RIVERWOOD

ROAD, GRADING, STORM DRAIN, LANDSCAPE AND STORMWATER MANAGEMENT CONSTRUCTION PLANS

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY, PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE, UNLESS WAIVER(S) HAVE BEEN APPROVED.
2. 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.
3. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.
4. WETLAND DELINEATION PROVIDED BY ECO-SCIENCE PROFESSIONALS, INC. DATED SEPTEMBER, 2001.
5. TRAFFIC CONTROL DEVICES, MARKINGS AND SIGNING SHALL BE IN ACCORDANCE WITH THE MOST CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). ALL STREET AND REGULATORY SIGNS SHALL BE IN PLACE PRIOR TO THE PLACEMENT OF ANY ASPHALT.
6. STREET LIGHTS PLACEMENT AND TYPE OF FIXTURE & SIGNING SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL, VOL. III (1993) AND AS MODIFIED BY "GUIDELINES FOR STREET LIGHTS IN RESIDENTIAL DEVELOPMENTS (JUNE, 1993)"
7. TOPOGRAPHY SHOWN ON-SITE WAS FIELD RUN BY J.A. RICE, INC. ON OR ABOUT SEPTEMBER, 2002. FIELD RUN TOPOGRAPHY WAS SUPPLEMENTED WITH INFORMATION PURCHASED FROM HOWARD COUNTY GEOGRAPHICAL INFORMATION SYSTEMS.
8. HORIZONTAL DATUM FOR THIS PLAN IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM NAD '83 AS PROJECTED FROM HOWARD COUNTY CONTROL POINTS 29CA AND 29IC.
9. THIS PROPERTY IS NOT WITHIN THE METROPOLITAN DISTRICT. PRIVATE WATER AND SEWER SYSTEMS SHALL BE PROVIDED FOR THIS DEVELOPMENT. WELLS SHALL BE DRILLED PRIOR TO RECORDATION OF FINAL PLAT.
10. [hatched symbol] THIS AREA DESIGNATES A PRIVATE SEWAGE EASEMENT AS REQUIRED BY THE MARYLAND STATE DEPARTMENT OF THE ENVIRONMENT FOR INDIVIDUAL SEWAGE DISPOSAL. IMPROVEMENTS OF ANY NATURE IN THIS AREA ARE RESTRICTED UNTIL PUBLIC SEWER IS AVAILABLE. THIS EASEMENT SHALL BECOME NULL AND VOID UPON CONNECTION TO A PUBLIC SEWER SYSTEM. THE COUNTY HEALTH OFFICER SHALL HAVE THE AUTHORITY TO GRANT ADJUSTMENTS TO THE PRIVATE SEWAGE EASEMENT. RECORDATION OF A MODIFIED SEWAGE EASEMENT PLAT SHALL NOT BE REQUIRED.
11. STORMWATER MANAGEMENT SHALL BE PROVIDED FOR THIS PROJECT BASED ON GUIDELINES ESTABLISHED BY THE 2000 MARYLAND STORMWATER DESIGN MANUAL VOLUMES I & II. STORMWATER MANAGEMENT SHALL BE PROVIDED BY USE OF NON-STRUCTURAL METHODS FOR, GRASS SWALES, MEETING GROUND WATER RECHARGE VOLUMES. 2 POCKET PONDS AND 5 MICROPOOL EXTENDED DETENTION FACILITIES SHALL BE CONSTRUCTED TO MEET THE WATER QUALITY AND CHANNEL PROTECTION VOLUME REQUIREMENT. ALL FACILITIES TO BE CLASS 'A' STRUCTURES. THESE FACILITIES WILL BE PRIVATELY OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION.
12. EXISTING UTILITIES ARE SHOWN BY APPROVED CONTRACT DRAWINGS AND FIELD LOCATIONS. EXISTING WELLS AND/OR SEWERAGE EASEMENTS WITHIN 100' OF THE PROPERTY HAVE BEEN SHOWN FROM THE BEST AVAILABLE INFORMATION.
13. THE TRAFFIC STUDY WAS PREPARED BY MARS TRAFFIC GROUP, INC. IN OCTOBER, 2001 AND REVISED IN JANUARY, 2002.
14. THE STREAM CROSSINGS SHOWN ALONG CASTLEBRIDGE ROAD (FORMERLY ROAD 'A') ARE STRATEGICALLY LOCATED WHERE THE STREAM CHANNEL IS NARROWEST AND AVOIDS IMPACT TO WETLANDS. THERE ARE NO WETLANDS WHERE THESE CROSSINGS WILL OCCUR. THE DEPARTMENT OF PLANNING AND ZONING HAS MADE THE DETERMINATION THAT THE 3 SOUTHERN STREAM CROSSINGS FOR PROPOSED CASTLERIDGE ROAD ARE TO BE CONSIDERED "ESSENTIAL DISTURBANCES" IN ACCORDANCE WITH SECTION 16.116(c) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS BASED ON THE JUSTIFICATION SUBMITTED BY THE DEVELOPER WITH THE REVISED PLAN DATED JANUARY 17, 2002.
15. A NOISE STUDY IS NOT REQUIRED FOR THIS PROJECT.
16. THIS PLAN IS SUBJECT TO COMPLIANCE WITH THE FOURTH EDITION OF THE SUBDIVISION REGULATIONS AS A CONSEQUENCE FOR ITS SUBMISSION PRIOR TO 11-15-2001. THIS PROJECT IS SUBJECT TO COMPLIANCE WITH COUNTY COUNCIL BILL 50-2001 WHICH AMENDS PORTIONS OF THE ZONING REGULATIONS AS A CONSEQUENCE FOR NOT HAVING PRELIMINARY PLAN APPROVAL PRIOR TO 11-1-2001.
17. WP-02-64 WAS APPROVED ON 2-28-02 BY THE PLANNING DIRECTOR. WP-02-64 WAS A REQUEST TO WAIVE THE FOLLOWING:

    SECTION 16.116(a) – WHICH REQUIRES THAT GRADING, REMOVAL OF VEGETATIVE COVER AND TREES, PAVING AND NEW STRUCTURES SHALL NOT BE PERMITTED WITHIN 25 FEET OF A WETLAND, 50 FEET OF AN INTERMITTENT STREAM BANK OR 75 FEET OF A PERENNIAL STREAM BANK TO ALLOW A CROSSING FOR PROPOSED CASTLEBRIDGE ROAD (FORMERLY ROAD 'A') IN THE VICINITY OF WHITHORN WAY (FORMERLY ROAD 'B').

    SECTION 16.132(a)(1)(i) – WHICH REQUIRES THE DEVELOPER TO CONSTRUCT OR PROVIDE FOR CONSTRUCTION OF ROADS FOR REQUIRED CONNECTIONS TO ADJACENT PROPERTIES (THIS APPLIES TO THE CONNECTIONS FOR ADJACENT PARCELS 117 AND 291).

    SECTION 16.120(c)(2)(iii) – WHICH REQUIRES THAT NON-PIPESTEM LOTS (FUTURE PHASE 2 BULK PARCEL FF) (BULK PARCEL F UNDER S-02-09) WHICH HAVE SUBDIVISION POTENTIAL UNDER CURRENT ZONING TO HAVE SUFFICIENT PUBLIC ROAD FRONTAGE TO MEET THE PUBLIC ROAD RIGHT-OF-WAY REQUIREMENTS IN THE DESIGN MANUAL.

    SECTION 16.120(c)(2)(i) – WHICH REQUIRES THAT 20 FEET OF PUBLIC ROAD FRONTAGE BE PROVIDED FOR PRESERVATION PARCELS (BUILDABLE PRESERVATION PARCEL N) (PRES. PARCEL G UNDER S-02-09).
18. THE FLOODPLAIN LIMIT SHOWN ON THIS PLAN WAS DETERMINED FROM A FLOODPLAIN STUDY PREPARED BY BENCHMARK ENGINEERING, INC. IN OCTOBER 2002 AND REVISED IN NOVEMBER, 2003. THE FLOODPLAIN LIMIT FOR THE MIDDLE PATUXENT RIVER IS BASED ON THE HOWARD COUNTY MIDDLE PATUXENT FLOODPLAIN STUDY, MAP #29-38.
19. THE PURPOSE OF THE PRESERVATION PARCELS AND THE JUSTIFICATION FOR THE DESIGN OF THE CLUSTER SUBDIVISION IS AS FOLLOWS:

    PRESERVATION PARCELS 'A' THRU 'E' ARE PROPOSED AS NON-BUILDABLE PARCELS TO PROTECT STEEP SLOPES AND STREAM BUFFER AREAS WHICH ARE CONSIDERED PRIORITY AREAS. THEY WILL BE DEDICATED TO THE HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS. THEY ARE ENCUMBERED BY AN EASEMENT AGREEMENT WITH THE HOMEOWNERS ASSOCIATION. THIS AGREEMENT PROHIBITS FURTHER SUBDIVISION OF THE PARCEL, OUTLINES THE MAINTENANCE RESPONSIBILITIES OF ITS OWNER AND ENUMERATES THE USES PERMITTED ON THE PROPERTY.

    PRESERVATION PARCEL 'F' IS PROPOSED AS A PRIVATELY OWNED NON-BUILDABLE PARCEL TO PROTECT STEEP SLOPES AND STREAM BUFFER AREAS WHICH ARE CONSIDERED PRIORITY AREAS. IT IS ENCUMBERED BY AN EASEMENT AGREEMENT WITH THE HOMEOWNERS ASSOCIATION AND HOWARD COUNTY. THIS AGREEMENT PROHIBITS FURTHER SUBDIVISION OF THE PARCEL, OUTLINES THE MAINTENANCE RESPONSIBILITIES OF ITS OWNER AND ENUMERATES THE USES PERMITTED ON THE PROPERTY.

    PRESERVATION PARCELS 'G' THRU 'L' ARE PROPOSED AS NON-BUILDABLE PARCELS SOLELY FOR STORMWATER MANAGEMENT FACILITIES AS A REQUIREMENT TO CONTROL STORMWATER RUNOFF AND PROVIDE WATER QUALITY AND GROUND WATER RECHARGE. THEY WILL BE OWNED BY THE H.O.A. THEY ARE ENCUMBERED BY AN EASEMENT AGREEMENT WITH HOWARD COUNTY. THIS AGREEMENT PROHIBITS FURTHER SUBDIVISION OF THE PARCEL, OUTLINES THE MAINTENANCE RESPONSIBILITIES OF ITS OWNER AND ENUMERATES THE USES PERMITTED ON THE PROPERTY.

    PRESERVATION PARCELS 'M' THRU 'P' AND 'R' ARE PROPOSED AS NON-BUILDABLE PARCELS TO BUFFER FROM ADJACENT PROPERTIES VIA EXISTING VEGETATION, REFORESTATION AND OTHER GREENERY. THEY WILL BE DEDICATED TO THE HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS. THEY ARE ENCUMBERED BY AN EASEMENT AGREEMENT WITH THE HOMEOWNERS ASSOCIATION. THIS AGREEMENT PROHIBITS FURTHER SUBDIVISION OF THE PARCEL, OUTLINES THE MAINTENANCE RESPONSIBILITIES OF ITS OWNER AND ENUMERATES THE USES PERMITTED ON THE PROPERTY.

    PRESERVATION PARCEL 'Q' IS PROPOSED AS A PRIVATELY OWNED BUILDABLE PARCEL INTENDED TO BE PLACED IN THE AGRICULTURAL LAND PRESERVATION PROGRAM. THIS PARCEL WILL BE AN EXTENSION OF THE ADJACENT AGRICULTURAL PRESERVATION EASEMENT AND PROTECTS THE MIDDLE PATUXENT RIVER AND ITS STEEP SLOPES. ONE (1) BUILDING UNIT IS TO BE BUILT ON THIS PARCEL. IT IS ENCUMBERED BY AN EASEMENT AGREEMENT WITH THE AGRICULTURAL LAND PRESERVATION PROGRAM. THIS AGREEMENT PROHIBITS FURTHER SUBDIVISION OF THE PARCEL, OUTLINES THE MAINTENANCE RESPONSIBILITIES OF ITS OWNER AND ENUMERATES THE USES PERMITTED ON THE PROPERTY.

    BULK PARCELS 'AA' THRU 'GG' ARE PROPOSED AS BULK PARCELS FOR A FUTURE RESUBDIVISION AS PHASE 2. THERE IS POTENTIAL FOR 47 ADDITIONAL CLUSTER LOTS (40 AS PHASE 2). THE REMAINDER AFTER CLUSTER LOTS ARE ESTABLISHED WILL BE NON-BUILDABLE PRESERVATION PARCELS SOME OF WHICH WILL BE IN THE AGRICULTURAL LAND PRESERVATION PROGRAM.

    BULK PARCEL 'HH' IS PROPOSED AS A NON-BUILDABLE BULK PARCEL FOR A POSSIBLE RIGHT-OF-WAY FOR ACCESS TO PARCEL 117. IT SHALL BE TRANSFERRED TO PARCEL 117 UPON RECORDATION OF THE PLAT.
20. A WAIVER REQUEST TO SECTION 2.5.2.H.3 OF THE HOWARD COUNTY DESIGN MANUAL VOL. III, ROADS AND BRIDGES (REQUESTING SUFFICIENT DISTANCE TO THE RIGHT FOR A STOPPED VEHICLE TO MAKE A LEFT TURN AND SUFFICIENT DISTANCE TO THE LEFT FOR A STOPPED VEHICLE TO MAKE A LEFT TURN) TO WAIVE THE LAST 90' OF THE REQUIRED 975' OF SIGHT DISTANCE TO THE RIGHT AND THE LAST 115' OF THE REQUIRED 515' OF SIGHT DISTANCE TO THE LEFT WAS GRANTD ON MAY 20, 2002 SUBJECT TO COMPLETION OF THE PROPOSED GRADING AS SHOWN ON THE SIGHT DISTANCE PROFILE AND PROVIDING ACCELERATION AND DECELERATION LANES AT THE ENTRANCE.
21. THE TOTAL FOREST CONSERVATION OBLIGATION HAS BEEN MET BY THE ON-SITE RETENTION OF 78.2 ACRES OF NET TRACT AREA FOREST (61.7 ACRES WITHIN THE LIMITS OF A FOREST CONSERVATION EASEMENT). THE 16.5 ACRES NOT WITHIN A FOREST CONSERVATION EASEMENT IS LOCATED ON THE BULK PARCELS THAT SHALL BE SUBDIVIDED AS PART OF PHASE 2. THAT 16.5 ACRES SHALL BE TAKEN AS "CLEARED" UNDER THE PHASE 2 SUBDIVISION PLANS. ANY REFORESTATION REQUIREMENT AS A RESULT OF THE PHASE 2 CLEARING SHALL BE DONE UNDER THE PHASE 2 PLANS.
22. FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE DPW DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$64,050.00. (\$43,800 FOR 146 PERIMETER TREES, \$17,250 FOR 115 PERIMETER EVERGREENS AND \$3,000 FOR 100 PERIMETER SHRUBS)
23. NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, OR PLACEMENT OF NEW STRUCTURES IS PERMITTED WITHIN THE LIMITS OF WETLANDS, STREAMS, FLOODPLAINS OR THEIR BUFFERS AND FOREST CONSERVATION EASEMENT AREAS EXCEPT IN THE DESIGNATED NECESSARY ROAD CROSSINGS AND AS PER WP-02-64.
24. ALL SIGNS SHALL BE MOUNTED ON A 2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE POST (14 GAUGE) INSERTED INTO A 2-1/2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE SLEEVE (12 GAUGE) – 3 FEET LONG. A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON TOP OF EACH POST.

PLAN VIEW

SCALE: 1" = 300'

NOTE: FOR R/W CHART AND MONUMENT REFERENCES SEE SHEET 15

AS-BUILT 1-7-09

SHEET INDEX	
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1	TITLE SHEET
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7	ROAD PROFILES
8	ROAD PROFILES
9	ROAD PROFILES
10	ROAD PROFILES
11	ROAD PROFILES
12	HOMEWOOD ROAD WIDENING PLAN
13	STORM DRAIN DRAINAGE AREA MAP
14	STORM DRAIN DRAINAGE AREA MAP
15	STORM DRAIN DRAINAGE AREA MAP
16	STORM DRAIN PROFILES
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20	STORM DRAIN PROFILES
21	GRADING, SEDIMENT AND EROSION CONTROL PLAN
22	GRADING, SEDIMENT AND EROSION CONTROL PLAN
23	GRADING, SEDIMENT AND EROSION CONTROL PLAN
24	GRADING, SEDIMENT AND EROSION CONTROL PLAN
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26	SEDIMENT & EROSION CONTROL NOTES & DETAILS
27	LANDSCAPE PLAN
28	LANDSCAPE PLAN
29	LANDSCAPE PLAN AND STREAM DIVERSION DETAILS
30	FOREST CONSERVATION PLAN
31	FOREST CONSERVATION PLAN
32	FOREST CONSERVATION PLAN
33	FOREST CONSERVATION PLAN
34	SWM DETAILS FACILITY #1
35	SWM DETAILS FACILITY #2
36	SWM DETAILS FACILITY #3
37	SWM DETAILS FACILITY #4
38	SWM DETAILS FACILITY #5
39	SWM DETAILS FACILITY #6
40	SWM NOTES AND BORING LOGS
41	SWM NOTES, BORING LOGS AND TEMP. DIV. PIPE PROFILES
42-53	ARCHDRAIN DETAILS
54-55	ARCHDRAIN SPECIFICATIONS, POOL DETAILS & STABILIZATION DETAILS

VICINITY MAP

SCALE: 1" = 2000'

BENCHMARKS NAD'83 HORIZONTAL

HO. CO. #29CA
3/4" REBAR W/ CAP
N 5744526.138' E 1343533.820'
ELEV.=423.53

HO. CO. #29IC
STAMPED ALUMINUM DISK SET ON 3/4" IRON ROD
N 572323.559' E 1344112.295'
ELEV.=468.79

SITE ANALYSIS DATA CHART

GENERAL SITE DATA

1.) PRESENT ZONING: RC-DEO
2.) APPLICABLE DPZ FILE REFERENCES: WP-02-64, S-02-009, P-03-010
3.) PROPOSED USE OF SITE: RESIDENTIAL (SFD – HOMES)
4.) PROPOSED WATER AND SEWER SYSTEMS: PRIVATE

AREA TABULATION

1.) GROSS TRACT AREA: 269.85 AC.±
2.) AREA WITHIN 100-YEAR FLOODPLAIN: 44.83 AC.±
3.) TOTAL AREA OF 25% OR GREATER STEEP SLOPES: 6.00 AC.±; AREA NOT IN FLOODPLAIN (FOR NTA CALC): 4.83 AC.±
4.) NET TRACT AREA: 220.19 AC.±
5.) TOTAL NUMBER OF LOTS ALLOWED PER ZONING: 1 UNIT PER 4.25 GROSS ACRES: 63; 1 UNIT PER 2 NET ACRES (MAX): 110
6.) TOTAL NUMBER OF RESIDENTIAL UNITS/LOTS PROPOSED ON THIS SUBMISSION (POTENTIAL 40 ADDITIONAL LOTS IN PHASE 2): 43
7.) AREA OF CLUSTER LOTS: 46.34 AC.±
8.) AREA OF NON-BUILDABLE PRESERVATION PARCELS (PARCELS A – P): 84.10 AC.±
9.) AREA OF BUILDABLE PRESERVATION PARCELS (PARCEL Q): 43.94 AC.±
10.) AREA OF NON-BUILDABLE BULK PARCELS** (PARCELS AA – II): 83.69 AC.±
11.) AREA OF BUILDABLE BULK PARCELS: N/A
12.) AREA OF ROAD RIGHT-OF-WAY: 11.78 AC.±
13.) OPEN SPACE ON-TOTAL SITE*: 0.00 AC.; PERCENTAGE OF GROSS AREA: 0%
14.) AREA OF RECREATIONAL OPEN SPACE REQUIRED: N/A

* 5% OF GROSS REQUIRED (13.49 AC.±) OR NONE IF THE PRES. PARCEL IS DEDICATED TO THE HOA OR HOWARD COUNTY.

** NON-BUILDABLE BULK PARCEL 'HH' (0.21 ACRES) INCLUDED IN PHASE 1 AREA CALCULATIONS.

PHASING TABULATION		
ALLOCATION YEAR	NO. OF RESIDENTIAL LOTS	PHASE
2005	43	1
2006	40	2

DENSITY EXCHANGE CHART	
GROSS AREA	269.85 AC.±
NET TRACT AREA	220.19 AC.±
DWELLING UNITS ALLOWED (as matter of right)	269.85 AC.± @ 1 DU per 4.25 GROSS ACRES = 63
MAXIMUM DWELLING UNITS ALLOWED W/ CEO's	220.19 AC.± @ 1 DU per 2.00 NET ACRES = 110
PROPOSED DWELLING UNITS	90*
NUMBER OF CEO UNITS TO BE RECEIVED	90 – 63 (base density) = 27
SENDING PARCEL INFORMATION	(SHALL BE PROVIDED UNDER PHASE 2. AS PHASE 1 WILL NOT RECEIVE DENSITY)

*43 PHASE 1, 40 PHASE 2 AND 7 POTENTIAL FUTURE LOTS ON THE FUTURE BULK PARCEL JJ

NO.	DATE	REVISION
1	5-4-06	CHANGE NUMBER OF PLANS IN SET

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

[signature] 7-18-05
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

[signature] 7/25/05
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

[signature] 7/19/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

BENCHMARK ENGINEERING, INC.
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

[signature] 6/2/05

DEVELOPER: ELIOAK, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: HOMEWOOD, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL, 515 MADISON AVENUE, 32nd FLOOR, NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21, PARCELS: 86; TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86; THIRD ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

TITLE: TITLE SHEET

DATE: JUNE, 2005 | PROJECT NO. 1132
DES: JMC/DBT | DRAFT: JMC/DBT | CHECK: CAM
SCALE: AS SHOWN | SHEET 1 OF 55

F-04-82

BEBOTECH PRECAST CONCRETE ARCH OVERFILLED SYSTEM SPECIFICATONS

1. **GENERAL**

1.1. **DESCRIPTION OF WORK INCLUDED**

THIS WORK CONSISTS OF FURNISHING AND CONSTRUCTING A PRECAST CONCRETE ARCH OVERFILLED SYSTEM IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN CONFORMITY WITH THE LINES, GRADES, AND DIMENSIONS SHOWN ON THE PLANS OR ESTABLISHED BY THE ENGINEER. THE PRECAST CONCRETE ARCH SHALL BE A BEBO PRECAST CONCRETE ARCH SYSTEM.

1.2. **RELATED WORK**

1.2.1. EXCAVATION, EARTHWORK, AND CONTROLLED BACKFILL.
1.2.2. CAST-IN-PLACE CONCRETE FOUNDATIONS.
1.2.3. CAST-IN-PLACE CONCRETE LEVELING PADS IN FOOTING KEYWAY.
1.2.5. INSTALLATION OF PRECAST CONCRETE ARCH ELEMENTS, SPANDREL WALLS, AND WINGWALLS.
1.2.6. WATERPROOFING PRECAST CONCRETE ARCH ELEMENTS.
1.2.7. GROUTING.
1.2.8. ROADWAY CONSTRUCTION.

