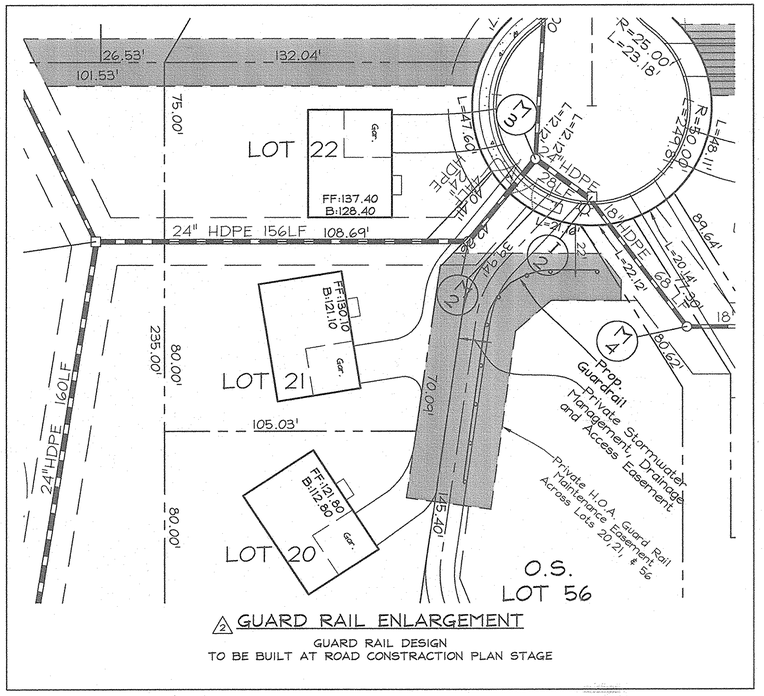
DESIGN BY:	PS/KO
DRAWN BY:	MM/KO
CHECKED BY:	ZYF
SCALE:	1"=50'
DATE:	Mar. 21, 2007
W.O. No.:	3018
SHEET No.:	9 OF 20

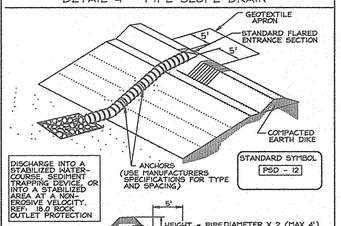
F-04-111



⚠2 GUARD RAIL ENLARGEMENT

GUARD RAIL DESIGN
TO BE BUILT AT ROAD CONSTRACTION PLAN STAGE

DETAIL 4 - PIPE SLOPE DRAIN



NOTE: PIPE SIZE DESIGNATION IS PSD 12 = PIPE SLOPE DRAIN WITH A 12" DIAMETER PIPE.

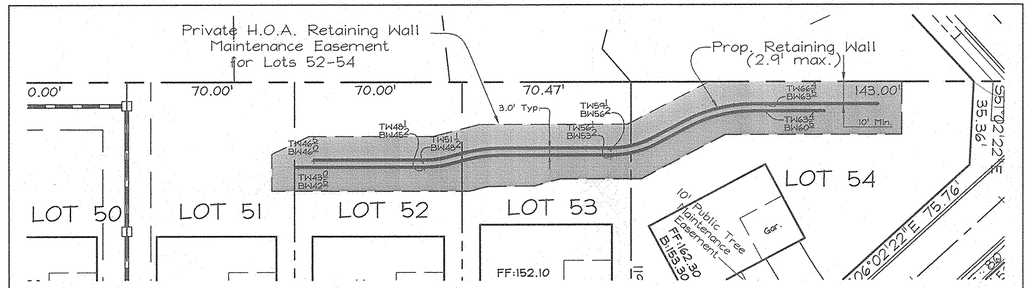
Table 6 Design Criteria for Pipe Slope Drain

Size	Pipe/Tubing Diameter (D) in	Maximum Drainage Area (Acres)
PSD-12	12	0.5
PSD-18	18	1.5
PSD-21	21	2.5
PSD-24	24	3.5
PSD-24 (2)	24	5.0

Construction Specifications - Pipe Slope Drain

1. The Pipe Slope Drain (PSD) shall have a slope of 3 percent or steeper.
2. The top of the earth dike over the inlet pipe shall be at least 2 times the pipe diameter measured at the invert of the pipe.
3. Flexible tubing is preferred. However, corrugated metal pipe or equivalent PVC pipe can be used. All connections shall be watertight.
4. A flared end section shall be attached to the inlet end of pipe with a watertight connection. Filter cloth shall be placed under the inlet of the pipe slope drain and shall extend out 5' from the inlet. The filter cloth shall be "keyed in" on all sides.
5. The Pipe Slope Drain shall be securely anchored to the slope by staking at the grommets provided. Spacing for anchors shall be as provided by manufacturer's specification. In no case shall less than two (2) anchors be provided, equally spaced along the length of pipe. These details should be provided by pipe suppliers.
6. The soil around and under the pipe and end section shall be hand tamped in 4 inch lifts to the top of the earth dike.
7. All pipe connections shall be watertight.
8. Whenever possible where a PSD drains an unstabilized area,it shall outlet into a sediment trap or basin. If this is not possible then the slope drain will discharge into a stable conveyance that leads to a sediment trap or basin. When discharging into a trap or basin the PSD shall discharge at the same elevation as the wet pool elevation. The discharge from the PSD must be as far away from the sediment control outlet as possible.
9. When the drainage area is stabilized, the PSD shall discharge onto a stabilized area at a non-erosive velocity.
10. Inspection and any required maintenance shall be performed periodically and after each rain event.
11. The inlet must be kept open at all times.

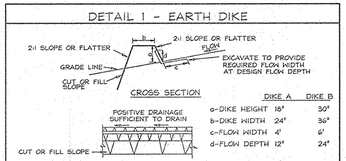
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE B - 5 - 4	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION



RETAINING WALL ENLARGEMENT

LOTS 51 - 54
TO BE BUILT AT SITE DEVELOPMENT PLAN STAGE

DETAIL 1 - EARTH DIKE



	DIKE A	DIKE B
a-DIKE HEIGHT	18"	30"
b-DIKE WIDTH	24"	36"
c-FLOW WIDTH	4'	6'
d-FLOW DEPTH	12"	24"

STANDARD SYMBOL A-2 B-3

FLOW CHANNEL STABILIZATION GRADE 0.5% MIN. 10% MAX.

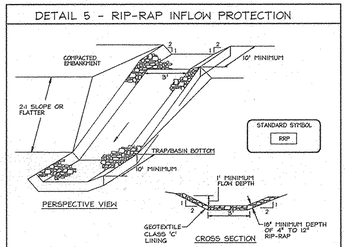
1. Seed and cover with straw mulch.
2. Seed and cover with Erosion Control Matting or line with sod.
3. 4" - 7" stone or recycled concrete equivalent pressed into the soil 7" minimum

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 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.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE B - 6 - 2	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/19/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/19/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 4-16-07

Note: THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

No.	Revisions	Date
⚠2	Removed Retaining Wall Enlargement Details. Relabeled Easement.	02/12/2007
⚠1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.672.0267

RETAINING WALL ENLARGEMENTS and SEDIMENT AND EROSION CONTROL DETAILS

HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — 22118 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
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DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: 1"=20'
DATE: Jan. 23, 2007
W.O. No.: 3018
SHEET No.: 8 OF 20

F-04-111

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SEQUENCE OF CONSTRUCTION

1. Obtain grading permit and contact Howard County Sediment Control Inspector (SCI) to arrange a preconstruction meeting. (1 Day)
2. Install Stabilized Construction Entrance at Fairlee Road as access point for construction. (1 Day)
3. Clear and grub as necessary for installation of sediment control features, including super silt fences, earth dikes, slope drains, and sediment basin.
4. Install silt fence, super silt fence, forebays and CS-1 for sediment basin use phase. Provide temporary 1.0' weir opening and temporary brick and mortar blocking per detail this sheet. (2 weeks)
5. Clear and grub site and install earth dikes and pipe slope drains to convey runoff to basin. Note that earth dikes to be adjusted as grading and filling progresses on a daily basis. * *
6. With permission of SCI, begin road and lot grading. (2 Weeks)
7. Grade roads and lots to subgrade and install storm drain system and grass channels to be used for runoff conveyance to basin,* and construct retaining wall. (4 Weeks)
8. Pave roadways and apply permanent stabilization to all disturbed areas. (2 Weeks)
9. With permission of SCI, remove all silt fences/super silt fences and stabilize those areas. (1 Week)
10. Flush storm drains of sediment. Convert sediment/stormwater basin to permanent SWM(CS-1): dewater and remove accumulated sediment blocking devices on weir, construct permanent weir to proposed elevation, install trash rack, fine grade bottom to proposed elevations and apply permanent seeding and mulching to disturbed areas. (1 week)

* Remove earth dikes and pipe slope drains where storm drains are in-place to convey runoff to basin.

* * Contractor to provide temporary stabilization to perimeter slopes within 7 days of grading or as directed by Howard County Sediment Control Inspector.

HUNTERS RIDGE SWM SUMMARY TABLE

Category	Volume Required	Volume Provided	Notes
Water Quality Volume (WQ_v)	0.5 Ac. Ft.	0.86 Ac. Ft.	0.36 Ac. Ft. stored in micro pool with 0.25 Ac. Ft. of extended detention.
Recharge Volume/Area (Re_v) (Re_a)	0.92 Ac.Ft. 0.99 Ac.	1.0 Ac. Ft.	See Note below
Channel Protection Volume (Cp_v)	33,106 cu. ft	33,106 cu. ft	1/2 incoming volume is detained for 18.48 hrs.
Overbank Flood Protection (Q_p)	N/A	N/A	Not Required
Extreme Flood Volume (Q_f)	N/A	N/A	Not Required

Notes:
Recharge area (Re_a) treatment provided for lots 12-17, 1/2 lot 18, 1/2 lot 35 and all of lots 36-39 with grass channels at average slopes of 4%.
Sheet Flow to Buffer credit taken for lot 11 and 1/2 of lot 19.
Dry well treatment provided for lots 43-54. (Dry wells at downspouts provided).

LEGEND

(SWM Facility Hydrologic Zones Planting Requirements)

Zone 1 - 6406 s.f. - 12"-36" depth below normal pool elevation
Pickerelweed, Deep Water Duck Potato, Sago Pond Plant, Wild Celery, Redhead Grass. Plugs or bare root at 24" centers.

Zone 2 - 7177 s.f. - 0"-12" depth below normal pool elevation
Blue Flag Iris, Duck Potato, Flowering Bulrush, Softrush, Sedges, Lobelia, Pond Cypress, various asters. Plugs or bare root at 24" centers.

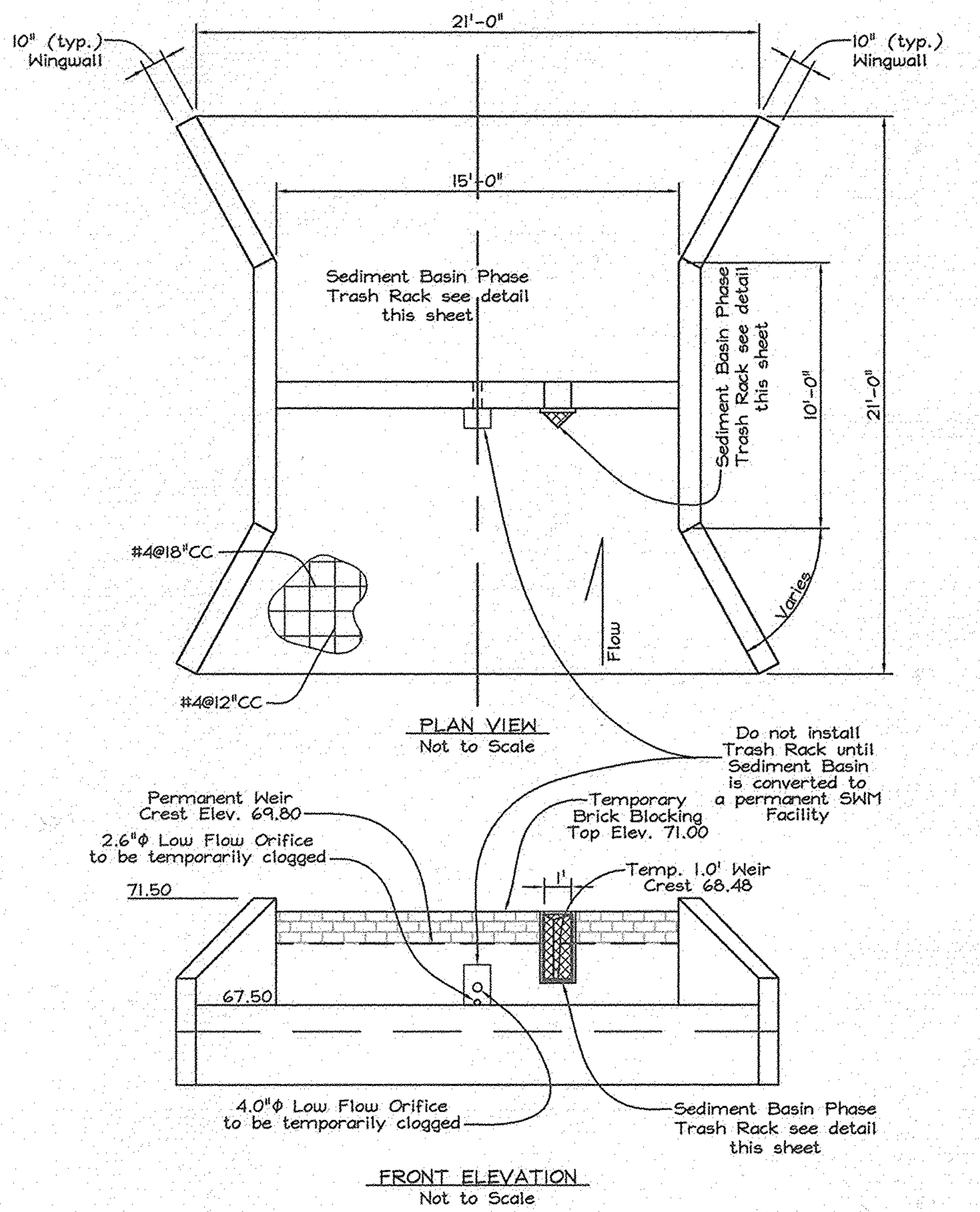
Zone 3 - 11236 - 0"-12" elevation above normal pool elevation
New England Aster, Marsh Aster, Marsch Marigold (Appalachian Plateau), Tussock Sedge, Spotted Joe Pye Weed, Forget Me Nots, Inkberry, Purple, Red Osier Dogwood, Seed Mix Only

Zone 4 - 4488 s.f. - 1' to Cpv water surface elevation
Purple Cone Flower, Birds Foot Trefoil, Slender Rush, Deer Tongue Grass, Lespedeza, Switch Grass, Serviceberry, Gray Birch, Hackberry, Sweet Pepper, Bush (Coastal Plain), Gray Stem Dogwood, Red Osier Dogwood, Green Ash. Seed Mix with potted stock (No trees/shrubs on dam slopes).*

Zone 5 - Cpv to Qp100 water surface elevation
(many wildflowers and native grasses) American Holly, Witch Hazel, Ninebark, Red Oak, American Elderberry, American Hemlock, Lowbush, Blueberry, Maple Leaf Viburnum, Nannyberry, Blackhaw Viburnum Seed Mix with potted stock (No trees/shrubs on dam slopes).*

None Shown — Zone 6 - Qp100 water surface elevation and above
This area will be planted, where necessary, as part of forest conservation obligations. Many Natives. All species must be able to tolerate flood plain conditions.
Native Grasses. Seed Mix with potted stock (No trees/shrubs on dam slopes).*

* Plant mix of 3 potted stock species at density of 2 / 1000 s.f. area.



