SITE DATA

LOCATION: TAX MAP 24, GRID 18, PARCEL '255' 2ND ELECTION DISTRICT EXISTING ZONING: R-ED DPZ REFERENCES: S-01-09, PB CASE NO. 352 (APP. 6/13/01), P-02-14, WP-03-26 (APP. 10/25/02) GROSS AREA OF PROJECT: 19.25 AC. AREA OF 100-YR FLOODPLAIN: 0.29 AC. (12,632 SF) AREA OF STEEP SLOPES OUT FLOODPLAIN: 2.42 AC. (105,449 SF)

NET AREA OF PROJECT: 16.54 AC. (720,287 SF) AREA OF PUBLIC RIGHT-OF-WAY DEDICATION: 1.65 AC (71,845 SF AREA OF OPEN SPACE REQUIRED: 25% OR 4.81 AC. AREA OF CREDITED OPEN SPACE PROVIDED: 43% OR 8.23 AC.

AREA OF NON-CREDITED OPEN SPACE PROVIDED: 0.25 AC. APPROXIMATE LIMIT OF DISTURBANCE: 11.31 AC.±

GENERAL NOTES

1. ALL ASPECTS OF THE PROJECT ARE IN CONFORMANCE WITH THE LATEST HOWARD COUNTY STANDARDS UNLESS WAIVERS

2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE.

3. 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 TO THE START OF WORK.

4. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION

PLACEMENT OF ANY ASPHALT.

7. THE PROJECT BOUNDARY IS BASED ON A SURVEY PREPARED BY FREDERICK WARD ASSOCIATES. DATED JUNE 2001. 8. THE TOPOGRAPHY SHOWN HEREON IS BASED ON AERIAL PHOTOGRAMETRIC SURVEY PREPARED POTOMAC AERIAL SURVEYS,

COUNTY GEODETIC CONTROL STATIONS: 24FB & 24I1 10. WATER AND SEWER FOR THIS PROJECT WILL BE PUBLIC AND PROVIDED THROUGH CONTRACT NO. 14—4054—I 11. THE DISTURBANCE TO THE STEEP SLOPES FOR THE 8" SEWER CONTRACT NO. 14-4054-D HAS BEEN DEEMED NECESSARY

IN ACCORDANCE WITH SECTION 16.116(c) OF THE HOWARD COUNTY SUBDIVISION & LAND DEVELOPMENT REGULATIONS. 12. STORMWATER MANAGEMENT IS PROVIDED FOR THIS DEVELOPMENT. THE TWO STORWATER MANAGEMENT FACILITIES

ARE 1-YR EXTENDED DETENTION FACILITIES (POCKET PONDS) FOR WQv AND Cpv AND ALSO PROVIDE 10-YR AND 100-YR MANAGEMENT (TIBER BRANCH WATER SHED). Rev IS PROVIDED BY ROOFTOP DISCONNECT CREDITS. THE TWO FACILITIES ARE LOCATED ON LOTS 34 AND 36 AND WILL BE PRIVATELY OWNED AND MAINTAINED BY THE HOA. BOTH FACULTIES ARE HAZARD CLASS 'A'.

. STORMWATER MANAGEMENT SOIL BORINGS FOR THIS SITE ARE BASED ON A GEOTECHNICAL BENSON & ASSOCIATES, DATED AUGUST 9, 2001.

14. THE STORMWATER MANAGEMENT DESIGN FOR THIS PROJECT INCLUDES 5.7 ACRES OF NATURAL CONSERVATION AREA. 15. STREAMS SHOWN ON-SITE ARE BASED ON A FIELD INVESTIGATION BY ECO-SCIENCES, DATED NOVEMBER 2000. AND

THE AERIAL PHOTOGRAMETRIC SURVEY PREPARED BY POTOMAC AERIEL SURVEYS, INC. NO WETLANDS OCCUR ON THIS SITE.

17. A FOREST STAND DELINEATION PLAN WAS PREPARED FOR THIS SITE BY FREDERICK WARD ASSOCIATES, DATED FEBRUARY 2001 AND APPROVED UNDER S-01-09.

18. FOREST CONSERVATION PLAN PREPARED BY FREDERICK WARD ASSOCIATES, DATED OCTOBER 2002. FOREST CONSERVATION REQUIREMENTS PER SECTION 16.1202 OF THE HOWARD COUNTY CODE AND THE FOREST CONSERVATION OF REFORESTATION. TOTAL OBLIGATION FOR THIS SITE IS 5.07 AC. OF RETENTION AND 1.34 AC. OF REFORESTION.

FINANCIAL SURETY IN THE AMOUNT OF \$51,574.80 WILL BE POSTED WITH THE FC MAINTENANCE AGREEMENT 19. NO CLEARING, GRADING, OR CONSTRUCTION IS PERMITTED WITHIN THE WETLANDS, STREAMS, OR THEIR BUFFERS, AND

21. PERIMETER AND STORMWATER MANAGEMENT LANDSCAPING REQUIREMENTS AS SET FORTH IN SECTION 16.124 OF THE SUBDIVISION REGULATIONS, THE HOWARD COUNTY LANDSCAPE MANUAL AND PB-352 (APP. 6/13/01) SHALL BE COMPLIED WITH. A FINANCIAL SURETY IN THE AMOUNT OF \$16,350.00 FOR THE REQUIRED 40 SHADE TREES AND 29 EVERGREEN TREES WILL BE POSTED AS

AS PART OF THE DEVELOPER'S AGREEMENT 22. STREET TREES ARE REQUIRED FOR THIS PROJECT IN ACCORDANCE WITH SECTION 16.124(e)(1) OF THE SUBDIVISION REGULATIONS AND THE LANDSCAPE MANUAL. A FINANCIAL SURETY IN THE AMOUNT OF \$21,900.00 TO BE POSTED AS PART

OF THE DEVELOPER'S AGREEMENT FOR THE REQUIRED 73 STREET TREES. 23. TREE PROTECTION FENCING WILL BE PROVIDED AT THE LIMITS OF DISTURBANCE WHERE GRADING IS ADJACENT TO FOREST

CONSERVATION RETENTION AREAS AND SENSITIVE ENVIRONMENTAL AREAS, SUCH AS STREAM BUFFERS AND STEEP SLOPES. 24. STREET LIGHTING HAS BEEN PROVIDED FOR THE PUBLIC ROAD IN ACCORDANCE WITH SECTION 16.135 OF THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE DESIGN MANUAL. ALL STREET LIGHTS ARE TO BE BGE "TRADITIONAIRE" STYLE IN ACCORDANCE WITH PLANNING BOARD APPROVAL OF PB CASE NO. 352, SIGNED JUNE 13, 2001. A MINIMUM OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.

25. SEDIMENT AND EROSION CONTROL HAS BEEN PROVIDED FOR THIS SITE. 26. THIS PROPERTY IS WITHIN THE METROPOLITAN DISTRICT.

27. TO THE BEST OF THE OWNERS KNOWLEDGE, THERE ARE NO BURIAL/CEMETARY LOCATIONS ON SITE.

28. A NOISE STUDY IS NOT REQUIRED FOR THIS SITE.

29. OPEN SPACE LOTS 34 AND 36 TO BE PRIVATELY OWNED AND MAINTAINED BY THE HOA. OPEN SPACE LOT 35 TO BE

OWNED AND MAINTAINED BY HOWARD COUNTY DEPT. OF RECREATION AND PARKS. 30. HOUSES ON LOTS 1 AND 32 SHALL BE ORIENTED TO FACE OLD COLUMBIA PIKE (SCENIC ROAD).

31. EXISTING STRUCTURES ON LOT 33 ARE TO REMAIN. NO ADDITIONS OR EXPANSIONS ARE ALLOWED UNLESS IN COMPLIANCE WITH THE APPLICABLE ZONING REGULATIONS. THE PROPERTY IS LISTED IN THE HOWARD COUNTY HISTORIC SITES INVENTORY AS SITE NUMBER HO-623, THE NELSON HOUSE. 32. OLD COLUMBIA PIKE IS A SCENIC ROAD.

33. FOR FLAG OR PIPE STEM LOTS, REFUSE COLLECTION, SNOW REMOVAL AND ROAD MAINTENANCE ARE PROVIDED TO THE JUNCTION OF THE FLAG OR PIPE STEM AND THE ROAD RIGHT-OF-WAY ONLY AND

NOT ONTO THE FLAG OR PIPE STEM DRIVEWAY. 34. THIS PROJECT, PB CASE NO. 352, WAS APPROVED BY THE PLANNING BOARD AND SIGNED ON JUNE 13, 2001. 35. WP-03-26: A WAIVER PETITION HAS BEEN SUBMITTED AND APPROVED, DATED OCTOBER 25, 2002, TO WAIVE SECTION 16.102.c.(2) TO BE ALLOWED TO TRANSFER A PORTION OF PARCEL '565', TAX MAP NO. 18, TO PARCEL '255', BY DEED ADJOINER INSTEAD OF BY RECORDING A SUBDIVISION PLAT. APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:

1. THE ADJOINER DEED MUST BE RECORDED PRIOR TO SIGNATURE APPROVAL OF THE PENDING PLAT FOR THE WOODS OF TIBER BRANCH SUBDIVISION. 36. AS A CONSEQUENCE OF ITS SUBMISSION PRIOR TO NOVEMBER 15, 2001, THIS SUBDIVISION PLAN IS GRANDFATHERED

TO THE FOURTH EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND BECAUSE THE PRELIMINARY PLAN WAS NOT APPROVED PRIOR TO NOVEMBER 1, 2001, THIS PROJECT IS SUBJECT TO COMPLIANCE WITH COUNTY COUNCIL BILL 50-2001 WHICH AMENDED PORTIONS OF THE ZONING REGULATIONS.

37. MDE PERMIT APPLICATION TRACKING NUMBER FOR STREAM CROSSING: 02-NT-0473/200360710

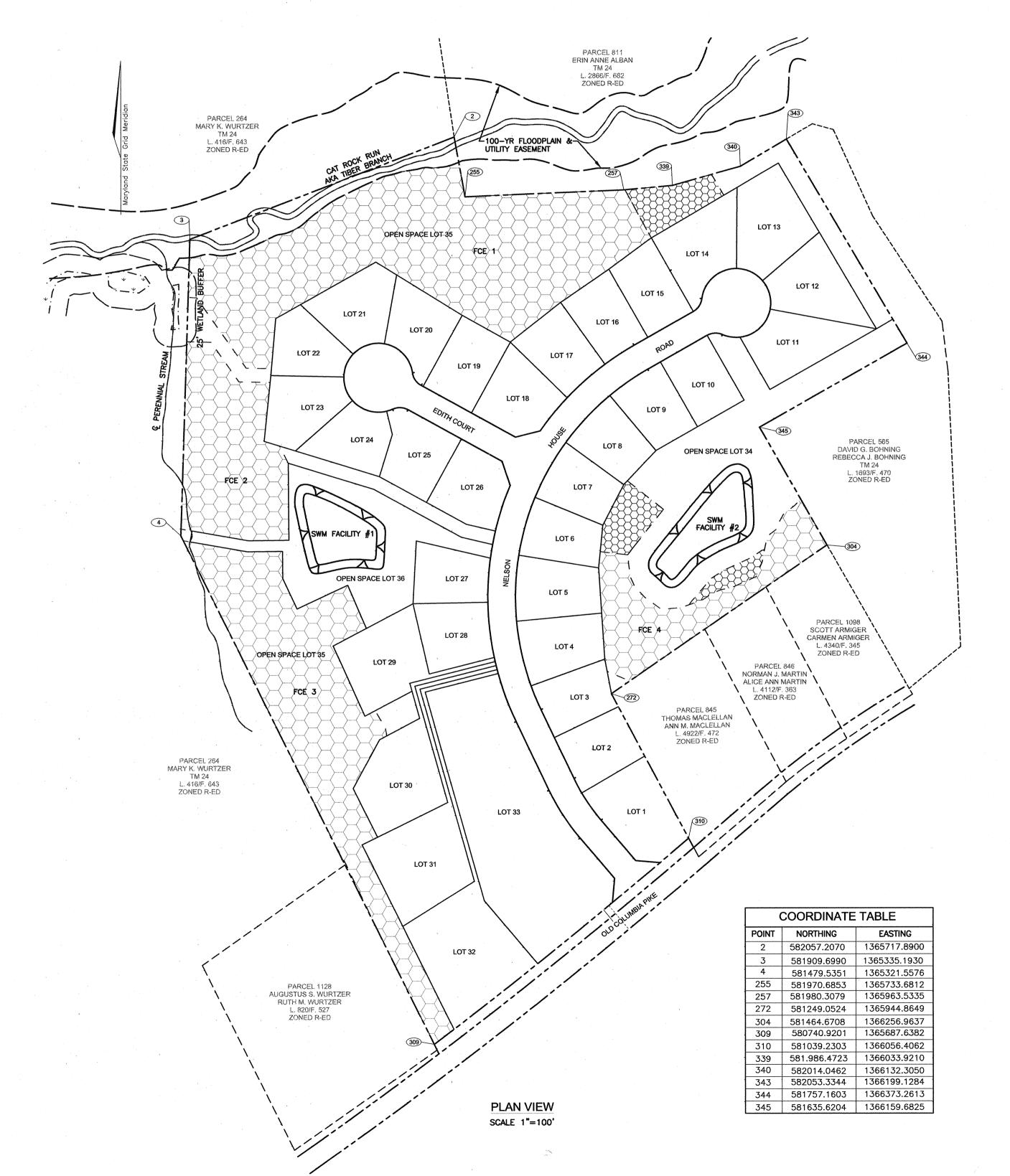
38. THE CONTRACTOR SHALL CLEAN AND STABILIZE THE POND OF THE BOHNING PROPERTY OF SEDIMENT ATTRIBUTED TO THIS PLAN, UPON REQUEST OF THE OWNERS OF THE BOHNING PROPERTY, DURING THE LIFE OF THE OPEN GRADING PERMIT.

39. THE PROPOSED DRYWELLS AND THE PROPOSED "RAIN GARDEN" BIORETENTION FACILITIES ARE TO BE CONSTRUCTED

40. THE PROPOSED RETAINING WALL SHALL BE OWNED AND MAINTAINED BY THE HOA. NO STRUCTURE SHALL BE LOCATED WITHIN THE PROPOSED PRIVATE VARIABLE WIDTH DRAINAGE, WALL MAINTENANCE & UTILITY EASEMENT.