1.3. **RELATED DOCUMENTS**

1.3.1. THE DESIGN SHALL BE IN CONFORMANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SIXTEENTH EDITION, 1996, INCLUDING DIVISION 1 - DESIGN AND SECTIONS AND SUBSECTIONS AS FOLLOWS:
1.3.1.1. SECTION 1 - GENERAL PROVISIONS
1.3.1.1.1 SUBSECTION 1.3.2 - HYDRAULIC STUDIES
1.3.1.2. SECTION 2 - GENERAL FEATURES OF DESIGN
1.3.1.2.1 SUBSECTIONS 2.3 - CLEARANCES AND 2.4 - UNDERPASSES
1.3.1.3. SECTION 3 - LOADS
1.3.1.3.1 SUBSECTIONS 3.3 - DEAD LOAD
1.3.1.3.2 SUBSECTIONS 3.7 - HIGHWAY LOADINGS
1.3.1.3.3 SUBSECTIONS 3.8 - IMPACT
1.3.1.3.4 SUBSECTIONS 3.9 - LONGITUDINAL FORCES
1.3.1.3.5 SUBSECTIONS 3.10 - CENTRIFUGAL FORCES
1.3.1.3.6 SUBSECTIONS 3.11.1, 3.11.2, 3.11.4, 3.12.1 - TRAFFIC LANES AND LOADS
1.3.1.3.7 SUBSECTIONS 3.15 - WIND LOADS
1.3.1.3.8 SUBSECTIONS 3.16 - THERMAL FORCES
1.3.1.3.9 SUBSECTIONS 3.20 - EARTH PRESSURE
1.3.1.3.10 SUBSECTIONS 3.22 - COMBINATIONS OF LOADS
1.3.1.4. SECTION 4 - FOUNDATIONS
1.3.1.5. SECTION 5 - RETAINING WALLS
1.3.1.6. SECTION 6 - CULVERTS
1.3.1.6.1 SUBSECTION 6.4 - DISTRIBUTION OF WHEEL LOADS THROUGH EARTH FILLS
1.3.1.7. SECTION 8 - REINFORCED CONCRETE
1.3.1.7.1 SUBSECTION 8.1 - APPLICATION
1.3.1.7.2 SUBSECTION 8.1.2 - NOTATIONS AND 8.1.3 - DEFINITIONS
1.3.1.7.3 SUBSECTION 8.2 - CONCRETE AND 8.3 - REINFORCEMENT
1.3.1.7.4 SUBSECTION 8.7 - MODULUS OF ELASTICITY AND POISSON'S RATIO
1.3.1.7.5 SUBSECTION 8.8.1 - SPAN LENGTH
1.3.1.7.6 SUBSECTION 8.14.1 - DESIGN METHOD
1.3.1.7.7 SUBSECTION 8.14.3 - CONCRETE ARCHES.
1.3.1.7.8 SUBSECTION 8.15 - SERVICE LOAD DESIGN METHOD
1.3.1.7.9 SUBSECTION 8.17 - REINFORCEMENT
1.3.1.7.10 SUBSECTION 8.20 - SHRINKAGE AND TEMPERATURE REINFORCEMENT
1.3.1.7.11 SUBSECTION 8.21 - SPACING LIMITS FOR REINFORCEMENT
1.3.1.7.12 SUBSECTION 8.22 - PROTECTION AGAINST CORROSION
1.3.1.7.13 SUBSECTION 8.32 - SPLICES OF REINFORCEMENT

1.4. **DELIVERY, STORAGE AND HANDLING**

1.4.1. ARCH ELEMENTS:
1.4.1.1. SPREADER BEAMS ARE REQUIRED FOR THE LIFTING OF PRECAST CONCRETE ARCH ELEMENTS TO PRECLUDE DAMAGE FROM BENDING OR TORSION FORCES.
1.4.1.2. SEE SHOP DRAWINGS FOR ELEMENT WEIGHTS AND APPROPRIATE SPREADER BEAM LENGTHS.
1.4.1.3. THE CONTRACTOR MUST PROVIDE A DOUBLE-DRUM CRANE WITH EQUAL CAPACITY ON EACH DRUM FOR THE INSTALLATION OF THE PRECAST ELEMENTS.
1.4.1.4. CARE MUST BE EXERCISED IN HANDLING AND MOVING THE ARCH ELEMENTS. PRECAST CONCRETE ARCH ELEMENTS SHALL BE CAST LIFTED AND STORED IN UPRIGHT POSITION.
1.4.1.5. PRECAST CONCRETE ARCH ELEMENTS SHOULD BE PROPERLY STORED TO PREVENT CRACKING. STORE ARCH ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE.
1.4.1.6. PRECAST CONCRETE ARCH ELEMENTS MUST NOT BE SHIPPED UNTIL THE CONCRETE HAS ATTAINED THE SPECIFIED DESIGN COMPRESSIVE STRENGTH AS DIRECTED BY THE ENGINEER OR THE VENDOR OF THE PRECAST CONCRETE ARCH SYSTEM.
1.4.2. SPANDREL AND WING WALL SEGMENTS:
1.4.2.1. PRECAST CONCRETE SPANDREL AND WING WALL SEGMENTS ARE LIFTED THROUGH THE USE OF BOTH LIFTING AND ERECTION ANCHORS.
1.4.2.2. PRECAST CONCRETE SPANDREL AND WING WALL SEGMENTS MAY BE UNLOADED AND PLACED ON THE GROUND AT SITE UNTIL INSTALLED. STORE SPANDREL SEGMENTS USING TIMBER SUPPORTS AS APPROPRIATE.
1.4.2.3. PRECAST CONCRETE SPANDREL AND WING WALL SEGMENTS ARE CAST, STORED AND SHIPPED IN A FLAT POSITION.
1.4.2.5. PRECAST CONCRETE SPANDREL AND WING WALL SEGMENTS MUST NOT BE SHIPPED UNTIL THE CONCRETE HAS ATTAINED THE SPECIFIED DESIGN COMPRESSIVE STRENGTH AS DIRECTED BY THE ENGINEER OR OR THE VENDOR OF THE PRECAST CONCRETE ARCH SYSTEM.

1.5. **PROJECT SITE CONDITIONS**

1.5.1. DO NOT PERFORM GROUTING WHEN TEMPERATURES ARE EXPECTED TO GO BELOW 35O FOR A PERIOD OF 72 HOURS
1.5.2. DO NOT PERFORM BACKFILLING DURING WET OR FREEZING WEATHER.

1.6. **WEIGHT RESTRICTIONS FOR CONSTRUCTION MACHINERY**

1.6.1. IN THE IMMEDIATE AREA OF THE ARCH, THE FOLLOWING RESTRICTIONS FOR THE USE OF HEAVY CONSTRUCTION MACHINERY DURING BACKFILLING OPERATIONS APPLY:
1.6.1.1. NO CONSTRUCTION EQUIPMENT SHALL CROSS THE BARE PRECAST CONCRETE ARCH WITHOUT APPROPRIATE BACKFILL AS DETAILED IN NUMBER 2 AND 3 BELOW.
1.6.1.2. AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF 4 INCHES OVER THE CROWN OF THE ARCH, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 30 TONS MAY CROSS THE ARCH.
1.6.1.3. AFTER THE COMPACTED FILL LEVEL HAS REACHED 18 INCHES OVER THE CROWN OF THE PRECAST CONCRETE ARCH, CONSTRUCTION EQUIPMENT WITHIN THE DESIGN LOAD LIMITS FOR THE ROAD MAY CROSS THE PRECAST CONCRETE ARCH.

2. **EXECUTION**

2.1. **CAST-IN-PLACE (CIP) FOUNDATIONS**

2.1.1. THE DESIGN SIZE AND ELEVATION OF THE CIP FOUNDATIONS SHALL BE AS SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
2.1.2. THE FOUNDATIONS FOR PRECAST CONCRETE ARCH ELEMENTS, SPANDREL AND WINGWALLS MUST BE CONNECTED BY REINFORCEMENT TO FORM ONE MONOLITHIC BODY. EXPANSION JOINTS SHALL NOT BE USED. SHRINKAGE AND TEMPERATURE CRACKS ARE ACCEPTABLE AND DO NOT DETRACT FROM SYSTEM PERFORMANCE AND SAFETY.
2.1.3. THE FOUNDATION SHALL BE GIVEN A SMOOTH FLOAT FINISH.
2.1.4. EXCAVATE FOUNDATIONS ONLY AS DIRECTED BY SITE SOIL ENGINEER TO REMOVE UNSUITABLE SOIL.
2.1.5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ERECTION OF THE FOUNDATIONS PER THE VENDOR OF THE PRECAST CONCRETE ARCH RECOMMENDATIONS AND PER THE PLANS AND SPECIFICATIONS.
2.1.6. PRIOR TO INSTALLATION OF ARCH ELEMENTS, THE CONTRACTOR SHALL VERIFY THAT THE CIP ARCH FOOTINGS HAVE THE REQUIRED CONCRETE STRENGTH.
2.1.7. THE SITE SOILS ENGINEER SHALL CERTIFY THAT THE BEARING CAPACITY MEETS OR EXCEEDS THE FOOTING DESIGN REQUIREMENTS, PRIOR TO THE CONTRACTOR POURING OF THE FOOTINGS. A COPY OF THE REPORT SHALL BE SUBMITTED TO VENDOR OF THE PRECAST CONCRETE ARCH, PRIOR TO SHIPMENT OF ARCH ELEMENTS.

2. **CRITICAL DIMENSIONS FOR FOUNDATIONS**

2.2.1. TO ENSURE CORRECT INSTALLATION OF THE PRECAST CONCRETE ARCH SYSTEM ELEMENTS, CARE AND CAUTION MUST BE EXERCISED IN FORMING THE SUPPORT AREAS FOR ARCH, SPANDREL AND WINGWALL ELEMENTS. EXERCISING SPECIAL CARE WILL FACILITATE THE RAPID INSTALLATION OF THE PRECAST COMPONENTS.
2.2.2. BEFORE STARTING ERECTION PROCEDURES, CHECK THE FOLLOWING ITEMS:
2.2.2.1. DISTANCE BETWEEN TWO OPPOSITE ARCH KEY BACKS; TO BE THE ARCH OUTSIDE SPAN PLUS 8 INCHES APPROXIMATELY OR PER VENDOR OF THE PRECAST CONCRETE ARCH SUBMITTAL DRAWINGS.
2.2.2.2. ALIGNMENT OF THE ARCH KEY ALONG THE LENGTH OF THE FOUNDATION.
2.2.2.3. TOTAL LENGTH OF THE ARCH FOUNDATION IN ORDER TO CALCULATE THE EXACT SPACING NEEDED BETWEEN THE PRECAST CONCRETE ARCH ELEMENTS.
2.2.2.4. FOUNDATION SURFACES FOR THE PRECAST CONCRETE SPANDREL AND WINGWALLS TO ENSURE THAT THEY ARE LEVEL AND WITHIN 1/4 INCH OF THE DIMENSIONS INDICATED.

2.3. **ARCH ELEMENT LEVELING PADS**

2.3.1. MORTAR LEVELING PADS MUST BE POURED IN THE PRECAST CONCRETE ARCH KEYS TO GUARANTEE CORRECT SEATING OF THE ARCH ELEMENTS. LEVELING PADS MUST BE APPROXIMATELY 2 INCHES THICK AND 16 INCHES LONG TO ENSURE THAT EACH PRECAST CONCRETE ARCH ELEMENT IS RESTING ON APPROXIMATELY 8 INCHES OF PAD AT EACH JOINT.
2.3.2. THE LEVELING PADS ARE TO BE POURED TO WITHIN 1/8 INCH OF THE REQUIRED ELEVATION.
2.3.3. THE GROUT SHALL BE 5000 PSI WITH MAXIMUM AGGREGATE SIZE OF ¼ INCH.
2.3.4. NO LOADS ARE ALLOWED ON THE MORTAR LEVELING PADS WITHIN 72 HOURS OF THEIR PLACEMENT.
2.3.5. MASONITE SHIMS MAY ALSO BE USED AS LEVELING PADS.

2.4. **INSTALLATION PROCEDURES FOR THE PRECAST ELEMENTS**
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT A CRANE OF THE CORRECT LIFTING CAPACITY IS AVAILABLE TO HANDLE THE PRECAST CONCRETE UNITS. THIS CAN BE ACCOMPLISHED BY USING THE WEIGHTS GIVEN FOR THE PRECAST CONCRETE ARCH SYSTEM COMPONENTS AND BY DETERMINING THE LIFTING REACH FOR EACH CRANE UNIT. SITE CONDITIONS MUST BE CHECKED WELL IN ADVANCE OF SHIPPING TO ENSURE PROPER CRANE LOCATION AND TO AVOID ANY LIFTING RESTRICTIONS. THE LIFT ANCHORS PROVIDED IN EACH UNIT ARE THE ONLY MEANS TO BE USED TO LIFT THE ELEMENTS. THE PRECAST CONCRETE ELEMENTS MUST NOT BE SUPPORTED OR RAISED BY OTHER MEANS THAN THOSE GIVEN IN THE MANUALS AND DRAWINGS WITHOUT WRITTEN APPROVAL FROM THE VENDOR OF THE PRECAST CONCRETE ARCH SYSTEM.

APPROVED: DEPARTMENT OF PUBLIC WORKS

5-15-06
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

5/25/06
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

5/23/06
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

2.5. **INSTALLATION OF ARCH ELEMENTS**

2.5.1. A SUFFICIENT QUANTITY OF 1-1/2" X 7-1/2" X 16" CONCRETE BLOCKS AS WELL AS HARDWOOD WEDGES MUST BE AVAILABLE AND ON SITE FOR USE AS SHIMS TO PREVENT LATERAL SPREADING OF THE PRECAST CONCRETE ARCH AFTER INSTALLATION. ALSO, A GOOD SUPPLY OF ¼, ½ INCH AND 1/8 THICK STEEL OR PLASTIC PLATE SHIMS FOR VARIOUS SHIMMING PURPOSES SHOULD BE ON SITE.
2.5.2. MEASURE FROM THE END OF THE FOUNDATION AND MARK THE TOP OF EACH LEVELING PAD WHERE EACH ARCH IS TO BE PLACED. SPACING BETWEEN ARCH ELEMENTS IS APPROXIMATELY ½ INCH. CHECK THE TOTAL LENGTH OF THE FOUNDATION AGAINST THIS VALUE. IT IS HELPFUL TO HAVE ½ INCH THICK WOODEN BOARDS OR PLASTIC SHIMS AVAILABLE TO ASSIST IN SPACING THE PRECAST CONCRETE ARCH ELEMENTS AS THEY ARE BEING SET.
2.5.3. A SPREADER BEAM MUST BE AVAILABLE TO LIFT THE PRECAST CONCRETE ARCH ELEMENTS FROM THE TRUCK.
2.5.4. A SLING ASSEMBLY, WITH RIGGING MUST BE AVAILABLE TO ROTATE THE ELEMENT IN THE AIR TO THE INSTALLATION POSITION.
2.5.5. THE PRECAST CONCRETE ARCH ELEMENT IS THEN LOWERED INTO/ONTO THE KEY. IT IS IMPERATIVE THAT ANY LATERAL SPREADING OF THE ARCH ELEMENT BE AVOIDED AFTER IT IS INSTALLED. THEREFORE, THE CONCRETE BLOCKS ARE PLACED IN THE KEY ON THE LEVELING PADS AND SMALLER SHIMS AND WEDGES ADDED BEFORE COMPLETE RELEASE OF THE PRECAST CONCRETE ARCH ELEMENT FROM THE CRANE.
2.5.6. MAKE SURE THAT A PRECAST ARCH END ARCH ELEMENT (ARCH ELEMENT WITH CURB) IS PLACED AS THE FIRST AND LAST ARCH ELEMENT.
2.5.7. BEBO PRECAST CONCRETE TWIN-LEAF ARCH UNITS ARE TRANSPORTED AND LIFTED/ROTATED IN A SIMILAR MANNER AS THE SINGLE-LEAF ELEMENTS. TWO DOUBLE-DRUM CRANES (OR ONE CRANE AND DISPLACEABLE SCAFFOLDING) ARE REQUIRED FOR THE ERECTION OF THE PRECAST CONCRETE ARCH UNITS.
2.5.8. IDEALLY, ONE CRANE SHALL BE LOCATED ON EACH (OUTER) SIDE OF THE FOUNDATIONS TO INDEPENDENTLY LIFT HALF-ARCH UNITS FROM THE DELIVERY TRUCKS AND INTO POSITION. THE TWO TWIN PRECAST CONCRETE UNITS ARE LIFTED AND POSITIONED SIMULTANEOUSLY.
2.5.9. ALTERNATIVELY, IF CRANES ARE TO BE POSITIONED ON THE SAME SIDE OF THE FOUNDATIONS OR WITHIN THE ARCH SPAN, THEY SHOULD BE LOCATED SO THAT THE FINAL JOINTING MOVEMENT OF THE UNITS AT THE CROWN CAN BE EFFECTED WITHOUT DAMAGE TO THE INTERLOCKING JOINT KEY.
2.5.10. BEFORE RELEASING THE LOAD OF EACH PRECAST CONCRETE ARCH HALF UNIT FROM THE CRANE, BOTH ELEMENTS MUST BE BLOCKED AT THE FOUNDATION KEY IN THE CORRECT POSITION AND THE CURVED TIE ROD MUST BE INSERTED AND FIXED IN THE BLOCKOUTS AT THE CROWN JOINT.
2.5.11. AGAIN, CHECK THE SPAN WIDTH AT REGULAR INTERVALS TO MINIMIZE THE SPREADING.
2.5.12. ONCE CORRECTLY POSITIONED AND ALIGNED, THE PRECAST CONCRETE TWIN-LEAF UNITS ARE JOINTED AT THE CROWN WITH CAST-IN-PLACE CONCRETE AS SHOWN IN THE DRAWINGS.
2.5.13. PRECAST CONCRETE ARCH TWIN-LEAF PROFILES ARE DESIGNED FOR THE ARCH DEAD LOAD TO ACT ON THE THREE-PINNED ARCH. IN CASE SCAFFOLDINGS ARE USED FOR THE ERECTION, THEY MUST BE REMOVED (OR LOWERED) BEFORE THE CROWN JOINT IS CAST.

2.6. **INSTALLATION OF WINGWALLS AND HEADWALLS**

2.6.1. TENSAR STRUCTURAL GEOGRID WINGWALLS AND HEADWALLS.
2.6.1.1. THE INSTALLATION OF THE TENSAR STRUCTURAL GEOGRID AND KEYSTONE WINGWALLS AND HEADWALLS SHALL MEET THE REQUIREMENTS OF THE END WALL SPECIFICATIONS ON THE DRAWINGS.

2.7. **WATERPROOFING AND SUBSOIL DRAINAGE**

2.7.1. SUBSOIL DRAINAGE SHALL BE AS DIRECTED BY THE ENGINEER.
2.7.2. AS A MINIMUM, THE JOINTS BETWEEN THE PRECAST CONCRETE ARCH ELEMENTS MUST BE SEALED BY PLACING SECTIONS OF 1 1/2 INCH DIAMETER PREFORMED MASTIC IN EACH JOINT. THE JOINT IS THEN COVERED WITH A 12 INCH SELF-ADHERING STRIP OF RUBBERIZED ASPHALT FLASHING SUCH AS CARLISLE'S CCW-705-TWF OR APPROVED EQUAL.
2.7.3. WEEP HOLES MAY BE INCORPORATED INTO THE BOTTOMS OF THE ARCHES IF A SUBSOIL DRAINAGE SYSTEM IS REQUIRED.

2.8. **GROUTING**

2.8.1. FILL THE ARCH KEY WITH GROUT. COMPACT AS REQUIRED TO ENSURE THAT THE ENTIRE KEY AROUND THE ARCH ELEMENT IS COMPLETELY FILLED.
2.8.2. FILL THE LIFTING AND ERECTION ANCHOR RECESSES WITH GROUT.
2.8.3. ALL GROUT SHALL BE 5000 PSI WITH MAXIMUM AGGREGATE SIZE OF ¼ INCH.

2.9. **BACKFILL ZONES**

2.9.1. ZONE A: EXISTING SOIL, CONSTRUCTED EMBANKMENT OR OVERFILL.
2.9.2. ZONE B: FILL WHICH IS DIRECTLY ASSOCIATED WITH PRECAST CONCRETE ARCH INSTALLATION.
2.9.3. ZONE C: ROAD STRUCTURE.

2.10. **REQUIRED FILL PROPERTIES**

2.10.1. ZONE A
2.10.1.1. ZONE A REQUIRES NATURAL GROUND OR FILL MATERIAL WITH SPECIFICATIONS AND FILLING AS WELL AS COMPACTING PROCEDURES EQUAL TO THAT FOR NORMAL ROAD EMBANKMENTS.
2.10.1.2. NATURAL GROUND IS TO BE SUFFICIENTLY STABLE TO ALLOW EFFECTIVE SUPPORT TO THE PRECAST CONCRETE ARCH UNITS. AS A GUIDE, THE EXISTING NATURAL GROUND SHOULD BE OF SIMILAR QUALITY AND DENSITY TO ZONE B MATERIAL FOR A MINIMUM LATERAL DIMENSION OF ONE ARCH SPAN OUTSIDE OF THE ARCH FOOTING.
2.10.2. ZONE B
2.10.2.1. GENERALLY, SOILS THAT MEET THE FOLLOWING BASIC REQUIREMENTS ARE ACCEPTABLE:
- Φ' ≥ 30° (ANGLE OF INTERNAL COMPACTED STATE)FRICTION, IN
- WL ≤ 40% (LIQUID LIMIT)
- IP ≤ 10% (PLASTICITY INDEX)

2.10.2.2. SOILS SHALL BE REASONABLY FREE OF ORGANIC MATTER, AND, NEAR CONCRETE SURFACES, FREE OF STONES LARGER THAN 3 INCHES IN DIAMETER.
2.10.2.3. MATERIALS WITH GRADATIONS THAT FALL WITHIN THE FOLLOWING LIMITS (SHADED AREA OF FIGURE C2), NORMALLY FULFILL THE ABOVE BASIC REQUIREMENTS:

Figure C2: Zone B Gradation Limits

SOILS SHOULD HAVE A WATER CONTENT THAT ALLOWS TO OBTAIN THE REQUIRED COMPACTION. THIS IS ESPECIALLY CRITICAL FOR SOILS OF THE USCS GROUPS SM-ML AND SM-SC.
SOILS THAT EXCEED THE GRADATION LIMITS AT THE OPENINGS ≤ 0.020 MM (SILT/CLAY FRACTION) OF THE USCS GROUPS GC-CL, SC-CL, ML AND CL-ML CAN STILL BE ACCEPTABLE, BUT NEED TO BE LABORATORY TESTED FOR THE ABOVE BASIC REQUIREMENTS.