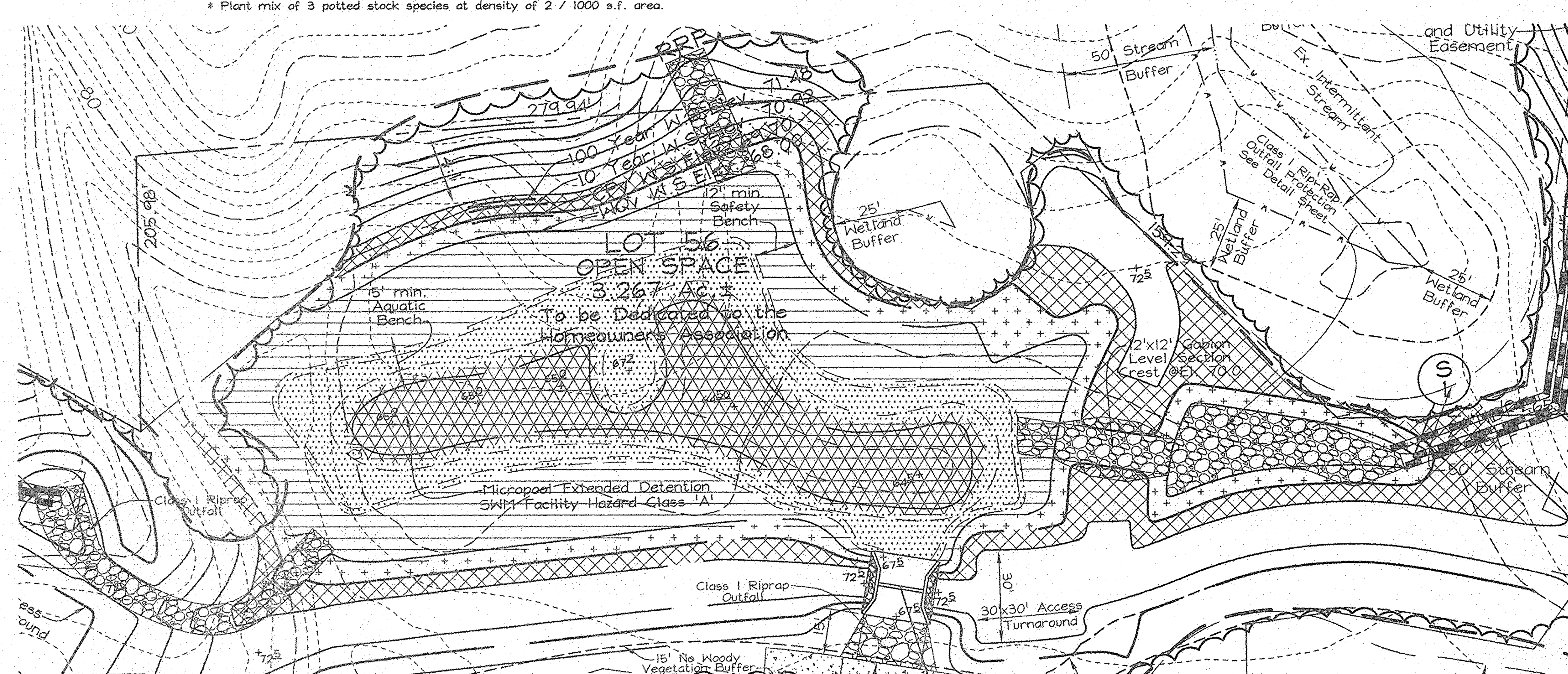
CS-1 CONCRETE WEIR CONTROL STRUCTURE

MODIFICATIONS FOR SEDIMENTCONTROL

NOT TO SCALE

NOTE:

Contractor shall form up a 1.0' wide temporary weir notch in the weir wall at crest elevation 68.48, providing a 2"x2" keyway. Contractor shall extend permanent weir crest to elevation 71.0 using brick and mortar, leaving a 1.0' wide opening to elevation 68.48. Once Sediment Control Measures are removed, these modifications shall be removed and the 1' wide weir shall be formed and poured to the permanent weir crest elevation (69.80).



SWM POND PLANTING DETAIL

Scale: 1" = 30'

21.0 STANDARDS 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 vegetable 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 a 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 that 1 and 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.

II. 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.

iii. 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 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 ammendments 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 place 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.

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, discing 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 acre dolomitic limestone (92 lbs/100 sq.ft.) and 600 lbs per acre 10-10-10 fertilizer (14 lbs./1000 sq.ft.) before seeding. Harrow or disc into upper three inches of soil. At the time of seeding, apply 400 lbs. per acre 30-0-0 ureaform fertilizer (9 lbs/1000 sq.ft.)
2) Acceptable-Apply 2 tons per acre dolomatic limestone (92 lbs/1000 sq.ft.) and apply 1000 lbs. per acre 10-10-10- fertilizer (23 lbs./1000 sq.ft.) before seeding. Harrow or disc 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/1000 sq.ft.) of Turf Type Tall Fescue. For the period May 1 thru July 31, seed with 60 lbs. Turf Type Tall Fescue per acre and 2 lbs. per acre (.05 lbs./1000 sq.ft.) of weeping lovegrass. During the period of October 16 thru February 28, protect site by: Option (1) 2 tons per acre well anchored straw mulch and seed as soon as possible in the spring. Option (2) Use sod. Option (3) Seed with 60 lbs/acre Kentucky 31 Tall Fescue and mulch with 2 tons/acre well anchored straw.

MULCHING: Apply 1 1/2 to 2 tons per acre (70 to 90 lbs/1000 sq. 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/1000 sq.ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq.ft.) for anchoring.

MAINTENANCE: Inspect all seeded areas and make needed repairs, replacements and reseedings.

TEMPORARY SEEDING NOTES

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

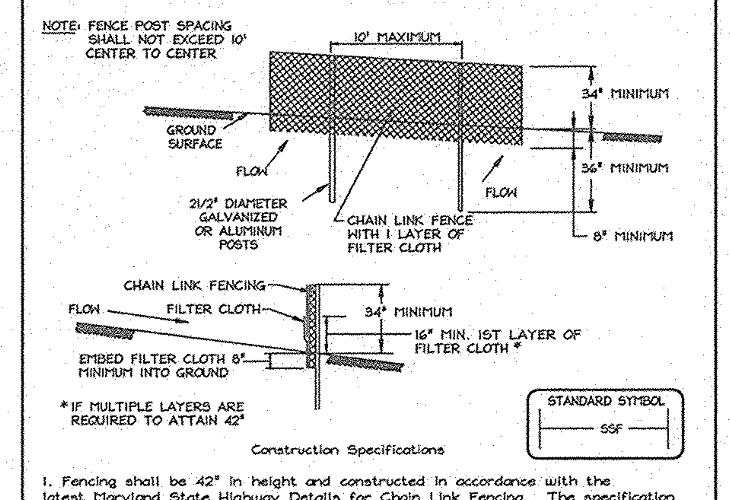
SOIL AMENDMENTS: Apply 600 lbs. per acre 10-10-10 fertilizer (14 lbs./1000 sq.ft).

SEEDING: For periods March 1 thru April 30 and from August 15 thru November 15, seed with 2 1/2 bushel per acre of annual rye (3.2 lbs./1000 sq.ft.) For the period May 1 thru August 14, seed with 3 lbs. per acre of weeping lovegrass (.07 lbs./1000 sq.ft.). For the period November 1 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./1000 sq.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/1000 sq.ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq.ft.) for anchoring.

REFER TO THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR RATE AND METHODS NOT COVERED.

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

SEDIMENT CONTROL NOTES

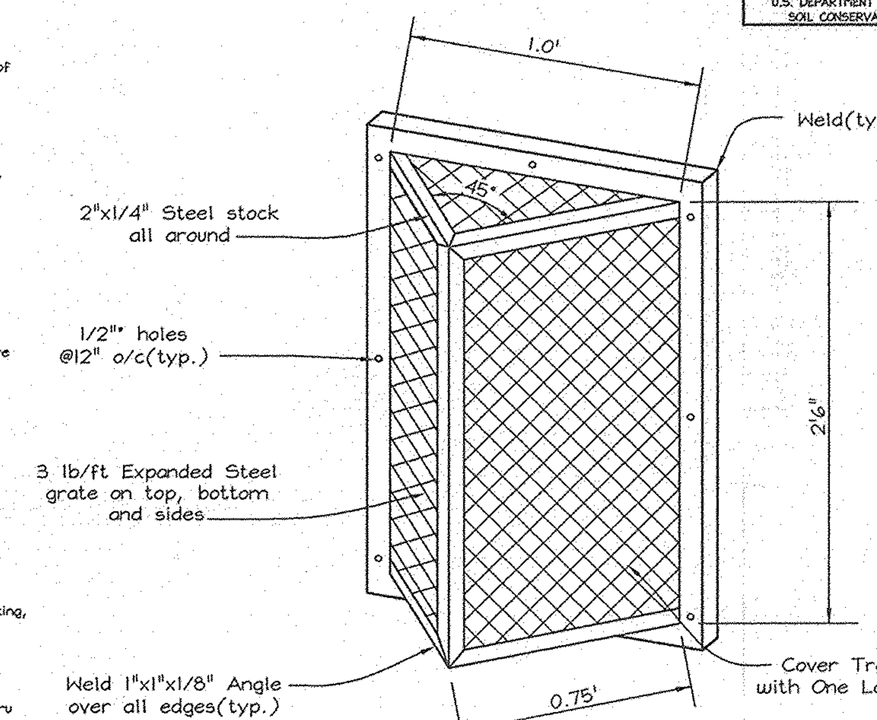
1. A minimum of 48 hours notice must be given to the Howard County Department of Inspection, License and Permits Sediment Control Division prior to the start of any construction (313-1855).
2. All vegetation and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the 1994 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, 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 for permanent seeding, sod, temporary seeding, and mulching (Sec. G). Temporary stabilization with mulch alone shall 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	25.66 Acres
Area Disturbed	17.68 Acres
Area to be roofed or paved	1.39 Acres
Area to be vegetatively stabilized	16.29 Acres
Total Cut	92,098 CY **
Total Fill	91,706 CY **
Offsite waste/borrow area location	*

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 controls 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 shall be back-filled and stabilized within one working day, whichever is shorter.

* To be determined by contractor, with pre-approval of the Sediment Control Inspector with an approved and active grading permit

**Total cut and fill quantities are for permit purposes only. Contractor to verify earthwork quantities.

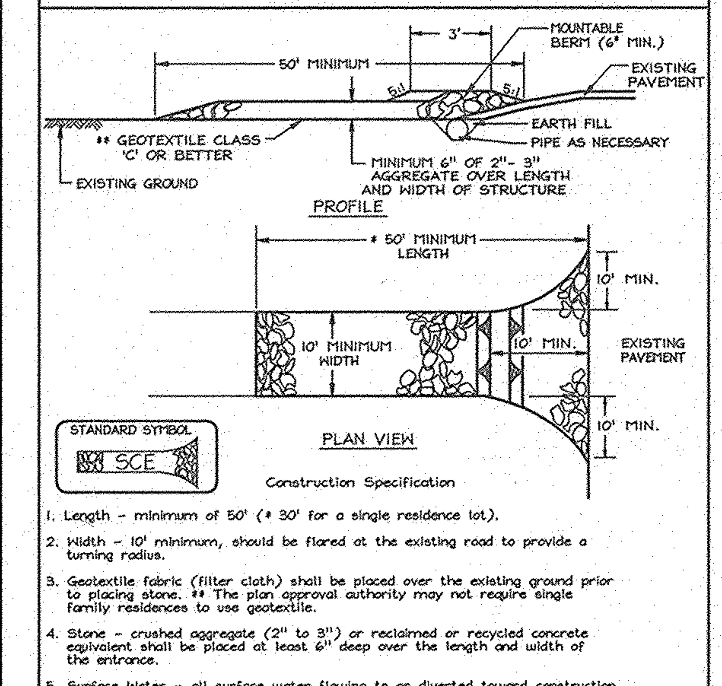


TRASH RACK DETAIL

NOT TO SCALE

Note:
THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE

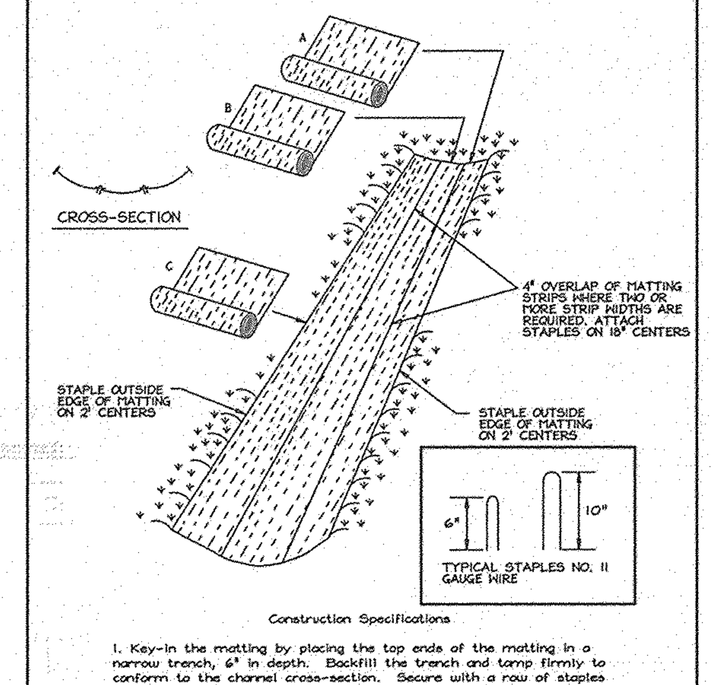


Construction Specification

1. Length - minimum of 50' (* 30' for a 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.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE F - 17 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 30 - 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.

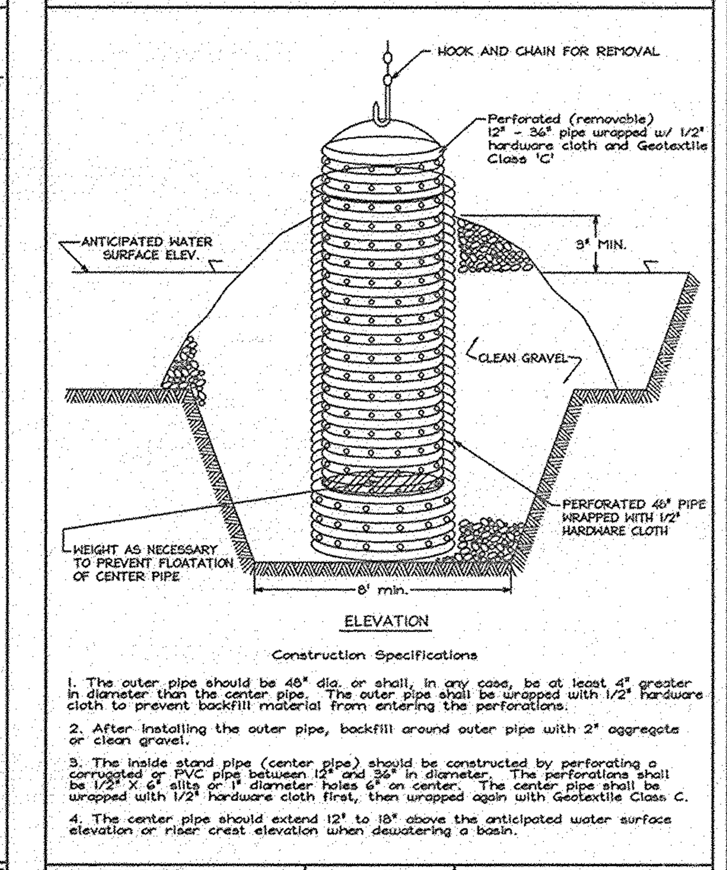
Note: If flow will enter from the edge of the matting then the area effected by the flow must be keyed-in.

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

NOTES FOR TEMPORARY TRASH RACK

(To be used on Temporary Weir during Sediment Basin Phase only.)
1. Trash rack to be centered over opening.
2. Steel to conform to ASTM A-36.
3. All surfaces to be coated with ZRC cold galvanizing compound after welding.
4. Trash rack to be fastened to the wall with 1/2" masonry anchors. Trash rack to be removeable.

DETAIL 20A - REMOVABLE PUMPING STATION

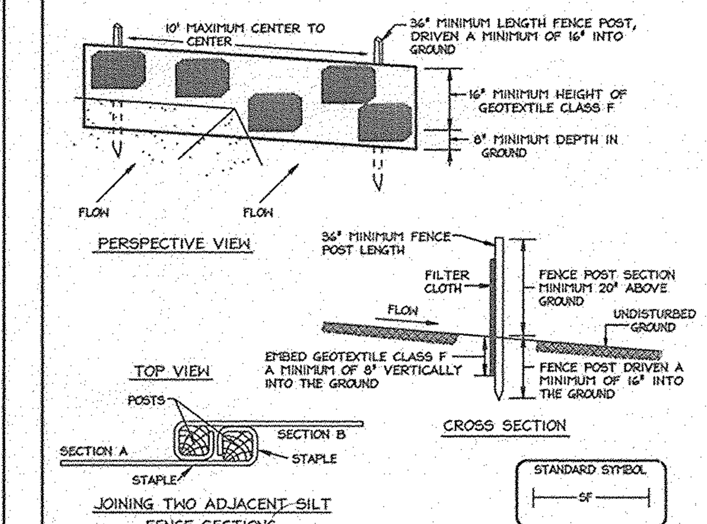


Construction Specifications

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.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE D - 12 - 4	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

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 1 1/2" x 1 1/2" square (minimum) cut, or 1 3/4" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighing not less than 1.00 pound 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 ft /minute (max.)	Test: MSMT 322
Filtering Eggeciency	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 reaches 50% of the fabric height.