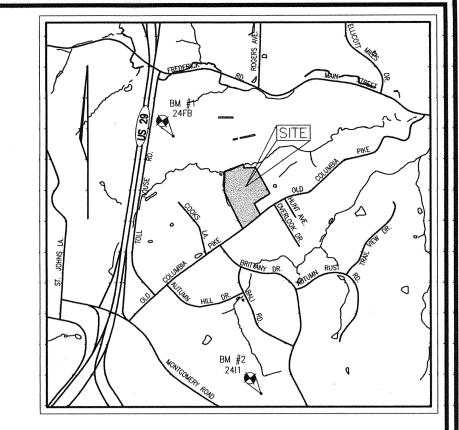
APPROVED: DEPARTMENT OF PUBLIC WORKS 4-21-04 Chief, Bureau of Highways APPROVED: DEPARTMENT OF PLANNING AND ZONING

FINAL ROAD CONSTRUCTION PLAN THE WOODS OF TIBER BRANCH LOTS 1-36 HOWARD COUNTY, MARYLAND



BENCHMARK NO. 1: COUNTY CONTROL #24FB N 582652.103 E 1364255.930 ELEV. = 423.282

BENCHMARK NO. 2: COUNTY CONTROL #2411 N 577298.654 E 1366075.133



VICINITY MAP SCALE 1"=2000'

1	1-YR STORM POND & BASIN SUMMERY					
POND	Q ₁	EX.	Q _{1TI}	EMP.	Q ₁₁	DEV.
#1	3.3	cfs	3.0	cfs	0.1	cfs
#2	3.6	cfs	1.6	cfs	0.1	cfs

STORMWATER MANAGEMENT REQUIREMENTS (ACTUAL; INCLUDES CREDITS)

DRAINAGE AREA 0 AC-FT** 0.2 AC-FT*** 0 AC-FT*** -0 AC-FT** 0.32 AC-FT++ 0 AC-FT++ -

 0.45 AC-FT 0.60 AC-FT 0.48 AC-FT 0.57 AC-FT *PROVIDED BY ROOFTOP DISCONNECT CREDIT

Q1< 2.0 CFS EXEMPT *PROVIDED BY BIORETENTION RAIN GARDEN

++PROVIDED BY INFILTRATION (DRY WELL) AND SHEET FLOW TO BUFFER CREDIT

	SHEET INDEX			
SHEET NO.	TITLE			
1	COVER SHEET			
2	ROAD CONSTRUCTION PLAN AND PROFILES			
3	ROAD CONSTRUCTION PLAN AND PROFILES			
4	GRADING AND SEDIMENT & EROSION CONTROL PLAN			
5	GRADING AND SEDIMENT & EROSION CONTROL PLAN			
6	SEDIMENT & EROSION CONTROL DETAILS			
7	STORMDRAIN DRAINAGE AREA MAP			
8	STORM DRAIN PROFILES			
9	STORMWATER MANAGEMENT DETAILS-POND #1			
10	STORMWATER MANAGEMENT DETAILS-POND #2			
11	LANDSCAPE PLAN			
12	FOREST CONSERVATION PLAN			
13	FOREST CONSERVATION AND LANDSCAPE NOTES & DETAILS			
14	RETAINING WALL DESIGNS			
15	RETAINING WALL DESIGNS			
16	RETAINING WALL DESIGNS			
17	RETAINING WALL DESIGNS			
18	RETAINING WALL DESIGNS			

NOTE: THIS IS A REPLACEMENT SHEET FOR SHEET 1 TO ACCOMMODATE THE REVISED GRADING AND ALL RELATED CHANGES.

NO.	REVISION		DATE
1	REVISED GRADING		12/26/03
	·		
	,	*	

COVER SHEET THE WOODS OF TIBER BRANCH LOTS 1-36

REVISED

TAX MAP 24 BLOCK 18 HOWARD COUNTY, MARYLAND 2ND ELECTION DISTRICT REF.: S-01-09, PB CASE NO. 352 (APP. 6/13/01), P-02-14, WP-03-26 (APP. 10/25/02)



THEODORE & PATRICIA NELSON 3992 OLD COLUMBIA PIKE ELLICOTT CITY, MARYLAND 21043

THE WOODS OF TIBER BRANCH. LL C/O TRINITY QUALITY HOMES
3675 PARK AVE., STE. 301
ELLICOTT CITY, MARYLAND 21043

(410) 480-0023

FREDERICK WARD ASSOCIATES, INC.

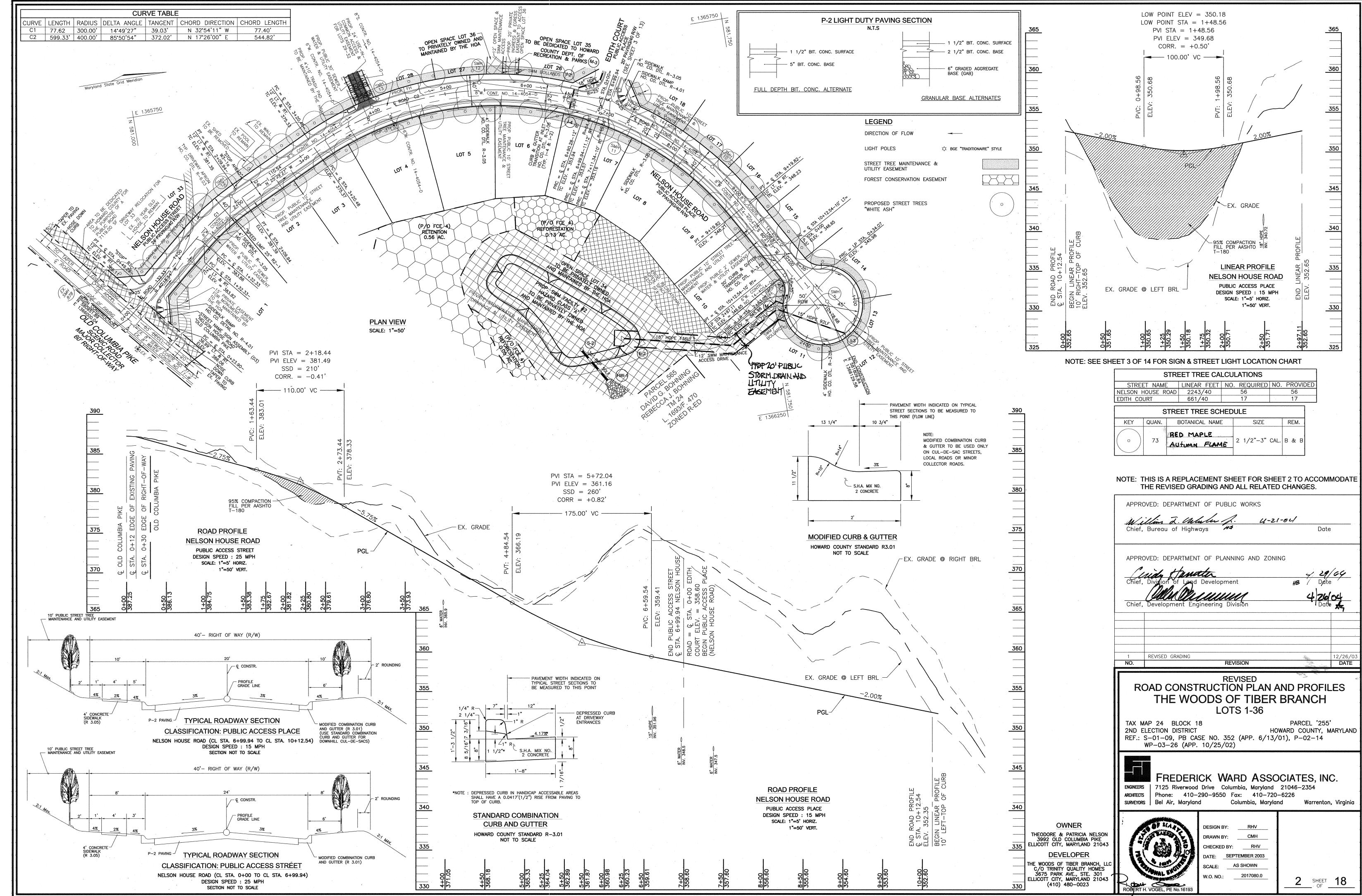
ENGINEERS | 7125 Riverwood Drive Columbia, Maryland 21046-2354 ARCHITECTS | Phone: 410-290-9550 Fax: 410-720-6226 SURVEYORS | Bel Air, Maryland Columbia, Maryland Warrenton, Virginia



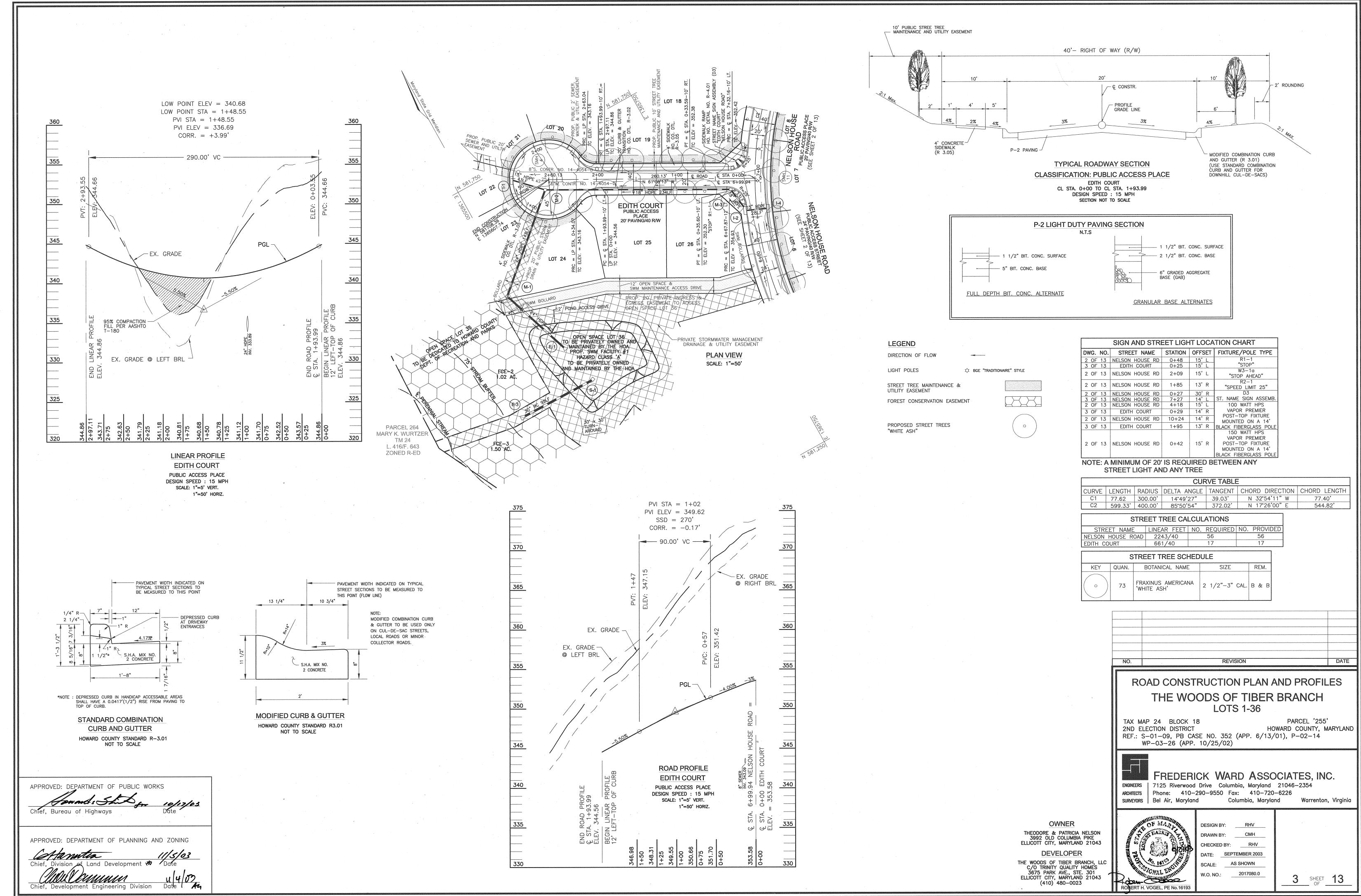
ROBERT H. VOGEL, PE No.16193

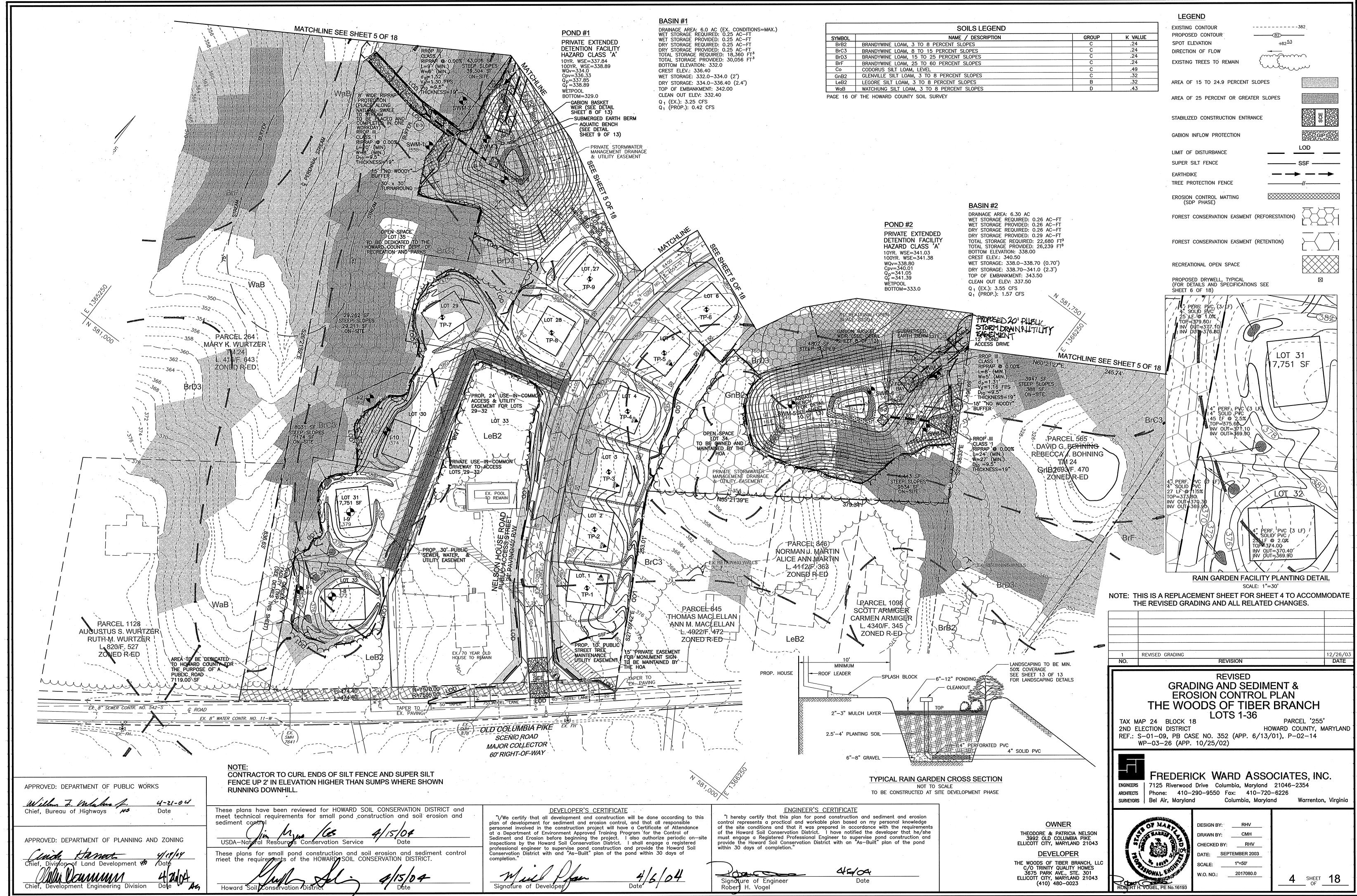
SEPTEMBER 2003 2017080.0

SHEET 18

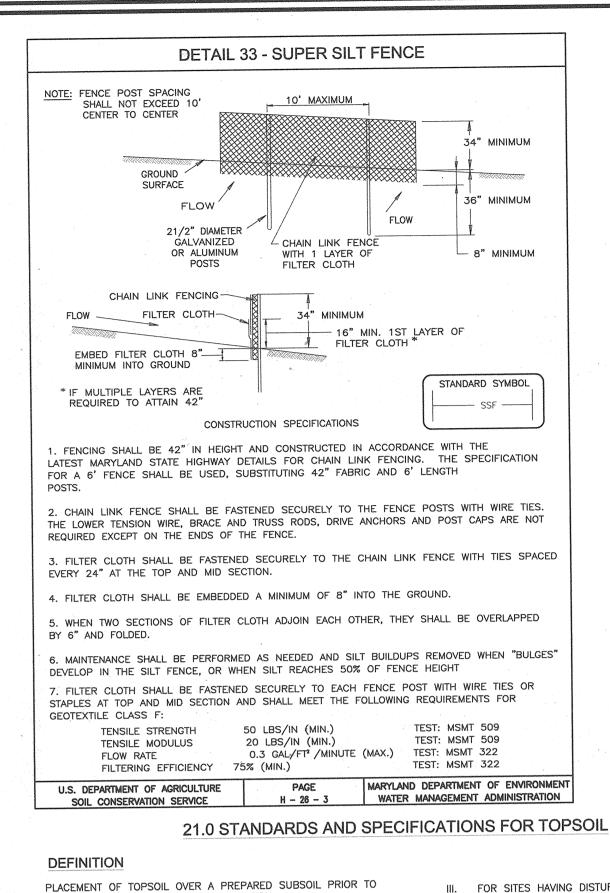


F-03-119





F-03-119



ESTABLISHMENT OF PERMANENT VEGETATION.