THE FOLLOWING USCS SOIL GROUPS ARE NOT ACCEPTABLE AS BACKFILL MATERIAL IN THEIR NATURAL STATE:

GC-CH (GRAVEL WITH HIGH PLASTICITY CLAY)
SC-CH (SAND WITH HIGH PLASTICITY CLAY)
CL (GRAVELLY AND/OR SANDY, CLAYEY SILT)
OL (GRAVELLY AND/OR SANDY, ORGANIC SILT)
CH (GRAVELLY AND/OR SANDY, SILTY CLAY)
OH (GRAVELLY AND/OR SANDY ORGANIC SILTY CLAY)
MH (GRAVELLY AND/OR SANDY HIGH PLASTICITY SILT)

MATERIAL OF THE SOIL GROUPS GC-CH AND SC-CH CAN BE IMPROVED ("SOIL CEMENT") BY ADDING CEMENT OR LIME AND USED FOR BACKFILLING. HOWEVER, SPECIAL KNOW-HOW AND TESTING WILL BE NECESSARY.
THE SUITABILITY OF BACKFILL MATERIAL CAN ALSO BE DETERMINED USING AASHTO DESIGNATION M 145-87. IN GENERAL, SOILS GROUPS A-1, A-2, A-3 AND A-4 ARE ACCEPTABLE (SEE TABLE BELOW, BUREAU OF PUBLIC ROADS CLASSIFICATION).

TYPICAL USCS MATERIALS	Group	Sub-Group	Per Cent Passing U.S. Sieve No.			Character of Fraction Passing No. 40 Sieve		Group Index No. 1)	Soil Description
			10 [2mm]	40 [0.4mm]	200 [0.074mm]	Liquid Limit	Plasticity Index		
GW, GP, SP	A-1			50 max.	25 max.		6 max.	0	Well-graded gravel or sand, may include fines
GM, SW, SP, SM		A-1-a	50 max.	30 max.	15 max.		6 max.	0	Largely gravel but can include sand and fines
		A-1-b		50 max.	25 max.		6 max.	0	Gravelly sand or graded sand; may include fines
GM, SM, ML, SP, GP	A-2				35 max.			0 to 4	Sands and gravels with excessive fines
SC, GC, GM		A-2-4			35 max.	40 max.	10 max.	0	Sands, gravels with low-plasticity silt fines
SC, GC		A-2-5			35 max.	41 min.	10 max.	0	Sands, gravels with plastic silt fines
		A-2-6			35 max.	40 max.	11 min.	4 max.	Sands, gravels with clay fines
SC, GC		A-2-7			35 max.	41 min.	11 min.	4 max.	Sands, gravels with highly plastic clay fines
SP,SM,SW	A-3			51 min.	10 max.		Nonplastic	0	Fine sands
ML, SM, SC	A-4				36 min.	40 max.	10 max.	0 max	Low-compressibility silts
MH, OH, ML, OL	A-5				36 min.	41 min.	10 max.	12 max.	High-compressibility silts
CL, ML, OL	A-6				36 min.	40 max.	11 min.	16 max.	Low-to-medium-compressibility clays
	A-7				36 min.	41 min.	11 min.	20 max.	High-compressibility clays
OL, CH, MH, OH, CL, ML		A-7-5			36 min.	41 min.	11 min.	20 max.	High-compressibility silty clays
OH, CH, MH, CL, ML, OL		A-7-6			36 min.	41 min.	11 min.	20 max.	High compressibility, high-volume change clays
PT, OH	A-8								Peat, highly organic soils

Acceptable Soils — Non-acceptable Soils (shaded)

1) DETERMINATION OF GROUP INDEX NO.
GROUP INDEX = (F - 35) · [0.2 + 0.005 · (LL - 40)] + 0.01 · (F - 15) · (PI - 10)
IN WHICH: F = PERCENTAGE PASSING NO. 200 (0.074 MM) SIEVE, EXPRESSED AS A WHOLE NUMBER. THIS PERCENTAGE IS BASED ONLY ON THE MATERIAL PASSING THE 3-IN (75 MM) SIEVE.
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
- INDEX NO. 0 - 4 INDICATES A "GOOD" MATERIAL
- INDEX NO. 5 - 14 INDICATES A "FAIR" MATERIAL
- INDEX NO. 15 - 19 INDICATES A "POOR" MATERIAL
- INDEX NO. 20 OR GREATER INDICATES A "VERY POOR" MATERIAL

THE NECESSARY FILL PROPERTIES FOR ZONE B CAN ALSO BE ACHIEVED BY THE USE OF CONTROLLED LOW-STRENGTH MATERIALS (FLOWABLE/SELF-COMPACTING FILL). THIS CAN BE PARTICULARLY BENEFICIAL IN RESTRICTED CONDITIONS (NARROW EXCAVATIONS) WHERE COMPACTING IS DIFFICULT AND/OR WHEN PLACEMENT OF BACKFILL IS TIME-CONSUMING (MULTIPLE-SPAN STRUCTURES). COMPRESSIVE STRENGTHS OF THIS CLSM OF 100 PSI (0.7 N/MM2) OR EVEN LESS ARE APPROPRIATE.

2.10.3. ZONE C
2.10.3.1. ZONE C IS THE ROAD SECTION OF GRAVEL, ASPHALT OR CONCRETE BUILT IN COMPLIANCE WITH LOCAL ENGINEERING PRACTICES. MINIMUM OVERFILL HEIGHT IS ONE FOOT AND A HALF OVER THE CROWN OF THE ARCH, INCLUDING THE PAVEMENT. THERE SHOULD BE AT LEAST 4 INCHES OF SELECT FILL BETWEEN THE ARCH EXTRADOS AND THE BOTTOM OF THE PAVEMENT.
2.10.3.2. PRIOR TO SHIPPING THE PRECAST ARCH ELEMENTS, THE CONTRACTOR SHALL SUPPLY A CERTIFICATION LETTER BY A LICENSED SOILS TESTING FIRM OR REPRESENTATIVE STATING THAT THE BACKFILL SOIL MEETS THE REQUIREMENTS OF SECTION 3.11 B, NUMBER 1 AND 2 ABOVE.

2.11. **PLACING AND COMPACTING OF FILL**

2.11.1. UNLESS OTHERWISE SPECIFIED, BACKFILLING OPERATIONS SHOULD NOT BEGIN UNTIL THE GROUT OF THE ARCH KEY HAS BEEN IN PLACE FOR 72 HOURS.
2.11.2. DUMPING FOR BACKFILLING IS NOT ALLOWED ANY NEARER THAN 3 FT TO A VERTICAL PLANE THROUGH THE ARCH KEY.
2.11.3. THE FILL MUST BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING ONE FOOT. THE MAXIMUM DIFFERENCE IN THE SURFACE LEVELS OF THE FILL ON OPPOSITE SIDES OF THE ARCH MUST NOT EXCEED 2 FEET.
2.11.4. THE FILL BEHIND WINGWALLS MUST BE PLACED AT THE SAME TIME AS THAT OF THE ARCH FILL. IT MUST BE PLACED IN PROGRESSIVELY PLACED HORIZONTAL LAYERS NOT EXCEEDING ONE FOOT PER LAYER.
2.11.5. THE BACKFILL OF ZONE B MUST BE COMPACTED TO A MINIMUM DENSITY OF 95% AS REQUIRED BY AASHTO T-99.
2.11.6. SOIL WITHIN 1 FOOT OF CONCRETE SURFACES SHOULD BE HAND-COMPACTED. ELSEWHERE, USE OF ROLLERS IS ACCEPTABLE. IF VIBRATING ROLLER-COMPACTORS ARE USED, THEY SHOULD NOT BE STARTED OR STOPPED WITHIN ZONE B AND THE VIBRATION FREQUENCY SHOULD BE AT LEAST 30 REVOLUTIONS PER SECOND.
2.11.7. THERE ARE NO SPECIAL REQUIREMENTS FOR THE BACKFILL MATERIAL AND COMPACTING BEHIND WINGWALLS EXCEPT THAT EACH SHOULD SATISFY THE CRITERIA FOR NORMAL ROAD EMBANKMENTS.

2.12. **SETTLEMENTS AND HORIZONTAL DISPLACEMENTS**

2.12.1. THE CONTRACTOR SHALL CHECK SETTLEMENTS AND HORIZONTAL DISPLACEMENT OF FOUNDATION TO ENSURE THAT THEY ARE WITHIN THE ALLOWABLE LIMIT PROVIDED BY THE ENGINEER. THESE MEASUREMENTS SHOULD GIVE AN INDICATION OF THE SETTLEMENTS AND DEFORMATIONS ALONG THE LENGTH OF THE FOUNDATIONS.
2.12.2. THE FIRST MEASUREMENT ROW SHOULD TAKE PLACE AFTER THE ERECTION OF ALL PRECAST ARCH SYSTEM ELEMENTS, A SECOND AFTER COMPLETION OF BACKFILLING, AND A THIRD BEFORE OPENING OF THE BRIDGE TO TRAFFIC. FURTHER MEASUREMENTS CAN BE MADE ACCORDING TO LOCAL CONDITIONS.
2.12.3. THE MAXIMUM DIFFERENCE IN VERTICAL DISPLACEMENTS 'V' SHOULD NOT EXCEED 1 INCH ALONG THE LENGTH OF ONE FOUNDATION.
2.12.4. IN CONJUNCTION WITH POSSIBLE DISPLACEMENTS OF THE FOUNDATIONS, CHECK FOR VISIBLE CRACKS IN THE CONCRETE OF THE ARCH INTRA DOS. FINE OR HAIRLINE CRACKS ARE TO BE EXPECTED IN THE CROWN AREA AND ARE NOT HARMFUL.

2.13. **MEASUREMENT AND PAYMENT**

2.13.1. PAYMENT SHALL BE CONSIDERED FULL COMPENSATION FOR ALL LABOR, MATERIAL, AND EQUIPMENT TO INSTALL THE PRECAST CONCRETE ARCH SYSTEM AND ALL ITS COMPONENTS, FOOTINGS, BACKFILL, ROADWAY AND CLEAN UP.
2.13.2 THE PRECAST CONCRETE ARCH SYSTEM SHALL BE PAID FOR ON A LUMP SUM BASIS.

MGWC 2.7: Brush Layering

Description

Brush layers are live branch cuttings interspersed between layers of compacted soil in the face of a cut or fill slope to provide stability and act as horizontal slope drains. Brush layers can be used in conjunction with wooden stakes to repair small localized slumps or holes in streambanks (*live gully repair*).

Effective Uses & Limitations

Live brush layers effectively:

- provide long-term durability and erosion control, especially when used on Rosgen stream types B3, B4, B5, B6, C1, C2, C3, C4, C5, C6, DA, E3, E4, E5, and E6;
- trap debris and slow surface waters thereby reducing erosion;
- encourage plant propagation and the invasion of natural vegetation;
- act as lateral drains to dry excessively wet sites;
- reinforce newly constructed fill slopes; and
- replace brush mattresses and live fascines on sites with deep-seated mass stability problems.

When constructed for live gully repair, brush layers:

- provide an immediate surface barrier by redirecting water away from the washed-out area,
- reinforce the backfill and protect the restored area against future scour and washout, and
- furnish cover for wildlife.

To improve their effectiveness, brush layers can be used in combination with rock toe protection and other restoration measures. Additionally, brush layering is an effective technique when the following limitations are observed:

- brush layering is usually more effective on fill slopes than cut slopes because branch length is not restricted by the depth to which benches can be dug,
- cut brush layering should be limited to slopes of 2H:1V or less, and
- live gully repair should be used only to repair relatively small slumps and holes.

Material Specifications

Live branches should be cut from fresh, green, healthy, dormant parent plants which are adapted to the site conditions whenever possible.
- Live branches should be 0.5 to 2.5 inches (1.3 to 6 centimeters) in diameter and should be long enough so that 1/2 to 2/3 of the branch is in contact with the soil at the back of the terrace, bench, or gully while projecting slightly from the slope face.
- Commonly used woody plants for this measure include willow, poplar, and alder since they are versatile and have high growth rates with shrubby habits, fibrous root systems, and high transpiration rates especially when in leaf.

- A partial listing of woody plants recommended by the United States Department of Agriculture's Soil Conservation Service is presented in MGWC 2.4:Live Stakes.
- Live branch cuttings should be kept covered and moist at all times and should be placed in cold storage if more than a few hours elapse between the cutting and construction times.

Live or inert stakes used for live gully repair should be sufficiently long to reach 3 feet (0.9 meters) into competent soil at the base of the slump or hole and soaked for 24 to 48 hours prior to installation.

Approximate Cost ($1999):
Cut: $9 to $14.50 per linear ft
Fill: $13 to $28 per linear ft

Installation Guidelines

Brush layer installation should occur during periods of low flow beginning at the rivers edge or low point of the targeted gully. If construction begins at the river's edge, a stable toe with an granular filter designed according to MGWC 2.1: Riprap must first be constructed below the normal baseflow level according to riprap sizing and installation guidelines (refer to Detail 2.7).

- Live cuttings should be placed on prepared earth lifts for fill brush layering or excavated terraces for cut brush layering.

  1. Fill brush layers should be positioned on prepared earth lifts 7 to 17 feet (2 to 5 meters) in width, and cut brush layers should be arranged on trenches with a minimum width of 3 to 7 feet (1 to 2 meters).
  2. The brush rows should be angled away from the contour on excessively wet sites, and the angle of the branches from the horizontal should range from 10 to 20 degrees; steeper for wetter soils and flatter for dry soils.
  3. Branches should be arranged in a crisscross fashion in 4 to 12-inch (10 to 30-cm) thick layers with their cut ends touching the back of the slope or gully. Live gully repair requires that the branch cuttings be arranged around wooden stakes. The wooden stakes should be spaced 1 to 1.5 feet (0.3 to 0.45 meters) apart and driven a minimum of 2 to 3 feet (0.6 to 0.9 meters) into competent ground. A maximum of 25% of the brush layer should protrude from the slope face.

- Moist backfill should be lightly compacted on top of each layer of branches to eliminate air voids and provide an adequate soil/branch interface to initiate growth. Each layer of backfill should have a thickness of 6 to 12 inches (0.15 to 0.30 meters).
- Subsequent rows of brush layers should be spaced as follows, though frequently wet and unstable slopes may require closer spacing:

Table 2.7: Suggested Spacing for Brush Layers

Slope Steepness	Contour Spacing
1.5:1 to 2:1	4-5 ft (1.2-1.5 m)
2:1 to 2.5:1	5-6 ft (1.5-1.8 m)
2.5:1 to 3:1	6-8 ft (1.8-2.4 m)
3:1 to 4:1	7-10 ft (2.1-3.0 m)

- The completed installation should match the existing slope profile. Long straw or mulching material should be used between brush layer rows on slopes of 3H:1V or flatter to impede surface erosion until native vegetation invades the area. On steeper slopes, jute or coir fabric should be used.

Maryland's Guidelines To Waterway Construction
DETAIL 2.7(a): BRUSH LAYERING

Maryland's Guidelines To Waterway Construction
DETAIL 2.7(b): BRUSH LAYERING

MGWC 2.9: Live Crib Wall

Description

Live crib walls are hollow, box-like frameworks of untreated logs or timbers filled with riprap and alternating layers of suitable backfill and live branch layers and are used for slope, streambank, and shoreline protection.

Effective Uses & Limitations

Live crib walls are constructed to protect the toes and banks of eroding stream reaches against scour and undermining, particularly at the outsides of meander bends where strong river currents are present. The log frameworks provide immediate protection from erosion while the live branch cuttings contribute long-term durability and ultimately replace the decaying logs. Additionally, live crib walls are effective in areas where encroachment into the stream channel should be avoided.

When considering these structures as a stream restoration technique, the following limitations should be considered:

- Live crib walls should not be used where the channel bed is severely eroded or where undercutting is likely to occur (e.g. where the terrain is rocky or where narrow channels are bounded by high banks).
- Live crib walls are not intended to resist large lateral earth stresses, therefore their heights should be limited accordingly (as noted in the installation specifications).
- Live crib walls promote siltation and retain large amounts of bed material; therefore they require continual monitoring for adverse streamflow patterns.
- Live crib walls can be an effective restoration measure when used on the following Rosgen stream types: B3, B4, B5, B6, C1, C2, C3, C4, C5, C6, DA, E3, E4, E5, and E6.

Material Specifications

When choosing and preparing logs and woody cuttings for live crib walls, the following guidelines should be followed:

- Crib frameworks should be constructed from stripped logs or untreated lumber 4 to 6 inches (10 to 15 centimeters) in diameter.
- Live branches should be cut from fresh, green, healthy parent plants which are adapted to the site conditions whenever possible.

  1. Live branches should be 0.5 to 2.5 inches (1.3 to 6 centimeters) in diameter and should be long enough to reach the soil at the back of the wooden crib structure while projecting slightly from the crib face.
  2. Commonly used woody plants for this measure include willow, poplar, and alder since they are versatile and have high growth rates with shrubby habits, fibrous root systems, and high transpiration rates especially when in leaf.
  3. A partial listing of woody plants recommended by the United States Department of Agriculture's Soil Conservation Service is presented in MGWC 2.4: Live Stakes.
  4. Live branch cuttings should be kept covered and moist at all times and should be placed in cold storage if more than a few hours elapse before installation.

- Gravel and stones for the filter and riprap layers should be sized according to MGWC 2.1: Riprap.

- Fill soil should be native to the site, when possible, and should contain enough fine material to allow for the live branches to root and grow readily.

Approximate Cost ($1999):
$11 to $28 per square foot of the front face

Installation Guidelines

All erosion and sediment control devices, including dewatering basins, should be implemented as the first order of business according to a plan approved by the WMA or local authority. Live crib walls should be installed as follows (refer to Details 2.9a):

1. The location of the crib wall revetment should vary depending upon flow conditions and the reach's degree of curvature (refer to Detail 2.9b).

2. Stream flow should be diverted away from the site according to a plan approved by the WMA or local authority. (See *Section 1, Temporary Instream Construction Measures, Maryland Guidelines to Waterway Consruction*).

3. Loose material at the toe of the embankment should be excavated until a stable foundation is reached, usually within 2 to 3 feet (0.6 to 0.9 meters) of the surface. The crib foundation and structure should be inclined into the slope at a minimum angle (measured from the horizontal) ranging from 10H:1V to 6H:1V to increase the structure's stability.

4. The first course of logs or timbers should be positioned at the front and back of the excavated foundation approximately 3 to 6 feet (0.9 to 1.8 meters) apart and parallel to the slope contour. Successive courses of logs or timbers should be situated at right angles on top of the previous course such that they overhang the front and back of the previous course by 3 to 6 inches (7.6 to 15 centimeters). Once in position, each course should be secured to the previous course with nails or reinforcing bars and backfilled with granular filter material and stone riprap (up to the normal baseflow level).

5. Live branch cuttings should be placed on top of the courses having logs or timbers running parallel to the contour (above the normal baseflow level).

   - The growing tips of the branches should be oriented toward the front face such that a maximum of 25 percent of their lengths project from the framework.
   - Each layer of branches should be followed with a layer of compacted soil to ensure an adequate soil-branch interface to stimulate growth.
   - Cribbing heights should range from 50 to 70% of the bank height. It has also been recommended that live crib walls should be designed to a maximum height of 6 feet (1.8 meters), including the foundation, or 13 feet (4 meters) in height for structural stability reasons.

Note: Live crib walls can also be constructed in a stair-step fashion with each successive course of timbers set back 6 to 9 inches (15 to 23 centimeters) from the previously installed course.

Maryland's Guidelines To Waterway Construction
DETAIL 2.9(a): LIVE CRIB WALL

Maryland's Guidelines To Waterway Construction
DETAIL 2.9(b): CRIB WALL PLACEMENT

NO.	DATE	REVISION
1	5/06	CONVERT HEADWALLS TO CONCRETE AND ADD MGWC NOTES AND DETAILS

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

DEVELOPER: ELIOAK, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: HOMEWOOD L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER:
JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL SEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL JR. AND GENEVIEVE A. CARROLL
c/o JOHN LEE CARROLL
5 MADISON AVENUE
32nd FLOOR
NEW YORK, NEW YORK 10022

PROJECT: ...RWOOD - PHASE ...
LOTS 1 - 42, PRESERVATION PARCELS 'A' TH... 'P' & 'R', ...ABLE PRESERVATION PARCEL 'Q', ...UILDABLE BULK PARCELS 'A' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 2... PARCELS: 86; TAX MAP 29, GRID: 3,4,9&10, PARCEL 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

... ROAD CONSTRUCTION PLAN SPECIFICATIONS AND STABILIZATION DETAILS

DATE: ... 2006 | PROJECT NO. 1...32
SCALE: AS SHOWN | SHEET 55 OF 55

DES: LDD | DRAFT: LDD | CHECK: DAM

F-04-82

P:\1132 Homewood\dwg\7025 REDLINE.dwg, SPECIFICATIONS (2), 5/3/2006 9:11:52 AM, jmc, Oce TDS600 HDI for mylar.pc3

I - GENERAL

1.0 STANDARDS AND DEFINITIONS

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

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

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

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

1.2 DEFINITIONS

1.2.1 Owner - In these specifications the word "Owner" shall mean Homewood, LLC., Ellicott City, Maryland.

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

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

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

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

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

2.0 GENERAL CONDITIONS

2.1 The Contractor shall furnish all labor, material and equipment and perform all work and services except those set out and furnished by the Owner, necessary to complete in a satisfactory manner the site preparation, excavation, filling, compaction, grading as shown on the plans and as described therein.
This work shall consist of all mobilization clearing and grading, grubbing, stripping, removal of existing material unless otherwise stated, preparation of the land to be filled, filling of the land, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades, slopes, and specifications.

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

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

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

2.3 The construction shall be performed under the direction of an experienced engineer who is familiar with the design plan.

II - MULTI-PLATE

1.0 GENERAL

1.1 This work shall consist of furnishing, fabricating, and installation of a Multi-Plate arch culvert in conformance with these specifications, the manufacturer provisions, and the details shown on the plans.

1.2 The contractor shall verify the actual location of all utilities in the field before beginning any work that could be impacted by these utilities.

1.3 Contractor must notify/contact all utility companies to determine exact locations of existing utilities prior to commending any work on this contract.

1.4 Contractor shall coordinate construction with work done by others adjacent to or within the contract limits.

2.0 DIMENSIONS

2.1 The proposed structure shall be a MULTI-PLATE arch with the following dimensions:

Span: 15'-0"
Rise: 4'-8"
Gage: 12

2.2 All plan dimensions on the contract drawings are measured in a true horizontal plan unless otherwise noted.

2.3 All dimensions, locations, and elevations of existing structures shown on the contract drawings shall be verified by the contractor in the field.

3.0 DESIGN CRITERIA

All design, except where noted, conforms to the applicable sections of the 1996 AASHTO standard specifications for highway bridges.

4.0 WORKMANSHIP AND INSPECTIONS

All metal piping materials shall conform to the workmanship and inspection requirements of AASHTO M36 and M167.

5.0 MATERIALS AND DIMENSIONS

5.1 Steel structural plate arches shall conform to the requirements of AASHTO M167.
5.2 Bolts and nuts shall meet the provisions of ASTM A-449 and ASTM A-563, Grade C, respectively, and shall be galvanized in accordance with the requirements of ASTM A-153, Class C.

6.0 INSTALLATION

ASSEMBLY. The Structure shall be assembled in accordance with the Manufacturer's instructions. All plates shall be unloading and handled with reasonable care. Plates shall not be rolled or dragged over gravel rock and shall be prevented from striking rock or other hard objects during placement in trench or on bedding.