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

SEDIMENT BASIN SCHEDULE (CS-1)

Drainage Area 22.23 Ac.
Storage Required 40,014 cu.ft. wet & dry
Storage Provided 40,014 cu.ft. wet & dry
Weir Length 15' tot.
Bottom Elevation: 64.5
Cleanout Elevation: 67.5
Embankment Elevation: 73.0 (constructed)
Wet Storage Elevation: 68.48
Dry Storage Elevation: 70.20
Q_1 Existing: 12.17 CFS
Q_1 Proposed: 8.65 CFS @ elevation 70.44
Q_{10} Existing: 66.51 CFS
Q_{10} Proposed: 52.77 CFS @ elevation 71.78

No.	Revisions	Date
2	Revised Title Block Lot Numbers	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

SEDIMENT AND EROSION CONTROL AND SWM POND NOTES AND DETAILS

HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — ZACHARIA YOSEF FISCH — 22418 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY: KO
DRAWN BY: KO
CHECKED BY: ZYF
SCALE: As Shown
DATE: Mar. 21, 2007
W.O. No.: 3018
SHEET No.: 7 OF 20

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 4/19/07
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

[signature] 4/19/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

[signature] 4-16-07
CHIEF, BUREAU OF HIGHWAYS — DATE

DEVELOPER'S CERTIFICATE

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

[signature] 3.23.07
SIGNATURE OF DEVELOPER — DATE
RICHMOND AMERICAN HOMES OF MARYLAND, INC.

ENGINEERS CERTIFICATE

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

Zacharia Y. Fisch 3.23.07
SIGNATURE OF ENGINEER — DATE
ZACHARIA Y. FISCH

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

[signature] 4/10/07
USDA-NATURAL RESOURCES CONSERVATION SERVICE — DATE

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

[signature] 4/10/07
HOWARD SOIL CONSERVATION DISTRICT — DATE

F-04-111

M:\KOHN 3018\dwg\Final\3018_3n_s7.dwg, 3/23/2007 9:54:57 AM, ded, 1:1

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/19/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/19/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

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ZACHARIA Y. FISCH

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USDA-NATURAL RESOURCES CONSERVATION SERVICE — DATE 4/10/07

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HOWARD SOIL CONSERVATION DISTRICT — DATE 4/10/07

No.	Revisions	Date
2	Revised Title Block, Lot Numbers, and Removed Retaining Wall Easement.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

Note: THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

OWNER/DEVELOPER

Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

SEDIMENT AND EROSION CONTROL AND GRADING PLAN

HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — ZACHARIA YOSEF FISCH — 22418 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: 1"=50'
DATE: Mar. 21, 2007
W.O. No.: 3018
SHEET No.: 6 OF 20

F-04-111

LEGEND

Existing Contour	------------ 382
Proposed Contour	—(82)—
Spot Elevation	+82 53
Direction of Flow	
Tree Protection Fence	
Existing Trees to Remain	
Light Poles	Post Top / Overhead / Bollard
Stabilized Construction Entrance	SCE
Silt Fence	SF
Super Silt Fence	SSF
Earth Dike	A-1
Limit of Disturbance	LOD
Erosion Control Matting	ECM
Rip-Rap Inflow Protection	RRP
Gabion Inflow Protection	GM
Removable Pumping Station	RPS
Grass Swale for Recharge	⇒

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[signature] 3.23.07

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Zacharia Y. Fisch 3.23.07

SIGNATURE OF ENGINEER DATE
ZACHARIA Y. FISCH

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

Jim Meyer 4/10/07

USDA-NATURAL RESOURCES CONSERVATION SERVICE DATE

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[signature] 4/10/07

HOWARD SOIL CONSERVATION DISTRICT DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 4/19/07
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[signature] 4/9/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

[signature] 4-16-07
CHIEF, BUREAU OF HIGHWAYS DATE

Note:
THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

No.	Revisions	Date
2	Revised Lots and Lot Numbers, Grading, & Pipestems. Deleted Retaining Walls. Relabeled Easement. Moved Street Light. Re-Subdivided Lot 5.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

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SEDIMENT AND EROSION CONTROL AND GRADING PLAN
HUNTERS RIDGE

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STATE OF MARYLAND — ZACHARIA YOSEF FISCH — 22413 — PROFESSIONAL ENGINEER

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Tel:410-750-2251 Fax: 410-750-7350
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DESIGN BY: PS/KO
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SHEET No.: 5 OF 20

F-04-111

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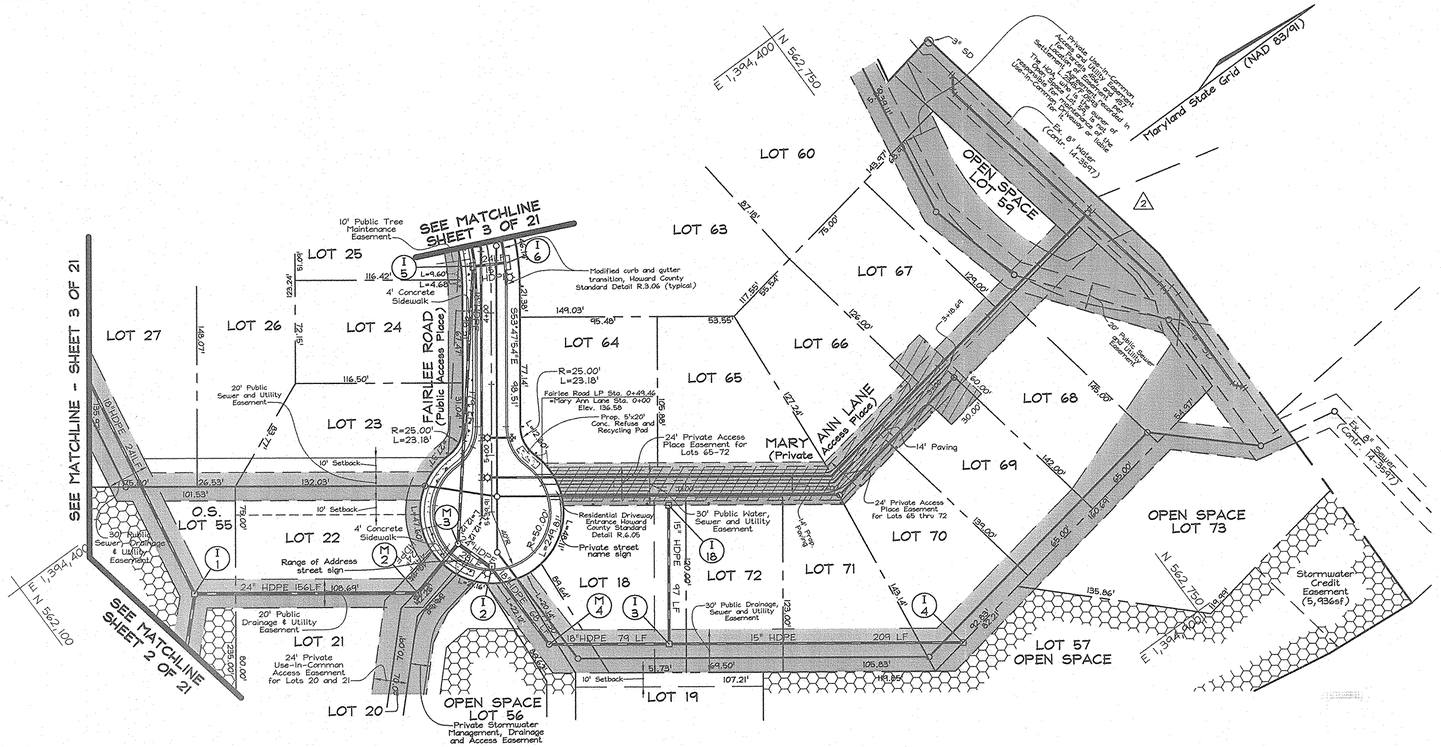
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/19/07

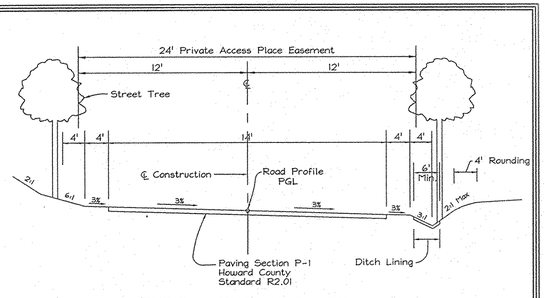
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/19/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 4-16-07



ROAD PLAN
SCALE: 1"=50'



TYPICAL ROADWAY SECTION
CLASSIFICATION : PRIVATE ACCESS PLACE
NOT TO SCALE

No.	Revisions	Date
2	Revised Lots and Lot Numbers. Deleted Retaining Wall. Revised Pipesterms. Moved Street Light. Re-Subdivided Lot 5. Revised Easements.	02/12/2007
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OWNER/DEVELOPER
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Columbia, Md 21045
410.872.0267

ROAD PLAN AND PROFILE
PRIVATE ACCESS PLACE
HUNTERS RIDGE

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1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — JOSHUA YORK FISCH — 22418 — PROFESSIONAL ENGINEER
Expiration Date: 2-14-09

FSH Associates
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Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

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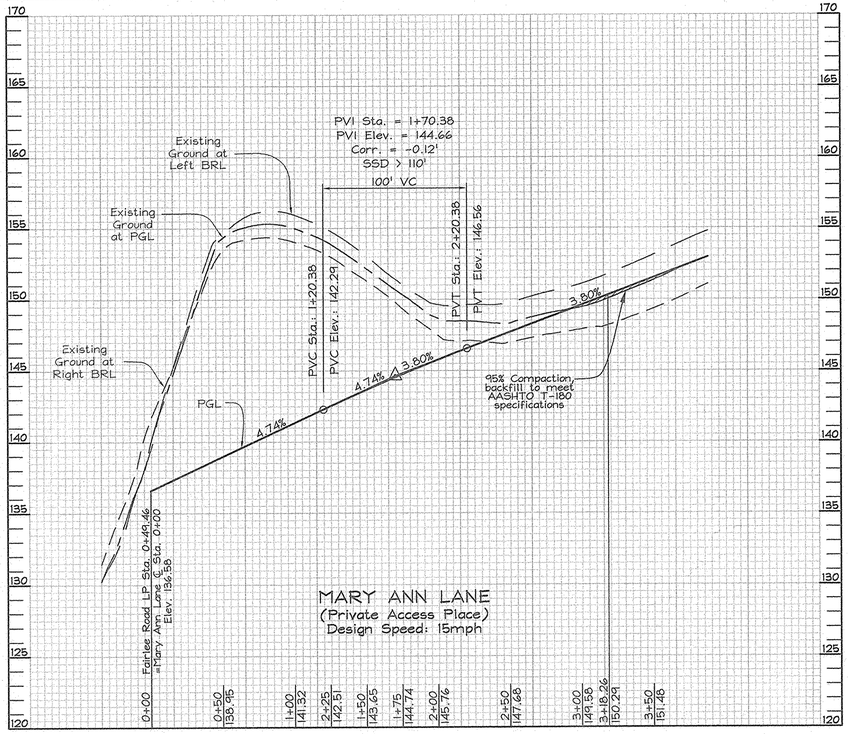


ROAD PROFILE
SCALE- HORIZONTAL: 1"=50'
VERTICAL: 1"=5'

SEE MATCHLINE - THIS SHEET

LOT 37 LOT 36 LOT 38

20' Private Drainage & Utility Easement
20' Public Drainage & Utility Easement

24" HDPE 272 LF

OPEN SPACE LOT 55

LOTS 44-48 WESLEY WOODS SECTION 2 P-03-06 ZONED R12

LOTS 32-41 WESLEY WOODS SECTION 1 PLAT NO. 14928 ZONED R12

MOUNT AUGUSTINE SEC. 2 AREA P.B. 29 F. 100

OPEN SPACE LOT 71 MOUNT AUGUSTINE SECT. AREA 2 PLAT #9413 ZONED R-12

N 561,650 E 1,393,600

EXISTING BULK PARCEL 'C'

LOT 1 LOT 2 LOT 3 LOT 4

N06°17'11"W 87.69'

Range of Address street sign

Maryland State Grid (NAD 83/91)

N 562,700 E 1,394,400

FAIRFIELD ROAD (Public Access Street)

LOT 62

SEE MATCHLINE SHEET 4 OF 21

N36°12'06"E 104.32'

N36°12'06"E 804.47'

N36°12'06"E 210.54'

Private H.O.A. Retaining Wall Maintenance Easement for Lots 51-54

Fairlee Road ℄ Sta. 2+18.60 = Joseph Scott Drive ℄ Sta. 0+00 Elev. 160.07

LOT 43 LOT 44 LOT 45 LOT 46 LOT 47 LOT 48 LOT 49 LOT 50 LOT 51 LOT 52 LOT 53 LOT 54

LOT 42 LOT 41 LOT 40 LOT 39 LOT 38 LOT 37 LOT 36 LOT 35 LOT 34 LOT 33 LOT 32 LOT 31 LOT 30 LOT 29 LOT 28 LOT 27 LOT 26 LOT 25 LOT 24

N33°33'18"W 540.41'

176.17'

24" Private Use-In-Common Driveway Access Easement for Lots 43 and 45

Range of Address street sign

6"x10' Public Water Easement for Fire Hydrant

20' Private Drainage & Utility Easement

6"x10' Public Water Easement for Fire Hydrant

Public Drainage & Utility Easement

Modified curb and gutter transition, Howard County Standard, Detail R.3.06 (typical)

10' Public Tree Maintenance Easement

Modified curb and gutter transition, Howard County Standard Detail R.3.06 (typical)

4' Concrete Sidewalk

30' Public Storm Drain and Storage Area Easement

OPEN SPACE LOT 55

JOSEPH SCOTT DRIVE (Public Access Street)

℄ Sta.9+71.67=LP Sta.2+59.69 PC Elev. 129.01

℄ Sta.9+71.67=LP Sta. 0+00 PC Elev. 129.01

PRC ℄ Sta. 4+40.21 Elev. 126.23

PRC ℄ Sta. 2+56.34 Elev. 130.26

PT ℄ Sta. 2+56.34 Elev. 140.22

PC ℄ Sta. 1+28.76 Elev. 150.26

PC ℄ Sta. 7+56.85 Elev. 130.16

PT ℄ Sta. 2+18.60 Elev. 160.07

SEE MATCHLINE - SHEET 2 OF 21

SEE MATCHLINE SHEET 4 OF 21

Note: THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

10' Public Tree Maintenance Easement

40'- RIGHT OF WAY (R/W)

8' 24' 8'

2' 1' 4' 3' ℄ Construction Profile Grade Line Profile Grade Line Linear Profile 5' 1'

4% 2% 33' 33' 4% 2%

4" Rounding

4" Concrete Sidewalk (R 3.06)

P-2 Paving

Modified Combination Curb and Gutter (R 3.01)

TYPICAL ROADWAY SECTION
CLASSIFICATION: PUBLIC ACCESS PLACE
ROAD: JOSEPH SCOTT DRIVE
DESIGN SPEED: 25 MPH
NOT TO SCALE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/9/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/9/07

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 4-16-07

PAVEMENT WIDTH INDICATED ON TYPICAL STREET SECTIONS SHALL BE MEASURED TO THIS POINT (FLOW LINE)

NOTE: ROLLED CONFIGURATION SHOWN ABOVE SHALL BE USED ONLY ON CUL-DE-SAC STREETS, LOCAL ROADS, OR MINOR COLLECTOR ROADS

SHA TS2.10 STANDARD

MODIFIED CURB & GUTTER
HOWARD COUNTY STANDARD R3.01
NOT TO SCALE

ROAD PLAN
SCALE: 1"=50'

No.	Revisions	Date
2	Revised Lot Number. Removed Retaining Wall Easement.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

ROAD PLAN AND PROFILE
JOSEPH SCOTT DRIVE
HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — VIRGINIA VOSBERGIAN — 22418 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: As Shown
DATE: Mar. 21, 2007
W.O. No.: 3018
SHEET No.: 3 OF 20

Low Point Elev. = 125.77
Low Point Sta. = 1+29.84
PVI Sta. = 1+29.84
PVI Elev. = 123.82
195.00' VC

PVC Sta.: 0+32.34
PVC Elev.: 127.72
PVT Sta.: 2+27.34
PVT Elev.: 127.72
Low Point
PGL @ Edge of Paving
-4.00%
-2.00%
+2.00%
+4.00%
95% Compaction, backfill to meet AASHTO T-180 specifications
Existing Ground at PGL
Existing Ground at BRL
Begin Linear Profile ℄ Sta. 9+71.67 = LP Sta. 0+00 El.: 129.01
End Linear Profile ℄ Sta. 9+71.67 = LP Sta. 2+59.69 El.: 129.01