UNACCEPTABLE SOIL GRADATION.

MATERIAL TOXIC TO PLANT GROWTH.

STABILIZATION SHOWN ON THE PLANS.

AGRICULTURAL EXPERIMENTAL STATION.

IVY, THISTLE, OR OTHERS AS SPECIFIED.

IN THE FOLLOWING PROCEDURES.

MUST MEET THE FOLLOWING:

LIMESTONE IS NOT FEASIBLE.

SLOPES WHERE:

TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETABLE GROWTH.

ZONE IS NOT DEEP ENOUGH TO SUPPORT PLANTS OR FURNISH

D. THE SOIL IS SO ACIDIC THAT TREATMENT WITH

AREAS HAVING SLOPES STEEPER THAN 2:1 REQUIRE SPECIAL

CONSTRUCTION AND MATERIAL SPECIFICATIONS

SPECIFICATIONS. TYPICALLY, THE DEPTH OF TOPSOIL TO BE

REPRESENTATIVE SOIL PROFILE SECTION IN THE SOIL SURVEY

PUBLISHED BY USDA-SCS IN COOPERATION WITH MARYLAND

II. TOPSOIL SPECIFICATIONS - SOIL TO BE USED AS TOPSOIL

TOPSOIL SHALL BE A LOAM, SANDY LOAM, CLAY LOAM,

. TOPSOIL MUST BE FREE OF PLANTS OR PLANT PARTS SUCH

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,

ROOTS, TRASH, OR OTHER MATERIALS LARGER THAT 1 AND 1/2" IN

III. WHERE THE SUBSOIL IS EITHER HIGHLY ACIDIC OR

FEET) PRIOR TO THE PLACEMENT OF TOPSOIL. LIME SHALL BE

I. PLACE TOPSOIL (IF REQUIRED) AND APPLY SOIL

SECTION I - VEGETATIVE STABILIZATION METHODS AND MATERIALS.

AMENDMENTS AS SPECIFIED IN 20.0 VEGÉTATIVE STABILIZATION -

II. FOR SITES HAVING DISTURBED AREAS UNDER 5 ACRES:

AS BERMUDA GRASS, QUACKGRASS, JOHNSONGRASS, NUTSEDGE, POISON

COMPOSED OF HEAVY CLAYS, GROUND LIMESTONE SHALL BE SPREAD AT

THE RATE OF 4-8 TONS/ACRE (200-400 POUNDS PER 1,000 SQUARE

DISTRIBUTED UNIFORMLY OVER DESIGNATED AREAS AND WORKED INTO

THE SOIL IN CONJUNCTION WITH TILLAGE OPERATIONS AS DESCRIBED

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,

SALVAGED FOR A GIVEN SOIL TYPE CAN BE FOUND IN THE

CONSIDERATION AND DESIGN FOR ADEQUATE STABILIZATION. AREAS

HAVING SLOPES STEEPER THAN 2:1 SHALL HAVE THE APPROPRIATE

TOPSOIL SALVAGED FROM THE EXISTING SITE MAY BE USED

PROVIDED THAT IT MEETS THE STANDARDS AS SET FORTH IN THESE

THE ORIGINAL SOIL TO BE VEGETATED CONTAINS

FOR THE PURPOSE OF THESE STANDARDS AND SPECIFICATIONS,

CONTINUING SUPPLIES OF MOISTURE AND PLANT NUTRIENTS.

LEVELS, LOW PH, MATERIALS TOXIC TO PLANTS, AND/OR

CONDITIONS WHERE PRACTICE APPLIES

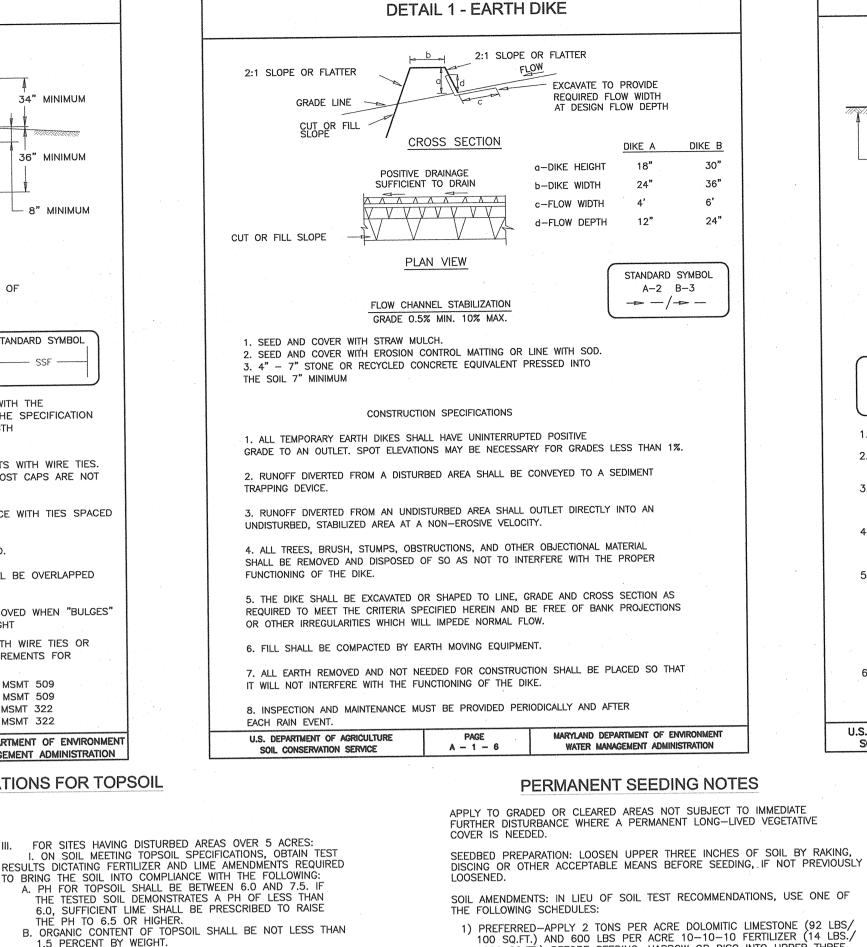
IS NOT ADEQUATE TO PRODUCE VEGETATIVE GROWTH.

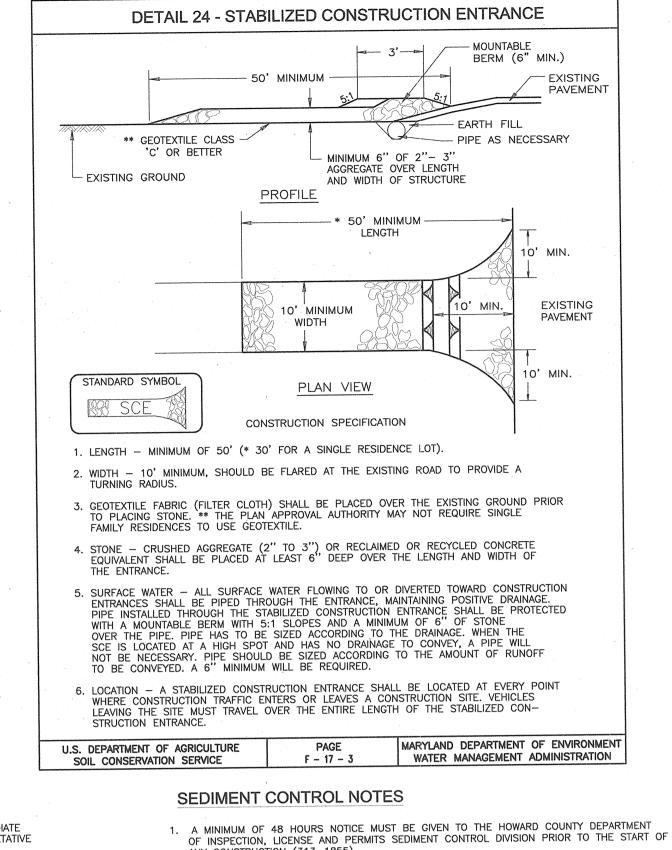
SOILS OF CONCERN HAVE LOW MOISTURE CONTENT, LOW NUTRIENT

THIS PRACTICE IS LIMITED TO AREAS HAVING 2:1 OR FLATTER

THE TEXTURE OF THE EXPOSED SUBSOIL/PARENT MATERIAL

THE SOIL MATERIAL IS SO SHALLOW THAT THE ROOTING





ANY CONSTRUCTION (313-1855).

DESIGN MANUAL, STORM DRAINAGE.

ESTABLISHMENT OF GRASSES.

AREA TO BE ROOFED OR PAVEL

AREA TO BE VEGETATIVELY STABILIZED

OFFSITE WASTE/BORROW AREA LOCATION

HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.

WITH AN APPROVED AND ACTIVE GRADING PERMIT

SEQUENCE OF CONSTRUCTION

2. NOTIFY HOWARD COUNTY BUREAU OF INSPECTIONS AND PERMITS (313-1880) AT LEAST 24 HOURS

3. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE AND

BEFORE STARTING ANY WORK.

INSTALL TREE PROTECTION DEVICES.

AND INSTALL STORM DRAIN SYSTEM.

SIDEWALK. INSTALL STREET TREES.

7. SITE ANALYSIS

TOTAL AREA

AREA DISTURBED

AND REVISIONS THERETO.

2. ALL VEGETATION AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE

3. FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY

THAN 3:1, (B) 14 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE

4. ALL SEDIMENT TRAPS/BASINS SHOWN MUST BE FENCED AND WARNING SIGNS POSTED

5. ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE

6. ALL SEDIMENT CONTROL STRUCTURES ARE TO REMAIN IN PLACE AND ARE TO BE

8. ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.

UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.

1. OBTAIN GRADING PERMIT AND MDE PERMIT FOR STREAM CROSSING 1 DAY

5. CONSTRUCT STORMWATER MANAGEMENT FACILITIES (SEDIMENT BASINS 1 & 2)

8. BEGIN CONSTRUCTION OF WATER, SEWER AND STORM DRAIN SYSTEM. 1 WEEK

9. GRADE ROAD TO SUB-BASE AND ROUGH GRADE REMAINING SITE. 1 WEEK

12. WITH INSPECTOR'S APPROVAL AND ROAD PAVING COMPLETE AND CONTRIBUTING DRAINAGE AREAS STABILIZED, CONVERT SEDIMENT BASINS TO FINAL STORMWATER MANAGEMENT BY REMOVING DEWATERING DEVICES AND BLOCKING FROM BASIN #2.

13. AS STORMWATER MANAGEMENT POND IS STABILIZED, INSTALL POND

LANDSCAPING AS SHOWN IN SCHEDULE 'D' AND PERIMETER LANDSCAPING AS SHOWN IN SCHEDULE 'A'. SEE SHEET 13

(MDE PERMIT APPLICATION TRACKING NO. 02-NT-0473/200360710)

4. WITH COUNTY INSPECTOR'S APPROVAL OF TREE PROTECTION DEVICE

INSTALL PERIMETER SUPER SILT FENCE AND CLEANWATER DIKE.

7. WITH INSPECTOR'S APPROVALS CLEAR AND GRUB SITE TO LOD.

10. WITH ROAD GRADED TO SUB-BASE AND INLETS ARE IN PLACE

11. WITH CURB AND GUTTER IN PLACE PAVE ROAD AND INSTALL

BEGIN INSTALLATION OF CURB AND GUTTER.

9. ADDITIONAL SEDIMENT CONTROLS MUST BE PROVIDED, IF DEEMED NECESSARY BY THE

10. ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES, APPROVAL OF THE INSPECTION

GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED

11. TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT

* TO BE DETERMINED BY CONTRACTOR, WITH PRE-APPROVAL OF THE SEDIMENT CONTROL INSPECTOR

AGENCY SHALL BE REQUESTED UPON COMPLETION OF INSTALLATION OF PERIMETER EROSION

AND SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR

WHICH SHALL BE BACK-FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.

DURATION NOTES:

2 DAYS

OBTAINED FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.

IN ACCORDANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL

EROSION AND SEDIMENT CONTROL FOR PERMANENT SEEDING, SOD, TEMPORARY SEEDING

WHEN RECOMMENDED SEEDING DATES DO NOT ALLOW FOR PROPER GERMINATION AND

MAINTAINED IN OPERATIVE CONDITION UNTIL PERMISSION FOR THEIR REMOVAL HAS BEEN

AND MULCHING (SEC. G). TEMPORARY STABILIZATION WITH MULCH ALONE SHALL BE DONE

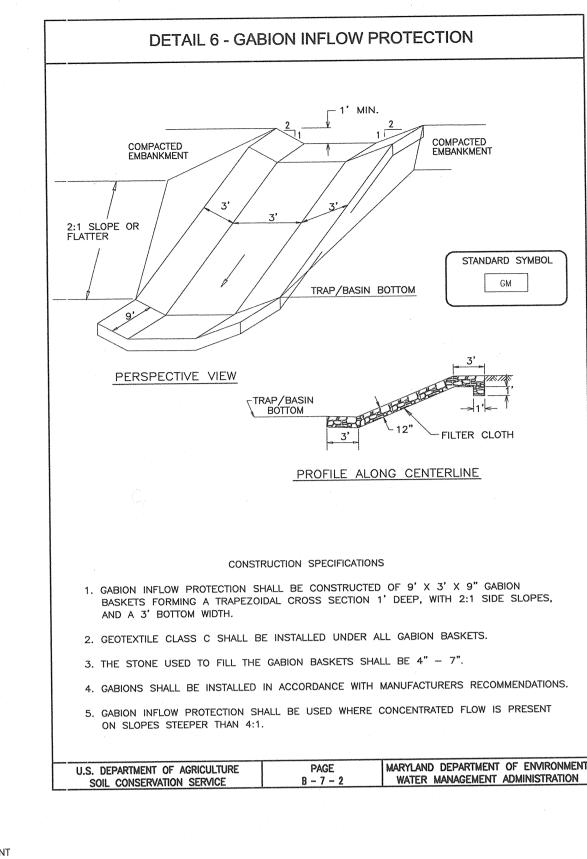
STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.