The Structure shall be placed in the footing starting at the downstream end. Structures with circumferential seams shall be installed with their inside circumferential sheet laps pointing downstream.

III - FOOTINGS

1.0 EXCAVATION FOR FOOTINGS

1.1 Footing excavation shall consist of the removal of all material, of whatever nature, necessary for the construction of foundations.

1.2 It shall be the responsibility of the Contractor to identify and relocate all existing utilities which conflict with the proposed footing locations shown on the plan. The Contractor must call the appropriate utility company at least 48 hours before any excavation to request exact field location of utilities, and coordinate removal and installation of all utilities with the respective utility company.

1.3 The side of all excavations shall be cut to prevent sliding or caving of the material above the footings.

1.4 Excavated material shall be disposed in accordance with the plan established by the Engineer.

1.5 The footings are designed for a bearing capacity of 2,000 psf, and this shall be verified in the field before construction.

2.0 CONCRETE FOOTING DIMENSIONS

The footings shall be reinforced in accordance with the construction drawings.

IV - HEADWALLS/WINGWALLS

1.0 The headwalls/wingwalls shall consist of reinforced concrete conforming to Chapter III of these specifications and to Division II, Section 8, of the AASHTO Standard Specifications for highway bridges having a minimum compression strength of 3,500 psi.

2.0 Reinforcing steel shall conform to ASTM A-615, Grade 60, having a minimum yield strength of 60,000 psi.

3.0 The headwalls shall be anchored to the aluminum arch in the manner shown on the plans and shall be formed and poured in accordance with the plan dimensions.

4.0 Round weep holes spaced not over 5 feet on center shall be placed in the walls as shown on the construction drawings. A granular envelope, consisting of #57 stone or equivalent, shall be placed behind each weep hole for a distance of approximately 1 foot from all edges of the weep hole. A free-draining geotextile screen shall be placed between the weep hole and the stone to prevent erosion of the stone.

V - SELECT BACKFILL SPECIFICATIONS

1.0 GENERAL CONDITIONS

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

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

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

2.0 SUBSURFACE CONDITIONS

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

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

3.0 SITE PREPARATION

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

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

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

4.0 FORMATION OF FILL AREAS

4.1 SELECT BACKFILL

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

5.0 MINIMUM BACKFILL REQUIREMENTS

5.1 MATERIAL

A granular type of material shall be used around and over the structure. This select structural backfill material shall conform to AASHTO Specification M-145: A-1, A-2-4, A-2-5, or A3 meeting the following criteria:

TABLE VI-I
BACKFILL REQUIREMENTS

AASHTO M-145 TABLE 2 (MODIFIED)*					
GROUP CLASSIFICATION	A-1		A-2 (Modified)		A-3
	A-1-a	A-1-b	A-2-4	A-2-5	A-3
Sieve Analysis, Percent Passing					
No. 10 (2.00 mm)	50 max.	--	--	--	--
No. 40 (0.425 mm)	30 max.	50 max.	--	--	51 min.
No. 100 (.150 mm)	--	--	50 max.	50 max.	--
No. 200 (0.075 mm)	15 max.	25 max.	20 max.	20 max.	10 max.
CHARACTERISTICS OF FRACTION PASSING NO. 40 (0.425mm)					
Liquid Limit	--	--	40 max.	41 min.	--
Plasticity Index	6 max.		10 max.	10 max.	NP
USUAL TYPES OF SIGNIFICANT CONSTITUENT MATERIALS	Stone Fragments, Gravel and Sand		Silty or Clayey Gravel and Sand		Fine Sand

*Modified to be more select than M-145.

Additional Backfill Material Requirements:

1. Backfill must be well-graded material. Open-graded or gap-graded materials are not allowed.
2. On-site mixing or blending to achieve specified gradation is not allowed.
3. The maximum particle size shall not exceed 3 inches.
4. The stone particles shall be angular and not rounded.
5. The backfill should have a Los Angeles Abrasion Test loss no greater then 40%. Other backfill materials which provide equivalent long term structural properties in the environmental conditions expected (saturation, freeze-thaw, etc.) may be used. Such materials shall be approved only after thorough investigation and testing by a soils engineer.

5.2 BACKFILL LIMITS

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

5.3 BACKFILL PLACEMENT

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

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

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

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

6.0 SLOPE RATIO AND STORM WATER RUN-OFF

Protected slopes shall not be greater than 1.5 (horizontal) to one (1) (vertical) in both cut and fill, and storm water shall not be drained over the slopes.

7.0 GRADING

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

8.0 COMPACTING

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

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

VI- SCOUR PROTECTION

1.0 All riprap placed in conjunction with this project shall be MD-SHA Class I armoring and shall possess the minimum gradation specified in each CBC Engineers report.

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

1.2 The total thickness of riprap shall be not less than specified in each CBC Engineers report.

1.3 All riprap shall be underlain by a layer of Mirafi 140 or equivalent filter fabric as shown on the construction drawings.

VI - CONCRETE

1.0 CODES AND STANDARDS

1.1 Reinforced concrete shall conform to the requirements of AASHTO Standard Specifications for Highway Bridges, Division II - Construction, Section 8, "Concrete Structures", for Class A concrete, having a minimum compressive strength of 3,500 psi.

2.0 STANDARDS FOR MATERIALS

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

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

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

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

3.0 PROPORTIONING OF CONCRETE

3.1 COMPOSITION

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

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

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

3.1.4 An air-entraining admixture, conforming to the requirements of ASTM C260, shall be used in all concrete furnished under this contract. The quantity of admixture shall be such as to produce an air content in the freshly mixed concrete of 6 percent plus or minus 1 percent as determined in accordance with ASTM C231 or C173.

3.2 Qualities Required - As indicated in the table below:

TABLE VI-1
QUALITIES REQUIRED

ITEM	QUALITY REQUIRED
Class	A
Type of Cement	I or II
Compressive Strength f'c @ 28 days	3,500 psi
Slump, inches	2 - 4 in.

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

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

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

4.0 MIXING AND PLACING

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

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

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

5.0 FORM WORK

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

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

6.0 CURING

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

7.0 REINFORCING STEEL

7.1 MATERIAL

7.1.1 All reinforcing bars shall be deformed bars (ASTM-A615) Grade 60.

7.2 BENDING AND SPLICING

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

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

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

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

7.3 PLACING AND FASTENING

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

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

VII - FILTER FABRIC (GEOTEXTILE SCREEN)

1.0 Geotextile (filter fabric) shall be placed over the #57 drainage stone at all weepholes. The filter fabric shall be placed between weepholes, #57 drainage stone and the granular backfill material. Filter fabric shall be placed at all locations shown on the construction drawings.

2.0 Filter fabric cloth shall conform to Contech specification for C60-NW or equivalent and shall meet the following ASTM tests:

2.1 ASTM D4751 - Apparent opening size equal to #70 U.S. Standard Sieve Size.

2.2 ASTM D4632 (Grab Tensile Test) - Minimum Strength = 160 pounds.

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

2.4 ASTM D4533 (Trapezoidal Tear) - Minimum Strength = 60 pounds.

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

3.0 The minimum fabric coefficient of permeability (ASTM D4491) shall be 0.24 cm/sec.

4.0 The fabric shall be non-woven with a minimum thickness (ASTM D5199) of 60 mils.

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

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

SEE CONTRACT DRAWINGS AND REPORTS BY CBC ENGINEERS & ASSOCIATES 937-428-6150

MGWC 3.9: STEP POOLS

A technique for grade control and the improvement of aquatic habitat.

DESCRIPTION

The work should consist of constructing step-pool sequences in steep headwater stream channels for grade control and the creation of aquatic habitat through flow diversification. Step-pool channels are characterized by a succession of channel-spanning steps formed by large grouped boulders called clasts that separate pools containing finer bed sediments. As supercritical flow tumbles over the step, energy is dissipated in roller eddies and becomes subcritical in the associated downstream plunge pool.

EFFECTIVE USES & LIMITATIONS

Step-pool morphologies are typically associated with well confined, high-gradient channels with slopes greater than 3%, having small width-depth ratios and bed material dominated by cobbles and boulders. Step pools generally function as grade control structures and aquatic habitat features by reducing channel gradients and promoting flow diversity. At slopes greater than roughly 6.5%, similar morphologic units termed cascades spanning only a portion of the channel width are formed in these channel conditions. Step pools and cascades are generally found in the following Rosgen stream types: A1-A3 and B1-B3.

MATERIAL SPECIFICATIONS

Natural steps in step-pool morphologies can be formed by large clasts, bedrock outcrops, and large woody debris aligned across the channel. Engineered steps can be made from boulders, logs, and large woody debris chosen according to the desired height of the step. Additionally, boulders should be sized to resist the design storm event using MGWC 2.1: Riprap as a guide.

INSTALLATION GUIDELINES

All erosion and sediment control devices, including dewatering basins, should be implemented as the first order of business according to a plan approved by the WMA or local authority. The proposed construction sequence for step pools is as follows (refer to Detail 3.9):

1. The stream should be redirected by an approved temporary stream diversion (See *Section 1: Temporary Instream Construction Measures, Maryland's Guidelines to Waterway Construction*), the construction area should be dewatered, and any disturbed banks should be stabilized.
2. Step-pool units should be designed and constructed to have a characteristic step height, H, and step length, L, as shown in Detail 3.9, and all steps should be firmly anchored into the stream bank.
3. Step rocks shall be placed on footer rocks so that they rest on two halves of each footer rock below, and so that the step rock is offset in the upstream direction. Footer rocks should extend below the scour hole elevation.
4. As a general guideline, the ratio of the mean steepness, defined as the averaged value of step height over step length, to the channel slope, S, should lie in the range of 1 to 2 (1< {(H/L)AVE/S}< 2). Typical spacings for step pools and cascades are provided in Detail 3.9(b) relating to alluvial channel morphologies.
5. Whenever practical, a reference reach with similar flow rates, bed and bank material characteristics, type and density of riparian vegetation, and channel gradient should be surveyed at low flows to determine appropriate values of H and L. At high discharges, step-pool characteristics may be obscured.

CHANNEL STABILIZATION AND REHABILITATION TECHNIQUES — *MARYLAND DEPARTMENT OF THE ENVIRONMENT WATERWAY CONSTRUCTION GUIDELINES REVISED NOVEMBER 2000*

PAGE 3.9 - 1

MGWC 3.9: STEP POOLS

6. Once construction is completed, the diversion should be removed from upstream to downstream. Sediment control devices, including perimeter erosion controls, are to remain in place until all disturbed areas are stabilized in accordance with an approved sediment and erosion control plan and the inspection authority approves their removal.

CHANNEL STABILIZATION AND REHABILITATION TECHNIQUES — *MARYLAND DEPARTMENT OF THE ENVIRONMENT WATERWAY CONSTRUCTION GUIDELINES REVISED NOVEMBER 2000*

PAGE 3.9 - 2

Maryland's Guidelines To Waterway Construction
DETAIL 3.9(a): STEP POOLS

Adapted From Abrahams et al. (1995)

DEFINITION SKETCH:
STEP POOL

Note: L is measured parallel to the bed slope (tan θ)
H is measured perpendicular to the horizontal

CHANNEL STABILIZATION AND REHABILITATION TECHNIQUES | REVISED NOVEMBER 2000 PAGE 3.9 - 3 | MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

Maryland's Guidelines To Waterway Construction
DETAIL 3.9(b): STEP POOLS

Adapted From Montgomery and Buffington (1997)

PROFILE VIEW:
CASCADE & STEP POOL MORPHOLOGIES

Approximate channel slope: >0.065	Typical pool spacing: <1 channel width	Average step height (Abrahams et al., 1995) $1 \leq \{(H/L)_{AVE}/S\} \leq 2$

Approximate channel slope: 0.030-0.065	Typical pool spacing: 1-4 channel widths	Average step height (Abrahams et al., 1995) $1 \leq \{(H/L)_{AVE}/S\} \leq 2$

CHANNEL STABILIZATION AND REHABILITATION TECHNIQUES | REVISED NOVEMBER 2000 PAGE 3.9 - 4 | MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

Maryland's Guidelines To Waterway Construction
DETAIL 3.9(c): STEP POOLS

Section & Plan Views Adapted From Rosgen (1996)

PLAN VIEW: STEP POOL

CHANNEL STABILIZATION AND REHABILITATION TECHNIQUES | REVISED NOVEMBER 2000 PAGE 3.9 - 5 | MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

APPROVED: DEPARTMENT OF PUBLIC WORKS
[signature] 5-15-06
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
[signature] 5/25/06
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
[signature] 5/23/06 MK
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

NO.	DATE	REVISION
1	5/06	CONVERT HEADWALLS TO CONCRETE AND TO ADD MGWC NOTES AND DETAILS

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

[seal: State of Maryland Professional Engineer] [signature] 5/3/06

DEVELOPER: ELIOAK, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: HOMEWOOD, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL, c/o JOHN LEE CARROLL, 515 MADISON AVENUE, 32nd FLOOR, NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21, PARCELS: 86; TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

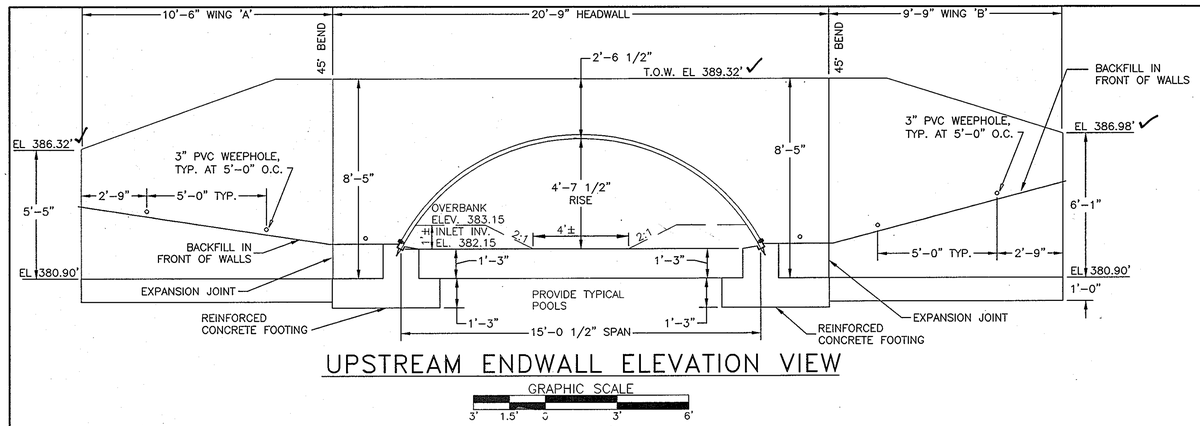
TITLE: REVISED ROAD CONSTRUCTION PLAN SPECIFICATIONS AND POOL DETAILS

DATE: MAY 2006	PROJECT NO. 1132
SCALE: AS SHOWN	SHEET 54 OF 55

DES: LDD | DRAFT: LDD | CHECK: DAM

F-04-82

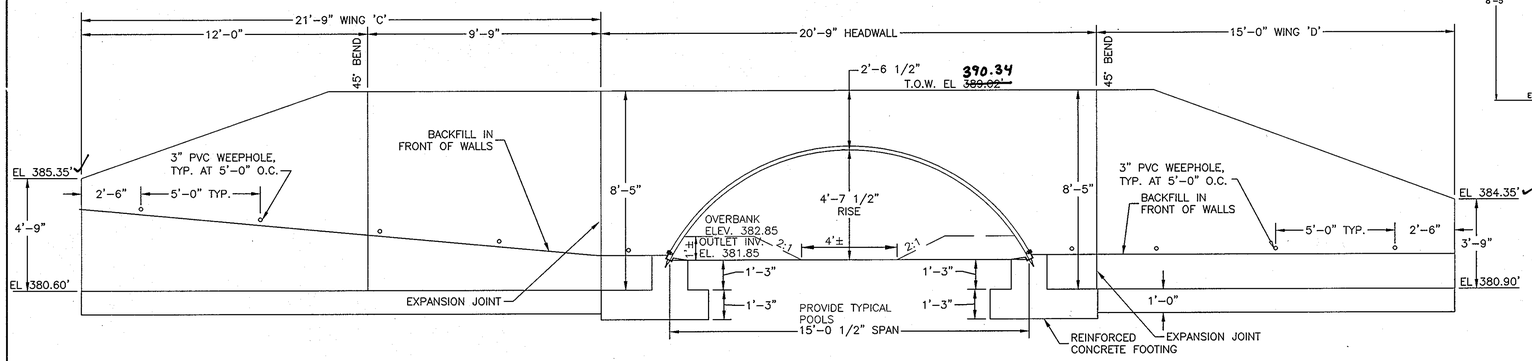
P:\1132 Homewood\dwg\7025 REDLINE.dwg, SPECIFICATIONS, 5/3/2006 9:10:34 AM, jmc, Oce TDS600 HDI for mylar.pc3



UPSTREAM ENDWALL ELEVATION VIEW

GRAPHIC SCALE

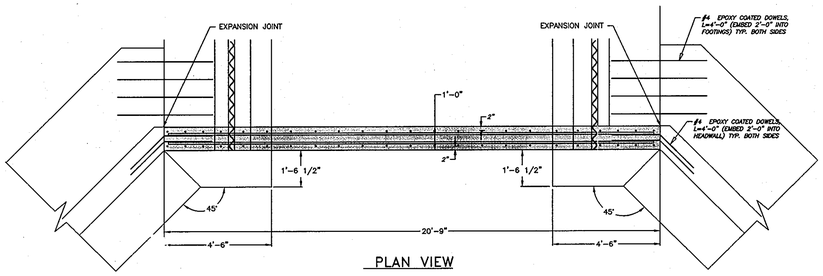
3' 1.5' 0 3' 6'



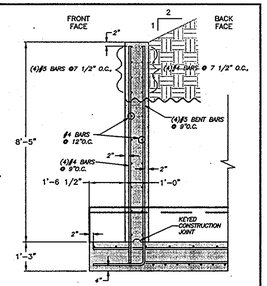
DOWNSTREAM ENDWALL ELEVATION VIEW

GRAPHIC SCALE

3' 1.5' 0 3' 6'



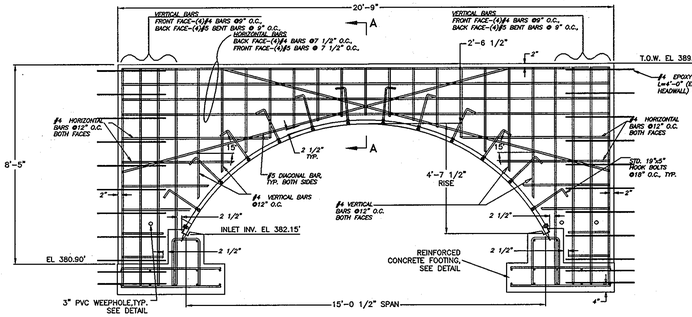
PLAN VIEW



SIDE VIEW

GRAPHIC SCALE

3' 1.5' 0 3' 6'

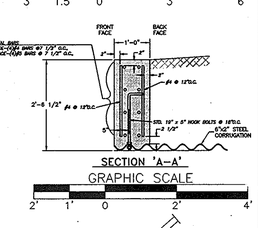


ELEVATION VIEW

UPSTREAM HEADWALL DESIGN

GRAPHIC SCALE

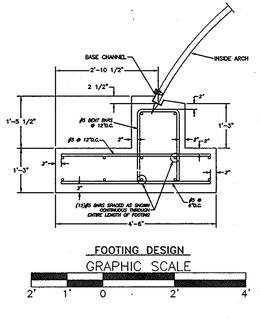
3' 1.5' 0 3' 6'



SECTION 'A-A'

GRAPHIC SCALE

2' 1' 0 2' 4'

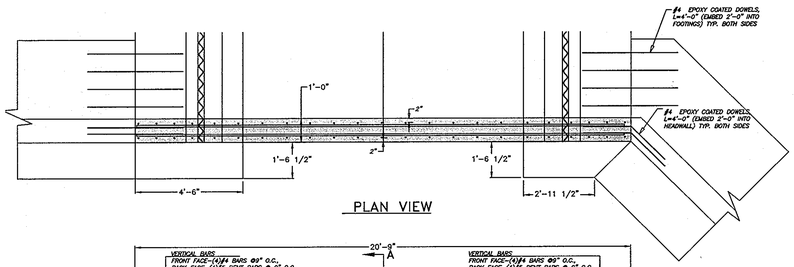


FOOTING DESIGN

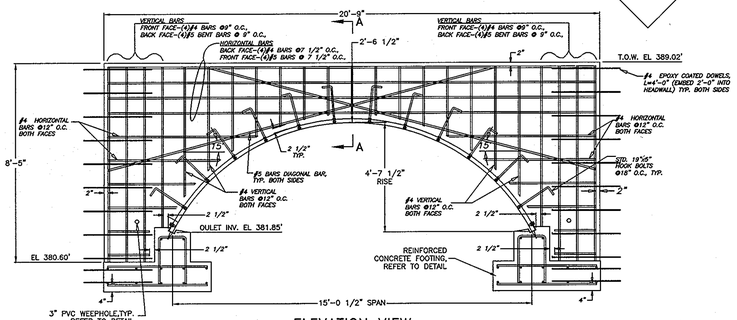
GRAPHIC SCALE

2' 1' 0 2' 4'

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 5992-4-0905-05.