JOSEPH SCOTT DRIVE
Linear Profile

HP ELEV = 130.59
HP STA = 8+25
PVI STA = 8+25
PVI ELEV = 130.84
A.D. = -2.00
K = 50.00
100.00' VC

PVC Sta.: 8+75
PVC Elev.: 130.34
PVT Sta.: 7+75
PVT Elev.: 130.34
Existing Ground at Left BRL
Existing Ground at PGL
Begin Linear Profile ℄ Sta. 9+71.67 El.: 129.37
PGL
-1.00%
1.00%
95% Compaction, backfill to meet AASHTO T-180 specifications
High Point

Low Point Elev. = 127.68
Low Point Sta. = 4+95.68
PVI Sta. = 3+75
PVI Elev. = 126.34
Corr. = 4.07'
SSD = >160'
295.00' VC

PVT Sta.: 5+22.50
PVT El.: 127.61
Low Point
Existing Ground at Right BRL
PVC Sta.: 2+27.50
PVC El.: 141.09
PGL
-10.00%
1.00%
-3.00%
-4.00%
-10.00%
95% Compaction, backfill to meet AASHTO T-180 specifications
PVT Sta.: 1+11
PVT El.: 152.74
100.00' VC
PVI Sta. = 0+61
PVI Elev. = 157.74
Corr. = -0.75'
SSD = >160'
PVC Sta.: 0+11
PVC El.: 159.74
℄ Sta. 0+00 = Fairlee Road ℄ Sta. 2+18.60 Elev.: 160.07

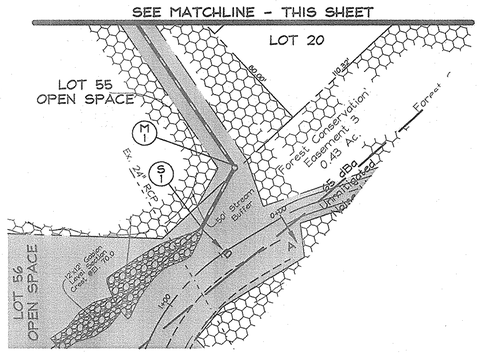
JOSEPH SCOTT DRIVE
(Public Access Street)
Design Speed: 25mph

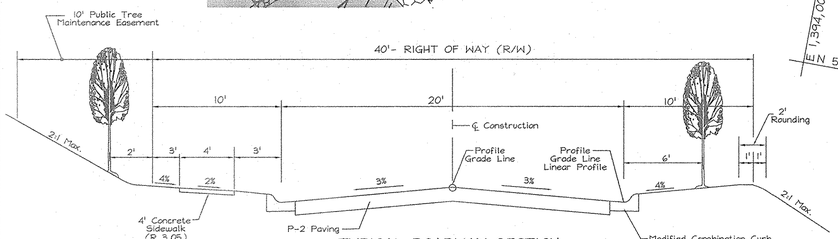
0+00	129.01	0+50	127.07	0+75	126.38	1+00	125.95	1+25	125.77	1+50	125.85	1+75	126.18	2+00	126.76	2+25	127.62	2+50	128.62

9+50	129.59	9+00	130.09	8+75	130.34	8+50	130.53	8+25	130.59	8+00	130.53	7+75	130.34	7+50	130.09	7+00	129.59	6+50	129.09	6+00	128.59	5+50	128.09	5+00	127.68	4+75	127.76	4+50	128.07	4+25	128.61	4+00	129.39	3+75	130.40	3+50	131.64	3+25	133.11	3+00	134.82	2+75	136.76	2+50	138.95	2+00	143.84	1+50	148.84	1+00	153.80	0+75	155.95	0+50	157.72	0+25	159.12	0+00	160.07

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

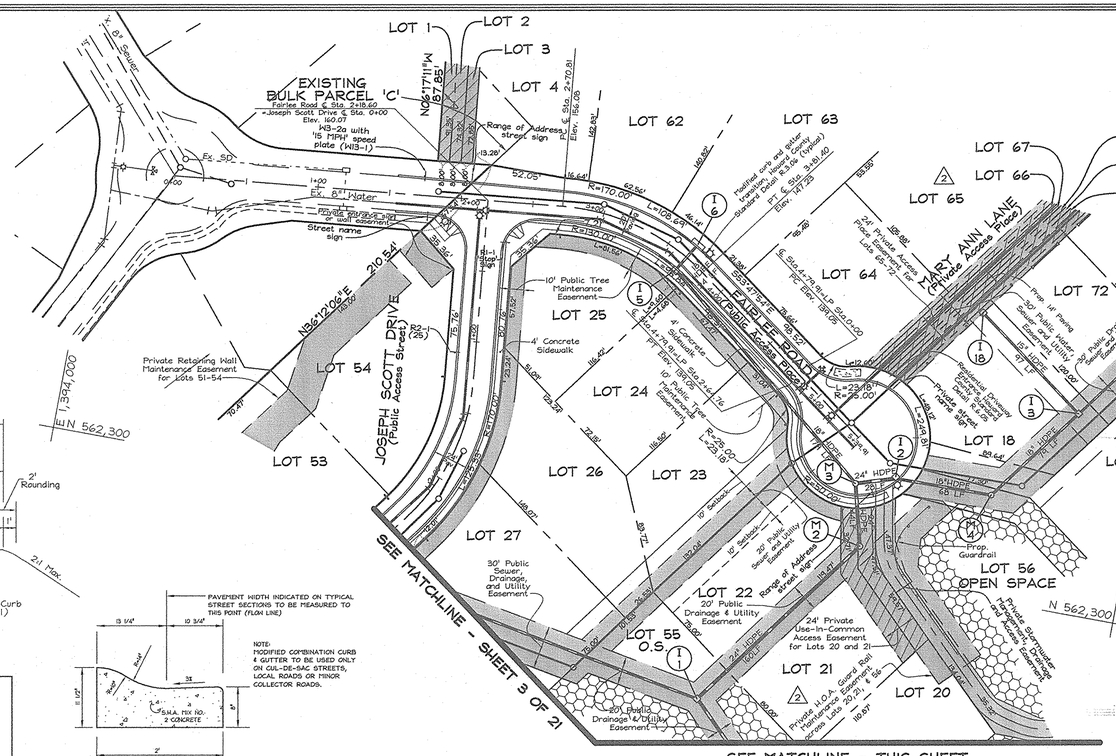
F-04-111





TYPICAL ROADWAY SECTION
CLASSIFICATION: PUBLIC ACCESS PLACE

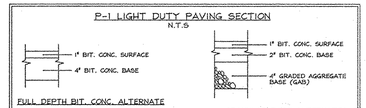
ROAD: FAIRLEE ROAD
DESIGN SPEED: 15 MPH
NOT TO SCALE



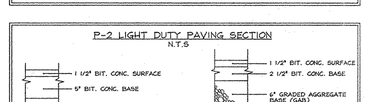
ROAD PLAN
SCALE: 1"=50'

MODIFIED CURB & GUTTER
HOWARD COUNTY STANDARD R3.01
NOT TO SCALE

P-1 LIGHT DUTY PAVING SECTION
N.T.S



P-2 LIGHT DUTY PAVING SECTION
N.T.S



Note:
The typical sections shown relate to C.B.R. value of 7.
Field conditions may require modifications to the above paving sections per on-site Geotechnical Engineer.

No.	Revisions	Date
2	Revised Lot Numbers and Removed Retaining Walls. Relabeled Easement.	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

Note:
THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

ROAD PLAN AND PROFILE
FAIRLEE ROAD
HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72 2
OPEN SPACE LOTS 55 THRU 59 & 73 1
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 4/19/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 4/19/07

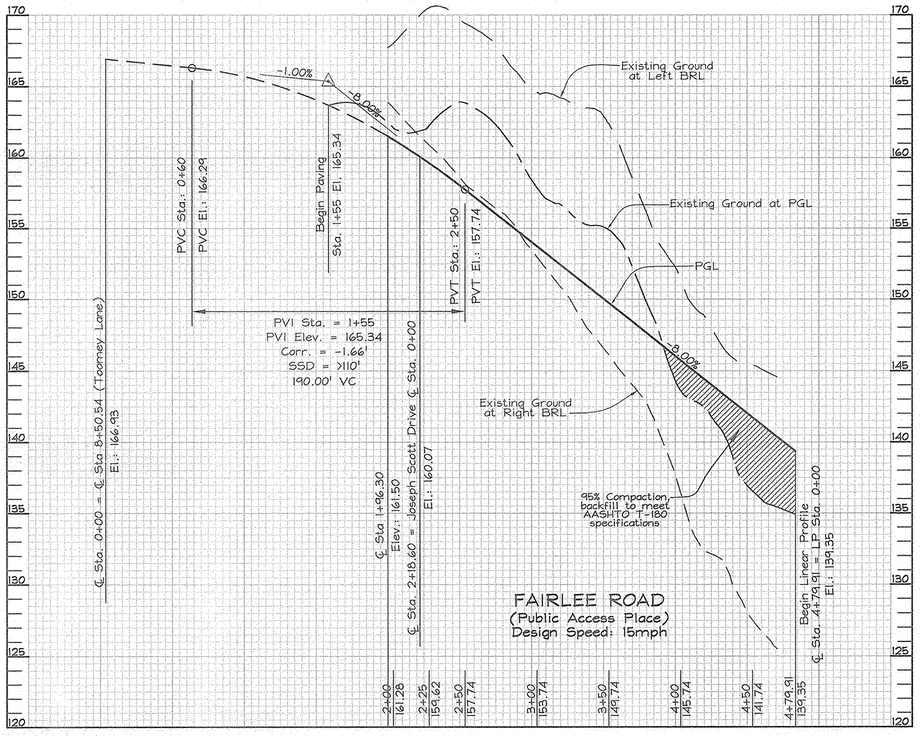
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

CHIEF, BUREAU OF HIGHWAYS — DATE 4-16-07

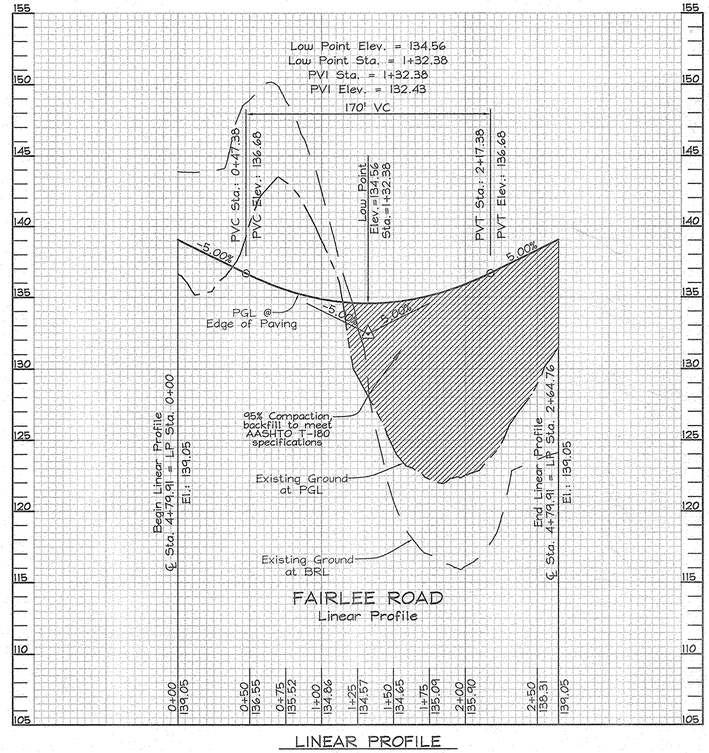
STATE OF MARYLAND — PAUL S. KOHLHAAS — No. 22418 — PROFESSIONAL ENGINEER

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

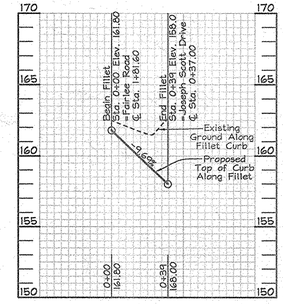
DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: As Shown
DATE: Mar. 21, 2007
W.O. No.: 3018
SHEET No.: 2 OF 20



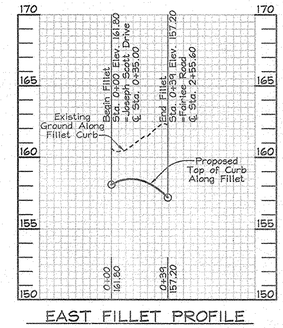
ROAD PROFILE
SCALE- HORIZONTAL: 1"=50'
VERTICAL: 1"=5'



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



WEST FILLET PROFILE
SCALE- HORIZONTAL: 1"=50'
VERTICAL: 1"=5'



EAST FILLET PROFILE
SCALE- HORIZONTAL: 1"=50'
VERTICAL: 1"=5'

F-04-111

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FINAL ROAD CONSTRUCTION PLAN
HUNTERS RIDGE

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73, AND A RESUBDIVISION OF BULK PARCEL 'C' WESLEY WOODS, SECTION 1
HOWARD COUNTY, MARYLAND

GENERAL NOTES

1. Subject property zoned "R-12" per 2/2/04 Comprehensive Zoning Plan.
2. This site is located within the metropolitan district.
3. Public water and sewer will be used within this site.
4. Howard County Soils Map 26.
5. Gross area of site subject to subdivision:
   a. Parcel 163: 25.58 ac.
   b. Bulk Parcel 'C': 3,321sf± or 0.08 ac.
   c. Total area: 25.66 ac.
6. Total area of steep slopes on site: 2.88 ac.±
7. Net area of site subject to subdivision: 22.78 ac.±
8. Area of proposed public r/w: 1.54 ac.±
9. Number of proposed buildable lots: 54
10. Area of proposed buildable lots: 12.33 ac.±
11. Number of proposed open space lots: 6
12. Area of proposed open space lots: 11.789 ac.±
13. Topography is based on a field run topography survey prepared by Fisher, Collins & Carter, inc. in Feb. of 2001 and aerial topography prepared by Harford Aerial Surveys, inc. in Feb. of 1999.
14. Field run boundary survey prepared by Fisher, Collins & Carter, inc. on April 2, 2001.
15. The coordinates shown hereon are based upon the Howard County Geodetic Control which is based on the Maryland State Plane Coordinate system. Howard County monument numbers 321A and 31BB were used for this project.
16. A.P.F.O. traffic study prepared by Street Traffic Studies L.T.D. and approved under S-01-24.
17. Wetlands delineation and report and forest stand delineation and report prepared by Exploration Research inc. and approved under S-01-24.
18. There are no floodplains, historic structures or cemeteries on-site.
19. No clearing, grading or construction is permitted within wetlands, streams or their required buffers, and steep slopes of 25% or greater containing a contiguous area of 20,000 SF or more, unless waivers have been approved. The steep slope disturbance for the construction of an access driveway for maintenance of the SWM facility located within Open Space Lot 56 determined to be necessary by DPZ in accordance with Section 16.116(c) of the Subdivision Regulations.
20. Open Space requirements:
   a. Open Space required (30%-8,400sf minimum lot size): 25.58ac.± x 0.30 = 7.697ac.±
   b. Open Space provided: 11.789 ac.±(0.2 ac.± non-credited)
21. Recreational open space requirements:
   a. Open Space required (200sf per buildable lot): 54 x 200 = 10,800 sf
   b. Open Space provided: 10,800 sf±
22. This plan is subject to the Fourth Edition of the Subdivision and Land Development Regulations and the Zoning Regulations as amended by Council Bill No. 50-2001. Development or construction on these lots must comply with setback and buffer regulations in effect at the time of submission of the site development plan, waiver petition, or building and grading permits.
23. The lots shown hereon comply with the minimum ownership width and lot area as required by the Maryland State Department of the Environment.
24. Internal landscaping for lots 25 and 54 will be shown at Site Development Plan stage.
25. For flag or pipestem lots, refuse collection, snow removal and road maintenance are provided to the junction of the flag or pipestem and road right-of-way line and not to the pipestem lot driveway.
26. Existing house on Lot 62 to be removed.
27. Stormwater management & water quality is provided as necessary in accordance with the 2000 stormwater management manual. Pond to be a micro pool extended detention pond hazard class 'A'. Facility to be owned and maintained by the Homeowners Association. Stormwater Management recharge requirement will be provided through grass channel credit, sheet flow to buffer credit and storage/infiltration within forebay at S-1 outfall and gravel recharge apron at S-2 outfall. A Level Spreader will be provided on Lot 19.
28. All ditches and swales will have erosion control matting.
29. This project is subject to review and approval by the Maryland Aviation Administration (MAA) regarding confirmation that construction of proposed structures on this site will not penetrate any navigational airspace and that the proposed SWM landscaping will meet their approval requirements. Permit number 04-064 has been approved in a letter dated 6/23/04.
30. CPv management for a portion of Wesley Woods (3 ac.±) is provided in the stormwater management facility on site.
31. A gravity sewer service waiver of Section 4.3.B.3.b of Volume II of the Howard County Design Manual has been approved by the Department of Public Works Bureau of Engineering for Lots 34-39 on June 18, 2004.
32. The contractor shall notify the following utility companies or agencies at least five(5) working days before starting work shown on these plans:

State Highway Administration	410.531.5533
BGE(contractor services)	410.850.4620
BGE(underground damage control)	410.787.9068
Miss Utility	1.800.257.7777
Colonial Pipeline Company	410.795.1390
Howard County, Dept. of Public Works, Bureau of Utilities	410.313.4900
Howard County Health Department	410.313.2640

33. The contractor shall notify Miss Utility at 1-800-257-7777 at least 48 hours prior to any excavation work being done.
34. The contractor shall notify the Department of Public Works/Bureau of Engineering Construction Inspection Division at (410) 313-1880 at least five (5) working days prior the start of work. All fills for public road surfaces require 95% compaction (AASHTO-T-180).
35. Landscape surety is based on the required landscaping of 65 shade trees, 23 evergreen trees, the Private Access Place street tress (19), and refuse pad shrubs (10), in the amount of $28,950.00.
36. This project complies with the requirements of section 16.1200 of the Howard County Code for Forest Conservation by retaining 1.65 acres of forest and planting 0.60 acres of reforestation within Forest Conservation Easement 1, retaining 2.60 acres of forest and planting 0.47 acres of reforestation within Forest Conservation Easement 2, planting 0.43 acres of reforestation within Forest Conservation Easement 3, and retaining 2.00 acres of forest and planting 0.23 acres of reforestation within Forest Conservation Easement 4. Total retention = 6.25 ac. Total reforestation provided = 1.72 ac. $91,911.74 surety to be posted with the Developer's Agreement. Requested Fee-in-lieu for 1.61 ac remaining obligation is $35,065.80.
37. Previous Howard County file numbers: S-99-16; S-01-24; WP-99-87; P-03-12
38. All construction shall be in accordance with the latest standards and specifications of Howard County plus MSHA standards and specifications if applicable.
39. Traffic control devices, markings and signing shall be in accordance with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD). All street and regulatory signs shall be in place prior to the placement of any asphalt.
40. Open Space Lots 55 thru 59, and 73:
   a. Open Space Lots 55, 57, and 73 to be dedicated to Howard County.
   b. Open Space Lots 56, 58, and 59 to be dedicated to the Homeowners Association.
41. Per the geotechnical report, prepared by Herbst/Benson & Associates, the following procedures are recommended for basin and embankment construction:
   a. Along the area of the proposed embankment, strip all vegetation, topsoil and any surface organically contaminated soils to expose relatively clean existing fills or competent native soils.
   b. Proof roll the exposed surface with a loaded tandem dump truck to delineate unsuitable areas and cut out any soft yielding areas to expose firm underlying soils.
   c. Excavate the core trench to a minimum depth of 4 feet below the proposed basin elevation using a minimum 4-foot bottom trench width and side slopes no steeper than 1:1. Beneath the principal spillway, the core trench depth should extend at least 4 feet beyond the bottom of the pipe cradle and use similar bottom widths and side slopes. Compact the bottom of the trench excavation to firm, unyielding condition.
   d. Backfill the core trench excavation using the native CL cut soils from the west slope as represented by boring SWM-4. Judging from the moisture/compacted density test results shown of SHEET 1, COMPACTION TEST, the fill should be readily compactible at the existing moisture content.
   e. Prior to placing the principal spillway pipe and cradle, examine the founding soils along the pipe alignment outside the core trench area. Undercut any organic or otherwise unsuitable material and compact the exposed grade to a firm, unyielding condition. The existing fill soils and core trench fills are expected to adequately support principal spillway construction providing that the applied bearing pressures do not exceed 1,000 PSF. Backfill the principal spillway excavation and place embankment fill using the native cut soils from the western slope and approved existing CL clay fill soil from the basin excavation to form the embankment.

General Notes to be Continued

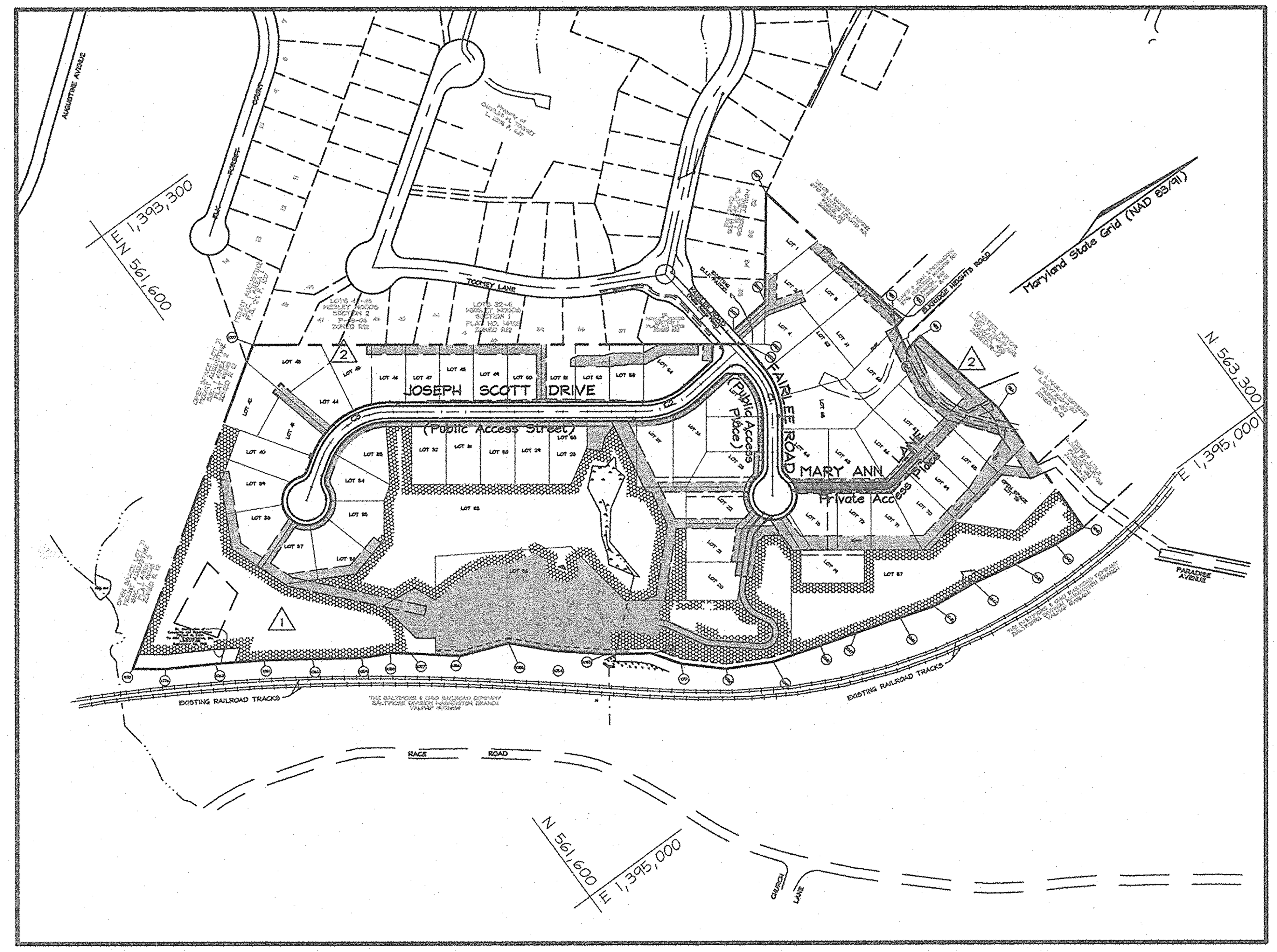
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

4/19/07
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

4/19/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

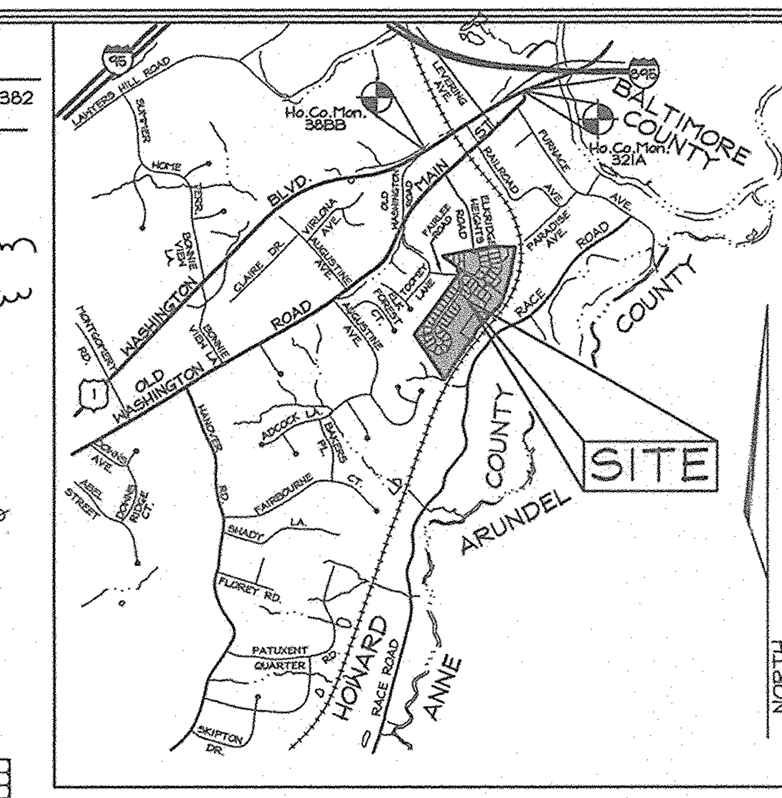
4-16-07
CHIEF, BUREAU OF HIGHWAYS — DATE



LOCATION MAP
SCALE: 1"=200'

LEGEND

Existing Contour	382
Proposed Contour	82
Existing Spot Elevation	382.3
Proposed Spot Elevation	+82.53
Direction of Flow	
Existing Trees to Remain	
15-24.99% Slopes	
25% and Greater Slopes	
Wetlands	
Utility Pole	Guy Wire, Pole
Access Easement	
Access and Utility Easement	
Proposed Drainage Swale	
Proposed Dry Well	
Forest Conservation Easement	



VICINITY MAP
SCALE:1=2000'

BENCHMARKS

Sta.	321A	N 172,232.2977	E 425,261.5439	El.: 8.4417 (meters)
		N 565,065.463	E 1,395,212.248	El.: 27.696 (feet)
Sta.	38BB	N 171,909.8745	E 424,785.3620	El.: 19.6328 (meters)
		N 564,007.646	E 1,393,649.975	El.: 64.412 (feet)

SHEET INDEX

DESCRIPTION	SHEET No.
Cover Sheet	1 of 20
Road Plan and Profile - Fairlee Road	2 of 20
Road Plan and Profile - Joseph Scott Drive	3 of 20
Road Plan and Profile - Private Access Place	4 of 20
Sediment and Erosion Control and Grading Plan	5 of 20
Sediment and Erosion Control and Grading Plan	6 of 20
Sediment and Erosion Control and SWM Pond Notes and Details	7 of 20
Retaining Wall Enlargement Plan and SEC Details	8 of 20
Storm Drain Drainage Area Map	9 of 20
Storm Drain Profiles	10 of 20
Storm Drain Profiles	11 of 20
Stormwater Management Notes and Details	12 of 20
Landscape Plan, Notes and Details	13 of 20
Landscape Plan, Notes and Details	14 of 20
Forest Conservation Plan	15 of 20
Forest Conservation Plan	16 of 20
Forest Conservation Notes and Details	17 of 20
Retaining Wall Profile, Details & Wall Section	18 of 20
Retaining Wall Tables, Details & Civil Plan	19 of 20
Retaining Wall Specifications	20 of 20

CENTERLINE ROAD CURVE DATA

CURVE #	RADIUS	LENGTH	DELTA	TANGENT	CHORD BEARING	CHORD LENGTH
C1	150.00	110.59	42°14'27"	57.94	N74°55'08"W	108.10
C2	150.00	110.59	42°14'27"	57.94	N15°04'52"E	108.10
C3	150.00	183.26	70°00'00"	105.03	S01°12'06"W	172.07

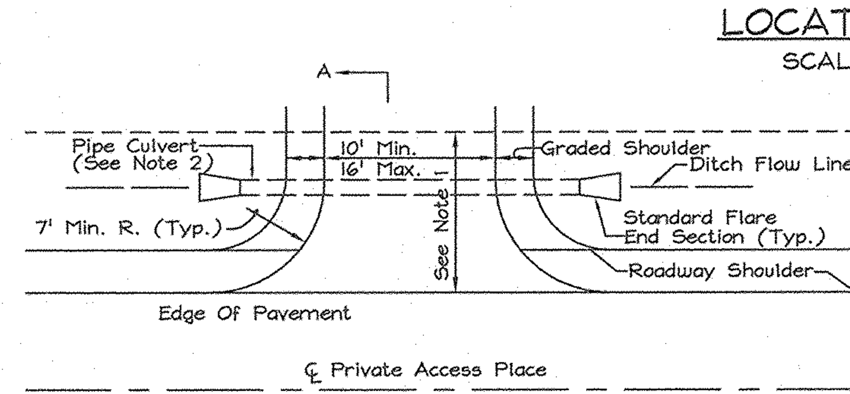
ROAD CLASSIFICATION

ROAD NAME	CLASSIFICATION	R/W
Fairlee Road	Public Access Place	40'
Joseph Scott Drive	Public Access Street	40'
Mary Ann Lane	Private Access Place	min. 24' easement

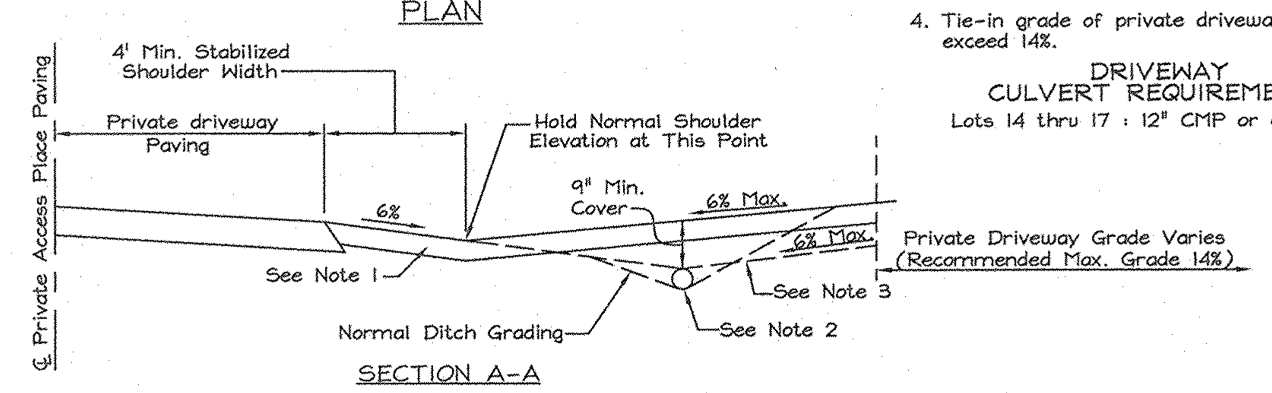
STREET LIGHT TABLE

FIXTURE TYPE	POLE TYPE	LOCATION	STREET
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 1+90 17' right	Fairlee Road
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 3+55 13' left	Fairlee Road
100 watt HPS vapor Premier post top mounted	14' black fiberglass	N 562,503.6 E 1,394,426.6	Fairlee Road
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 3+04 15' left	Joseph Scott Drive
100 watt HPS vapor Premier post top mounted	14' black fiberglass	℄ Sta. 7+90 15' right	Joseph Scott Drive
100 watt HPS vapor Premier post top mounted	14' black fiberglass	N 561,566.3 E 1,393,998.8	Joseph Scott Drive

Note: Light pole location given at center of base



PLAN



SECTION A-A

PRIVATE ACCESS PLACE RESIDENTIAL DRIVEWAY ENTRANCE
NOT TO SCALE

NOTES:
1. Driveway must be paved using standard paving section P-1 as shown on St'd. No. or alternate section equal to or better than P-1, as approved by D.P.W.
2. Drainage culvert shall be sized for a 10 year frequency storm and the minimum size shall be 12" dia. round or 14" x 9" arch pipe if larger pipe is required, ditch invert shall be lowered to provide min. ditch gradient of 0.5% and clearance shown.
3. Swale flow may be provided over driveway located at or near the crest of vertical curves on the public road where quantity of flow is small, as approved by D.P.W.
4. Tie-in grade of private driveway shall not exceed 14%.