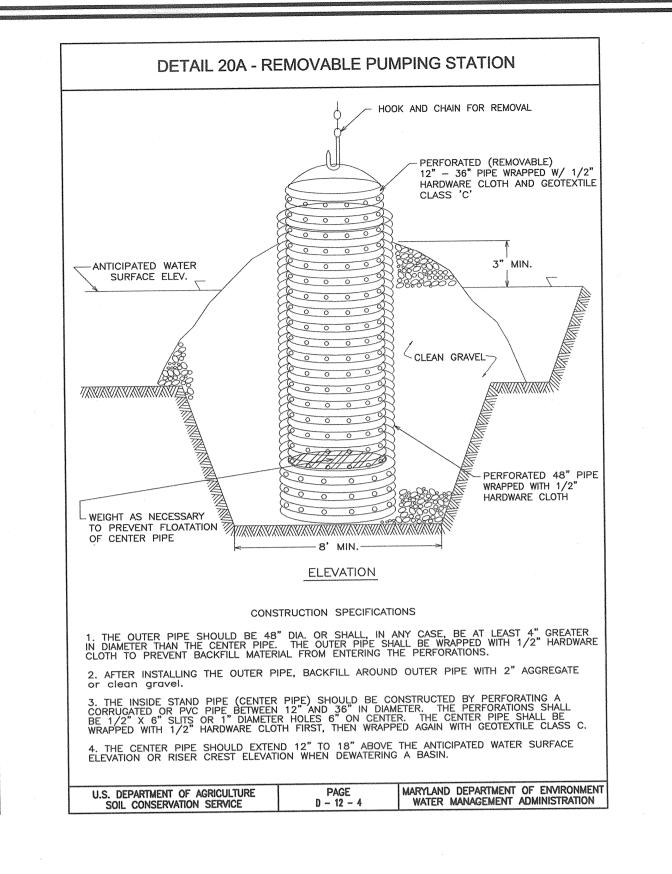
PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE 1994 MARYLAND

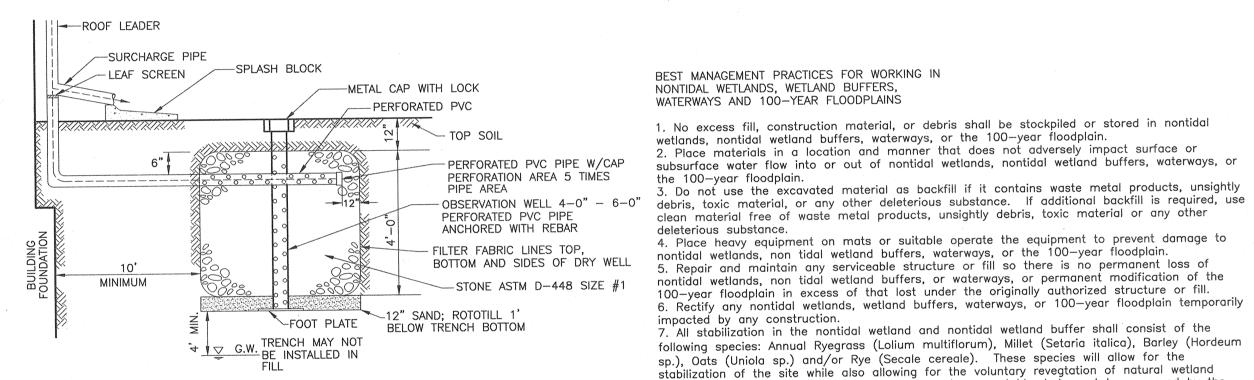
STABILIZATION SHALL BE COMPLETED WITHIN: (A) 7 CALENDAR DAYS FOR ALL PERIMETER

SEDIMENT CONTROL STRUCTURES, DIKES, PERIMETER SLOPES, AND ALL SLOPES GREATER

AROUND THEIR PERIMETER IN ACCORDANCE WITH VOL. 1, CHAPTER 7, HOWARD COUNTY







TYPICAL DRY WELL CROSS SECTION INFILTRATING AND NON-INFILTRATING NOT TO SCALE

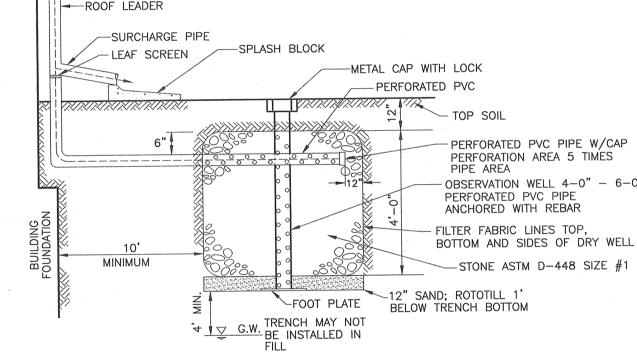
OR JE.	DRY WELL CHART						
THE	DIVI VALLE OID WAL						
	LOT No.	VOLUME REQUIRED	VOLUME PROVIDED	No.	SIZE WELLS		
THE INSPECTION ER EROSION	3	400 cf	400 cf	4*	5.25'x5.25'x4'deep		
ISTURBANCE OR JTHORIZED	5	200 cf	200 cf	2*	5.25'x5.25'x4'deep		
	6	200 cf	200 cf	2*	5.25'x5.25'x4'deep		
NGTHS OR THAT CHEVER IS SHORTER.	8	400 cf	400 cf	4*	5.25'x5.25'x4'deep		
TROL INSPECTOR	9	400 cf	400 cf	4*	5.25'x5.25'x4'deep		
	10	400 cf	400 cf	4*	5.25'x5.25'x4'deep		
	11	200 cf	200 cf	2**	4.2'x4.2'x4'deep		
ES:	13	400 cf	400 cf	4**	4.2'x4.2'x4'deep		
NG GRADING AND AFTER EACH RAINFALL, THE CONTRACTOR	14	200 cf	200 cf	2**	4.2'x4.2'x4'deep		
ALL INSPECT AND PROVIDE THE NECESSARY MAINTENANCE THE SEDIMENT AND EROSION CONTROL MEASURES SHOWN EREON.	15	200 cf	200 cf	2**	4.2'x4.2'x4'deep		
OWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE	19	400 cf	400 cf	4***	4.2'x4.2'x4'deep		
PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLIED WITH: A. 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL	20	400 cf	400 cf	4**	4.2'x4.2'x4'deep		
STRUCTURES, DIKES, SWALES, DITCH PERIMETER SLOPES SLOPES AND ALL SLOPES GREATER THAN 3:1.	22	400 cf	400 cf	4**	4.2'x4.2'x4'deep		
B. 14 CALENDAR DAYS FOR ALL OTHER DISTURBED AREAS.	23	200 cf	200 cf	2*	5.2'x5.2'x4'deep		
	24	400 cf	400 cf	4*	5.2'x5.2'x4'deep		
	25	400 cf	400 cf	4*	5.2'x5.2'x4'deep		
	26	400 cf	400 cf	4*	5.2'x5.2'x4'deep		
	27	400 cf	400 cf	4*	5.2'x5.2'x4'deep		
		400	100 - f	1 *	5 2'v5 2'v4'doop		

* ROOFTOP DISCONNECT CREDIT (NON-INFILTRATING DRYWELL REQUIRED FOR Rev

G.W. BE INSTALLED IN

8. After installation has been completed, make post construction grades and elevations the same as the original grades and elevations in temporarily impacted areas. 9. To protect aquatic specifies, in-stream work is prohibited as determined by the classification Use I waters: In-stream work shall not be conducted during the period March 1 through June 15, inclusive, during any year. 10. Stormwater runoff from impervious surfaces shall be controlled to prevent the 11. Culverts shall be constructed and any riprap places so as not to obstruct the movement of aquatic species, unless the purpose of the activity is to impound

400 cf 4* 5.2'x5.2'x4'deep



** INFILTRATING DRYWELL REQUIRED FOR Rev AND WQV *** INFILTRATING AND NON-INFILTRATING DRYWELLS REQUIRED

APPROVED: DEPARTMENT OF PUBLIC WORKS Chief, Bureau of Highways

APPROVED: DEPARTMENT OF PLANNING AND ZONING

V. TOPSOIL APPLICATION WHEN TOPSOILING, MAINTAIN NEEDED EROSION AND SEDIMENT CONTROL PRACTICES SUCH AS DIVERSIONS, GRAD 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. FLOW ENTERS AS SHEET FLOW 0% CHANNEL GRADE OR CONCENTRATED FLOW (SPREADER GRADE)

TOPSOIL HAVING SOLUBLE SALT CONTENT GREATER THAN

D. NO SOD OR SEED SHALL BE PLACED ON SOIL SOIL WHICH

USED FOR WEED CONTROL UNTIL SUFFICIENT TIME HAS

BY A QUALIFIED AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY

THE APPROPRIATE APPROVAL AUTHORITY, MAY BE USED IN LIEU OF

PLACE TOPSOIL (IF REQUIRED) AND APPLY SOIL AMMENDMENTS

ELAPSED (14 DAYS MIN.) TO PERMIT DISSIPATION OF

NOTE: TOPSOIL SUBSTITUTES OR AMENDMENTS, AS RECOMMENDED

HAS BEEN TREATED WITH SOIL STERILANTS OR CHEMICALS

500 PARTS PER MILLION SHALL NOT BE USED

HYTO-TOXIC MATERIALS

STABILIZATION METHODS AND MATERIALS

VARIABLE LENGTH SEE PLAN FOR ACTUAL LENGTH

NOT TO SCALE

USDA-Natural Resources Conservati

sediment control

Howard Soil Con**se**

OF EACH LEVEL SPREADER

<u>PLAN VIEW</u> -RIP-RAP LIF -ORIGINAL GROUND PROTECTION CLASS I RIP-RAP

These plans for small pond construction and soil erosion and sediment control

meet the requirements of the HOWARD SOIL CONSERVATION DISTRICT.

2:1 OR FLATTER--2:1 OR FLATTER LEVEL SPREADER

These plans have been reviewed for HOWARD SOIL CONSERVATION DISTRICT and meet technical requirements for small pond construction and soil erosion and

Signature of

1000 SQ.FT.) BEFORE SEEDING. HARROW OR DISC INTO UPPER THREE

30-0-0 UREAFORM FERTILIZER (9 LBS/1000 SQ.FT.)

CTOBER 16 THRU FEBRUARY 28. PROTECT SITE BY

THREE INCHES OF SOIL.

REPLACEMENTS AND RESEEDINGS.

IN THE SPRING, OR USE SOD.

(8 GAL/1000 SQ.FT.) FOR ANCHORING.

INCHES OF SOIL. AT THE TIME OF SEEDING, APPLY 400 LBS. PER ACRE

2) ACCEPTABLE-APPLY 2 TONS PER ACRE DOLOMATIC LIMESTONE (92 LBS/

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 KENTUCKY 31 TALL FESCUE. FOR THE PERIOD MAY 1 THRU JULY 31, SEED

WITH 60 LBS. KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS. PER ACRE

PER ACRE WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE

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

MAINTENANCE: INSPECT ALL SEEDED AREAS AND MAKE NEEDED REPAIRS,

TEMPORARY SEEDING NOTES

SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING,

DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY

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 TO

MULCHING: APPLY 1 1/2 TO 2 TONS PER ACRE (70 TO 90 LBS./1000

MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL

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

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

PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE

SQ.FT.) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR

SOIL AMENDMENTS: APPLY 600 LBS. PER ACRE 10-10-10 FERTILIZER (14 LBS./1000 SQ.FT).

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.

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

000 SQ.FT.) OF WEEPING LOVEGRASS. DURING THE PERIOD OF

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

DEVELOPER'S CERTIFICATE "I/We certify that all development and construction will be done according to this plan of development 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 Environment Approved Training Program for the Control of Sediment and Erosion before beginning the project. I also authorize periodic on—site inspections by the Howard Soil Conservation District. I shall engage a registered professional engineer to supervise pond construction and provide the Howard Soil Conservation District with and "As—Built" plan of the pond within 30 days of completion.'

ENGINEER'S CERTIFICATE "I hereby certify that this plan for pond construction and sediment and erosion control represents a proctical 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. I have notified the developer that he/she must engage a Registered Professional Engineer to supervise pond construction and provide the Howard Soil Conservation District with an "As-Built" plan of the pond within 30 days of completion."

doct Occor Signature of Engineer Rebert H. Vogel

DURING GRADING AND AFTER EACH RAINFALL, THE CONTRACTOR

FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE

OWNER THEODORE & PATRICIA NELSON 3992 OLD COLUMBIA PIKE ELLICOTT CITY, MARYLAND 21043 DEVELOPER THE WOODS OF TIBER BRANCH, LLC C/O TRINITY QUALITY HOMES 3675 PARK AVE., STE. 301 ELLICOTT CITY, MARYLAND 21043 (410) 480-0023

SURVEYORS | Bel Air, Maryland DESIGN BY: HARRY DRAWN BY: CHECKED BY: DATE: SCALE: W.O. NO.: ROBERT H. VOGEL, PE No.16193

WP-03-26 (APP. 10/25/02)

FREDERICK WARD ASSOCIATES, INC. ENGINEERS | 7125 Riverwood Drive Columbia, Maryland 21046-2354 Phone: 410-290-9550 Fax: 410-720-6226 Columbia, Maryland Warrenton, Virginia CMH SEPTEMBER 2003 AS SHOWN 2017080.0

3. Do not use the excavated material as backfill if it contains waste metal products, unsightly

. All stabilization in the nontidal wetland and nontidal wetland buffer shall consist of the

species. Other non-persistent vegetation may be acceptable, but must be approved by the

activities have been completed.

washing of debris into the waterway.

REVISED GRADING

TAX MAP 24 BLOCK 18

2ND ELECTION DISTRICT

Nontidal Wetlands and Waterways Division. Kentucky 31 fescue shall not be utilized in wetland

or buffer areas. The area should be seeded and mulched to reduce erosion after construction

REVISION

SEDIMENT & EROSION CONTROL DETAILS

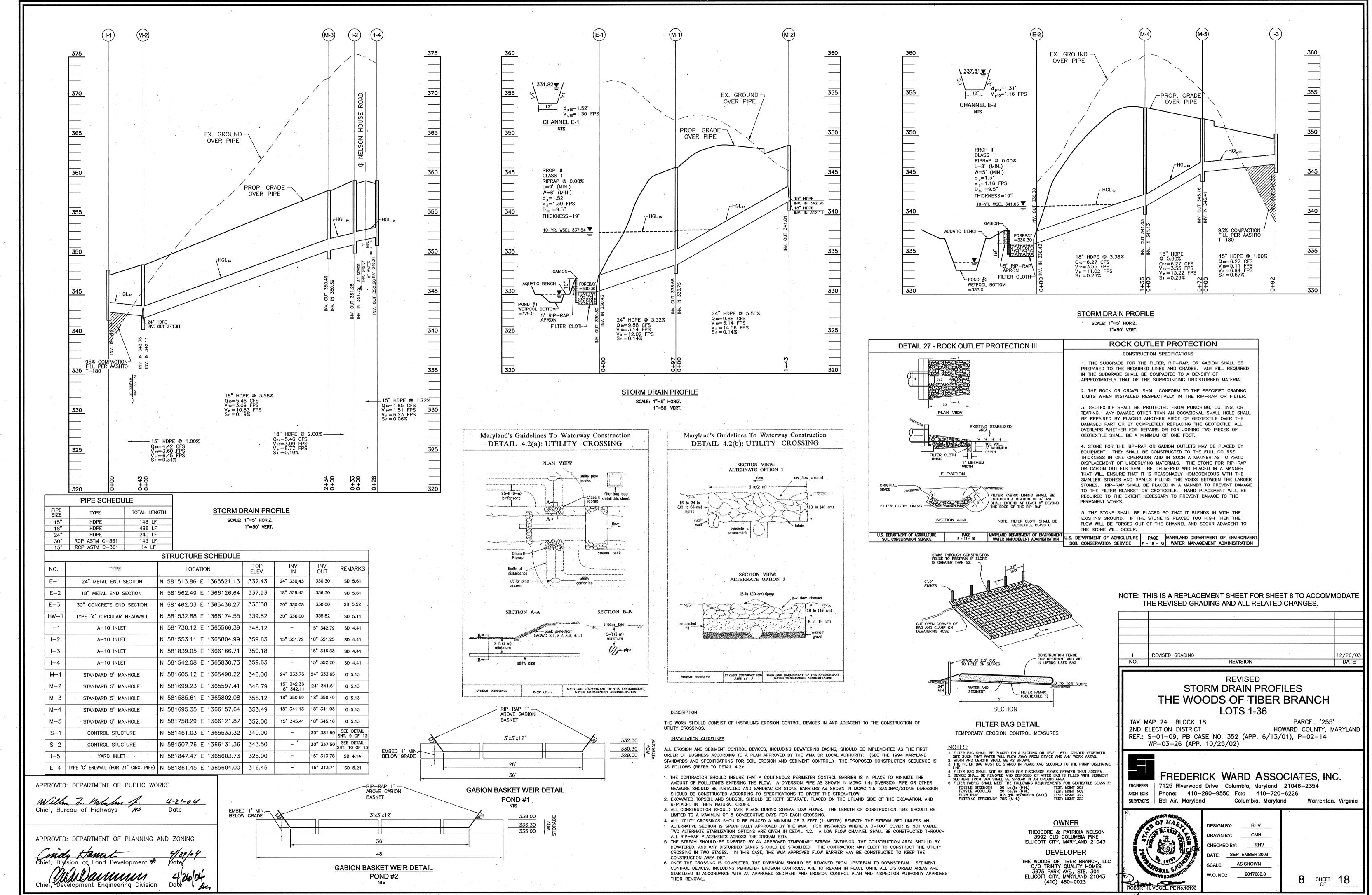
THE WOODS OF TIBER BRANCH

LOTS 1-36

REF.: S-01-09, PB CASE NO. 352 (APP. 6/13/01), P-02-14

PARCEL '255'