PLAN VIEW

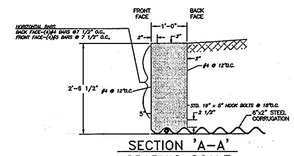


ELEVATION VIEW

DOWNSTREAM HEADWALL DESIGN

GRAPHIC SCALE

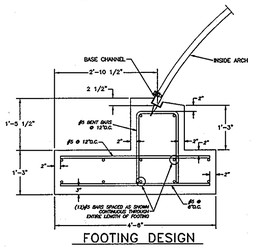
3' 1.5' 0 3' 6'



SECTION 'A-A'

GRAPHIC SCALE

2' 1' 0 2' 4'



FOOTING DESIGN

GRAPHIC SCALE

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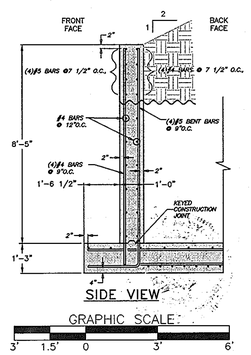

SIDE VIEW

GRAPHIC SCALE

3' 1.5' 0 3' 6'

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 5-18-06

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 5/25/06

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 5/23/06 MK

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Donald Moon 6/3/06

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
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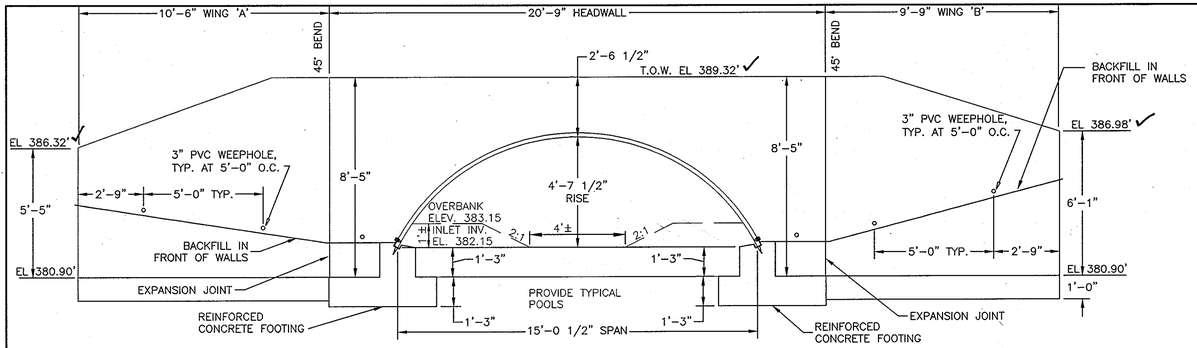
PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21, PARCELS: 86 — TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	REVISED ROAD CONSTRUCTION PLAN ARCHDRAIN DETAILS HW-7 TO HW-8
DATE:	MAY, 2006 — PROJECT NO. 1132
SCALE:	AS SHOWN — SHEET 52 OF 55

DES: LDD | DRAFT: LDD | CHECK: DAM

F-04-82

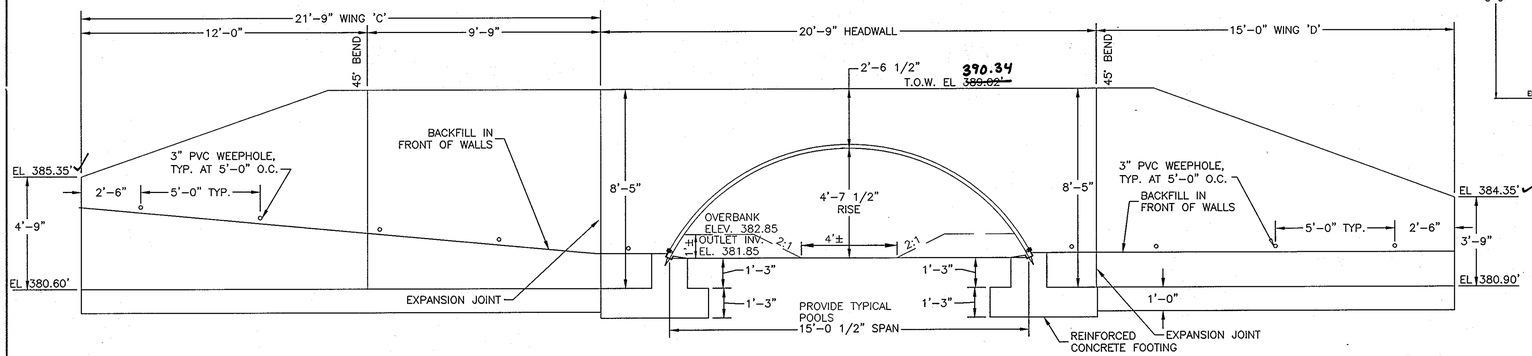
P:\1132 Homewood\dwg\7025 REDLINE.dwg, Sheet 49_8, 5/3/2006 9:09:44 AM, jmc, Oce TDS600 HDI for mylar.pc3



UPSTREAM ENDWALL ELEVATION VIEW

GRAPHIC SCALE

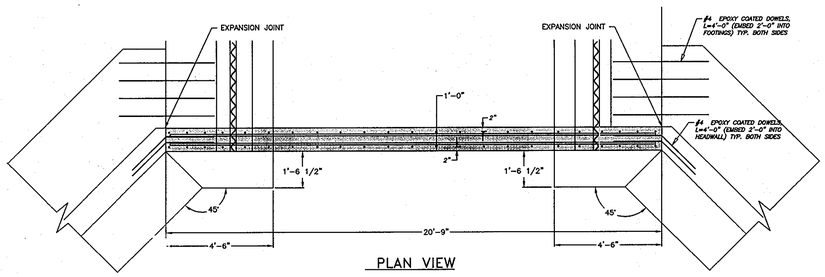
3' 1.5' 0 3' 6'



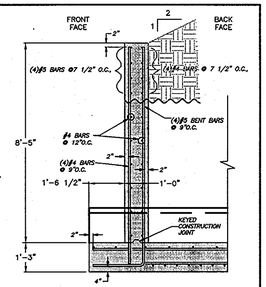
DOWNSTREAM ENDWALL ELEVATION VIEW

GRAPHIC SCALE

3' 1.5' 0 3' 6'



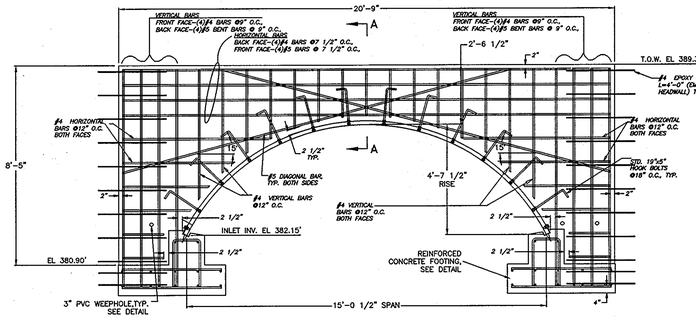
PLAN VIEW



SIDE VIEW

GRAPHIC SCALE

3' 1.5' 0 3' 6'

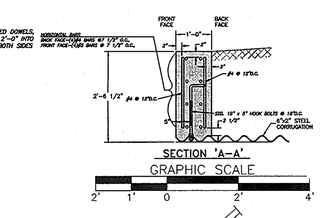


ELEVATION VIEW

UPSTREAM HEADWALL DESIGN

GRAPHIC SCALE

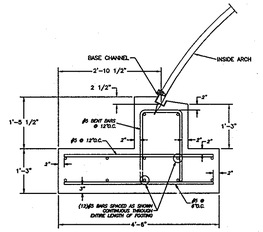
3' 1.5' 0 3' 6'



SECTION 'A-A'

GRAPHIC SCALE

2' 1' 0 2' 4'

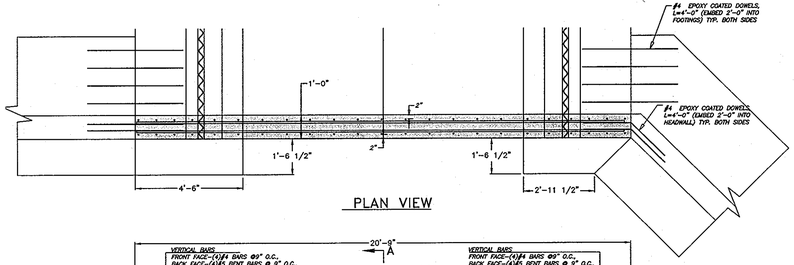


FOOTING DESIGN

GRAPHIC SCALE

2' 1' 0 2' 4'

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 5992-4-0905-05.



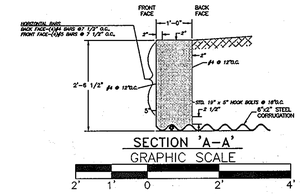
ELEVATION VIEW

DOWNSTREAM HEADWALL DESIGN

GRAPHIC SCALE

3' 1.5' 0 3' 6'

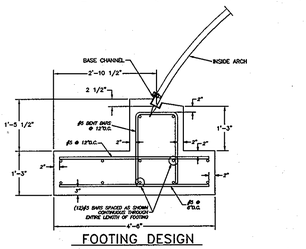
PLAN VIEW



SECTION 'A-A'

GRAPHIC SCALE

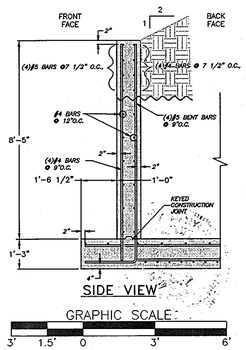
2' 1' 0 2' 4'



FOOTING DESIGN

GRAPHIC SCALE

2' 1' 0 2' 4'



SIDE VIEW

GRAPHIC SCALE

3' 1.5' 0 3' 6'

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 5-15-06

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 5/25/06

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 5/26/06 MK

NO.	DATE	REVISION
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DES: LDD	DRAFT: LDD — CHECK: DAM

PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 PARCELS: 88 — TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
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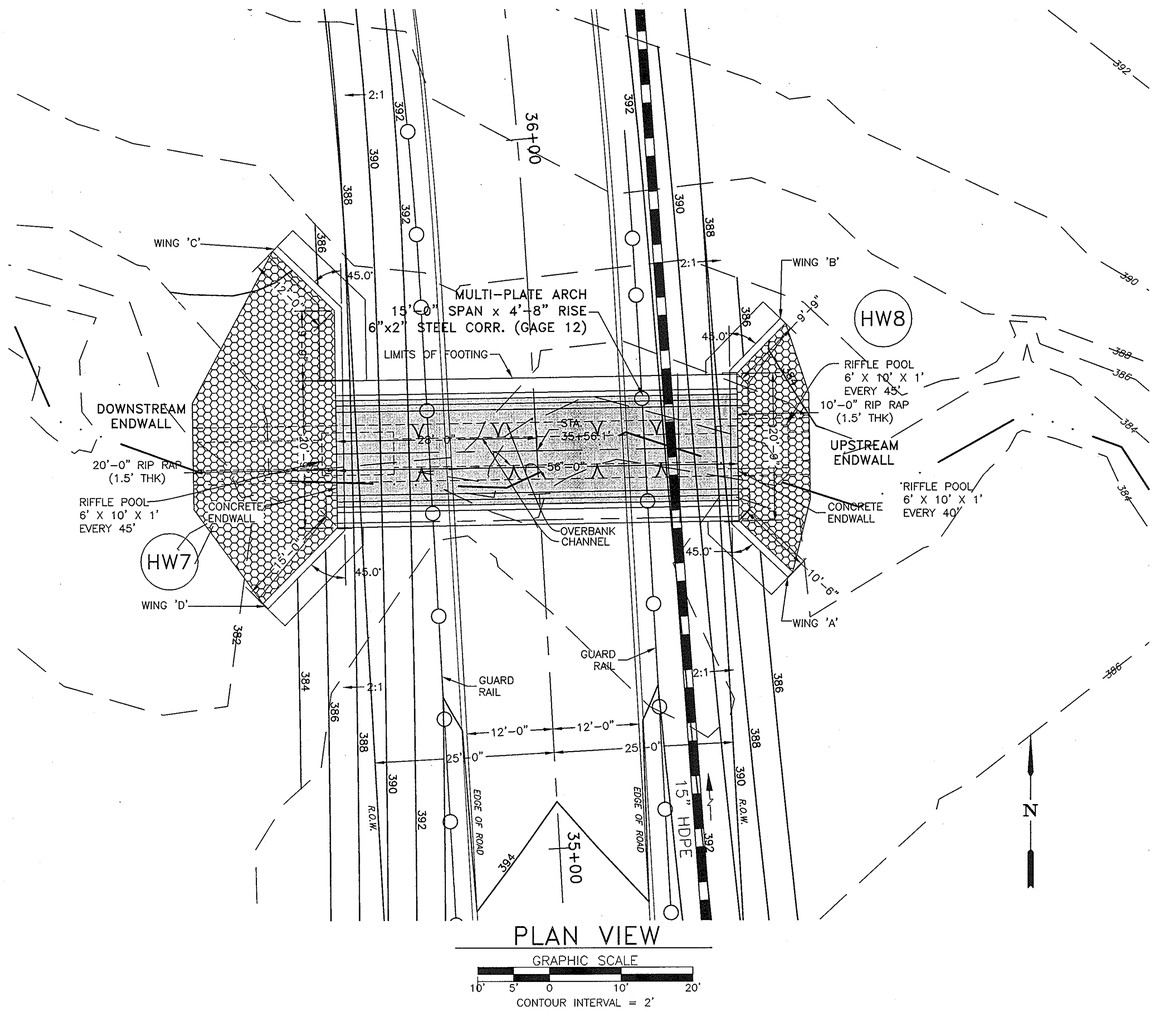
DATE:	MAY, 2006 — PROJECT NO. 1132
SCALE:	AS SHOWN — SHEET 52 OF 55

F-04-82

P:\1132 Homewood\dwg\7025 REDLINE.dwg, Sheet 49_8, 5/3/2006 9:09:44 AM, jmc, Oce TDS600 HDI for mylar.pc3

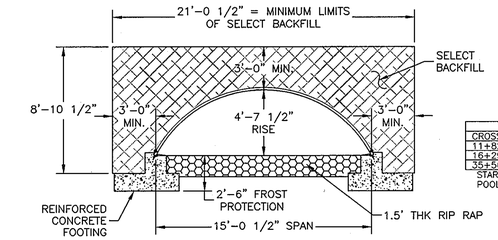


PLAN VIEW

GRAPHIC SCALE

10' 5' 0 10' 20'

CONTOUR INTERVAL = 2'



TYPICAL BACKFILL SECTION

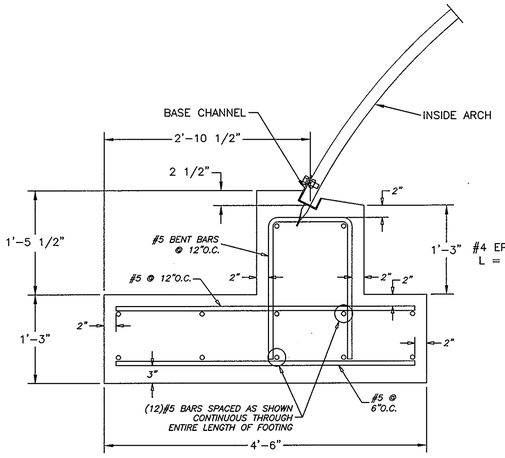
GRAPHIC SCALE

5' 2.5' 0 5' 10'

NOTES:
1. USE SALVAGED MATERIALS FROM THE EXISTING STREAM AS THE INVERT MATERIAL OF THE CHANNEL TO THE EXTENT POSSIBLE.
2. SMALL SALVAGED MATERIAL SHALL BE PLACED IN THE RIP-RAP WATER IS INTENDED TO FLOW ON THE SURFACE OF THE RIP-RAP CLOG WITH NATIVE MATERIALS OR WITH SIMILARLY SIZED NEW MATERIALS.

CROSSING STATION	BANKFULL WIDTH	POOL DESIGN POOL SPACING	POOL RADIUS	POOL DIMENSIONS	CHANNEL DIMENSIONS
11+82 (RIFFLE)	8' (SECTION 103)	40'	24'	W=6', L=10', D=1', S=0.0025	4' AT 0.8%
16+29 (STEP)	8' (SECTION 14)	16'	NA	W=4', L=20', H=1.2', S=0.0305	4' AT 3.05%
35+56 (RIFFLE)	9' (SECTION 214 US)	45'	27'	W=6', L=10', D=1', S=0.0025	4' AT 0.5%

START POOLS AT UPPER END OF CULVERT AND CONTINUE POOL SPACING TO END OF DOWNSTREAM RIPRAP, MINIMUM OF TWO POOLS.

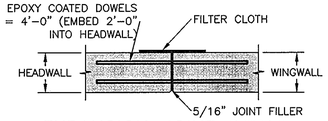


FOOTING DESIGN

GRAPHIC SCALE

1' 0.5' 0 1' 2'

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 5992-4-0905-05.

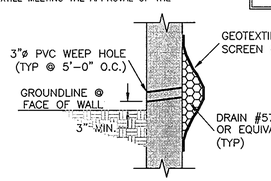


EXPANSION JOINT DETAIL

NOT TO SCALE

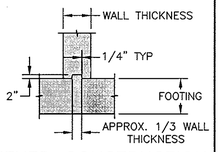
NOTES FOR EXPANSION JOINT:
A FILTER CLOTH THREE FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE APPLIED TO ALL TRANSVERSE JOINTS IN THE FOOTING AND WALLS. THE MATERIAL SHALL BE CENTERED ON THE JOINT AND THE EDGES SEALED WITH A MASTIC OR WITH TWO SIDED TAPE. THE FILTER CLOTH SHALL BE A GEOTEXTILE MEETING THE APPROVAL OF THE ENGINEER.

NOTES:
1.) CONCRETE SHALL BE f'c = 3,500 psi.
2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60
3.) FOOTING IS DESIGNED FOR A 2,000 psf ALLOWABLE BEARING CAPACITY



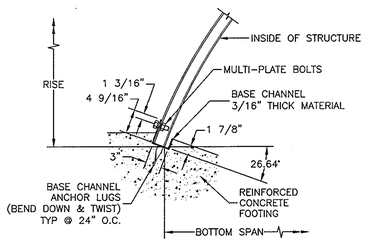
WEEP HOLE DETAIL

NOT TO SCALE



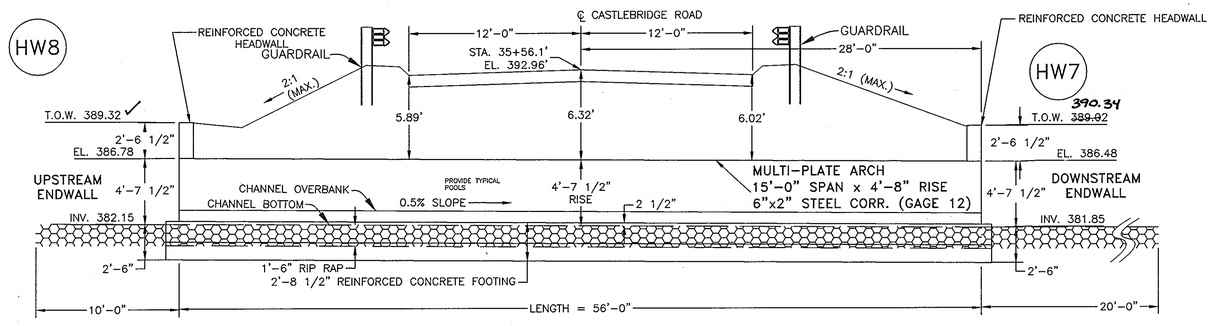
KEYED CONSTRUCTION JOINT DETAIL

NOT TO SCALE



BASE CHANNEL DETAIL

NOT TO SCALE



PROFILE ALONG ℄ OF STRUCTURE

GRAPHIC SCALE

5' 2.5' 0 5' 10'

NO.	DATE	REVISION
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ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL
c/o JOHN LEE CARROLL
515 MADISON AVENUE
32nd FLOOR
NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD - PHASE 1
LOTS 1 - 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21, PARCELS: 86 — TAX MAP: 29, GRID: 4,9&10, PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: REVISED ROAD CONSTRUCTION PLAN
ARCHDRAIN DETAILS HW-7 TO HW-8

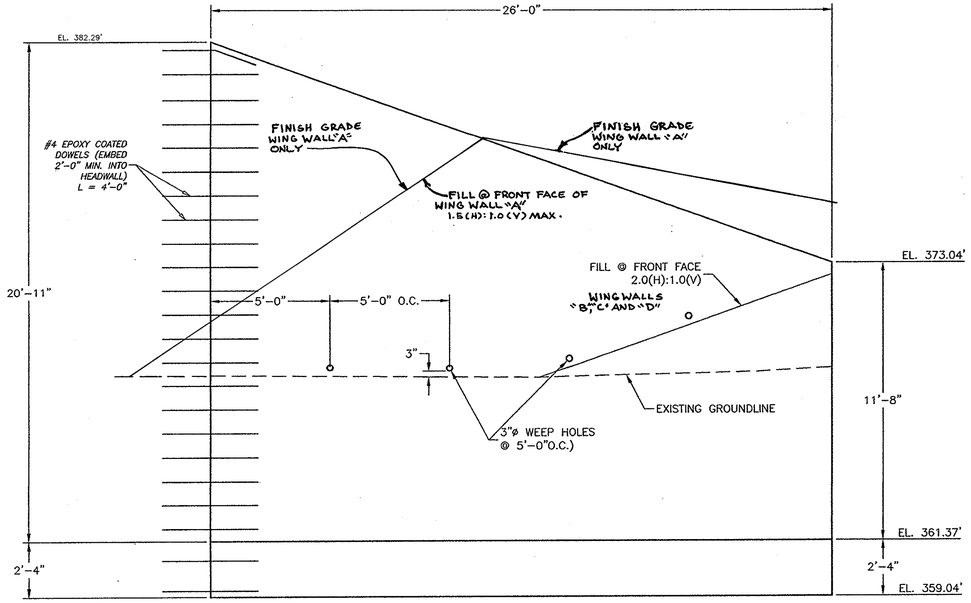
DES: LDD	DRAFT: LDD	CHECK: DAM

DATE: MAY, 2006 — PROJECT NO. 1132

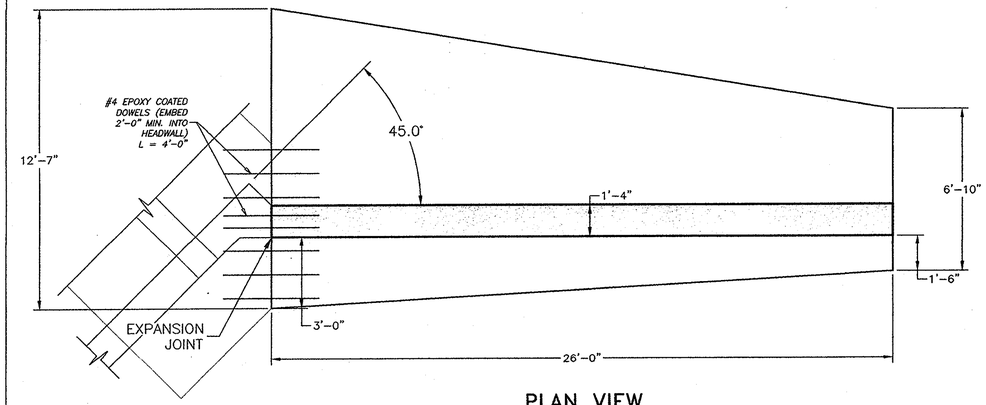
SCALE: AS SHOWN — SHEET 51 OF 55

F-04-82

P:\1132 Homewood\dwg\2025 REDLINE.dwg, Sheet 48_7, 5/3/2006 9:09:25 AM, jmc, Oce TDS600 HDI for mylar.pc3



ELEVATION VIEW

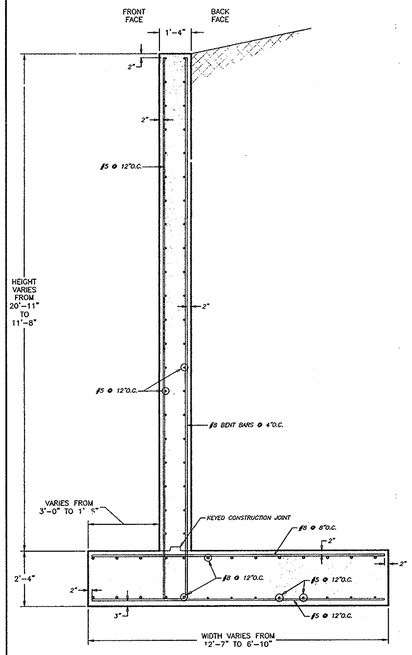


PLAN VIEW

NOTE:
WINGWALLS 'B' & 'D' ARE DEPICTED IN THIS DETAIL.
WINGWALLS 'A' & 'C' ARE SYMMETRICAL TO THIS DESIGN.