DRIVEWAY CULVERT REQUIREMENTS
Lots 14 thru 17 : 12" CMP or equivalent

Continuation of General Notes

42. The 5'x20' concrete pad for the "Refuse and Recycle Collection Pad" located within the public right-of-way will be maintained by the owners of Lots 65-72, pursuant to the Declaration of Right of Access and Maintenance Obligations recorded among the land records of Howard County Maryland
43. For private driveway culverts for lots 70-72, see detail this sheet.
44. All Fill Areas within Public Right-Of-Ways to have 95% Compaction.
45. All street sign posts shall be 2" square metal tube posts (14 gauge) installed into a 3" sleeve (2.5" square metal tube, 12 gauge) with a cap on top.

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

Note:
THIS SHEET SUPERSEDES PREVIOUS PLAN SIGNED SEPTEMBER 2004.

No.	Revisions	Date
2	Revised Lots and Lot Numbers. Deleted Retaining Wall & Their Easements on Lots 20, 21, & 43 thru 46. Revised Pipestems. Moved Street Light. Re-Subdivided Lot 5. Extended Sewer Easement. Revised General Notes #26 & 27. Removed General Note #32. Revised General Note #37 (formerly #38)	02/12/2007
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; Revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; Revised Forest Conservation Easement Areas; Added Lot 58.	02/28/2005

COVER SHEET
HUNTERS RIDGE
LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1, PLAT NO. 14926

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

STATE OF MARYLAND — PROFESSIONAL ENGINEER — 22418

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DESIGN BY: PS/KO
DRAWN BY: MM/KO
CHECKED BY: ZYF
SCALE: As Shown
DATE: Jan. 23, 2007
W.O. No.: 3018
SHEET No.: 1 OF 20

F-04-111

SPECIFICATIONS FOR SEGMENTAL RETAINING WALL SYSTEMS

PART 1: GENERAL

1.01 Description

A. Work includes furnishing and installing segmental retaining wall (SRW) Units to the lines and grades designated on the Final Design prepared by Ryan & Associates (RA). Also included are furnishing and installing appurtenant materials required for construction of the retaining wall as shown on the RA Final Design.

1.02 Reference Standards

A. ASTM C 140— Sampling and Testing Concrete Masonry Units
B. ASTM D 4595— Tensile Properties of Geotextiles by the Wide—Width Strip Method.
C. ASTM D 5262— Test Method for Evaluating the Unconfined Creep Behavior of Geo— Grids
D. GRI:GG1— Single Rib Geogrid Tensile Strength
E. GRI:GG5— Geogrid Pullout
F. ASTM D 698— Moisture Density Relationship for Soils, Standard Method
G. ASTM D 422— Gradation of Soils
H. ASTM 4318— Atterberg Limits of Soil
I. ASTM 3034— Specification for Polyvinyl Chloride (PVC) Plastic Pipe
J. ASTM D 1248— Specification for Corrugated Plastic Pipe

1.03 Design Standards

A. The following factors of safety must have been met in this design: Sliding 1.5, Overturning 2.0, Bearing Capacity 2.0, Geogrid Overstress 1.5, Geogrid Connection (between the block and the geogrid) and Geogrid Pullout 1.5 (from the block and from the soil).

PART 2: MATERIALS & DESIGN PARAMETERS

2.01 Segmental Retaining Wall Units

A. SRW Units shall be machine formed, Portland Cement concrete blocks specifically designed for retaining wall applications. The SRW Unit currently approved for this project is:

Keystone Compac II as manufactured by Betco Block & Products

NOTE: Where Keystone specifications and reference documents conflict with these specifications, the RA specifications hold precedence.

B. SRW Units shall be sound and free of cracks or other defects that would interfere with the proper placing of the units or significantly impair the strength or permanence of the structure. Cracking or excessive chipping may be grounds for rejection. Units showing cracks longer than 1/2 inch shall not be used within the wall. Units showing chips visible at a distance of 30 feet from the wall shall not be used within the wall.

C. Concrete used to manufacture SRW Units shall have a minimum 28 days compressive strength of 3,000 PSI and a maximum moisture absorption rate, by weight, of 8% as determined in accordance with ASTM C 140. Compressive strength test specimens shall conform to the saw—cut coupon provisions of Section 5.2.4 of ASTM C 140 with the following exception: Coupon shall be taken from the least dimension of the unit of a size and shape representing the geometry of the unit as a whole.

D. SRW Units molded dimensions shall not differ more than ± 1/8 inch from that specified, except height which shall be ± 1/16 inch as measured in accordance with ASTM C 140.

2.02 Geosynthetic Reinforcement

A. Geosynthetic reinforcement shall consist of geogrids as indicated on the RA Final Design. No geogrid substitutions shall be permitted without the prior approval of RA (a partial redesign may be necessary if geogrids are substituted). NOTE: it is always acceptable to substitute a higher strength geogrid (of the same manufacturer) for a lower strength geogrid.

2.03 Shear Connectors

A. Shear connectors shall be 1/2 inch diameter thermoset isopthalic polyester resin—pultruded fiberglass reinforcement rods or equivalents to provide connection between vertically and horizontally adjacent units. Strength of shear connectors between vertical adjacent units shall be applicable over a design temperature of 10 degrees F to +100 degrees F. These connectors shall be capable of holding the geogrid in the proper design position during geogrid pre—tensioning and backfilling.

2.04 Leveling Pad

A. Material for the leveling pad shall consist of compacted gravel or unreinforced concrete. Typical materials used for this leveling pad are #57, CR6, 21A, 2A modified, 2B, RC6, RC57, etc. Lean un—reinforced concrete with a strength of 1,500 PSI may also be used for the leveling pad.

2.05 Drainage Aggregate

A. Drainage aggregate shall be clean angular gravel (#57 or equivalent) with a size of 1/2 inch to 1 1/2 inches and less than 10% fines (passing the #200 sieve). Rounded "pea gravel" type aggregate is not permissible since it does not have the necessary frictional properties. Recycled gravel may be used if it meets the above criterion.

2.06 Drainage Pipe

A. The drainage collection pipe shall be a 4 inch perforated or slotted PVC or corrugated HDPE pipe.

2.07 Infill Soil: within the reinforced geogrid zone

A. The soils used must meet or exceed the friction angle stated in the RA Final Design (in the General Notes, on the typical wall section and on the structural cross sections). The reinforced material shall be free of debris and organic material (i.e.— no plants, roots, sod, top soil, trash, wood, etc.). The infill soil shall not consist of CH (fat clay), MH (elastic silt) or OH/ OL/ PT (organic) soils.

B. Rocks may be used as infill material as long as they have a maximum size of 6 inches and a mean diameter of 3 inches. Recycled concrete is permissible for infill except with certain polyester geogrids in water applications. In the case of water applications the geogrid manufacturer shall be consulted to see if the alkali in the recycled material will cause corrosive damage to their geogrid.

C. Select gravel (classified by USCS as GP or GW) is always an acceptable substitution in the event suitable soils (those meeting RA's and the site geotechnical engineer's requirements) are not readily available.

2.08 Retained Soil: the area beyond the infill soil and extending to a distance that is twice the wall's exposed height

A. This soil must meet or exceed the friction angle stated in the RA Final Design (in the General Notes, on the typical wall section and on the structural cross sections). This soil must be virgin (natural undisturbed with blow counts ≥12) or suitable fill (friction angle ≥ the RA Final Design requirement) compacted to 95% of a standard proctor maximum dry density.

2.09 Foundation Soil: the soil under the wall's gravel leveling pad and the soil under the reinforced geogrid zone

A. The foundation soil must meet or exceed the minimum allowable bearing capacity stated in the RA Final Design (in the General Notes and on the typical wall section). The sub—grade must be virgin (natural undisturbed soil with blow counts ≥12) or suitable fill (friction angle ≥ the RA Final Design requirement) compacted to 95% of a standard proctor maximum dry density.

2.10 Soil Investigation

A. RA recommends that every retaining wall design be preceded by an in—situ soil investigation by a licensed geotechnical engineer. However, if the owner and/or wall installer elects not to have an investigation conducted RA may assume soil design parameters based on: published data by the Soil Conservation Service (soil maps), a verbal description by the owner and/or wall installer or by RA's previous experience in certain geographic areas. It must be understood that the owner and/or wall installer bears full responsibility to the election not to have an investigation performed.

2.11 Site History & Information

A. Many factors other than soil information affect the performance and design of the retaining wall. RA relies on information provided by the owner and/or wall installer when designing a retaining wall. RA bears no responsibility if the owner and/or wall installer omit critical information required to properly design the wall. Information critical to wall design from the site consist of: topographic features (such as slopes), soil types, utilities, storm water management, structures (including buildings, other existing or proposed walls, swimming pools, etc.), site geological phenomenon, groundwater, loads with the wall's zone of influence (such as driveways, patios, roadways, sidewalks, etc.) and any other readily known site factors that could potentially impact the RA Final Design.

PART 3: CONSTRUCTION

3.01 Inspection

A. RA considers all retaining walls to be critical structures, meaning most walls require a considerable financial investment by the owner and failure of a wall will negatively impact a property both financially and from a public safety perspective. The owner or owner's representative is responsible for verifying that the wall installer meets all of the requirements of the RA Final Design (as stated in these specifications and the project's General Notes). This includes all submittals for materials and design, qualifications and proper installation of the wall system. All walls with an exposed height of 6 feet or greater must have the construction certified by a licensed geotechnical/ structural engineer registered in the jurisdiction of the project. Additionally, after the wall has been completed it is highly recommended that it be surveyed to establish the wall's current horizontal and vertical alignment.

B. The wall installer's field construction supervisor shall have demonstrated experience and be qualified to direct all work at the site.

C. RA provides construction oversight on some retaining wall projects. RA verifies general compliance with the RA Final Design; however, it is the wall installer's ultimate responsibility to construct the structure properly in accordance with the RA Final Design. RA's liability is limited to the amount of our fees for the scope of work provided for the wall designs and construction oversight.

3.02 Excavation

A. The wall installer shall excavate to the lines and grades shown on the RA Final Design and the project's civil plans. The wall installer shall take precautions to minimize over—excavation. Over—excavation shall be filled with compacted soil (friction angle ≥ RA design parameters) or gravel as directed by the site geotechnical engineer.

B. The wall installer shall verify the location of existing structures and utilities prior to excavation. The wall installer shall ensure that all surrounding structures are protected from the effects of wall excavation. Excavation support (shoring), if required, is the responsibility of the wall installer. All excavation must be conducted in accordance with OSHA (federal) and state safety regulations. All work to construct the wall must be in accordance with 29CFR1926 sub—part P (OSHA Excavation Safety Requirements).

3.03 Foundation Preparation

A. Following excavation, the foundation soils (under the wall's gravel leveling pad and under the wall's reinforced geogrid zone) shall be examined by the site geotechnical engineer to assure that the actual foundation soil strength meets or exceeds the minimum allowable bearing capacity in the RA Final Design (stated in the General Notes and shown on the typical wall section). Soils that do not meet the required strength shall be removed and replaced with approved select structural fill or gravel and be compacted to 95% of a standard proctor maximum dry density for the full depth.

B. In cases of poor bearing capacity or fill soils, an enlarged geogrid reinforced leveling pad may be required. This typically consists of a 1 foot deep X 4 foot wide leveling pad with geogrid under (on the sub—grade) and within the gravel (6 inches above the sub—grade). The sub—grade must be compacted with a "jJ—Tamp" or "Jumping Jack" type compactor with a minimum of three passes prior to geogrid placement. These extra measures will increase the soil's bearing capacity by a minimum of 1,000 PSF (RA shall be consulted if the soil's bearing capacity needs to be increased by more than 1,000 PSF).

3.04 Leveling Pad Construction

A. The leveling pad shall be placed so that its top elevation is the same as the bottom of block ("BB") elevation on the RA Final Design profile drawing. It shall have a minimum thickness of 6 inches and a minimum width of 2 feet. The leveling pad should, at a minimum, extend laterally at least a distance of 6 inches from the toe and heel of the lower most SRW Unit.

B. The leveling pad material shall be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor to provide a firm level—bearing surface on which to place the first course of SRW Units. A thin layer (not to exceed 1/2 inch) of well—graded sand or stone dust may be used to smooth the top of the leveling pad.

3.05 SRW Unit Installation

A. All SRW Units shall be installed at the proper elevation and orientation as shown on the RA Final Design profile drawing and in conjunction with the project's civil plans. The SRW Units shall be installed in general accordance with the manufacturer's recommendations (RA's Final Design shall govern in any conflict between the two requirements).

B. The first course of SRW Units shall be placed on the leveling pad. The units shall be leveled side—to—side, front—to—rear and with adjacent units, and aligned to ensure intimate contact with the leveling pad. The first course is the most important for accurate and acceptable results. Alignment may be done by means of a string line or an offset from the base line to the backs of the blocks. SRW units shall have a minimum 4 inch overlap of units on each successive course so that the wall is interlocked and continuous. No horizontal gaps greater than 1/4 inch between the faces of adjacent units are permitted.

C. Because the wall has a setback, its batter must be predetermined during the stake out process by the civil engineer/surveyor and wall installer. If there are critical dimensions that must be met on the high side of the wall then the base (at the toe) will need to be moved forward to compensate.

D. Lay out of curves and corners shall be installed in accordance with the civil plans and the RA Final Design. Construction techniques for curves and corners shall be in general accordance with the SRW manufacturer's installation guidelines. In general, all tangent angles shown on the civil drawings should be changed into curves to enhance the wall's strength and appearance. Continuous vertical joints are not recommended. Inside and outside 90° corners may be constructed without compromising the wall's integrity if they are properly interlocked. Inside corners should be constructed so that the SRW Units interlock (according to manufacturer's recommendations) and outside corners should incorporate special corner blocks when possible. If special outside corner blocks are not available from the block manufacturer for this project then the manufacturer's guidelines for building structural outside corners shall be followed. If gluing is necessary only industrial grade adhesives or sealants designed for concrete—to—concrete applications may be used (adhesives designed for plastic or wood applications are not acceptable).

E. Clean all excess debris from the tops of the SRW Units and install the next course.

F. Repeat procedures to extent of wall height.

G. A ±2° tolerance is permitted horizontally for wall batter (block setback). In no case shall a wall go beyond vertical (have a negative batter). Walls shall be built level (not with grade), however a ±1.5 inch tolerance over a 10 foot distance is permitted vertically (as checked from left to right along the wall).

H. Embedment shall be a minimum of 1 inch buried for every 1 foot of wall exposed with one block minimum when the front slope is 4:1 or greater (more level). Walls constructed on 3:1 front slopes or less (more steep) require additional buried blocks. See the profile drawing in the RA Final Design for the exact amount of embedment (the amount of buried block can be determined at each wall station by subtracting the "BB" elevations from the "GR" elevations).

3.06 Geogrid Reinforcement Placement

A. All geogrid reinforcement shall be installed at the proper elevation, length and strength as shown on the profile and structural cross sections in the RA Final Design. Partial geogrid coverage is not acceptable; no gaps shall be present between geogrid layers. 100% coverage is required, however it is not necessary to overlap the geogrid pieces. The geogrid shall be laid horizontally on the compacted infill soil and on top of the concrete SRW Units. The geogrid must be embedded into the SRW Units to the face. The wall installer shall verify that the orientation of the geogrid is in accordance with the geogrid manufacturer's recommendations. The highest strength direction of the geogrid must be perpendicular to the wall face (the geogrid must not be laid parallel to the wall— cannot be rolled out with the wall).

B. Geogrid reinforcement layers shall be one continuous piece for their entire embedment length. Overlapping of the geogrid in the design strength direction (perpendicular to the wall face) is not permitted.

C. Tracked construction equipment shall not be operated directly on the geogrid. A minimum of 6 inches of backfill is required prior to operation of tracked vehicles over the geogrid. Turning should be kept to a minimum. Rubber—tired equipment may pass over the geogrid reinforcement at slow speeds (less than 5 MPH).

D. The geogrid shall be in tension and free of wrinkles prior to placement of the infill soil. Nominal tension shall be applied to the geogrid and secured in place with staples, stakes or by hand until it is covered by 6 inches of infill soil.

E. For inside & outside corners and inside & outside curves the geogrid shall be placed according to the manufacturer's instructions to provide total geogrid coverage. On outside corners the geogrid should be shifted up or down one course and alternated so that the geogrid comes into the reinforced geogrid zone from both legs of the 90° angle. Geogrid layers should never be placed on top of one another: there must be a minimum of 3 inches of compacted infill soil between geogrid layers.