HOWARD COUNTY, MARYLAND



F-03-119

Lobert Ocea

Sign**i**ature of Engineer

Robert H. Vogel

3/29/03

SHEET 18

12/26/03

DATE

PARCEL '255'

AS SHOWN

N.O. NO.:

Com-Cosso

ROBERT H. VOGEL, PE No.16193

2017080.0

THE WOODS OF TIBER BRANCH, LLC

C/O TRINITY QUALITY HOME'S

3675 PARK AVE., STE. 301

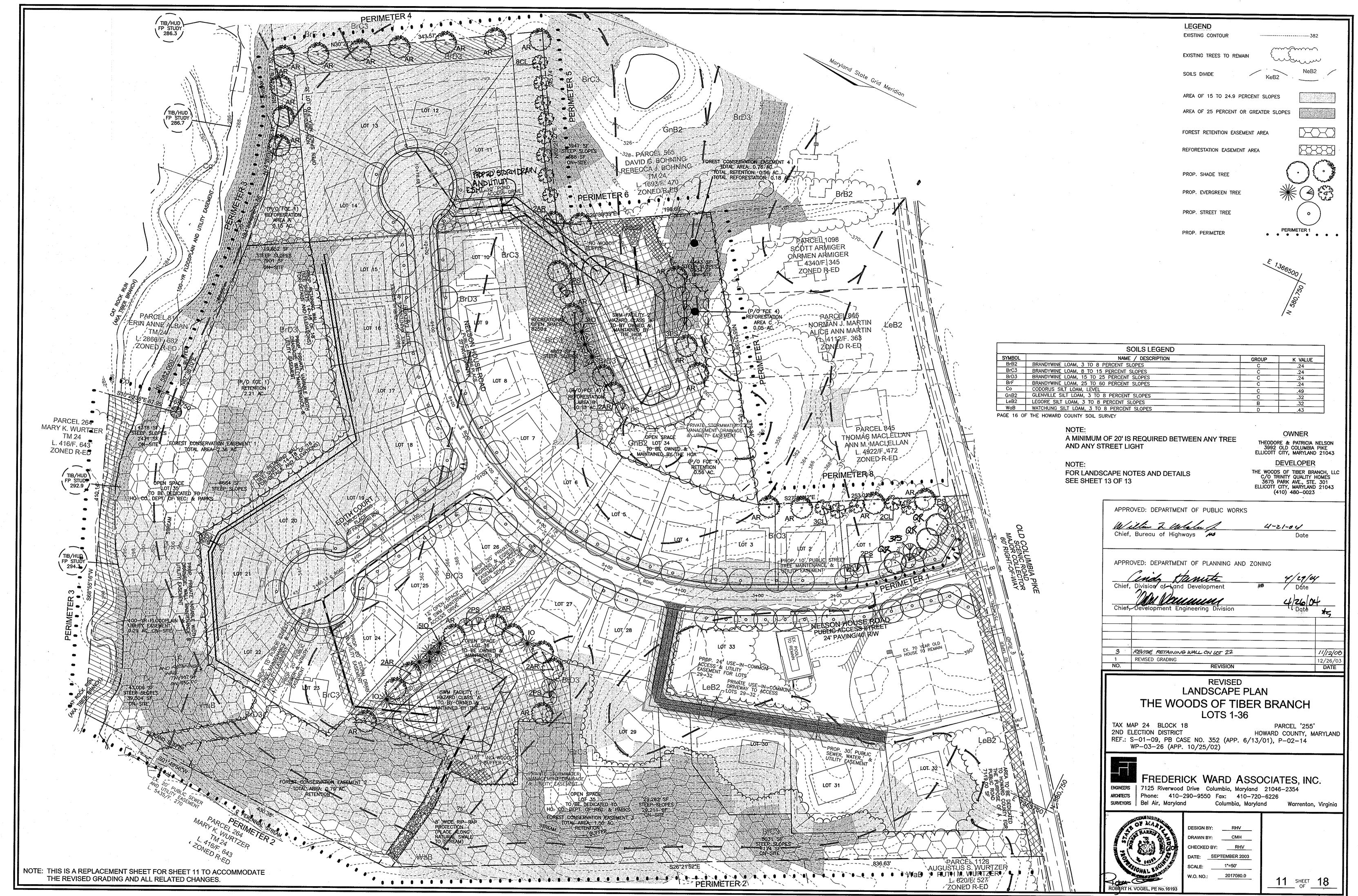
ELLICOTT CITY, MARYLAND 21043

(410) 480-0023

HOWARD COUNTY, MARYLAND

Warrenton, Virginia

Materials - (Aluminum Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO





FOREST CONSERVATION WORKSHEET ZONED R-ED **NET TRACT AREA:** A. TOTAL TRACT AREA B. AREA WITHIN 100 YEAR FLOODPLAIN C. AREA TO REMAIN IN AGRICULTURAL PRODUCTION D. NET TRACT AREA LAND USE CATEGORY INPUT THE NUMBER "1" UNDER THE APPROPIATE LAND USE ZONING, AND LIMIT TO ONLY ONE ENTRY. ZONED R-ED. IDA 0 0 E. AFFOREST THRESHOLD F. CONSERVATION THRESHOLD **EXISTING FOREST COVER:** G. EXISTING FOREST COVER (EXCLUDING FLOODPLAIN) = H. AREA OF FOREST ABOVE AFFORESTATION THRESHOLD = I. AREA OF FOREST ABOVE CONSERVATION THRESHOLD = BREAK EVEN POINT: $(.2 \times I) + F = BREAK EVEN POINT (6.14 AC)$ J. FOREST RETENTION WITH NO MITIGATION K. CLEARING PERMITTED WITHOUT MITIGATION PROPOSED FOREST CLEARING: L. TOTAL AREA OF FOREST TO BE CLEARED M. TOTAL AREA OF FOREST TO BE RETAINED PLANTING REQUIREMENTS: N. REFORESTATION FOR CLEARING ABOVE CONSERVATION THRESHOLD (L X.25) = 2.62 AC P. REFORESTATION FOR CLEARING BELOW CONSERVATION THRESHOLD Q. CREDIT FOR RETENTION ABOVE CONSERVATION THRESHOLD (M-F) = 1.28 AC R. TOTAL REFORESTATION REQUIRED (N+P-Q)S. TOTAL AFFORESTATION REQUIRED T. TOTAL REFORESTATION AND AFFORESTATION REQUIRED = OBLIGATION TO BE FULFILLED BY ON-SITE RETENTION OF 5.07 AC. (222,849 SF). ON-SITE REFORESTATION OF 0.34 AC. (14,810 SF) AND FEE-IN-LIEU FOR THE REMAINING 1.00 AC. (43,500 SF) 1. THE PROPERTY OUTLINE IS BASED ON A BOUNDARY SURVEY PREPARED BY FREDERICK WARD ASSOCIATES IN JUNE 2001. 2. THE EXISTING FEATURES AND CONTOURS SHOWN HEREON ARE BASED ON AERIAL TOPOGRAPHY PREPARED BY POTOMAC AERIAL COMPANY, FEBRUARY 2001. SEQUENCE OF CONTRUCTION FOREST CONSERVATION 1. PRECONSTRUCTION MEETING /SITE WALK WITH CONTRACTORS AND OTHER RESPONSIBL PARTIES TO DEFINE PROTECTION MEASURES TO BE UTILIZED AND TO POINT OUT PARTICULAR TREES TO BE SAVED. 2. STAKE OUT LIMITS OF DISTURBANCE AND TREE PROTECTION FENCING LOCATIONS ANCHOR POSTS SHOULD BE

3. INSTALL TREE PROTECTION FENCING: FENCING TO BE INSPECTED BY THE PROJECT ENGINEER OR THE PROJECT ECOLOGIST AND HOWARD COUNTY PLANNING AND ZONING. 4. PROCEED WITH TREE REMOVAL AND SITE IMPROVEMENTS AS PER APPROVED SEDIMENT CONTROL PLAN - TO BE INSPECTED BY HOWARD COUNTY PLANNING AND ZONING. 5. TEMPORARY TREE PROTECTION DEVICES SHALL BE REMOVED AFTER ALL FINISHED GRADING AND UTILITY CONSTRUCTION HAS OCCURED AND WITH APPROVAL FROM THE HOWARD COUNTY OFFICE OF PLANNING AND ZONING. HIGHLY VISABLE FLAGGING -USE 2" X 4" LUMBER FOR CROSS BEARING MAXIMUM 8 FEET MINIMUM 2" STEEL "U" CHANNEL OR 2" X 2" TIMBER, 6' IN LENGTH. USE 8' WIRE "U" TO - ANCHOR POSTS MUST BE SECURE FENCE BOTTOM. INSTALLED TO A DEPTH OF NO LESS THAN 1/3 OF THE TOTAL HEIGHT OF THE POST . FOREST PROTECTION DEVICE ONLY. RETENTION AREA WILL BE SET AS PART OF THE REVIEW PROCESS. BOUNDARIES OF RETENTION AREA SHOULD BE STAKED AND FLAGGED PRIOR TO INSTALLING DEVICE. 4. ROOF DAMAGE SHOULD BE AVOIDED. 5. PROTECTION SIGNAGE SHOULD BE USED 6. DEVICE SHOULD BE MAINTAINED THROUGHOUT CONSTRUCTION. **BLAZE ORANGE PLASTIC MESH** TYPICAL TREE PROTECTION FENCE DETAIL NTS

Date

APPROVED: DEPARTMENT OF PUBLIC WORKS

APPROVED: DEPARTMENT OF PLANNING AND ZONING

ision of Land Development 🙌

Development Engineering Division

Chief. Bureau of Highways

HOWARD COUNTY

HDR

1

MPD CIA

0

15% X D = 2.84 AC

20% X D = 3.79 AC

0

19.25 AC

0.29 AC

0.00 AC

18.96 AC

12.71 AC

11.76 AC

= 6.14 AC

= 9.41 AC

10.48 AC 5.01 AC

1.35 AC

1.3**.** AC

FOREST RETENTION AREAS AND NOTES

- 1. FORESTED STREAM BUFFERS ARE RETAINED IN OPEN SPACE LOTS. 2. NO RARE. THREATENED OR ENDANGERED SPECIES WERE OBSERVED ON THIS SITE.
- 3. THE WOODED STEEP SLOPES ARE SUBSTANTIALLY RETAINED IN OPEN SPACE LOTS. 4. FORESTED AREAS ADJACENT TO FLOODPLAINS AND STREAM BUFFERS ARE SUBSTANTIALLY RETAINED IN OPEN SPACE LOTS.
- 5. THERE ARE NO ISOLATED FOREST STANDS ON THIS SITE. 6. CHANGES IN GRADING AND RUNOFF WITHIN CONSTRUCTION/INSTALLATION AREAS WILL NOT ADVERSELY AFFECT THE SOILS WITHIN THE FOREST RETENTION AREA. SEDIMENT CONTROL MEASURES WILL REDIRECT CONCENTRATED FLOW RUNOFF TO STORMWATER MANAGEMENT FACILITIES, RETAIN SEDIMENT WITHIN THE CONSTRUCTION SITE,
- AND/OR REDIRECT CLEAN WATER AWAY FROM CONSTRUCTION AREAS. 7. FOREST CONSERVATION REQUIREMENTS PER SECTION 16.1200 OF THE HOWARD COUNTY CODE, DPZ, AND THE FOREST CONSERVATION MANUAL FOR THIS SUBDIVISION WILL BE FULFILLED BY THE RETENTION OF EXISTING FOREST IN THE AMOUNT OF 5.10 AC, REFORESTATION OF 0.34 AC., AND FFF-IN-LIFL FOR THE REMAINING 0.98 AC
- 8. THE FOREST CONSERVATION EASEMENT HAS BEEN ESTABLISHED TO FULFILL THE REQUIREMENTS OF SECTION 16.1200 OF THE HOWARD COUNTY CODE. NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION EASEMENT, HOWEVER, FOREST MANAGEMENT PRACTICES AS DEFINED IN THE DEED OF FOREST CONSERVATION EASEMENT ARE ALLOWED.

FOREST PROTECTION NOTES

PRE-CONSTRUCTION ACTIVITES

- 1. FOR RETENTION AREAS, INSTALL BLAZE ORANGE FENCE AND RETENTION SIGNS BEFORE CONSTRUCTION BEGINS.
- FENCING SHALL BE MAINTAINED IN GOOD CONDITION AND PROMPTLY REPAIRED OR RESTORED AS THE SITUATION WARRANTS.
- 3. A QUALIFIED TREE CARE EXPERT SHALL DETERMINE IF ROOT PRUNING IS REQUIRED ALONG THE LIMIT OF DISTURBANCE. ROOT PRUNE TREES AS REQUIRED. WATER ANY ROOT-PRUNED TREES IMMEDIATELY AFTER ROOT-PRUNING AND MONITOR FOR SIGNS OF STRESS DURING CONSTRUCTION.

CONSTRUCTION PHASE

- 1. NO DISTURBANCE OR DUMPING IS ALLOWED INSIDE THE TREE
- RETENTION AREA. 2. NO EQUIPMENT SHALL BE OPERATED INSIDE THE TREE
- RETENTION AREA INCLUDING TREE CANOPIES.
- 3. IN THE EVENT OF DROUGHT, THE PROTECTED TREES SHALL BE MONITORED FOR SIGNS OF STRESS AND WATERED AS NEEDED.

POST-CONSTRUCTION ACTIVITIES

- 1. AT THE DIRECTION OF A QUALIFIED TREE CARE EXPERT, DAMAGES TO RETAINED TREES SHALL BE REPAIRED BY THE CONTRACTOR.
- 2. FENCE REMOVAL AND STABILIZATION SHALL BE AS PER THE SEDIMENT AND EROSION CONTROL PLAN.
- DO NOT REMOVE SIGNS.

COST ESTIMATE: (For bonding purposes, only)

RETENTION OF 5.07 AC. (220,849 SF X 0.20) \$44,169,800 REFORESTATION OF 0.34 AC. (14,810 SF X 0.50) \$7,405.00.

SURETY NOTE

FINANCIAL SURETY IN THE AMOUNT OF \$51,57480 WILL BE POSTED WITH THE FC MAINTENANCE AGREEMENT.

COST OF FEE-IN-LIEU FOR THE REMAINING 100 AC. WILL BE \$21,780.00 (43,560 SF X 0.50)

ROOT PRUNING TRENCH -

3. EXACT LOCATION OF TRENCH SHOULD BE IDENTIFIED.

CRITICAL ROOT ZONE

ROOT PRUNING

NTS

— MIN. 11"----

FOREST

CONSERVATION

DO NOT DISTURB

MACHINERY, DUMPING OR STORAGE OF

ANY MATERIALS IS

PROHIBITED

TREE PROTECTION FENCE

TRENCH WITHIN 1' OF LIMIT C

- LIMIT OF DISTURBANCE

- 2' MINIMUM DEPTH

6" MAXIMUM WIDTH

DISTURBANCE LINE

RETENTION AREAS TO BE ESTABLISHED AS PART OF THE FOREST CONSERVATION PLAN REVIEW PROCESS.

. BOUNDARIES OF RETENTION AREAS TO BE STAKED, FLAGGED AND/OR FENCED PRIOR TRENCHING.

--- MIN. 11"--

FOREST

CONSERVATION

area

REFORESTATION

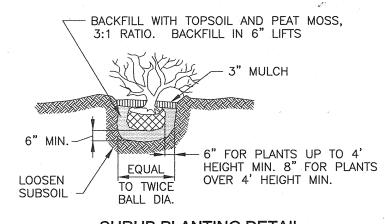
PROJECT

TREES FOR YOUR

5. ROOTS SHOULD BE CLEANLY CUT USING VIBRATORY KNIFE OR OTHER ACCEPTABLE EQUIPMENT.

4. TRENCH SHOULD BE IMMEDIATELY BACKFILLED WITH SOIL REMOVED OR ORGANIC SOIL

FENCE WITHIN 1' OF TRENCH LINE



5. PLANTING STOCK MUST BE PROTECTED FROM DESICCATION AT ALL 6. NEWLY PLANTED TREES MAY REQUIRE WATERING AS LEAST ONCE PER

SHRUB PLANTING DETAIL NOT TO SCALE

SPECIFICATIONS

SEWAGE EASEMENT.