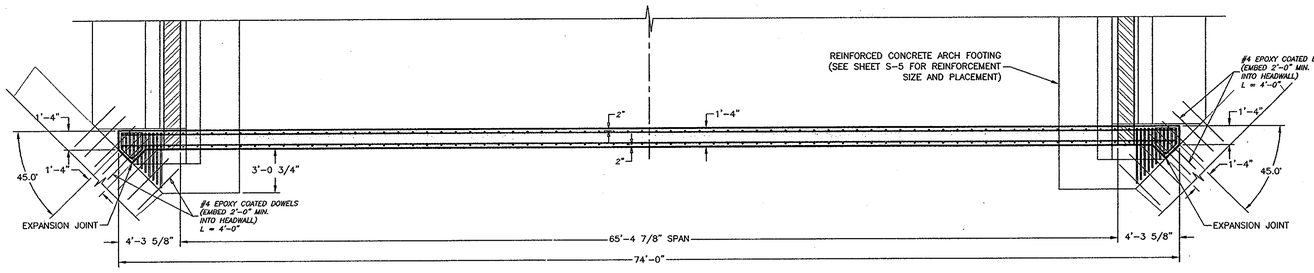
WINGWALLS DESIGN

SCALE: 1" = 3'

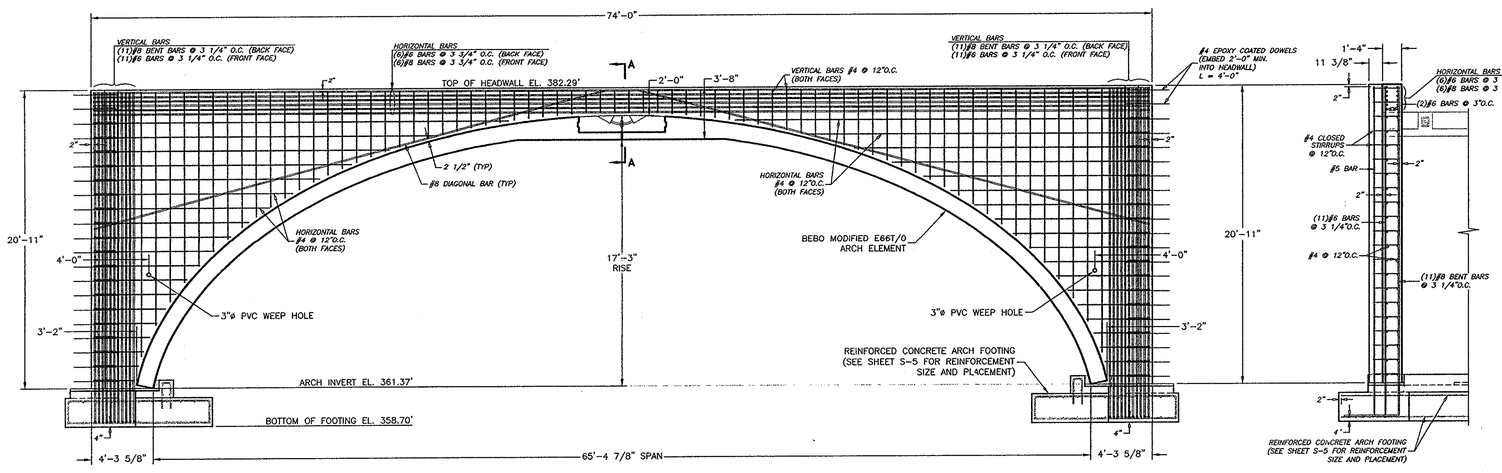


SECTION 'A-A'

GRAPHIC SCALE
3' 1.5' 0 3' 6'



PLAN VIEW



ELEVATION VIEW

HEADWALL DESIGN

GRAPHIC SCALE
5' 2.5' 0 5' 10'

SIDE VIEW

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 6601-4-1006-05.

NOTES:
1.) CONCRETE SHALL BE f'c=4,000 PSI
2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60.
3.) ARCH FOOTING KEY AND LEVELING PADS TYPE S GROUT=5,000 PSI, 1/4" AGGREGATE MAXIMUM.
4.) FOOTING IS DESIGNED FOR A 4,000 psf ALLOWABLE BEARING PRESSURE.

NO.	DATE	REVISION
3	2-20-08	REVISE GRADING AT WINGWALL 'A' HEADWALL #2
2	10-30-06	REVISE ARCH TYPE
1	5/06	CONVERT HEADWALLS TO CONCRETE

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 2-5-07

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 2/2/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 2/6/07

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bel-civilengineering.com

Donald Moon 1-4-07

DEVELOPER: ELIOAK, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: HOMEWOOD, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL
515 MADISON AVENUE
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NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD - PHASE 1
LOTS 1 - 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

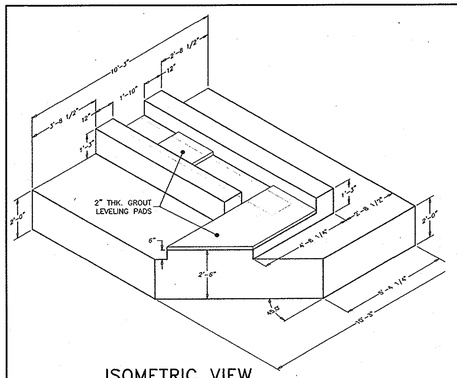
LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 88 TAX MAP: 29, GRID 3,4,9&10 PARCELS: 20 & 66
3RD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: Revised Final Road Construction Plan
REVISED ROAD CONSTRUCTION PLAN
ARCHDRAIN DETAILS HW-1 TO HW-2

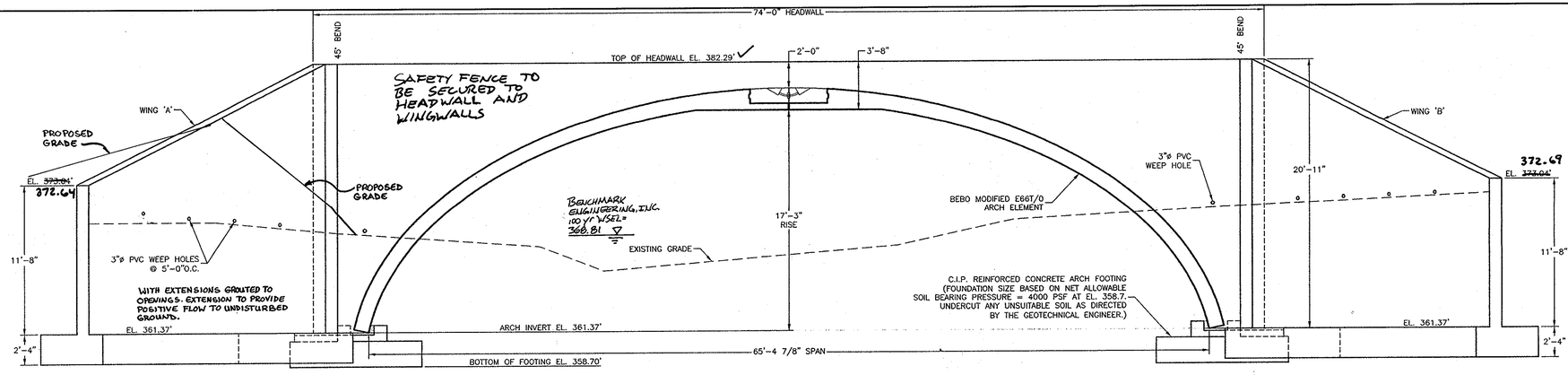
DATE: MAY, 2006 PROJECT NO. 1132
DES: LDD DRAFT: LDD CHECK: DAM
SCALE: AS SHOWN SHEET 50 OF 55

F-04-82

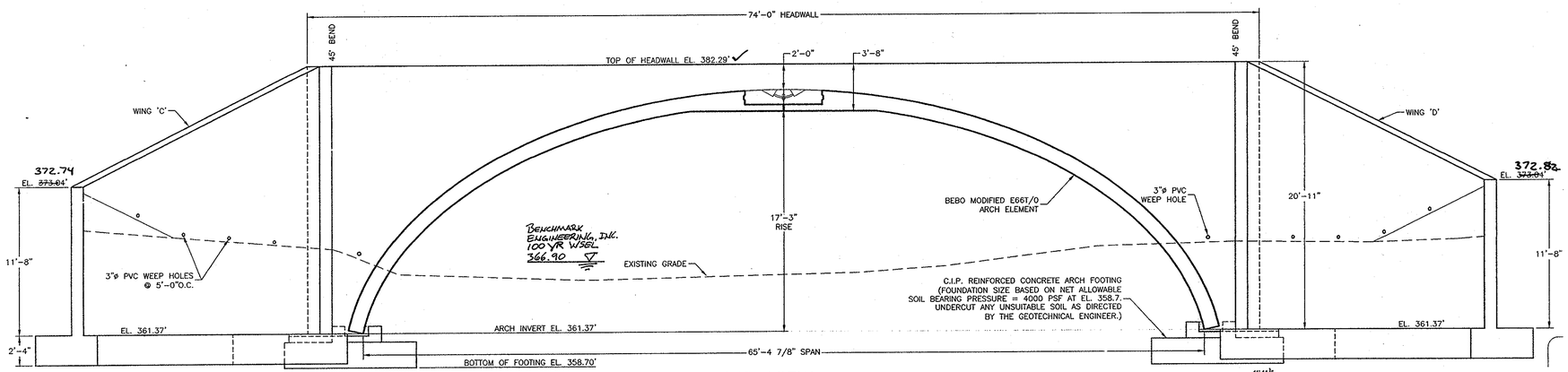
P:\1132 Homewoo.rdwg\7025 REDLINE CROSSING 1_recover.dwg, Sheet 47_6A, 1/4/2007 12:04:57 PM, imc, Oce TDS600 :ID1 for mylar.pc3



ISOMETRIC VIEW
END OF FOOTING
NOT TO SCALE



1 UPSTREAM END VIEW
SCALE: 1" = 5'



2 DOWNSTREAM END VIEW
SCALE: 1" = 5'

NOTES:

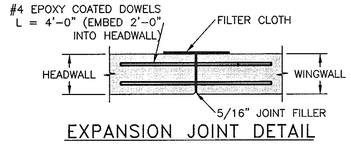
1.) CONCRETE SHALL BE f'c=4,000 PSI

2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60.

3.) ARCH FOOTING KEY AND LEVELING PADS TYPE S GROUT=5,000 PSI, 1/4" AGGREGATE MAXIMUM.

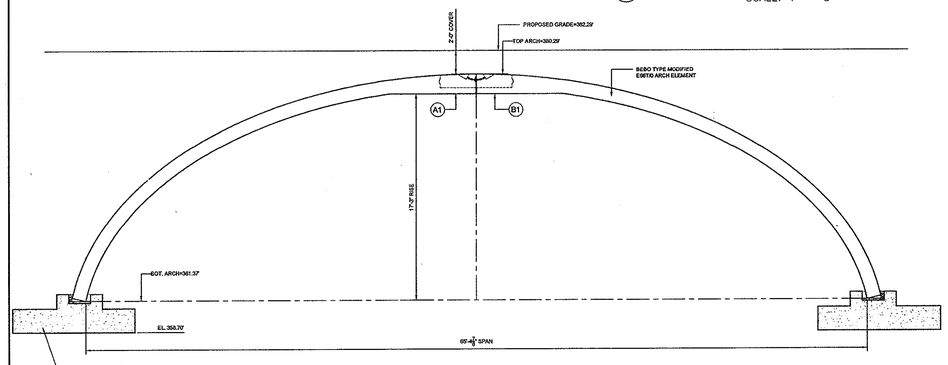
4.) FOOTING IS DESIGNED FOR A 4,000 psf ALLOWABLE BEARING PRESSURE.

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 6601-4-1006-05.

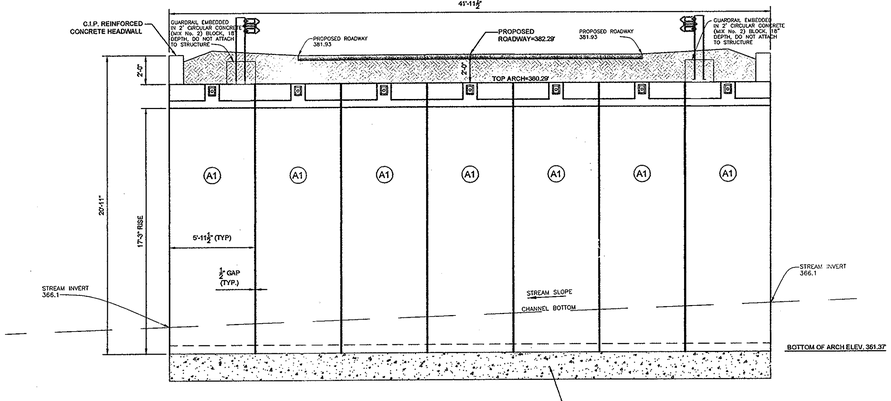


EXPANSION JOINT DETAIL
NOT TO SCALE

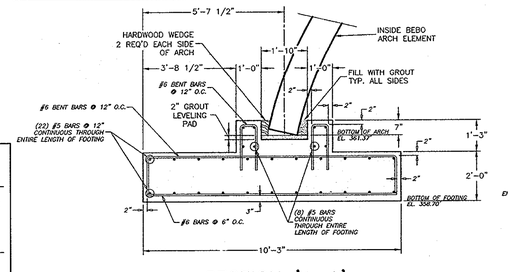
NOTES FOR EXPANSION JOINT:
A FILTER CLOTH THREE FOOT IN WIDTH AND DOUBLE THICKNESS SHALL BE APPLIED TO ALL TRANSVERSE JOINTS IN THE FOOTING AND WALLS. THE MATERIAL SHALL BE CENTERED ON THE JOINT AND THE EDGES SEALED WITH A MASTIC OR WITH TWO SIDED TAPE. THE FILTER CLOTH SHALL BE A GEOTEXTILE MEETING THE APPROVAL OF THE ENGINEER.



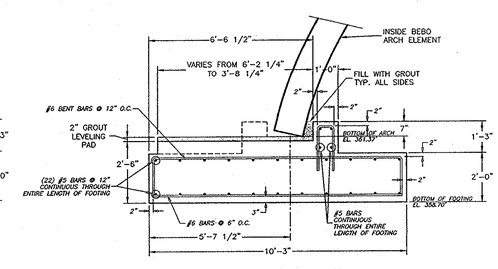
1 TYPICAL SECTION
SCALE: 1"= 6'



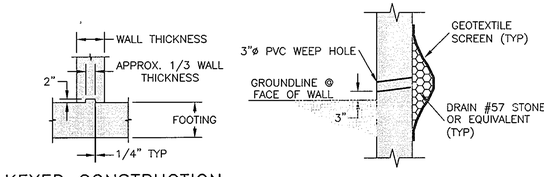
2 SECTION THRU CENTER
SCALE: 1"= 5'



SECTION 'A-A'



SECTION 'B-B'



KEYED CONSTRUCTION JOINT DETAIL
NOT TO SCALE

WEEP HOLE DETAIL
NOT TO SCALE

NO.	DATE	REVISION
3	2-20-08	REVISE GRADING AT HEADWALL #2
2	10-30-06	REVISE ARCH TYPE
1	5/06	CONVERT HEADWALLS TO CONCRETE

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 2-5-07

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 2/2/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 2/6/07

BENCHMARK
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8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

STATE OF MARYLAND — DONALD ALAN MASON — No. 21449 — PROFESSIONAL ENGINEER
Donald Mason
1-4-07

STATE OF MARYLAND — DONALD ALAN MASON — No. 21449 — PROFESSIONAL ENGINEER
Donald Mason
AS-BUILT 1-7-09

DEVELOPER: ELIOAK, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: HOMEWOOD, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL
c/o JOHN LEE CARROLL
515 MADISON AVENUE
32nd FLOOR
NEW YORK, NEW YORK 10022

DES: LDD | DRAFT: LDD | CHECK: DAM

PROJECT: RIVERWOOD - PHASE 1
LOTS 1 - 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

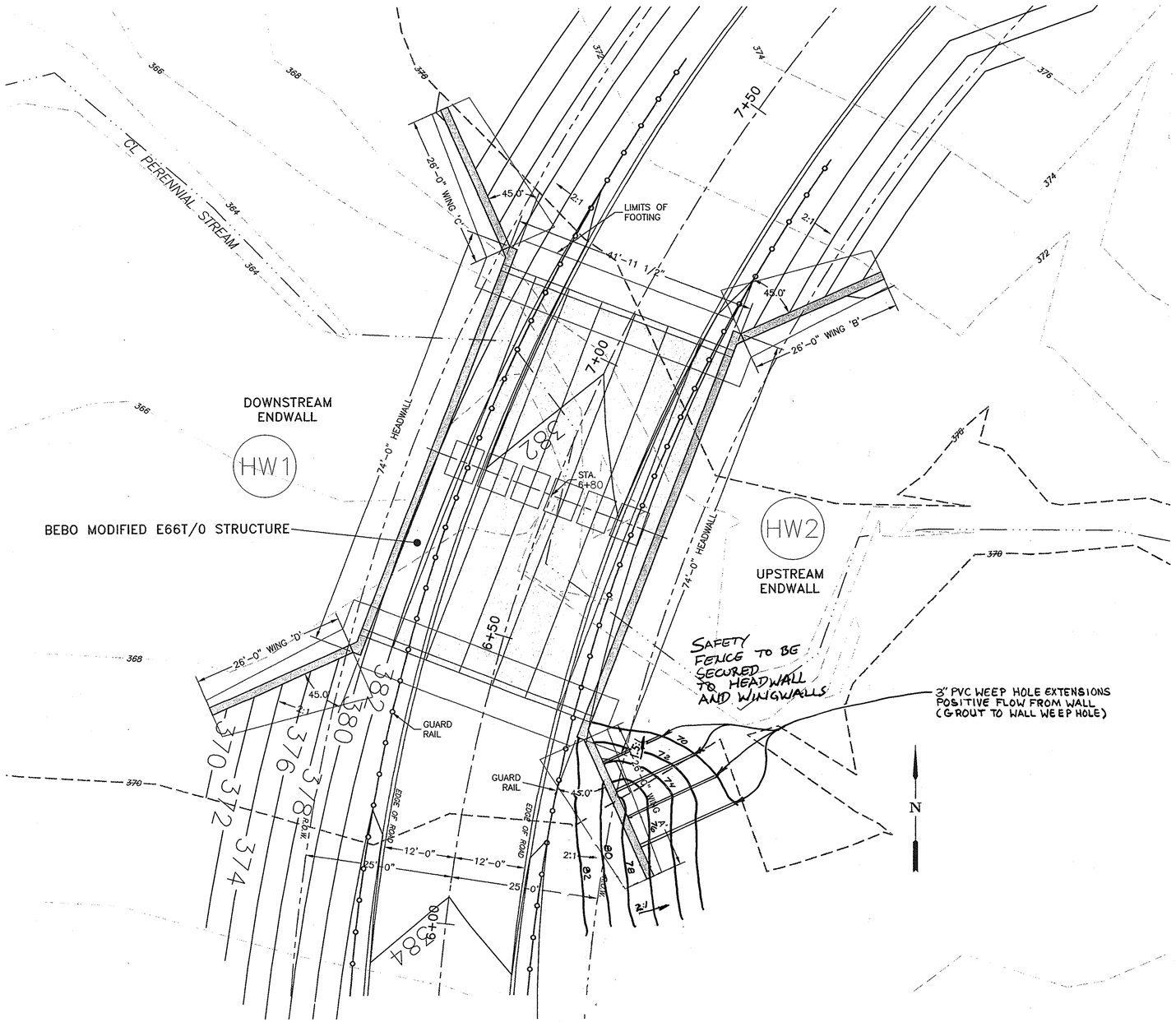
LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 28, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: ~~Revised~~ Final Road Construction Plan
REVISED ROAD CONSTRUCTION PLAN
ARCHDRAIN DETAILS HW-1 TO HW-2

DATE: MAY, 2006 | PROJECT NO. 1132
SCALE: AS SHOWN | SHEET 49 OF 55

F-04-82

P:\1132 Homewood\dwg\7025 REDLINE CROSSING 1_recover.dwg, Sheet 47_6, 1/4/2007 12:05:08 PM, imc, Oce TDS600 HDI for mylar.pc3



PLAN VIEW

GRAPHIC SCALE

10' 5' 0 10' 20'

CONTOUR INTERVAL = 2'

APPROVED: DEPARTMENT OF PURLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 2-5-07

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 2/7/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 2/6/07

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 6601-4-1006-05.

GENERAL NOTES

1. FOLLOW APPLICABLE PROVISIONS OF THE BEBO INSTALLATION INSTRUCTIONS AND WRITTEN SPECIFICATIONS.

2. IF CONDITIONS ARE DIFFERENT THAN THOSE STATED IN THESE DRAWINGS AND SPECIFICATIONS, THE CONTRACTOR MUST CONTACT THE ENGINEER PRIOR TO PROCEEDING WITH THE CONSTRUCTION OF THE BEBO ARCH.

3. THE SITE SOILS ENGINEER SHALL VERIFY THAT ALL FOUNDATION AND BACKFILL SOILS ARE COMPETENT PER THE DESIGN STANDARDS AND PARAMETERS GIVEN, IN PARTICULAR THAT:
- ALLOWABLE BEARING PRESSURES GIVEN ARE SUCH THAT THE NECESSARY SAFETY FACTORS AGAINST EXCEEDING THE BEARING CAPACITY ARE PRESERVED
- SETTLEMENTS ARE LIMITED TO THOSE AMOUNTS THAT ARE WITHIN THE BEBO STRUCTURAL TOLERANCES AND WITHIN THE VALUES NECESSARY TO SAFEGUARD THE VARIOUS FUNCTIONS OF THE BRIDGE
- OTHER NEGATIVE EFFECTS (LIQUEFACTION, ETC.) CAN BE EXCLUDED.

4. THE SITE SOILS ENGINEER SHALL VERIFY THAT SCOUR DEPTHS AND VELOCITIES MEET THE REQUIREMENTS OF THE FEDERAL HIGHWAY ADMINISTRATION, HEC 18, "EVALUATING SCOUR OF BRIDGES" OR ANY OTHER LOCAL STANDARD DESIGN CODES.

5. OVER EXCAVATE FOUNDATIONS TO REMOVE UNSUITABLE SOILS ONLY AS DIRECTED BY THE SITE SOILS ENGINEER.

6. BACKFILL MATERIAL MUST MEET THE REQUIREMENTS OF THE BEBO SYSTEM SPECIFICATIONS FOR BACKFILL.

7. COMPACTION OF BACKFILL SHALL NOT BE LESS THAN 95% STANDARD PROCTOR DENSITY, PER AASHTO-T-99.

8. COMPACTION TESTS SHALL BE TAKEN DURING THE BACKFILL STAGE. THE SITE SOILS ENGINEER SHALL DETERMINE THE MINIMUM NUMBER OF TESTS AND LOCATION.

BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS AND WATERS OF THE STATE

1) NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILES OR STORED IN NONTIDAL WETLANDS, THE NONTIDAL WETLAND BUFFER, OR WATERS OF THE STATE.
2) PLACE MATERIALS IN A LOCATION AND MANNER THAT DOES NOT ADVERSLY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUR OF NONTIDAL WETLANDS OR WATERS OF THE STATE.
3) DO NOT USE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITAIONSL BACKFILL IS REQUIRED, USE CLEAN MATERIAL FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.
4) PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE TEH EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, THE NONTIDAL WETLAND BUFFER, AND WATERS OF THE STATE.
5) REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMENANT LOSS OF NONTIDAL WETLANDS OR PERMANENT MODIFICATION OF WATERS OF THE STATE IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.
6) RECTIFY ANY NONTIDAL WETLANDS, NONTIDAL WETLANDS BUFFER, OR WATERS OF THE STATE TEMPORARILY IMPACTED BY ANY CONSTRUCTIO9IN RELATED ACTIVITIES.
7) SEED MIX USED FOR STABILIZATION IN NONTIDAL WETLANDS AND THE NONTIDAL WETLAND BUFFER SHALL CONSIST OF ONE OR MORE OF THE FOLLOWING SPECIES: ANNUAL RYEGRASS (Lolium multiflorum), MILLET (Setaria italica), BARLEY (Hordeum sp.), OATS (Uniola sp.), AND/OR RYE (Secale cereale). THESE SPECIES WILL ALLOW FOR STABILIZATION OF THE SITE WHILE ALSO ALLOWING OF THE VOLUNARY REVEGETATION OF NATIVE WETLAND SPECIES. OTHER NONPERSISENT VEGETAION MAY BE ACCEPTABLE BUT MUST BE APPROVED BY THE NONTIDAL WETLANDS AND WATERWAYS DIVISION. KENTUCKY 31 FESCUE SHALL NOT BE USED IN NONTIDAL WETLAND OR NONTIDAL WETLAND BUFFER AREAS. THE AREA SHOULD BE SEEDED AND MULCHED TO REDUCE EROSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.
8) AFTER INSTALLATION OF UNDERGROUND UTILITY LINES IN NONTIDAL WETLANDS AND WATERS OF THE STATE HAS BEEN COMPLETED, GRADES AND ELEVATIONS SHALL BE RETURNED TO PRE-CONSTRUCTION CONDITIONS.
9) TO PROTECT AQUADIC SPECIES, IN STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF STREAM:
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 DISCHARGE OF POLLUTANTS INTO NONTIDAL WETLANDS AND WATERWAYS.
11) CULVERTS AND ASSOCIATED RIPRAP EROSION PROTECTION SHALL BE CONSTRUCTED SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.

DESIGN ASSUMPTIONS

1. ALLOWABLE BEARING PRESSURE FOR FOOTINGS IS 4000 psf. THE ENGINEER OF RECORD AND THE CONTRACTOR SHALL VERIFY THAT THE SOILS MEET THIS ALLOWABLE BEARING CAPACITY. WRITTEN VERIFICATION OF THE ALLOWABLE BEARING CAPACITY SHALL BE SUBMITTED TO BEBOTech CORPORATION PRIOR TO COMMENCING WITH CONSTRUCTION.

2. PROCEEDING WITH THE CONSTRUCTION WITHOUT FIRST PROVIDING BEBOTech CORPORATION A WRITTEN REPORT VERIFYING CONDITIONS DISCUSSED IN NOTE 1 ABOVE SHALL ABSOLVE BEBOTech CORPORATION FROM ALL LIABILITY FOR THE DESIGN AND CONSTRUCTION OF THE FOUNDATIONS AND CONTRACTOR SHALL HOLD HARMLESS AND INDEMNIFY BEBOTech CORPORATION FROM ALL RESULTING CLAIMS, DAMAGES, LOSSES AND EXPENSES.

3. LIVE LOADS ARE BASED ON AASHTO HS-25, MODIFIED (125%) ALTERNATE MILITARY LOADING, P-82.

4. MINIMUM DEPTH OF COVER IS 1'-6" (INCLUDING PAVEMENT). MAXIMUM DEPTH OF COVER IS 3'-0"].

5. THE MINIMUM CONCRETE STRENGTH OF 4000 psi FOR ALL BEBO FOOTINGS SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO INSTALLATION OF THE ARCH ELEMENTS.

NO.	DATE	REVISION
3	2-20-08	REVISE GRADING AT HEADWALL #2
2	10-30-06	REVISE CULVERT TO BEBO E66 T/O
1	5/06	CONVERT HEADWALLS TO CONCRETE

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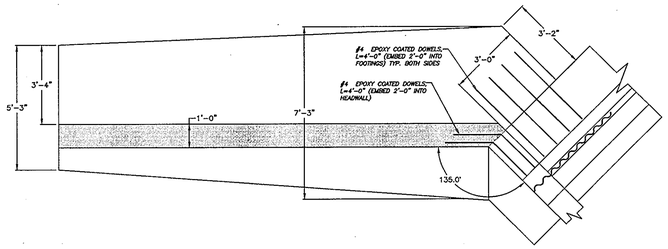
STATE OF MARYLAND — DONALD M. HOOD — No. 21515 — REGISTERED PROFESSIONAL ENGINEER — 1-4-07

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 5 5 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
DES: LDD	DRAFT: LDD CHECK: DAM

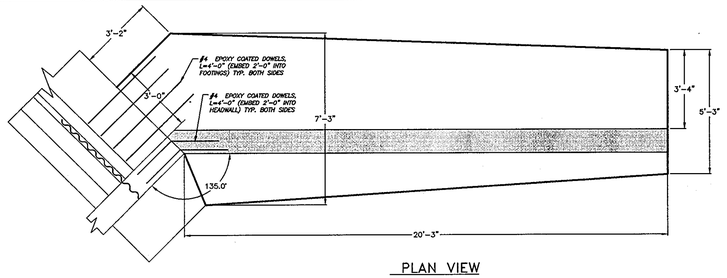
PROJECT:	RIVERWOOD - PHASE 1 LOTS 1 - 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION	TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	Revised Road Construction Plan REVISED ROAD CONSTRUCTION PLAN ARCHDRAIN DETAILS HW-1 TO HW-2
DATE:	MAY, 2006
PROJECT NO.	1132
SCALE:	AS SHOWN
SHEET	48 OF 55

F-04-82

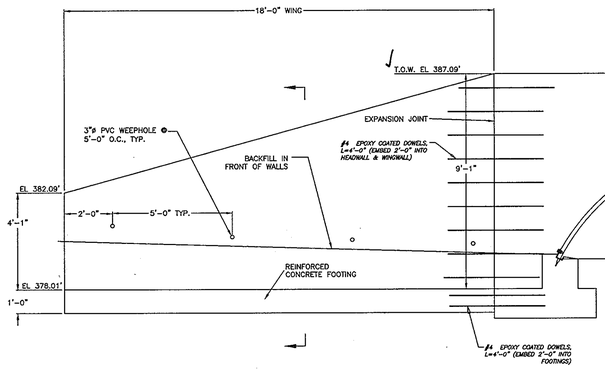
P:\1132 Homewood\dwg\7025 REDLINE CROSSING 1_recover.dwg, Sheet 46_5, 1/4/2007 9:09:02 AM, mo, Oce TDS600 HDI for mylar.pc3



PLAN VIEW



PLAN VIEW

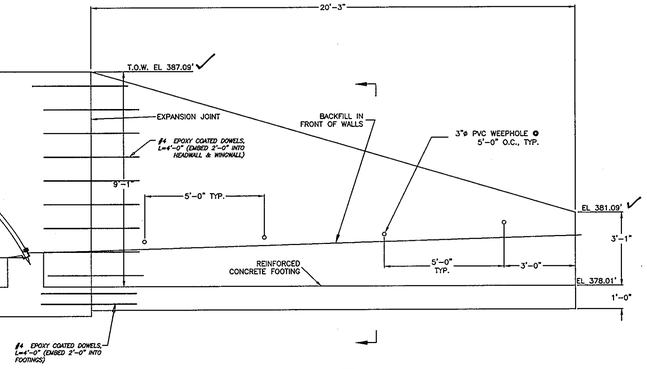


ELEVATION VIEW

DOWNSTREAM WINGWALL 'A' DESIGN

GRAPHIC SCALE

3' 1.5' 0 3' 6'

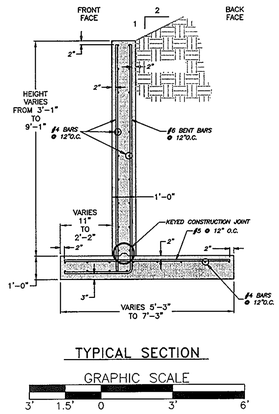


ELEVATION VIEW

DOWNSTREAM WINGWALL 'B' DESIGN

GRAPHIC SCALE

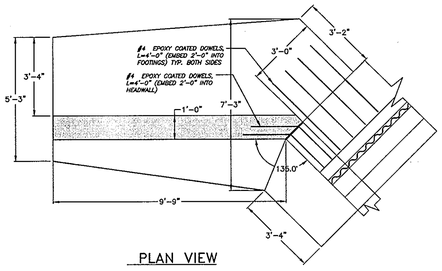
3' 1.5' 0 3' 6'



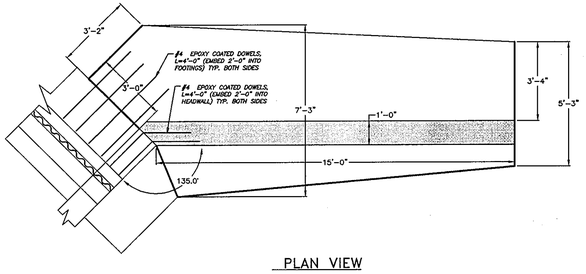
TYPICAL SECTION

GRAPHIC SCALE

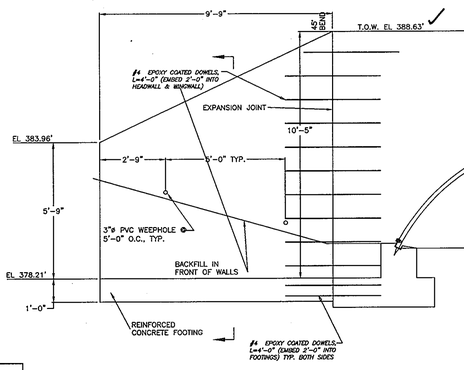
3' 1.5' 0 3' 6'



PLAN VIEW



PLAN VIEW

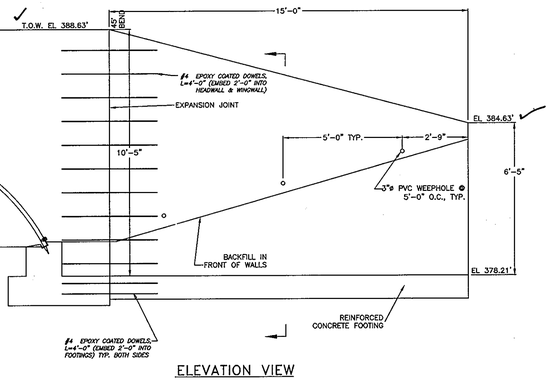


ELEVATION VIEW

UPSTREAM WINGWALL 'C' DESIGN

GRAPHIC SCALE

3' 1.5' 0 3' 6'

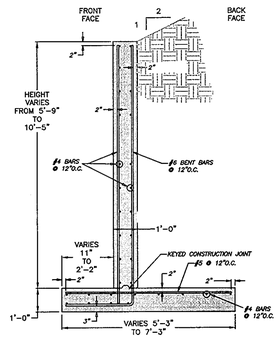


ELEVATION VIEW

UPSTREAM WINGWALL 'D' DESIGN

GRAPHIC SCALE

3' 1.5' 0 3' 6'



TYPICAL SECTION

GRAPHIC SCALE

3' 1.5' 0 3' 6'

STATE OF MARYLAND DONALD ALAN MASON No. 21143 PROFESSIONAL ENGINEER

AS-BUILTS 1-7-09

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 5992-2-0905-05.

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 5-15-06

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 5/25/06

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 5/23/06

NO.	DATE	REVISION
1	5/06	CONVERT HEADWALLS TO CONCRETE

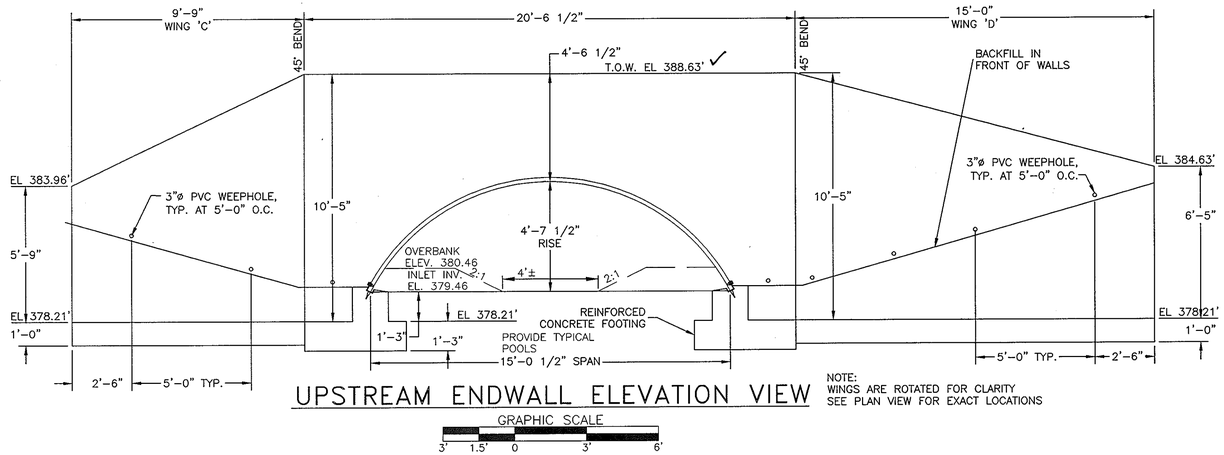
BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SU/E 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

Donald Mason 5/3/06

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
PROJECT:	RIVERWOOD - PHASE 1 LOTS 1 - 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	REVISED ROAD CONSTRUCTION PLAN ARCHDRAIN DETAILS HW-3 TO HW-4
DATE:	MAY, 2006 — PROJECT NO. 1132
SCALE:	AS SHOWN — SHEET 47 OF 55
DES: LDD	DRAFT: LDD — CHECK: DAM

F-04-82

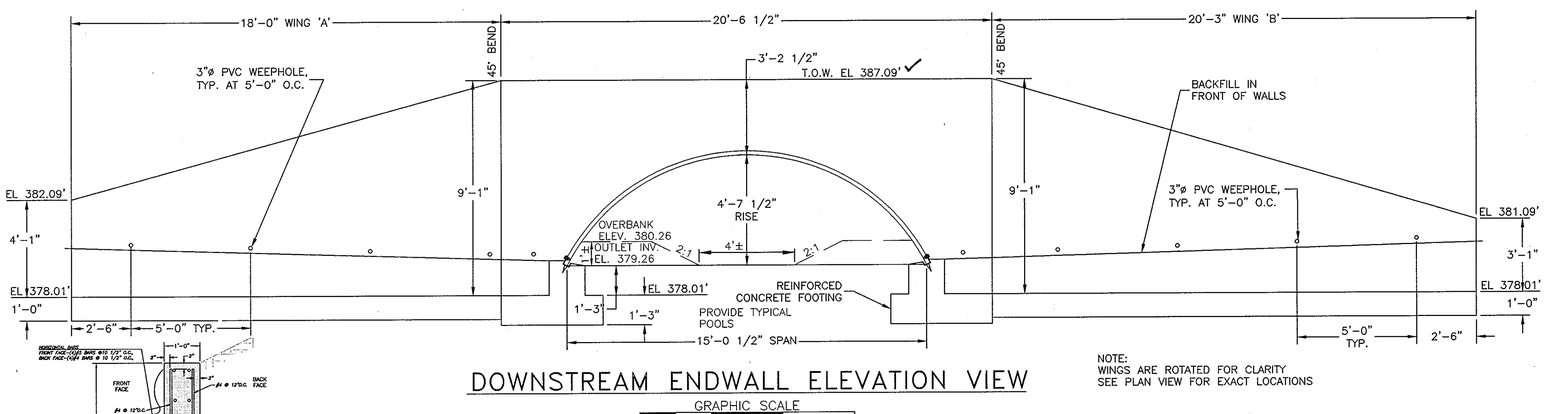
P:\1132 Homewood\dwg\7025 REDLINE.dwg, Sheet 45_4A, 5/3/2006 1:45:21 PM, jmc, Oce TDS600 HDI for mylar.pc3



UPSTREAM ENDWALL ELEVATION VIEW

NOTE:
WINGS ARE ROTATED FOR CLARITY
SEE PLAN VIEW FOR EXACT LOCATIONS

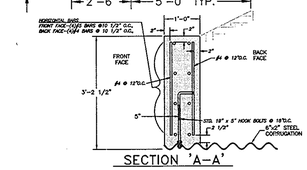
GRAPHIC SCALE
3' 1.5' 0 3' 6'



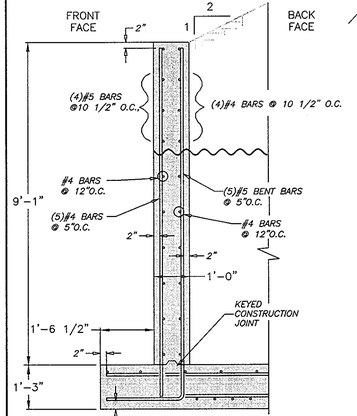
DOWNSTREAM ENDWALL ELEVATION VIEW

NOTE:
WINGS ARE ROTATED FOR CLARITY
SEE PLAN VIEW FOR EXACT LOCATIONS

GRAPHIC SCALE
3' 1.5' 0 3' 6'



SECTION 'A-A'



SIDE VIEW

DOWNSTREAM HEADWALL

GRAPHIC SCALE
2' 1' 0 2' 4'

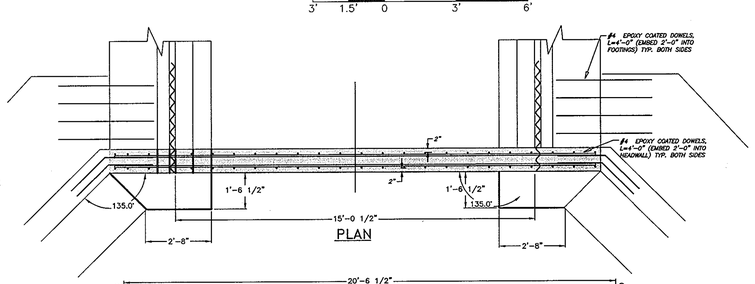
APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 5-15-06

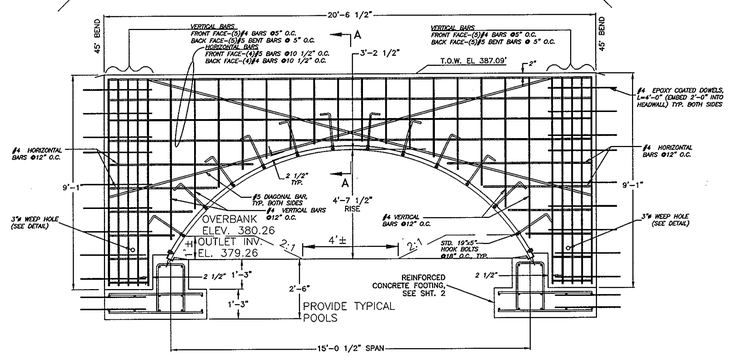
APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 5/25/06

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 5/26/06



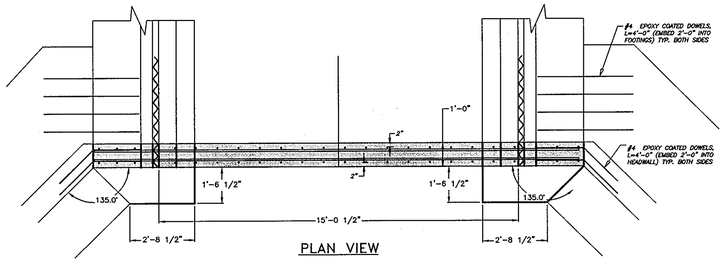
PLAN



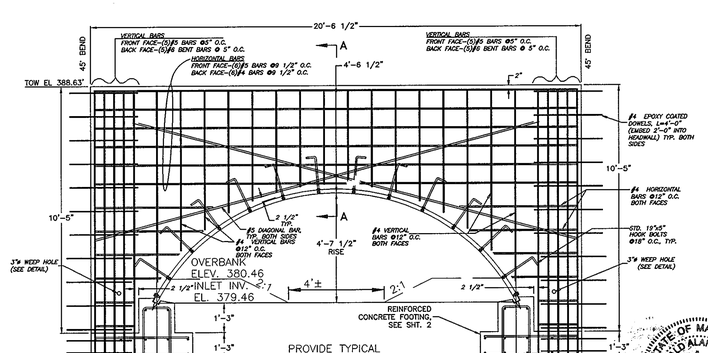
ELEVATION VIEW

DOWNSTREAM HEADWALL DESIGN

GRAPHIC SCALE
3' 1.5' 0 3' 6'



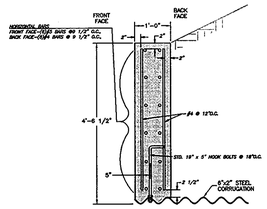
PLAN VIEW



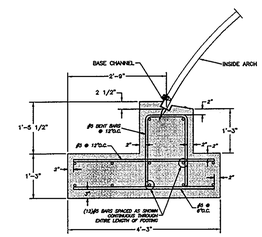
ELEVATION VIEW

UPSTREAM HEADWALL DESIGN

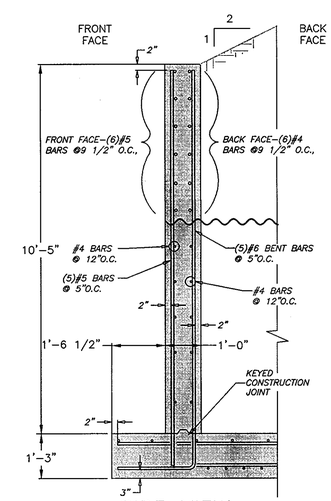
GRAPHIC SCALE
3' 1.5' 0 3' 6'



SECTION 'A-A'



FOOTING DESIGN



SIDE VIEW

UPSTREAM HEADWALL

GRAPHIC SCALE
2' 1' 0 2' 4'

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 5992-2-0905-05.