3.07 Wall Drainage

A. Drainage aggregate (clean gravel such as #57 or equivalent) shall be installed behind the entire wall face from the first course below grade to one course from the top of the wall. The drainage gravel shall be placed to a minimum thickness of 12 inches behind the SRW Units. Drainage gravel shall also fill all voids between and within (if hollow) the SRW Units. SRW Units must be filled with drainage aggregate in one course lifts (SRW Units may not be stacked in two or three course lifts and then have the gravel dumped in from the top through multiple courses). An impermeable clay layer (CL, GC or SC) shall be placed on top of the 12" drainage layer. If clayey soils are not readily available, a layer of filter fabric (Mirafi 140N or equivalent) shall be placed on top of the gravel (below the topsoil) to prevent the downward migration of fines.

B. Drainpipes are mandatory and shall be vented to daylight at the end(s) of the wall, at a central low point of the wall, or through the wall face at maximum intervals of 30 feet on center (no more than 6 inches above finished grade when vented through the wall face). The pipe(s) must maintain gravity flow of water outside the reinforced geogrid zone. Water must drain to an outlet and have positive flow. If a continuous pipe is run, it shall daylight into a storm sewer manhole or along a slope at an elevation lower than the lowest point of the pipe within the drainage aggregate. When drainpipes are daylighted at the end(s) of a wall they must be visible and unobstructed. The drainpipes should be checked by the owner on a regular basis to ensure that they remain open (not blocked, filled in, grown over, pinched).

C. Rear drainpipes are required in the following situations: when groundwater can rise and approach within 1 foot of the leveling pad sub—grade, in "cut" situations where the potential exists for storm water to enter the interface between the reinforced geogrid zone and the retained zone and when low permeable soils (CL— lean clay & ML— silt) are used for infill soil. Retaining walls with low permeable soils in the reinforced geogrid zone are more susceptible to being negatively impacted by hydrostatic forces. The owner may elect to install a rear drainpipe to minimize or eliminate potential hydrostatic force buildup leading to potential wall movements. RA recommends a rear drainage system for all walls with these soil types in cut situations, however ultimately it is the owner's decision. This rear drainpipe shall be surrounded by a minimum of 12 inches of gravel (#57 or equivalent) and surrounded with filter fabric to prevent the migration of fines. This rear drainpipe must vent to daylight or be directed to a storm sewer manhole (see instructions for front drainpipe in section 3.07B above).

D. Chimney drains (a second 12 inch layer of drainage aggregate within the rear 1 foot of the reinforced geogrid zone or directly behind the reinforced geogrid zone) must be installed when groundwater is present or likely (to an elevation that is a minimum of 1 foot above predicted levels as given by the site geotechnical engineer), when stated in the RA Final Design or when required by the site geotechnical engineer.

E. All drainage zone aggregate shall be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor (minimum of three passes).

3.08 Backfill Placement

A. The infill soil shall be placed as shown in the RA Final Design in the maximum compacted lift thickness of 10 inches and shall be compacted to a minimum of 95% of a standard proctor maximum dry density (ASTM D 698) at a moisture content within 2% of optimum. The backfill shall be placed and spread in such a manner as to eliminate wrinkles or movement of the geogrid and the SRW units. Compaction testing shall be done at 25%, 50%, 75% and 100% of the wall height or as specified by the site geotechnical engineer.

B. Only a vibratory plate or small—scale vibratory smooth drum compactor equipment shall be allowed within 3 feet of the front of the wall face. Compaction within the 3 feet behind the wall face shall be achieved by at least three (3) passes of the lightweight mechanical plate compactor or roller. Heavy equipment (such as track hoes, ride on rollers, pans, etc.) must be kept back a minimum of 3 feet from the rear of the wall.

C. At the end of each day's operation, the wall installer shall slope the last level of backfill away from the wall facing to direct water runoff away from the wall face.

D. At completion of wall construction if final grading, paving, landscaping and/or storm drainage installation adjacent to the wall is not placed immediately after wall completion, temporary grading shall be provided to ensure that water runoff is not allowed to collect or pond behind the wall until final construction adjacent to the wall is completed.

E. Filter fabric (Mirafi 140N or equivalent) is required when the infill soil is classified as poorly graded sand (SP) or well graded sand (SW) since these soils are non—cohesive and could potentially slough, clogging the gravel drainage layer. Filter fabric is optional between the 12 inch gravel drainage layer and the compacted infill soil if the backfill soils are clayey (CL or SC), gravelly (GC, GM, GP or GW) or silty (ML or SM).

3.09 SRW Caps

A. SRW caps shall be properly aligned and glued (for safety reasons) to the underlying SRW Units with a flexible high—strength concrete adhesive or sealant designed for "concrete to concrete" applications (not for plastic or wood). Rigid adhesive or mortar is not acceptable.

3.10 Water Applications

A. When walls are installed in water applications (such as storm water ponds, streams, bulkheads, areas adjacent to flood plains, etc.) all clean gravel must be used as infill up to 1 foot above the 100 year flood elevation, the high water level or the top of berm/spillway. This gravel must be free draining and have less than 10% fines (#57 or equivalent). Filter fabric (Mirafi 140N or equivalent) must go in front of the buried block, under the leveling pad, behind the reinforced geogrid zone (vertically up to the extent of the gravel infill) and on top of the gravel infill (horizontally). This is required to prevent the migration of fines into the gravel infill. Rip rap is required in front of the bottom three courses on walls installed in tidal waters. Rip rap is also required when indicated on the civil plans and where pipes with active water flow exit through the wall.

3.11 Rails, Fences & Other Structures

A. The scope of RA for this project does not include fence or railing designs. Typical details have been given to provide general guidelines for the installation of fences, guardrails and railings behind walls. RA cannot give specific details because the type, placement and height of fences and rails vary widely and because the requirements are different depending on the municipality and regulatory authority. RA can provide a project specific fence or rail detail and structural design for an additional fee if given exact information (material type and size and manufacturer's specifications and installation guidelines).

B. Open fences and railings not subject to wind loads (minimum of 50% open and maximum of 50% solid) may be placed directly behind the wall or in the wall (can be placed in the blocks only if they are a hollow system and if the cores and web alignment will accept the posts) as long as they are not subject to vehicular impact. Solid or semi—solid fences that are subject to wind loads must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall.

C. Guardrails subject to vehicular impact must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall. Guardrails may be placed closer than this 3 foot minimum only if a barrier (such as curbing, wheel stops, etc.) is in place to prevent vehicular impact (the overhang of vehicles must be considered when determining this).

D. Light post foundations, sign foundations and similar structures subject to wind loads must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall.

E. In cases where these 3 foot minimum distances cannot be met due to restraints on the site, additional analyses will need to be done to determine methods of stabilization. RA can provide these designs for an additional fee.

3.12 Storm Structures & Utilities

A. Reinforced Concrete Pipes (RCP) may pass through the leveling pad or wall structure without compromising the design. The SRW units may be cut to fit around the pipe and the voids filled with non—shrink grout or type "M" mortar. A concrete collar may be cast around the structure if desired. When a collar is cast, the top of the collar shall line up with an even block course to maintain proper alignment and neat workmanship.

B. The wall may not bear on plastic or steel pipes (such as ADS, CMP, HDPE, PVC, SLCPP, etc.) or utilities (such as electric, gas, phone lines, sewer or water lines, etc.). Grade beams or lintels must be used to bridge these non—load bearing structures. If a specific grade beam or lintel is not specified in the RA Final Design, RA shall be consulted to determine the size, strength and reinforcing of the grade beam or lintel. If these non—load bearing pipes or utilities are located at minimum of 42 inches below the wall's leveling pad then a grade beam or lintel is not necessary.

C. Concrete storm structures may be located behind a wall and be within the reinforced geogrid zone as dictated by the project's civil drawings. If the structure(s) cannot be moved out of the reinforced geogrid zone and the geogrid cannot be installed to its full design length the following shall apply. On small structures (such as collection boxes, concrete pipes less than 18 inches, inlets, manholes, etc.) it is acceptable to shorten the geogrid from the design length and meet the structure. The area between the wall and structure where the geogrid has been shortened must be filled with gravel (#57 or equivalent) and not soil. The gravel must be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor. On large structures and in cases where pipes parallel the wall for long distances, RA shall be consulted to determine the impact on the wall before allowing this to be done.

D. The wall's integrity may be compromised if pipes or structures burst or develop leaks and allow water or fluids to saturate the reinforced geogrid zone. RA is not responsible for wall failure that results from pipes or structures that burst or leak and allow water or fluids to saturate the reinforced geogrid zone.

3.13 Construction Adjacent to Completed Wall

A. The owner or owner's representative is responsible for ensuring that construction adjacent to the wall by others does not disturb the wall or place temporary construction loads on the wall that exceed design loads, including loads such as water pressure, temporary grades, or equipment loading. Heavy paving or grading equipment shall be kept a minimum of three feet behind the back of the wall face. Equipment with wheel loads in excess of 150 PSF live load shall not be operated with 10 feet of the face of the retaining wall during construction adjacent to the wall. Care should be taken by the general contractor or owner to ensure water runoff is directed away from the wall structure until final grading and surface drainage collection systems are completed.

B. Care must be taken when installing appurtenances (such as generators, transformers, etc.) or utilities within the reinforced geogrid zone of the wall. The compaction integrity of the reinforced geogrid zone must be maintained, both below and beside (around) the appurtenance or utility. Neglecting to do so may cause hydrostatic pressure and wall failure.

3.14 Storm Water Management

A. The segmental retaining wall is not a storm water management structure. The wall can accommodate the rainfall above the reinforced geogrid zone but not the watershed (including the retained zone). Therefore it is absolutely essential that surface water be prevented from entering (and ultimately saturating) the reinforced geogrid zone. This is usually accomplished by the site engineer (owner's civil engineer) grading the surface behind the wall to direct surface water to swales that divert the water around the wall ends or over the top of the wall through scuppers. If water is directed to the wall (such as applications with back slopes), the top 8 inches of compacted fill over the reinforced geogrid zone must have impermeable soil (such as CL, GC or SC). If clayey soils are not readily available an underlying geomembrane (geosynthetic liner) may also be used. This geomembrane shall be Mirafi G200N, Stratadrain or equivalent. It shall extend downward vertically a minimum of 3 feet behind the reinforced geogrid zone, be laid horizontally on top of the reinforced geogrid zone with a maximum slope of 10:1 and extend forward into the 12 inch gravel drainage layer.

3.15 Post Construction Responsibilities

A. Retaining walls are a substantial financial investment. Therefore it is in the owner's best interest that a wall maintenance budget be established within the overall property management budget to monitor and provide preventative maintenance. Retaining wall maintenance, at a minimum, should consist of: checking drainage, inspecting for settling and surveying to verify alignment and batter. This service should be by qualified personnel under the supervision of a licensed geotechnical/structural engineer. RA can provide this service for an additional fee.

B. RA SHOULD BE NOTIFIED AS SOON AS REASONABLY POSSIBLE IF THE RETAINING WALL EXHIBITS CONDITIONS CONTRARY TO THE RA FINAL DESIGN SO THAT RA MAY BE CONSULTED TO PROTECT THE OWNER'S INVESTMENT.

END OF SECTION Revised 01—07—04

The information contained herein is proprietary and is the sole property of RA. It is only intended for use on this project. Reuse of these drawings, sketches, and design computations in any manner is strictly prohibited pressure without written approval from RA. Any other use is subject to penalty of law. (c)

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/12/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE

No.	REVISION	Date
2	REVISE TITLE BLOCK	03-23-07
1	Revised Lot Areas for Lots 35 thru 39, 55 and 56; revised BRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

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LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72 (2)
OPEN SPACE LOTS 55 THRU 59 & 73

RETAINING WALL SPECIFICATIONS
HUNTERS RIDGE (1)
~~LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58~~
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

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DESIGN BY: DKS
DRAWN BY: JWP
CHECKED BY: WKR
SCALE: AS SHOWN
DATE: Jan. 07, 2004
W.O. No.: 30:8
SHEET No.: 20 OF 20

GENERAL NOTES

1. SOIL PARAMETERS: Based on review of the "Geotechnical Engineering Study" dated 07/20/2001 for this site prepared by Hillis–Carnes Engineering Associates, Inc., an internal angle of friction of 27° was used for the soils in this design. This is for a worst case CL (lean clay) soil type and shall be verified during wall construction. CH (fat clay), MH (elastic silt) and OH/OL/PT (organic) soils are not acceptable for wall construction. If these unsuitable soils are encountered they shall be removed and replaced with soils that meet or exceed the design friction angle of 27°. The on site geotechnical engineer shall monitor this closely during the construction process. The site soils vary widely (in addition to CL there is also ML– silt, SC– clayey sand & SM– silty sand). If possible, the sandy soils should be stockpiled and used for backfilling the wall since they have a higher friction angle, are more free draining and it is easier to achieve 95% compaction (CL & ML are fine–grained and it is difficult to control the moisture level). The moisture level of the soils must be ±2% of optimum. Since proctor tests were not available for the CL soil, an assumed unit weight (maximum wet density) of 125 PCF was used. Fluctuations of 5 PCF higher or lower will not affect these designs, however if the unit weight varies by more than 5 PCF Ryan & Associates (RA) must be notified so that the cross sections can be rerun to verify that all factors of safety are still met. The site geotechnical shall run standard proctor tests of the proposed backfill soil (prior to wall construction) to verify the accuracy of this design assumption. No cohesion was used in any of the calculations.

2. CONSTRUCTION OVERSIGHT: The construction of this wall must be performed under the observation of a Maryland Registered Professional Engineer to ensure that it is built in accordance with the RA General Notes and Specifications.

3. GLOBAL STABILITY: A global stability analysis was done on G–Slope design software for the wall and a factor of safety of 1.3 was met. A copy of the global stability analysis has been included in the 81/2" X 11" calculations submittal.

4. BEARING CAPACITY: The wall's sub–grade (the soils under the wall's gravel leveling pad and the soils under the wall's reinforced geogrid zone) must be tested by the site geotechnical engineer prior to wall construction and have a minimum allowable bearing capacity of 3,000 PSF. The sub–grades must be virgin (natural undisturbed soil with blow counts greater than or equal to 12) or suitable fill (greater than or equal to 27°) compacted to 95% of a standard proctor maximum dry density. Any areas of the sub–grade that does not meet this maximum pressure will require undercutting and/or geogrid reinforcing.

5. DESIGN SOFTWARE: Internal and external wall calculations were performed with Keywall 2001 design software (version 3.1.6). A table has been included ("Cross Section Details and Factors of Safety") which has the following information: section location (area of wall referenced), total wall height, loads applied, factors of safety (for sliding, overturning, bearing capacity and global stability) and bearing pressure (the load exerted by the wall on the sub–grade). Factors of safety of 1.5 were also met for: geogrid pullout (from the soil and from the block), geogrid overstress (geogrid rupture) and connection (block to geogrid).

6. SPECIFICATIONS: Construction and materials must conform to the attached "Specifications for Retaining Wall Systems".

7. GEOGRIDS: Mirafi 3XT & 5XT geogrids, which have LTDS (Long Term Design Strengths) of 1558 and 2234 respectively, were used in this design. All geogrid substitutions must have prior approval of RA.

8. WALL PROFILE: The elevation drawing was done to represent the grade changes necessary on the civil drawings and was done in even block course increments of .667' (8"). Minor field changes may be necessary by the wall installer. Lineal footage may be added or subtracted as needed if the wall's height is equal to or less than the design heights. If the wall needs to be raised in height, RA shall be notified and new structural cross sections must be provided before the wall installer proceeds. The cap height of .333' (4") is not shown on the profile drawing however its height may have been used in some cases to achieve the desired TW elevations.

9. WALL BATTER: The 7.1° batter (1" setback per block course) was used for the Keystone blocks in this design. The 0.5° (near vertical: 1/16" setback per block course) may not be used for this wall. NOTE: it is important for the wall installer and the civil engineer/surveyor to predetermine the walls' batters during stake out. The wall will need to be moved forward at its base if there are critical dimensions that must be met on the high sides of the wall.

10. FACTORS OF SAFETY: The following factors of safety have been met in this design: Sliding 1.5, Overturning 2.0, Bearing Capacity 2.0, Geogrid Overstress 1.5, Geogrid Pullout 1.5 (from the block and from the soil) and Global Stability 1.3.