4. PLANT MATERIAL SHALL BE NURSERY GROWN AND INSPECTED PRIOR TO 7. MULCH SHALL BE APPLIED IN ACCORDANCE WITH THE DIAGRAM

BARK MULCH, FREE OF WOOD ALCOHOL. 8. ALL NURSERY STOCK TO BE SPRAYED WITH DEER REPELLENT CONTAINING BITREX, SUCH AS REPELLEX. ALL NURSERY STOCK TO BE

TREE PLANTING AND STAKING

DECIDUOUS TREES UP TO 2-1/2" CALIPER

NOT TO SCALE

MUST BE REPLACED.

BACKFILL MATERIAL.

REFORESTATION AREA MONITORING NOTES

AND AUTUMN VISITS WILL DOCUMENT SUMMER KILL.

NATIVE SPECIES AT LEAST 12 INCHES TALL.

REFORESTATION PLANTING NOTES

PLANTING DETAILS AND PLANT SCHEDULE.

1. MONTHLY VISITS DURING THE FIRST GROWING SEASON ARE TO

2. THE MINIMUM SURVIVAL RATE SHALL BE 75% OF THE TOTAL

3. SURVIVAL WILL BE DETERMINED BY A STRATIFIED RANDOM

4. EFFECTIVE MONITORING WILL ASSESS PLANT SURVIVABILITY

ASSESS THE SUCCESS OF THE PLANTINGS AND TO DETERMINE IF

NECESSARY. EARLY SPRING VISITS WILL DOCUMENT WINTER KILL

NUMBER OF TREES PLANTED PER ACRE AT THE END OF THE TWO

REGENERATION ON THE PLANTING SITE MAY BE COUNTED UP TO

50% TOWARD THE TOTAL SURVIVAL NUMBER IF THE ARE HEALTHY

SAMPLING OF THE PLANTINGS. THE SPECIES COMPOSITION OF THE SAMPLE POPULATION SHOULD BE PROPORTIONATE TO THE AMOUNT

DURING THE FIRST GROWING SEASON AND MAKE RECOMMENDATIONS

1. AFFORESTATION AREAS MAY BE PLANTED AS SOON AS REASONABLE TO

DO SO. LATE WINTER-EARLY SPRING PLANTINGS ARE PREFERRED.

ALTERNATE PLANTING DATES MAY BE CONSIDERED AS CONDITION

BASED UPON THE RESULTS OF SOIL ANALYSIS FOR NITROGEN,

PHOSPHORUS, POTASSIUM, ORGANIC MATTER CONTENT AND pH.

3. PLANT MATERIALS WILL BE PLANTED IN ACCORDANCE WITH THE

REQUIRED, FERTILIZER WILL BE PROVIDED USING A SLOW RELEASE,

WORKS, P.O. BOX 310 HOLLINS, N.Y. 11423 OR APPROVED EQUAL.

SOLUBLE 16-8-16 ANALYSIS DESIGNED TO LAST 5-8 YEARS CONTAINED

IN POLYETHYLENE PERFORATED BAGS SUCH AS MANUFACTURED BY ADCO

PLANTING. PLANTS NOT CONFORMING TO THE AMERICAN STANDARD FOR

DUE TO TRUNK WOUNDS, BREAKAGE, DESICCATION, INSECT OR DISEASE

TIMES PRIOR TO PLANTING. MATERIALS HELD FOR PLANTING SHALL BE

WEEK DURING THE FIRST GROWING SEASON DEPENDING ON RAINFALL IN

PROVIDED AND SHALL CONSIST OF COMPOSTED, SHREDDED HARDWOOD

ORDER TO GET ESTABLISHED. THE INITIAL PLANTING OPERATION SHOULD ALLOW FOR WATERING DURING INSTALLATION TO COMPLETELY SOAK

MOISTENED AND PLACED IN COOL SHADED AREAS UNTIL READY FOR

NURSERY STOCK SPECIFICATIONS FOR SIZE, FORM, VIGOR, OR ROOTS, OR

2. SOIL AMENDMENTS AND FERTILIZATION RECOMMENDATIONS WILL BE MADE

EARLIEST PLANTING DATES WILL VARY FROM YEAR TO YEAR BUT PLANTING

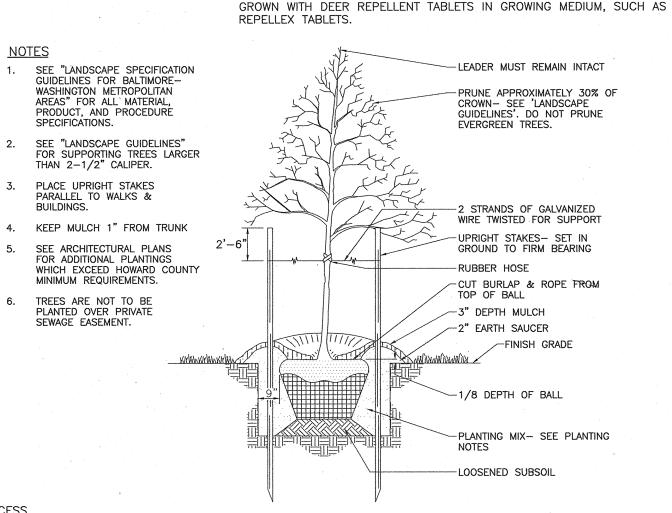
MAY GENERALLY BEGIN AS SOON AS THE GROUND IS NO LONGER FROZEN.

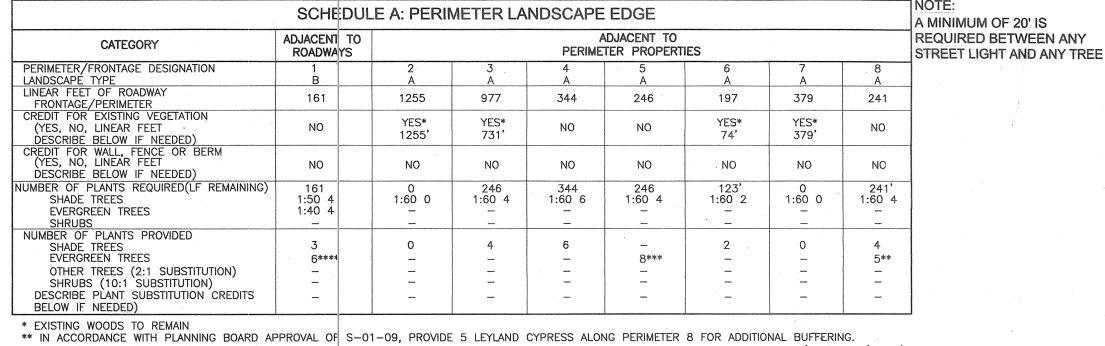
OF EACH SPECIES IN THE ENTIRE PLANTING TO BE SAMPLED.

FOR REINFORCEMENT PLANTINGS IF REQUIRED AT THAT TIME.

YEAR MAINTENANCE PERIOD. WILD TREE SEEDLINGS FROM NATURAL

SUPPLEMENTAL WATERING, PEST CONTROL OR OTHER ACTIONS ARE





*** 8 LEYLAND CYPRESS TO BE SUBSTITUTED FOR 4 SHADE TREES. LOCATION TO BE DETERMINED IN THE FIELD TO SCREEN MR. BOHNING'S HOUSE (P.565). ****2 EASTERN WHITE PINES SUBSTITUTED FOR 1 SHADE TREE

PLANTING DENSITY = 200 TREES PER ACRE

	REFORESTATION PLA REFORESTATION AR (P/O FCE	REA B/0.13 A	
QTY.	BOTANICAL NAME	SIZE	SPACING
7	ACER RUBRUM RED MAPLE	I"CAL	15 ×15'
7	PLATANUS OCCIDENTALIS SYCAMORE	I"CAL	15' x15'
6	PRUNUS SEROTINA BLACK CHERRY	I" CAL	15 × 15'
6	QUERCUS PALUSTIS SYCAMORE)"CAL	15' × 15'

PLANTING DENSITY = 200 TREES PER ACRE REFORESTATION PLANT SCHEDULE REFORESTATION AREA A/0.15 AC.

6 SYCAMORE

	(P/O FCE	4)	
QTY.	BOTANICAL NAME	SIZE	SPACING
8	ACER RUBRUM RED MAPLE	I" CAL	15°× 15°
8	PLATANUS OCCIDENTALIS SYCAMORE	I"CAL	15,712,
7	PRUNUS SEROTINA BLACK CHERRY	T" CAL	157 ×15'
7	QUERCUS PALUSTIS	1" CAL	15' × 15"

PLANTING DENSITY = 200 TREES PER ACRE

		- (846)	
	REFORESTATION PLA REFORESTATION AR (P/O FCE	REA C/0.06 A	
QTY.	BOTANICAL NAME	SIZE	SPACING
3	ACER RUBRUM RED MAPLE	1" CAL	15' × 15'
3	PLATANUS OCCIDENTALIS SYCAMORE	d"CAL	15 × 151
3	PRUNUS SEROTINA BLACK CHERRY	J" CAL	15' × 15'
3	QUERCUS PALUSTIS SYCAMORE	l" CALE -	15 '×15'

FOREST CONS EASEMENT	
FOREST CONSERVATION	EASEMENT 1
RETENTION	2.02 AC.
REFORESTION	0.15 AC.
	2.16 AC. TOTAL
FOREST CONSERVATION	EASEMENT 2
RETENTION	1.01 AC. TOTAL
FOREST CONSERVATION	EASEMENT 3
RETENTION	1.50 AC. TOTAL
FOREST CONSERVATION	EASEMENT 4
RETENTION	0.57 AC.
REFORESTION	0.19 AC.
	0.76 AC. TOTAL
TOTAL RETENTION	5.10 AC.
TOTAL REFORESTATION	0.34 AC.

SCHEDULE D: STORMWATER MANAGEMENT AREA LANDSCAPING POND #1 718 LF POND #2 713 LF LINEAR FEET OF PERIMETER CREDIT FOR EXISTING VEGETATION (NO, YES AND LINEAR FEET) CREDIT FOR OTHER LANDSCAPING NO (NO, YES AND %) NUMBER OF TREES REQUIRED 9 SHADE TREES SHADE TREES 9 EVERGREEN TREES EVERGREEN TREES 11 EVERGREEN TREES NUMBER OF TREES PROVIDED SHADE TREES 9 SHADE TREES 7 SHADE TREES EVERGREEN TREES 11 EVERGREEN TREES 9 EVERGREEN TREES SHRUBS

STING	WOODS	то	REMA
******			***********

LANDSCAPE SCHEDULE					
KEY	QUAN.	BOTANICAL NAME	SIZE	REM.	
åR	32	ACER RUBRUM 'OCTOBER GLORY' OCTOBER GLORY RED MAPLE	2 1/2"-3" Cal.	В & В	
(OK)	3	QUERCUS RUBRA	21/24-34CAI.	B & B	
PS	16	PINUS STROBUS EASTERN WHITE PINE	7' – 9' Ht.	B & B	
**	10	ILEX OPACA AMERICAN HOLLY OR EQUIV.	5' -6' Ht.	B & B	
CL CL	13	CYPRESS OCYPARIS LEYLANDI LEYLAND CYPRESS	5' — 6' Ht.	B & B	
CONFO	RM TO THE CAMW PLAN	RIALS SHALL BE FULL AND HEAVY, BE WELL MOST CURRENT AAN SPECIFICATIONS AND UTING SPECIFICATIONS. LL VERIFY LOCATION OF ALL UNDERGROUN	BE INSTALLED IN AC	CORDANCE	

FINAL LOCATION OF PLANT MATERIAL MAY NEED TO VARY TO MEET FINAL FIELD CONDITIONS. TREES SHALL NOT BE PLANTED IN THE BOTTOM OF DRAINAGE SWALES. . CONTRACTOR SHALL VERIFY PLANT QUANTITIES PRIOR TO BIDDING. IF PLAN DIFFERS FROM LANDSCAPE SCHEDULE, THE PLAN SHALL GOVERN.

DEVELOPER'S AGREEMENT

FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING PROVIDED PER THE LANDSCAPE MANUAL TO BE POSTED WITH THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$16,350.00 FOR THE REQUIRED 40 SHADE TREES AND 29 EVERGREEN TREES.

STRE	EET TREE CA	LCULATIONS	
STREET NAME	LINEAR FEET	NO. REQUIRED	NO. PROVIDED
NELSON HOUSE ROAD	2243/40	56	56

STREET TREE SCHEDULE					
KEY	QUAN.	BOTANICAL NAME	SIZE	REM.	
0	73	ACEPRIBRIM' AUTUMN FLAME	2 1/2"-3" CAL.	B & B	

661/40

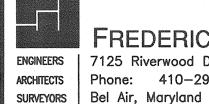
-	RAIN GARDEN BIORETENTIN PLANTING SCHEDULE							
	KEY	QUAN.	BOTANICAL NAME	SIZE	REM.			
	FA	12	LINDERA BENZOIN SPICEBUSH	3' – 4' Ht.	B & B OR CONT.			

11/23/04 REVISED SEEDLINGS TO 1" CALIPER TREES REVICED GRADING DATE REVISION FOREST CONSERVATION AND LANDSCAPE

NOTES AND DETAILS THE WOODS OF TIBER BRANCH LOTS 1-36

TAX MAP 24 BLOCK 18 2ND ELECTION DISTRICT

HOWARD COUNTY, MARYLAND REF.: S-01-09, PB CASE NO. 352 (APP. 6/13/01), P-02-14 WP-03-26 (APP. 10/25/02)



FREDERICK WARD ASSOCIATES, INC. ENGINEERS | 7125 Riverwood Drive Columbia, Maryland 21046-2354 ARCHITECTS | Phone: 410-290-9550 Fax: 410-720-6226

HARRIS

DESIGN BY: DRAWN BY: CHECKED BY: DATE: SEPTEMBER 2003 AS SHOWN W.O. NO.:

OWNER THEODORE & PATRICIA NELSON 3992 OLD COLUMBIA PIKE ELLICOTT CITY, MARYLAND 21043

DEVELOPER THE WOODS OF TIBER BRANCH, LLC ROBERT H. VOGEL, PE No.16193

Warrenton, Virginia Columbia, Maryland SHEET 18

3. ATTACHMENT OF SIGNS TO TREES IS PROHIBITED.

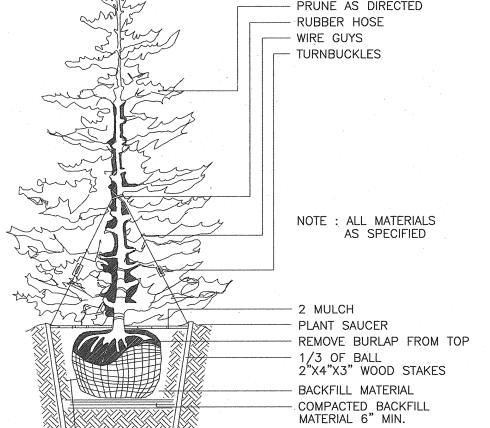
1. BOTTOM OF SIGNS TO BE HIGHER THAN TOP OF TREE PROTECTION FENCE.

FOREST CONSERVATION AREA SIGN

2. SIGNS TO BE PLACED APPROXIMATELY 100' FEET APART. CONDITIONS ON SITE AFFECTING VISIBILITY MAY WARRANT PLACING SIGNS CLOSER OR FARTHER APART.

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

OWNER/DEVELOPER



- 1'-0" ALL SIDES TYPICAL EVERGREEN TREE PLANTING DETAIL NOT TO SCALE

PRUNE AS DIRECTED

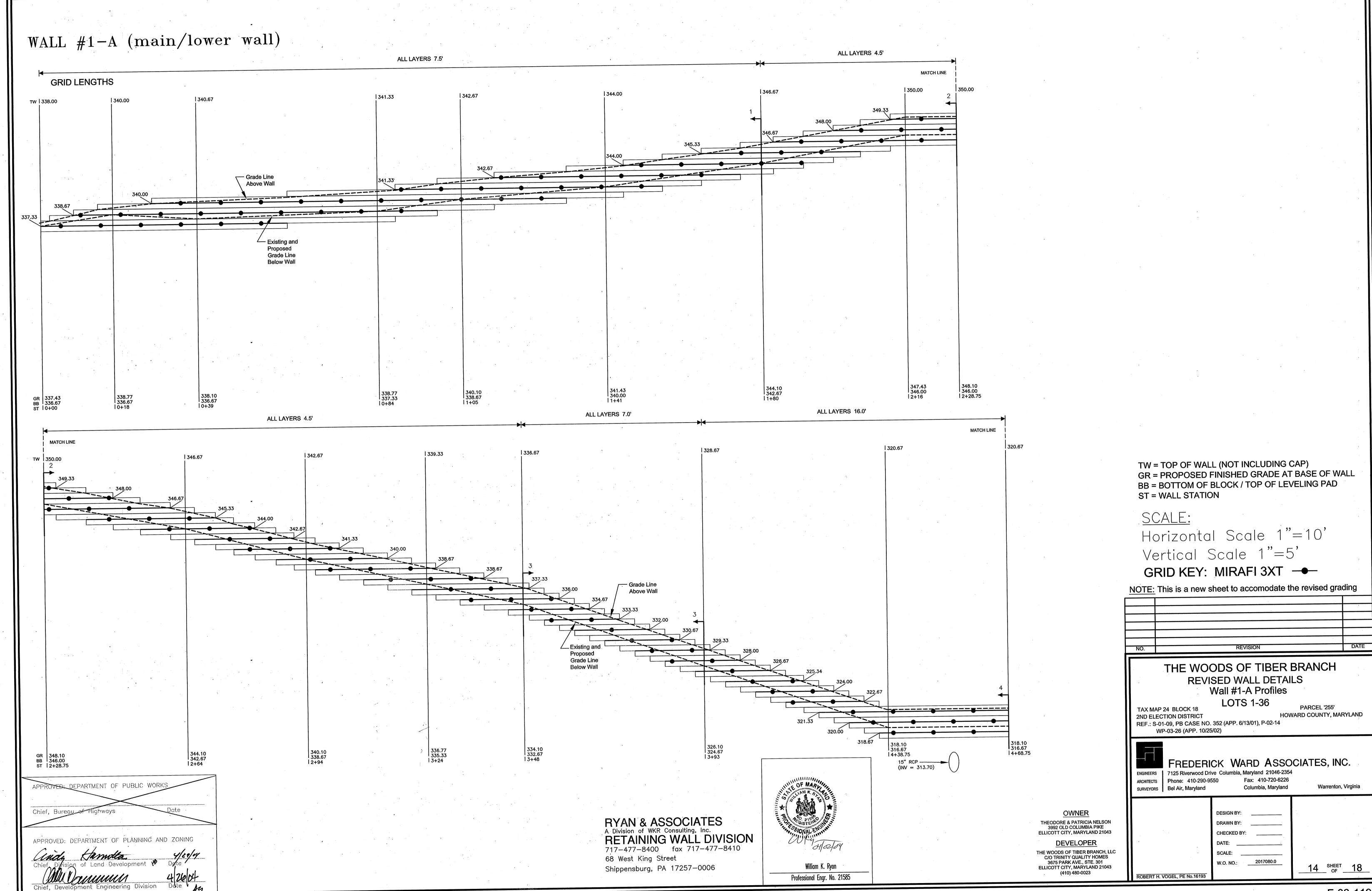
RAIN GARDEN FACILITY PLANTING DETAIL

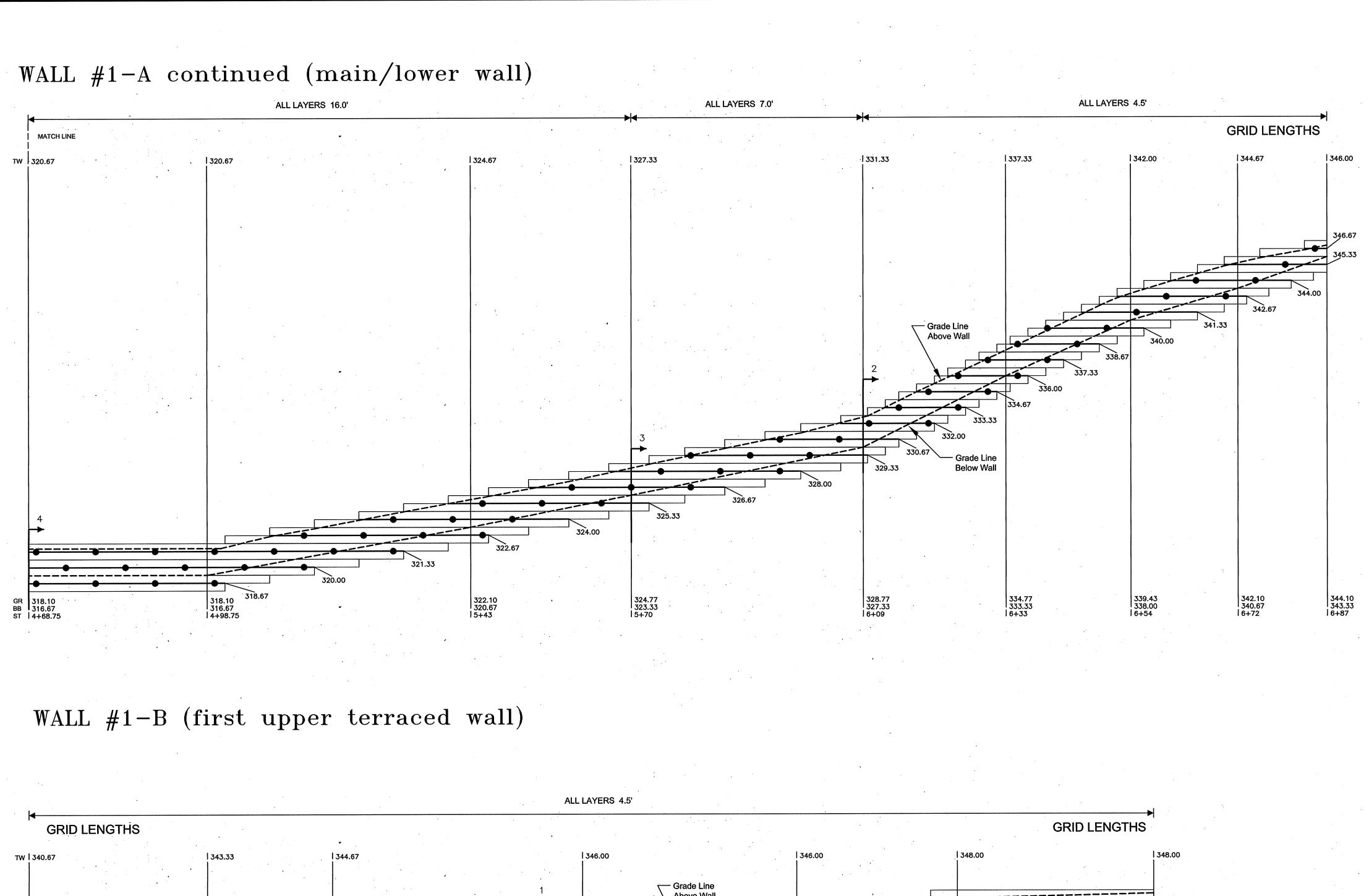
SCALE: 1"=30"

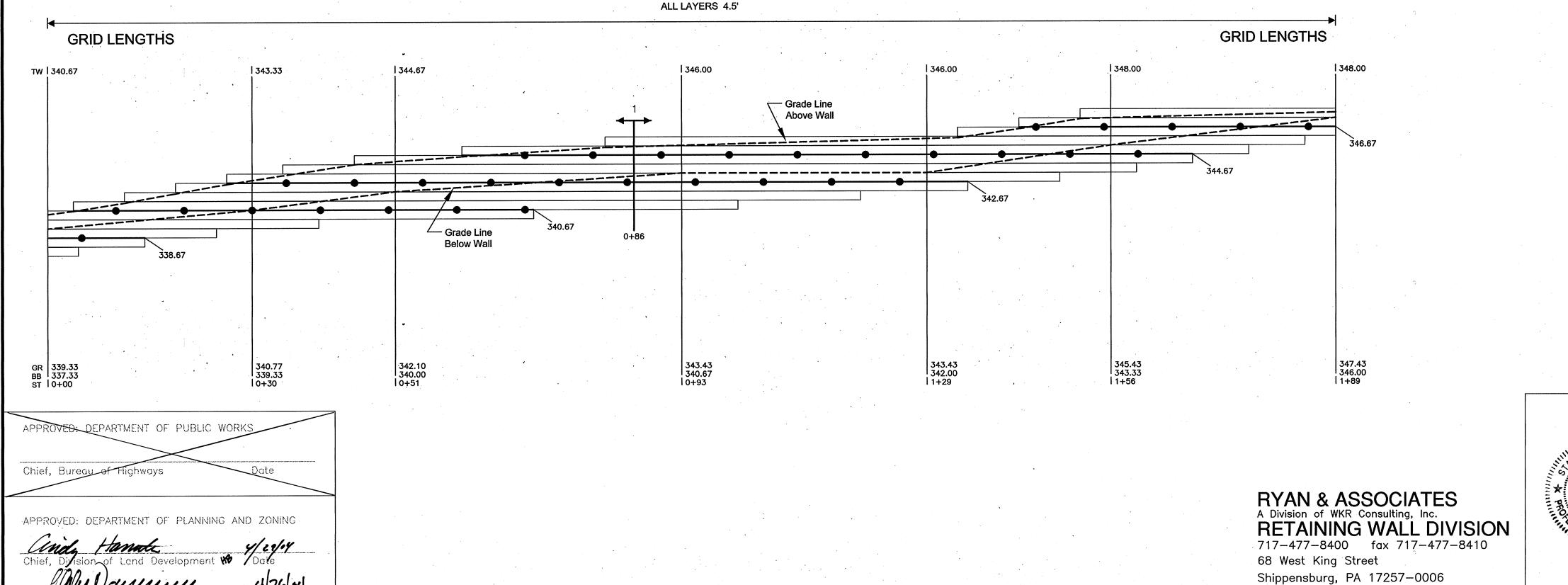
LARRY THOMPSON DNR QUALIFIED PROFESSIONAL

C/O TRINITY QUALITY HOMES 3675 PARK AVE., STE. 301 ELLICOTT CITY, MARYLAND 21043 (410) 480-0023

PARCEL '255'