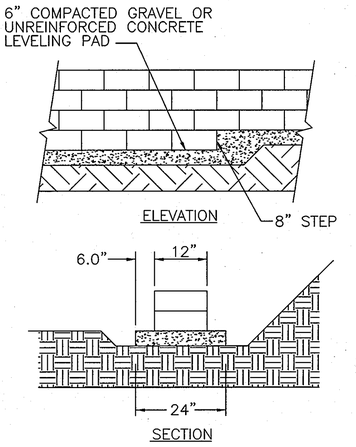
11. EMBEDMENT: The wall embedment varies from one to ten blocks. The exact amount of buried blocks may be determined by subtracting the "BB" elevations from the "GR" elevations on the RA profile drawing. Additional blocks were buried in some areas so that the wall will not be built on fill soils.

12. REAR DRAIN TILES: Rear drainpipes are required at the back of the wall's reinforced geogrid zone. This is in addition to the mandatory 4" drainpipe at the front of the wall (within the gravel leveling pad or behind the at grade courses– depending which drainpipe position is exercised). The rear drainpipe shall be surrounded by a minimum of 6" of clean gravel (#57 or equivalent) and shall have perpendicular solid pipes that run forward and connect to the front drainage system with crosses or tees.

13. BLOCK SYSTEM: This design is are valid only for the Keystone Compac II block system. Each segmental wall system has unique dimensions, connection devices and interacts differently with geogrids; therefore other block types may not be substituted.

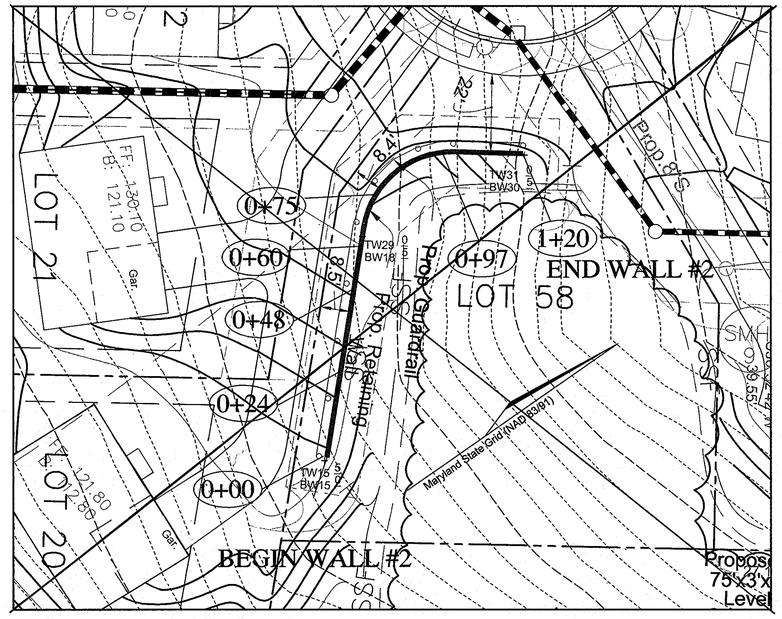
14. SEPARATE 81/2" X 11" SUBMITTAL: A separate 8 1/2" X 11" booklet has also been provided and includes: cover letter, General Notes, Keywall cross section calculations, G–Slope global stability calculations and RA Specifications.

15. SPECIAL HOWARD COUNTY RETAINING WALL SPECIFICATIONS:
a. Retaining walls shall only be constructed under the observation of a Registered Professional Engineer and a (NICET, WACEL, or equivalent) certified soils technician.
b. The required bearing pressure beneath the footing of the wall shall be verified in the field by a certified soils technician. Testing documentation shall be provided to the Howard County Inspector prior to the start of construction. The required test procedure shall be the Dynamic Cone Penetrometer Test ASTM STP–399.
c. The suitability of the fill material shall be confirmed by the on–site soils technician. Each eight inch lift must be compacted to 95% Standard Proctor Density and the testing report shall be made available to the Howard County Inspector upon completion of the construction.
d. For walls over ten feet in height, one soil boring is required every 100 feet along the length of the wall, copies of the boring reports shall be provided to the Howard County Inspector prior to the start of construction.



LEVELING PAD DETAIL

N. T. S.



~~WALL #2 (between Lots 21 & 58)~~
~~SCALE 1"=20'~~ 2

CROSS SECTION DETAILS & FACTORS OF SAFETY:

SECTION	STATION	TOTAL WALL HEIGHT	LOAD APPLIED	SLIDING minimum 1.50	OVERTURNING minimum 2.00	BEARING CAPACITY minimum 2.50	BEARING PRESSURE PSF	GLOBAL STABILITY minimum 1.30
WALL #1								
1	0+00 TO 0+39	10.00'	300 PSF LIVE LOAD	1.63	3.78	6.78	1467	1.69
2	0+39 TO 0+94	14.00'	300 PSF LIVE LOAD	1.70	4.36	6.42	2008	1.69
3	0+94 TO 1+20	10.00'	300 PSF LIVE LOAD	1.63	3.78	6.78	1467	1.69

MATERIAL ESTIMATE: BLOCK : Keystone Compac II GEOGRID: Mirafi 3XT & 5XT

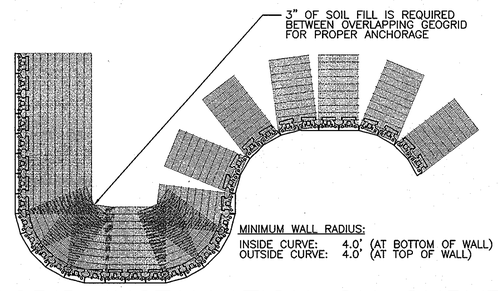
WALL	TOTAL SQ. FT.	(1.0 S.F.) BLOCK	(.5 S.F.) CAPS**	PINS	SQ. YDS. 3XT GRID	SQ. YDS. 5XT GRID	SQ. YDS. 7XT GRID	CU. YDS. DRAIN GRAVEL	LEVELING PAD GRAVEL	FT. WALL LENGTH
1	1,273	1,225	96	2,290	415	360	0	75	9	120

Totals include 2% extra for block and caps, 15% for geogrid and 5% for gravel.

* Ryan & Associates is not responsible for extras or shortages based on this take-off. It is the contractor's responsibility to verify the accuracy of this design by reviewing the site/ grading plan for this project.

** Includes one extra cap per step down on top of the wall for double capping.

REINFORCEMENT PLACEMENT FOR INSIDE AND OUTSIDE CURVES



MINIMUM WALL RADIUS:
INSIDE CURVE: 4.0' (AT BOTTOM OF WALL)
OUTSIDE CURVE: 4.0' (AT TOP OF WALL)

GEOGRID INSTALLATION ON CURVES

N. T. S.

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410.872.0267

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73 2

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 10/18/04

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10/15/04

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE

No.	REVISION	Date
2	REMOVE RETAINING WALL #2 DETAIL. REVISE TITLE BLOCK.	03.26.07
1	REVISED LOT AREAS & LOTS 35 thru 39, 55 and 56; revised area on lots 1 thru 3, 11, 15, 16, 19 thru 21 and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

RYAN & ASSOCIATES
A Division of WKR Consulting, Inc.
RETAINING WALL DIVISION
717–477–8400 fax 717–477–8410
68 West King Street
Shippensburg, PA 17257–0006

STATE OF MARYLAND — WILLIAM K. RYAN — No. 21586 — PROFESSIONAL ENGINEER

Professional Engr. No. 21586

RETAINING WALL TABLES, DETAILS & CIVIL PLAN

HUNTERS RIDGE

~~LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58~~ 1

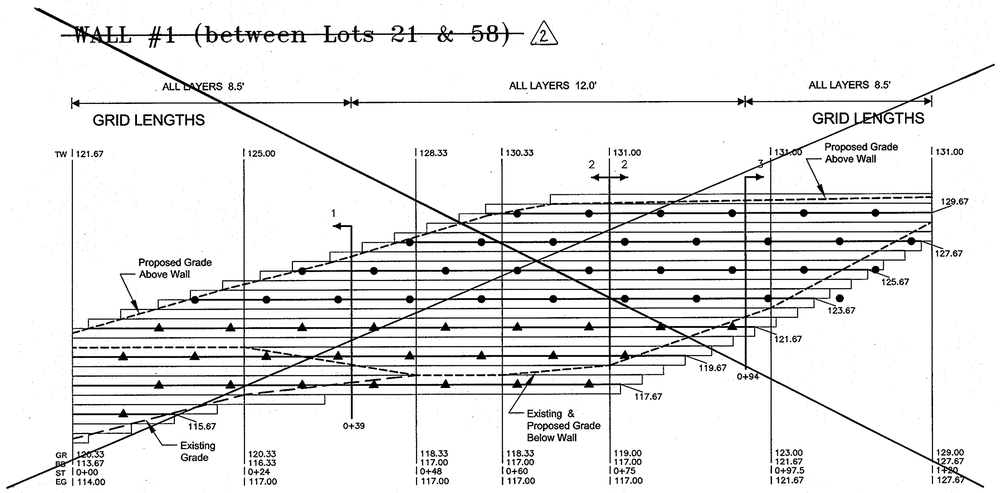
AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

FSH Associates
Engineers Planners Surveyors
8318 Forrest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY:	DKS
DRAWN BY:	JWP
CHECKED BY:	WKR
SCALE:	AS SHOWN
DATE:	Jan. 07, 2004
W.O. No.:	3018
SHEET No.:	19 OF 20

~~WALL #1 (between Lots 21 & 58)~~ 2



~~GRID KEY: MIRAFI 3XT~~
~~MIRAFI 5XT~~

2

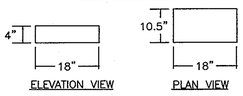
~~TW = TOP OF WALL (NOT INCLUDING CAP)~~
GR = PROPOSED FINISHED GRADE AT BASE OF WALL
BB = BOTTOM OF ~~BLOCK~~ / TOP OF LEVELING PAD
ST = WALL STATION
EG = EXISTING GRADE

2

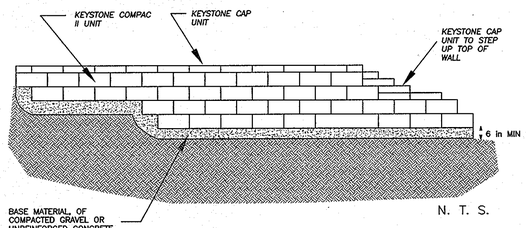
~~Scale:~~
~~Horizontal 1" = 10'~~
~~Vertical 1" = 5'~~

KEYSTONE COMPAC II DIMENSIONS

CAP UNIT



N. T. S.

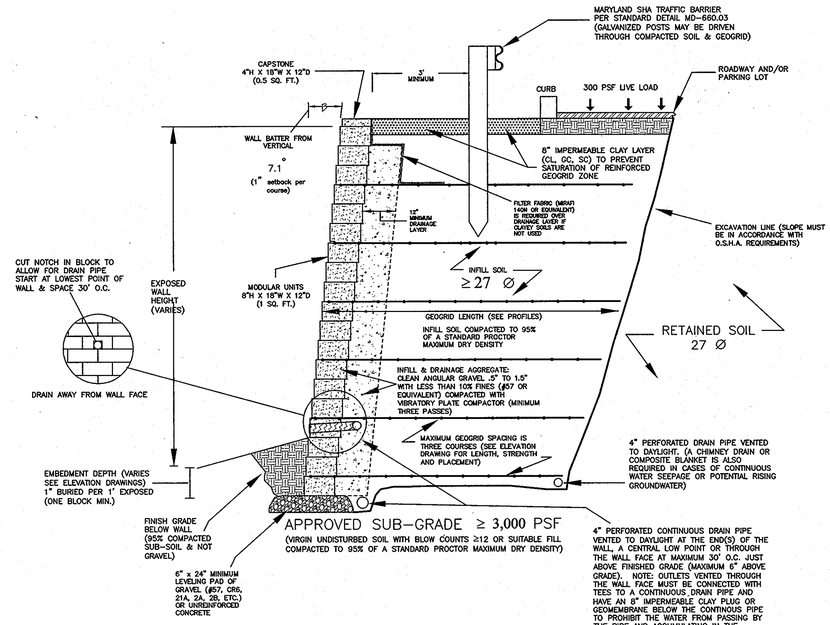


N. T. S.

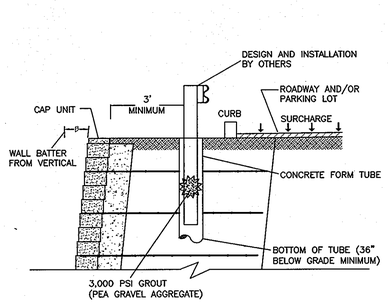
KEYSTONE STEP DOWN TYPICAL DETAIL

KEYSTONE COMPAC II

WALL SECTION

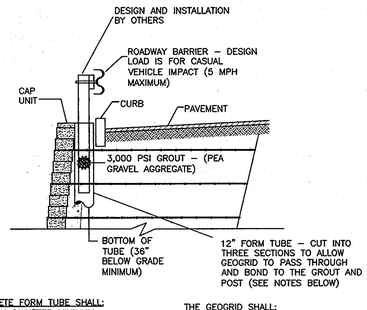


N. T. S.



NOTE:
1. GALVANIZED POSTS MAY BE DRIVEN DIRECTLY THROUGH THE COMPACTED SOIL AND GEOGRID (SEE DETAIL ABOVE RIGHT)
2. IF POSTS ARE SQUARE (SUCH AS 4X4 WOOD) CONCRETE FORM TUBES MUST BE PLACED DURING WALL CONSTRUCITON AND THE POSTS GROUTED IN LATER.
3. BLUNT POSTS MAY NOT BE DRIVEN INTO GEOGRID AFTER WALL CONSTRUCTION IS COMPLETE.

GUARDRAIL DETAIL
N.T.S.



NOTE:
THE CONCRETE FORM TUBE SHALL:
- BE 12" IN DIAMETER MINIMUM
- INTERSECT TWO GEOGRID LAYERS VERTICALLY
- BE CUT INTO SEGMENTS TO ALLOW THE GEOGRID TO PASS CONTINUOUSLY FROM THE FACE OF THE WALL, THROUGH THE FORM TUBE, THROUGH THE 12" DRAINAGE LAYER AND INTO THE REINFORCED SOIL ZONE – BE A MINIMUM OF 36" BELOW GRADE TO ELIMINATE ANY FROST CONCERNS
- BE GROUTED WITH 3,000 PSI CONCRETE (WITH PEA GRAVEL AGGREGATE) AFTER THE POST INSTALLATION

THE GEOGRID SHALL:
- PASS CONTINUOUSLY THROUGH THE CUT SECTION OF THE CONCRETE FORM TUBE
- BE CUT TO ALLOW THE POST TO BE INSTALLED AFTER THE WALL IS CONSTRUCTED (THE GEOGRID LEFT PENETRATING THE TUBE WILL BOND WITH THE GROUT TO CREATE A UNIFIED MASS WITH THE POST AND TRANSFER THE LOAD TO THE REINFORCED SOIL)
- BE KEPT TAUT WITHOUT ANY SLACK

GUARDRAIL WITH IMPACT LOAD
N.T.S.

No.	Revision	Date
2	Remove Wall #1 Detail. Revise Title Block.	03-26-2007
1	Revised Lot Areas for Lots 55 thru 59, 58 and 56; revised DRL on Lots 1 thru 3, 11, 15, 16, 19 thru 21, and 42; revised Forest Conservation Easement Areas; added Lot 58.	02.28.05

OWNER/DEVELOPER
Richmond American Homes of Maryland, Inc.
6200 Old Dobbin Lane
Columbia, Md 21045
410-872-0267

LOTS 1 THRU 4, 18 THRU 54, 60 THRU 72
OPEN SPACE LOTS 55 THRU 59 & 73 2

RETAINING WALL PROFILE, DETAILS & WALL SECTION

HUNTERS RIDGE 1

~~LOTS 1 THRU 54, OPEN SPACE LOTS 55 THRU 58~~

AND A RESUBDIVISION OF BULK PARCEL 'C'
WESLEY WOODS, SECTION 1

TAX MAP 38 GRIDS 4 & 10 — PARCEL 163
1ST ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cindy Hamato 10/9/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE 1/3

10/15/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE 6

~~APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS~~

~~CHIEF, BUREAU OF HIGHWAYS~~ N/A ~~DATE~~

RYAN & ASSOCIATES
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Shippensburg, PA 17257-0006

STATE OF MARYLAND — WILLIAM K. RYAN — No. 21586 — REGISTERED PROFESSIONAL ENGINEER

Professional Engr. No. 21586

FSH Associates
Engineers Planners Surveyors
8318 Forest Street Ellicott City, MD 21043
Tel:410-750-2251 Fax: 410-750-7350
E-mail: FSHAssociates@cs.com

DESIGN BY:	DKS
DRAWN BY:	JWP
CHECKED BY:	WKR
SCALE:	AS SHOWN
DATE:	Jan. 07, 2004
W.O. No.:	3018
SHEET No.:	18 OF 20