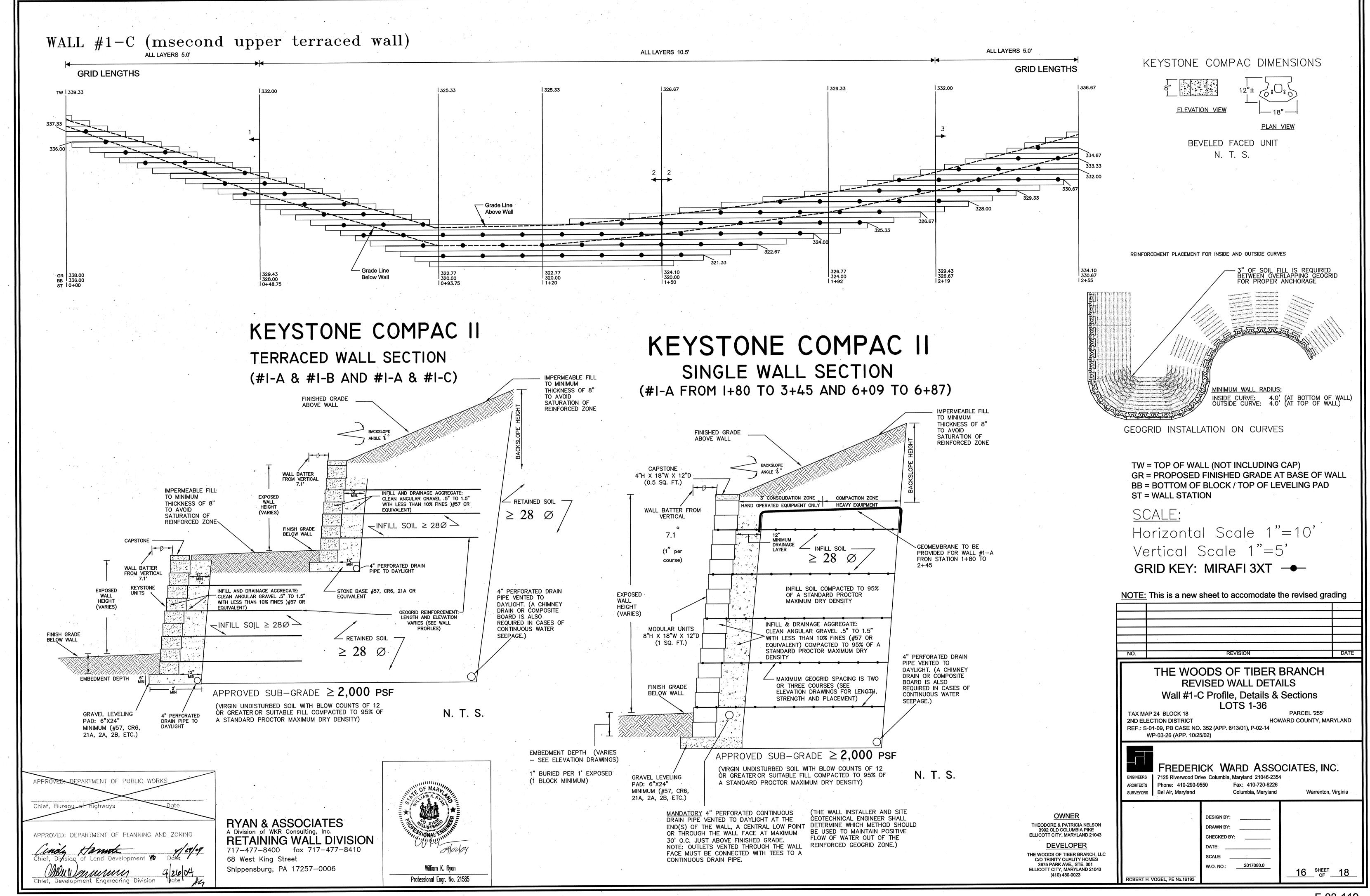


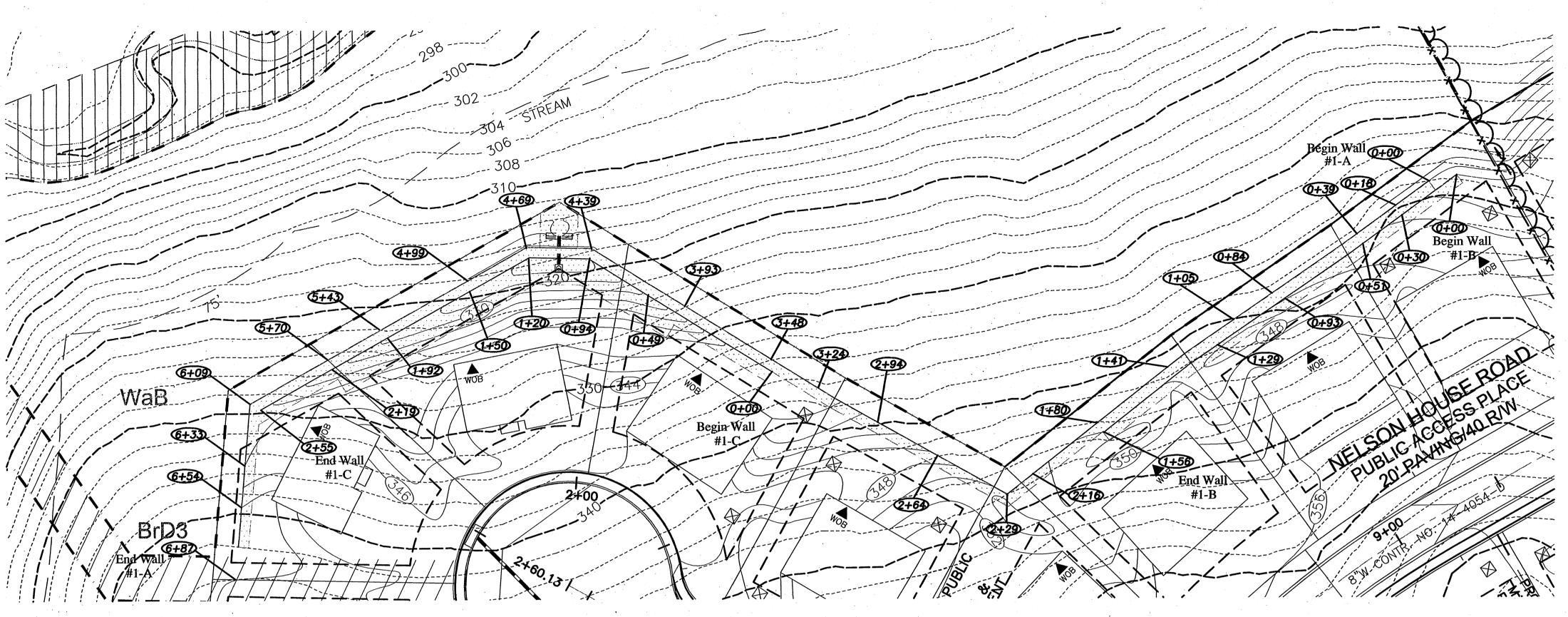
GR = PROPOSED FINISHED GRADE AT BASE OF WALL BB = BOTTOM OF BLOCK / TOP OF LEVELING PAD ST = WALL STATION SCALE: Horizontal Scale 1"=10' Vertical Scale 1"=5" GRID KEY: MIRAFI 3XT → NOTE: This is a new sheet to accomodate the revised grading THE WOODS OF TIBER BRANCH REVISED WALL DETAILS Wall #1-A & Wall #1-B Profiles LOTS 1-36 TAX MAP 24 BLOCK 18 2ND ELECTION DISTRICT REF.: S-01-09, PB CASE NO. 352 (APP. 6/13/01), P-02-14 WP-03-26 (APP. 10/25/02) FREDERICK WARD ASSOCIATES, INC. SURVEYORS Bel Air, Maryland Columbia, Maryland Warrenton, Virginia THEODORE & PATRICIA NELSON 3992 OLD COLUMBIA PIKE ELLICOTT CITY, MARYLAND 21043 THE WOODS OF TIBER BRANCH, LLC C/O TRINITY QUALITY HOMES 3675 PARK AVE., STE. 301 ELLICOTT CITY, MARYLAND 21043 (410) 480-0023 SCALE: W.O. NO.: 2017080.0 15 SHEET 18 ROBERT H. VOGEL, PE No.16193

DEVELOPER

Professional Engr. No. 21585

TW = TOP OF WALL (NOT INCLUDING CAP)





CROSS SECTION DETAILS & FACTORS OF SAFETY:

		TOTAL HEIGHT		SLIDING	OVERTURNING	BEARING CAPACITY	BEARING PRESSURE	GLOBAL STABILITY
SECTION	STATION	# of courses	LOAD APPLIED	minimum 1.50	minimum 2.00	minimum 2.50	maximum 2,000 PSF	minimum 1.30
WALL #1-A		,						
1	0+00 TO 1+80	6	3:1 SLOPE & 350 PSF DL	2.94	11.88	13.58	712	1.345
2	1+80 TO 3+48 & 6+09 TO 6+87	6	3:1 SLOPE	2.26	6.57	11.82	553	1.504
3	3+48 TO 3+93 & 5+70 TO 6+09	6	2:1 SLOPE & 350 PSF DL	1.59	5.41	12.38	739	1.400
4	3+48 TO 5+70	6	2:1 SLOPE & 350 PSF DL	1.93	9.31	18.30	1047	1.310
WALL #1-B								
. 1	ENTIRE WALL	8	3:1 SLOPE	1.85	4.38	12.08	770	1.345
WALL #1-C								
1	0+00 TO 0+49	6	2.5:1 SLOPE	2.10	6.40	12.90	595	1.400
2	0+49 TO 2+19	10	2:1 SLOPE	2.04	6.67	13.50	1177	1.310
3	2+19 TO 2+55	8	. 2.5:1 SLOPE	1.77	4.45	12.45	798	1.400

MATERIAL ESTIMATE:				BLOCK:	Keystone Compac II		GEOGRID Mirafi 3XT		
WALL	TOTAL	(1.0 S.F.) BLOCK	(.5 S.F.) CAPS**	PINS	SQ. YDS. 3XT GRID	CU. YDS. DRAIN GRAVEL	CU. YDS. LEVELING PAD GRAVEL	FT. DRAIN <u>PIPE</u>	FT. WALL LENGTH
WALL	SQ. FT.	BLUCK	CAPS	FINO	GKID	GIVAVEL	GIVAVEL		
1-A	3,055	2,770	570	4,624	1,940	181	53	721	687
1-B	895	825	140	1,398	200,	53	15	198	189
1-C	1,447	1,340	214	2,340	<u>950</u>	<u>86</u>	<u>20</u>	<u>268</u>	<u>255</u>
Totals	5,397	4,935	924	8,362	3,090	319	88	1,188	1,131

* 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.

Totals include 2.5% extra for block and caps, 15% for grid and 5% for gravel.

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

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

Professional Engr. No. 21585

ELLICOTT CITY, MARYLAND 21043 DEVELOPER THE WOODS OF TIBER BRANCH, LLC C/O TRINITY QUALITY HOMES 3675 PARK AVE., STE. 301 **ELLICOTT CITY, MARYLAND 21043**

THEODORE & PATRICIA NELSON 3992 OLD COLUMBIA PIKE

GENERAL NOTES

1. SOIL PARAMETERS: Based on review of the "Borehole Infiltrometer Testing Storm Water Management Study" dated 06/21/2002 for this site prepared by Herbst/Benson & Associates, an internal angle of friction of 28° was used for the soils in these designs. This is for a worst case ML (silt) soil type and shall be verified during wall construction. CH (fat clay), CL (lean 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 28°. The on site geotechnical engineer shall monitor this closely during the construction process. An assumed unit weight (maximum wet density) of 125 PCF was used and 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 engineer will need to run proctor tests to determine the actual soil density and moisture (soils used for wall construction must be within 2% of optimum moisture). No cohesion was used in any of the calculations.

2. CONSTRUCTION OVERSIGHT: The construction of these walls must be performed under the observation of a Maryland Registered ssional Engineer to ensure that they are built in accordance with the RA General Notes and Specifications.

3. GLOBAL STABILITY: Because these walls are terraced and there are slopes involved, global stability analyses were required. G—Slope design software was used and the geogrid layers were lengthened until factors of safety of 1.3 were met. The terraced walls were analyzed individually and as units. For analyses GA1 & GA2 (Wall #1-A by itself and Wall #1-A/#1-B terraced), all 28° soils were used (foundation, infill and retained). For analyses GA3 & GA4 (Wall #1-A/#1-C terraced) 28° soils were used for the infill and retained zones, however a 30° friction angle and a 130 PCF unit weight were used for the foundation soils since the borings indicate that the lower strata are SM (silty sand). The site geotechnical engineer will need to verify this during wall construction. If the foundation soils from station 3+45 to 6+09 of Wall #1-A are not SM and are ML then RA must be notified prior to wall construction. Additional soil tests or a redesign will necessary. NOTE: copies of the global stability analyses have been

4. BEARING CAPACITY: The walls' sub-grades (under the walls' gravel leveling pads and under the walls' reinforced geogrid zones) must be tested by the site geotechnical engineer prior to wall construction and have minimum allowable bearing capacities of 2,000 PSF. The sub-grades must be virgin (natural undisturbed soil with blow counts (12) or suitable fill (≥28°) compacted to 95% of a standard proctor maximum dry density. Any areas of the sub-grades that do not meet these maximum pressures will require

5. SPECIFICATIONS: Construction and materials must conform to the attached "Ryan & Associates segmental retaining wall

6. DESIGN SOFTWARE: Internal and external wall calculations were performed with Keywall 2001 design software (version 3.1.6) and the global stability calculations were done with G-Slope. 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 weight exerted by the wall). 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

7. TANGENT ANGLES: The angle points as drawn on the civil plans at stations 2+29, 4+39, 4+69 & 6+09 of Wall #1-A and stations 0+94 & 1+20 of Wall #1-C should be built as radii (inside and outside curves) to prevent vertical joints. If this cannot

be done, then these angles should be built structurally (like inside and outside corners) with the blocks interlocked and overlapped. 8. GEOGRIDS: Mirafi 3XT geogrid, which has a LTDS (Long Term Design Strength) of 1558, was used in these designs. All geogrid

9. WALL PROFILES: The elevation drawings were done to represent the grade changes necessary on the civil drawings and were 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 walls' heights are equal to or less than the design heights. If the walls need 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 drawings however its height may have been used in some cases to achieve the desired TW elevations. NOTE: the existing grade line has not been shown on the profiles because Wall #1-A (the main/lower wall) is being built on virgin ground (the proposed "GR" elevation is also the existing grade) and Walls #1-B & #1-C (the upper

terraces) will be built on the 95% compacted fill of Wall #1-A). 10. WALL BATTER: The 7.1° batter (1" setback per block course) was used for the Keystone blocks in these designs. The 0.5° (near vertical: 1/16" setback per block course) may not be used for these walls. NOTE: it is important for the wall installer and the civil engineer/ surveyor to predetermine the walls' batters during stake out. The walls will need to be moved forward at their

11. FACTORS OF SAFETY: The following factors of safety have been met in these designs: 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.

bases if there are critical dimensions that must be met on the high sides of the walls.

12. EMBEDMENT: The wall embedment varies from one to six blocks. The exact amount of buried blocks may be determined by

13. BLOCK SYSTEM: This design is valid only for the Keystone Compac II system. Each segmental wall system has unique 14. BACK SLOPES: Water management is especially critical since there are back slopes above these walls. Since water is being directed to the walls, the top 8" of compacted fill over the walls' reinforced geogrid zones must have impermeable soil (clay- such as CL, GC or SC) or underlying geomembranes (see the RA Specifications for details). The slopes may continue to the tops of the walls and the water may be directed over them (sheet flow) or swales may be constructed (clay, concrete or asphalt: see swale detail) behind the walls to divert the water around the ends of the walls. These swales should have minimum depths of 8" and minimum 1—2% slopes laterally from the high points to the ends of the walls. In no case should the surface water be allowed to pond and saturate the walls' reinforced geogrid zones or be introduced into the 12" gravel drainage layers. NOTE: the soils in the back slopes and the walls' retained zones (within the walls' zones of influence: behind the reinforced geogrid zones and extending to distances that are twice the walls' exposed heights) must be virgin (natural undisturbed soil with blow counts (12) or suitable fill (≥

15. SEPARATE 81/2" X 11' SUBMITTAL: A separate 8 1/2" X 11" booklet has been provided with a cover letter, General Notes, the Keywall cross section calculations and RA Specifications.

16. SPECIAL HOWARD COUNTY RETAINING WALL SPECIFICATIONS:

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

NOTE:	This is a new s	sheet to accomodate t	he revised grad	gnik		
NO.		REVISION		DATE		
2ND EL REF.: S	THE WOODS OF TIBER BRANCH REVISED WALL DETAILS Civil Plan, General Notes and Tables LOTS 1-36 TAX MAP 24 BLOCK 18 PARCEL '255' 2ND ELECTION DISTRICT HOWARD COUNTY, MARYLAND REF.: S-01-09, PB CASE NO. 352 (APP. 6/13/01), P-02-14 WP-03-26 (APP. 10/25/02)					
ARCHITECTS	FREDERICK WARD ASSOCIATES, INC. 7125 Riverwood Drive Columbia, Maryland 21046-2354 ARCHITECTS Phone: 410-290-9550 Fax: 410-720-6226 SURVEYORS Bel Air, Maryland Columbia, Maryland Warrenton, Virginia					
		DESIGN BY: DRAWN BY: CHECKED BY: DATE: SCALE:				

W.O. NO.:

ROBERT H. VOGEL, PE No.16193

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. ASTM D 5262— Test Method for Evaluating the Unconfined Creep Behavior of Geo- Grids

Single Rib Geogrid Tensile Strength

GRI:GG5-Moisture Density Relationship for Soils, Standard Method

G. ASTM D 422-Gradation of Soils

H. ASTM 4318- Atterberg Limits of Soil Specification for Polyvinyl Chloride (PVC) Plastic Pipe I. ASTM 3034-

J. ASTM D 1248- Specification for Corrugated Plastic Pipe

1.03 Desian 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) Geogrid Pullout 1.5 (from the block and from the soil) and Global Stability 1.3.

PART 2: MATERIALS & DESIGN PARAMETERS

2.01 Seamental Retainina 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

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 Č 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

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.

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.

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 backfillina.

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.

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

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

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

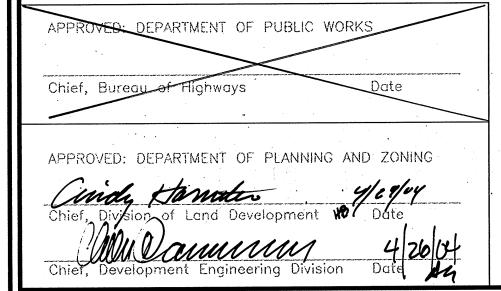
A. The foundation soil must meet or exceed the minimum allowable bearing capacity stated in the RA Final Design (in the General Notes and on the typical wall section). The sub-grade must be virgin (natural undisturbed with blow counts (12) or suitable fill (friction angle > the RA Final Design requirement)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

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

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

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

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 becompacted 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.

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 (accordina 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.

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 acoarid 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).

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 is 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).

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.

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

RYAN & ASSOCIATES

RETAINING WALL DIVISION

717-477-8400 fax 717-477-8410

A Division of WKR Consulting, Inc.

Shippensburg, PA 17257-0006

68 West King Street

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

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.

William K. Ryan

Professional Engr. No. 21585

THEODORE & PATRICIA NELSON 3992 OLD COLUMBIA PIKE **ELLICOTT CITY, MARYLAND 21043 DEVELOPER**

THE WOODS OF TIBER BRANCH, LLC C/O TRINITY OHALITY HOMES 3675 PARK AVE STE 301 FUICOTT CITY, MARYLAND 2104 (410) 480-0023

ROBERT H. VOGEL, PE No.16193

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.

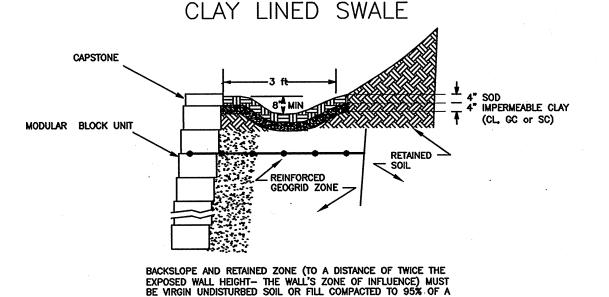
3.15 Post Construction Responsibilities

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 12-16-03

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 without written approval from RA. Any other use is subject to penalty of law. (c)



NOTE: This is a new sheet to accommodate the revised grading

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	2ND EL REF.: S	THE WOODS OF TIBER BRANCH REVISED WALL DETAILS Specifications and Swale Detail LOTS 1-36 TAX MAP 24 BLOCK 18 PARCEL '255' 2ND ELECTION DISTRICT HOWARD COUNTY, MARYLAND REF.: S-01-09, PB CASE NO. 352 (APP. 6/13/01), P-02-14 WP-03-26 (APP. 10/25/02)						
	FREDERICK WARD ASSOCIATES, INC. FREDERICK WARD ASSOCIATES, INC. 7125 Riverwood Drive Columbia, Maryland 21046-2354 Phone: 410-290-9550 Fax: 410-720-6226 SURVEYORS Bel Air, Maryland Columbia, Maryland Warrenton, Virginia							
			DESIGN BY: DRAWN BY: CHECKED BY: DATE: SCALE: W.O. NO.: 2017080.0	18 SHEET OF	18			