NO.	DATE	REVISION
1	5/06	CONVERT HEADWALLS TO CONCRETE

BENCHMARK
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ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

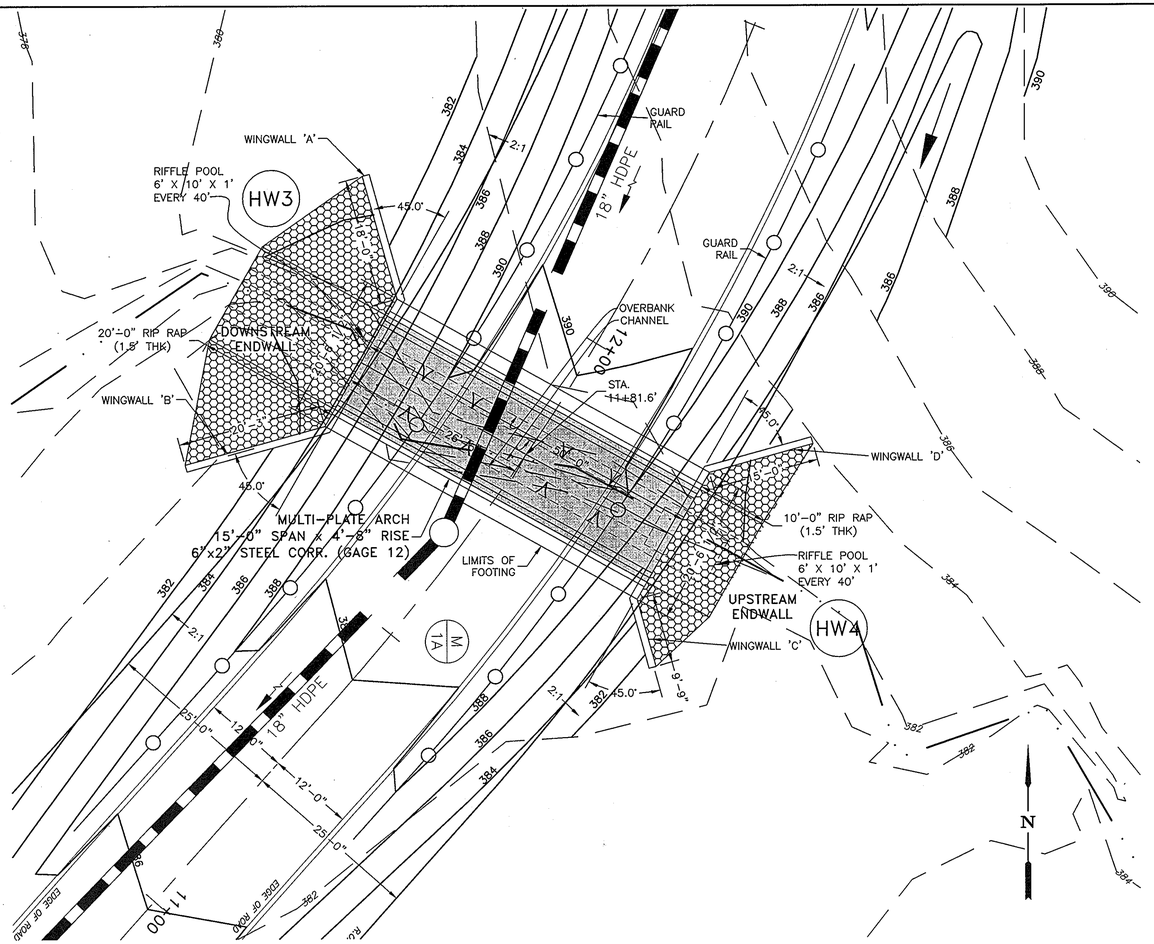
Donald Mason 5/3/06

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER
AS-BUILT 1-7-09

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 - 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 PARCELS: 86 — TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	REVISED ROAD CONSTRUCTION PLAN ARCHDRAIN DETAILS HW-3 TO HW-4
DATE:	MAY, 2006 — PROJECT NO. 1132
DES: LDD	DRAFT: LDD — CHECK: DAM — SCALE: AS SHOWN — SHEET 46 OF 55

F-04-82

P:\1132 Homewood\dwg\0025 REDLINE.dwg, Sheet 45_4, 5/3/2006 9:07:58 AM, jane, Oce TDS600 HDI for mylar.ss3

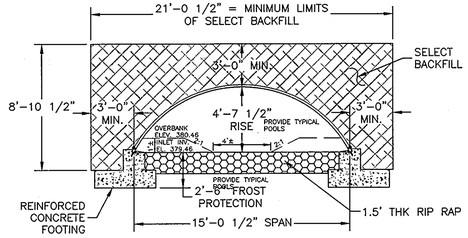


PLAN VIEW

GRAPHIC SCALE

10' 5' 0 10' 20'

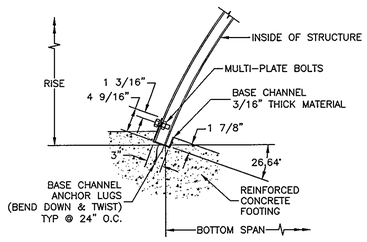
CONTOUR INTERVAL = 2'



TYPICAL BACKFILL SECTION

GRAPHIC SCALE

5' 2.5' 0 5' 10'

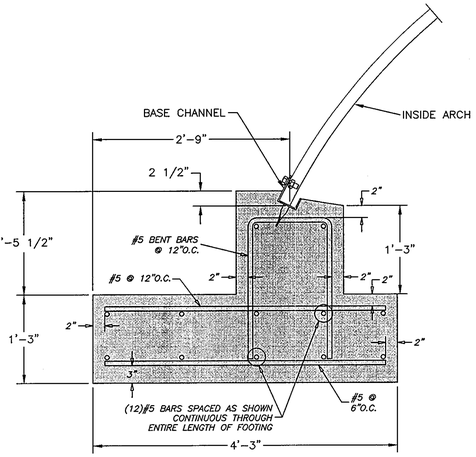


BASE CHANNEL DETAIL

NOT TO SCALE

NOTES:
1. USE SALVAGED MATERIALS FROM THE EXISTING STREAM AS THE INVERT MATERIAL OF THE CHANNEL TO THE EXTENT POSSIBLE.
2. SMALL SALVAGED MATERIAL SHALL BE PLACED IN THE RIP-RAP WATER IS INTENDED TO FLOW ON THE SURFACE OF THE RIP-RAP CLOG WITH NATIVE MATERIALS OR WITH SIMILIARLY SIZED NEW MATERIALS.

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 5992-2-0905-05.



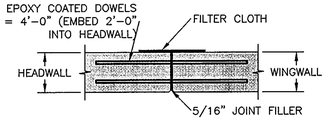
FOOTING DESIGN

GRAPHIC SCALE

1' 0.5' 0 1' 2'

POOL DESIGN					
CROSSING STATION	BANKFULL WIDTH	POOL SPACING	POOL RADIUS	POOL DIMENSIONS	CHANNEL DIMENSIONS
11+82 (RIFFLE)	8' (SECTION 103)	40'	24'	W=6', L=10', D=1', S=0.0025	4' AT 0.8%
16+29 (STEP)	8' (SECTION 14)	16'	NA	W=4', L=20', H=1.2', S=0.0305	4' AT 3.05%
35+56 (RIFFLE)	9' (SECTION 214 US)	45'	27'	W=6', L=10', D=1', S=0.0025	4' AT 0.5%

START POOLS AT UPPER END OF CULVERT AND CONTINUE POOL SPACING TO END OF DOWNSTREAM RIPRAP, MINIMUM OF TWO POOLS.

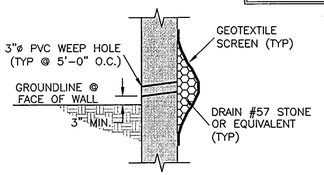


EXPANSION JOINT DETAIL

NOT TO SCALE

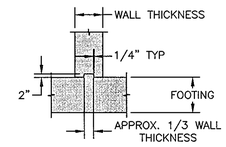
NOTES FOR EXPANSION JOINT:
A FILTER CLOTH THREE FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE APPLIED TO ALL TRANSVERSE JOINTS IN THE FOOTING AND WALLS. THE MATERIAL SHALL BE CENTERED ON THE JOINT AND THE EDGES SEALED WITH A MASTIC OR WITH TWO SIDED TAPE. THE FILTER CLOTH SHALL BE A GEOTEXTILE MEETING THE APPROVAL OF THE ENGINEER.

NOTES:
1.) CONCRETE SHALL BE f'c = 3,500 psi.
2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60
3.) FOOTING IS DESIGNED FOR A 2,000 psf ALLOWABLE BEARING CAPACITY



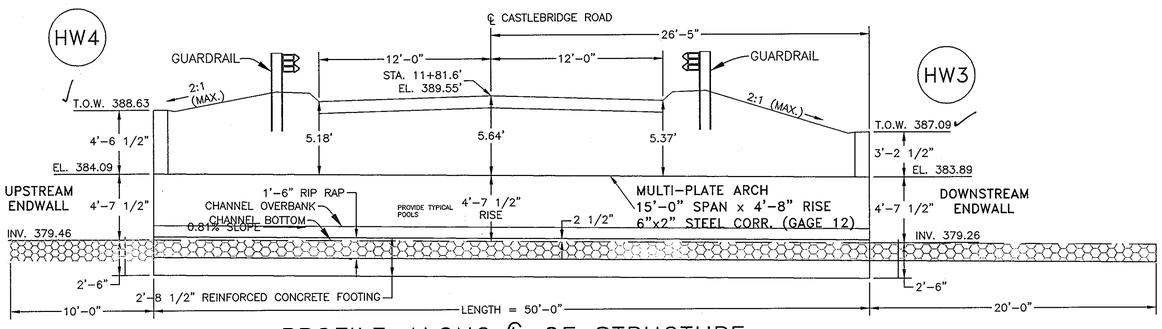
WEEP HOLE DETAIL

NOT TO SCALE



KEYED CONSTRUCTION JOINT DETAIL

NOT TO SCALE



PROFILE ALONG ℄ OF STRUCTURE

GRAPHIC SCALE

5' 2.5' 0 5' 10'

NO.	DATE	REVISION
1	5/06	CONVERT HEADWALLS TO CONCRETE

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CHIEF, BUREAU OF HIGHWAYS — DATE 5-15-06

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 5/26/06

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Donald Moan 5/3/06

STATE OF MARYLAND — DONALD ALAN MOAN — No. 21448 — PROFESSIONAL ENGINEER

AS-BUILT 1-7-09

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
DES: LDD	DRAFT: LDD — CHECK: DAM

PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42, NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
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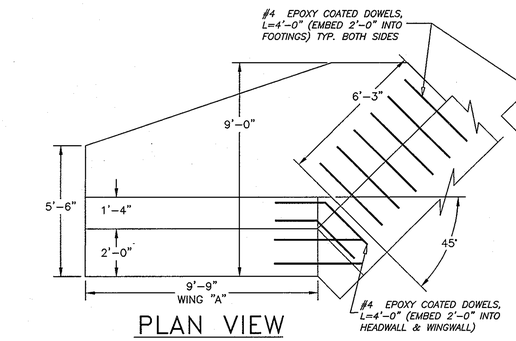
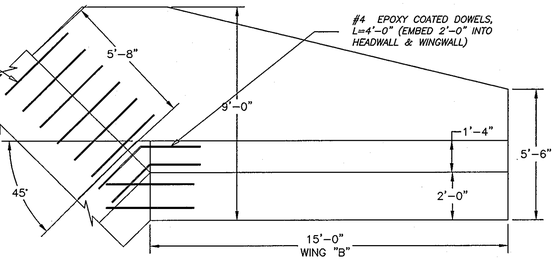
DATE:	MAY, 2006 — PROJECT NO. 1132
SCALE:	AS SHOWN — SHEET 45 OF 55

F-04-82

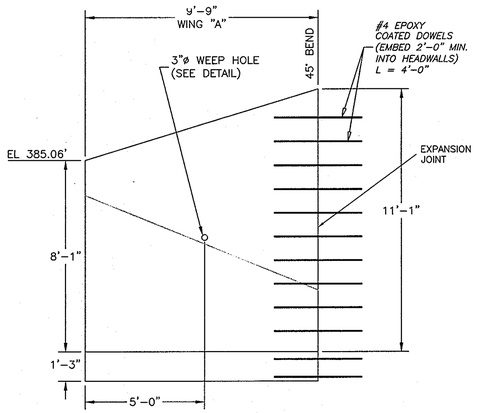
P:\1132 Homewood\dwg\7025 REDLINE.dwg, Sheet 44_3, 5/3/2006 9:06:56 AM, ime, Oce TDS600 HDI for mylar.pc3



PLAN VIEW



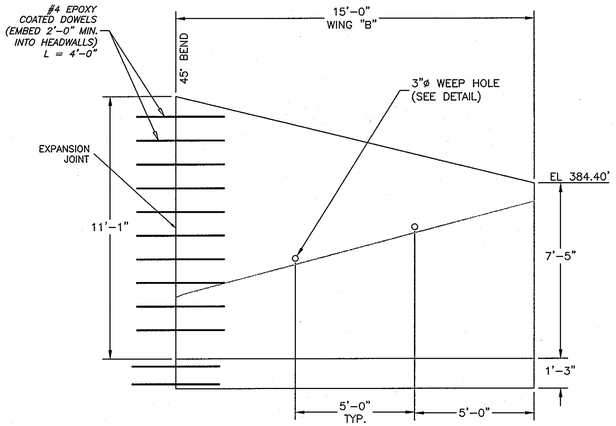
PLAN VIEW



ELEVATION VIEW WING "A"

GRAPHIC SCALE

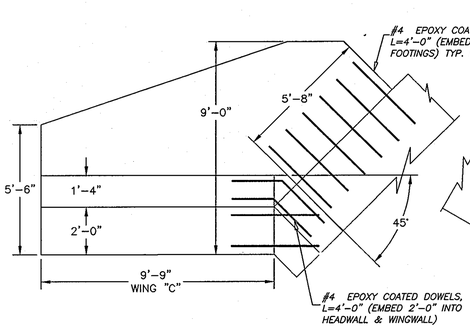
3' 1.5' 0 3' 6'



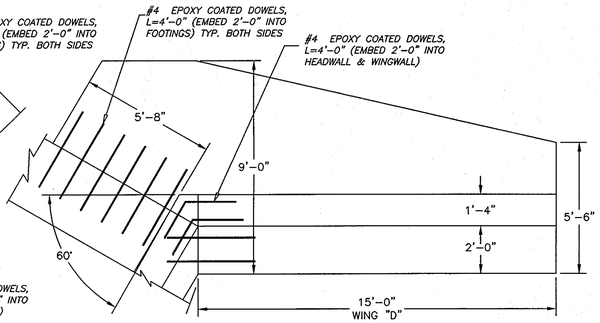
ELEVATION VIEW WING "B"

GRAPHIC SCALE

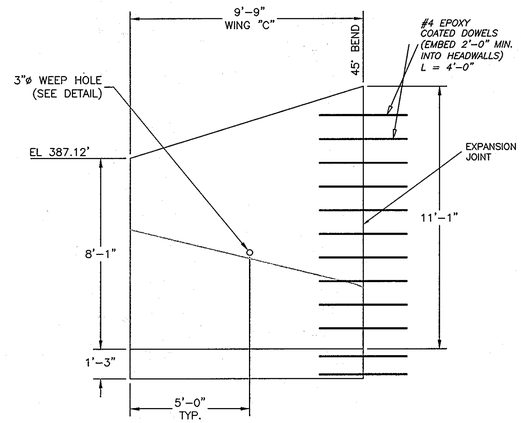
3' 1.5' 0 3' 6'



PLAN VIEW



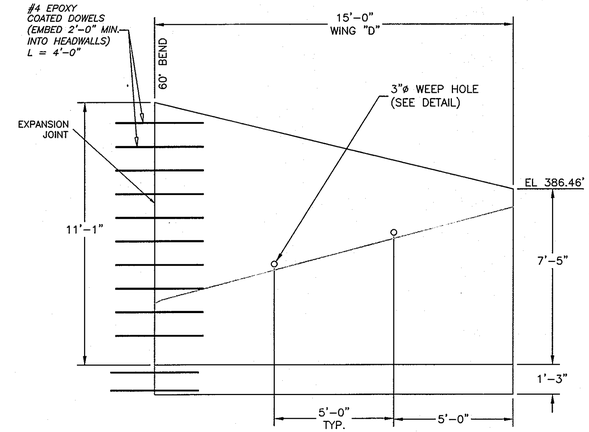
PLAN VIEW



ELEVATION VIEW WING "C"

GRAPHIC SCALE

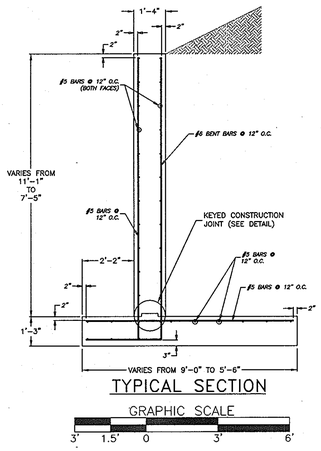
6' 3' 0 1.5' 3'



ELEVATION VIEW WING "D"

GRAPHIC SCALE

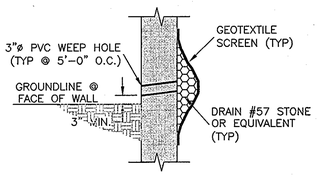
6' 3' 0 1.5' 3'



TYPICAL SECTION

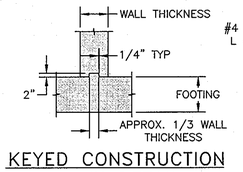
GRAPHIC SCALE

3' 1.5' 0 3' 6'



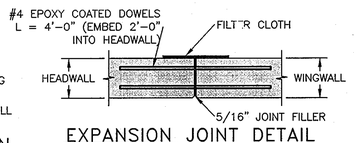
WEEP HOLE DETAIL

NOT TO SCALE



KEYED CONSTRUCTION JOINT DETAIL

NOT TO SCALE



EXPANSION JOINT DETAIL

NOT TO SCALE

NOTES FOR EXPANSION JOINT:
A FILTER CLOTH THREE FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE APPLIED TO ALL TRANSVERSE JOINTS IN THE FOOTING AND WALLS. THE MATERIAL SHALL BE CENTERED ON THE JOINT AND THE EDGES SEALED WITH A MASTIC OR WITH TWO SIDED TAPE. THE FILTER CLOTH SHALL BE A GEOTEXTILE MEETING THE APPROVAL OF THE ENGINEER.

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 5992-1-0905-05.

NOTES:
1.) CONCRETE SHALL BE f'c = 3,500 psi.
2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60
3.) FOOTING IS DESIGNED FOR A 2,000 psf ALLOWABLE BEARING CAPACITY

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 5-15-06

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 5/25/06

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 5/22/06

NO.	DATE	REVISION
1	5/06	CONVERT HEADWALLS TO CONCRETE

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

STATE OF MARYLAND — DONALD MOON — PROFESSIONAL ENGINEER

6/6/06

DEVELOPER: ELIOAK, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: HOMEWOOD, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL, c/o JOHN LEE CARROLL, 515 MADISON AVENUE, 32nd FLOOR, NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21, PARCELS: 88 & TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86, THIRD ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

TITLE: REVISED ROAD CONSTRUCTION PLAN ARCHDRAIN DETAILS HW-5 TO HW-6

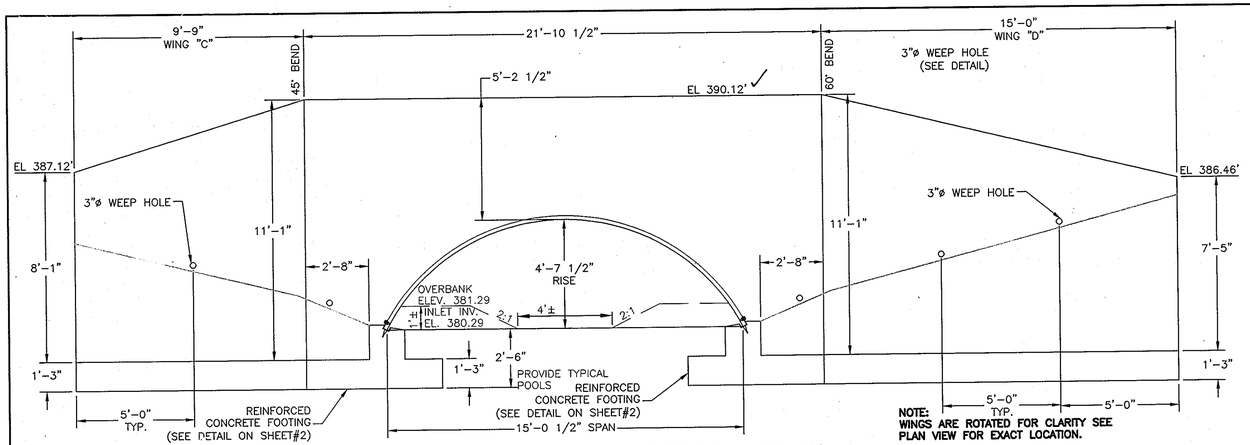
DES: LDD	DRAFT: LDD	CHECK: DAM

DATE: MAY, 2006 — PROJECT NO. 1132

SCALE: AS SHOWN — SHEET 44 OF 55

F-04-82

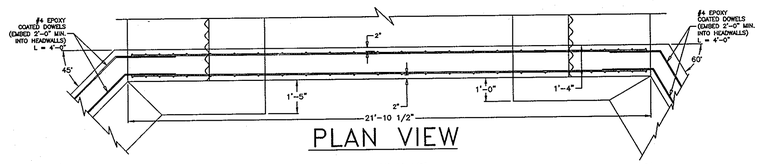
P:\1132 Homewood\dwg\7025 REDLINE.dwg, Sheet 43_2A, 5/3/2006 9:06:02 AM, jim, Oce TDS600 HDI for mylar.pc3



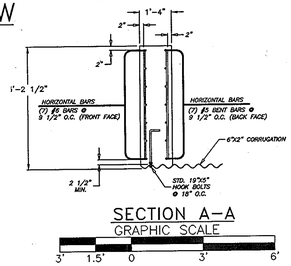
NOTE:
WINGS ARE ROTATED FOR CLARITY SEE PLAN VIEW FOR EXACT LOCATION.

UPSTREAM ENDWALL ELEVATION VIEW

GRAPHIC SCALE
6' 3' 0 1.5' 3'

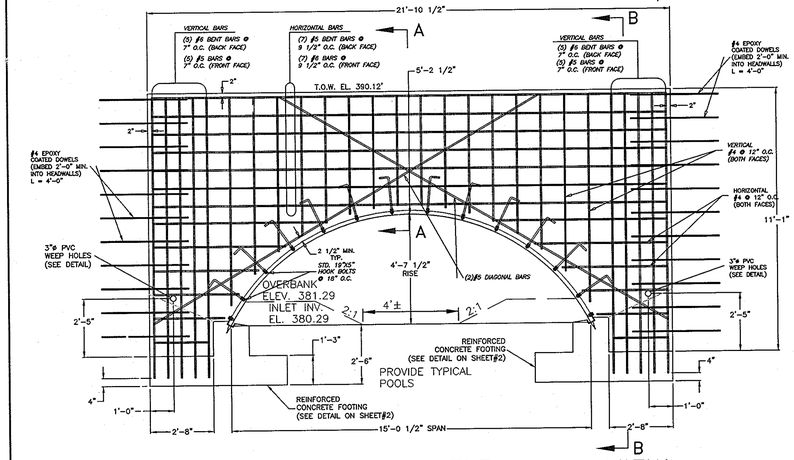


PLAN VIEW



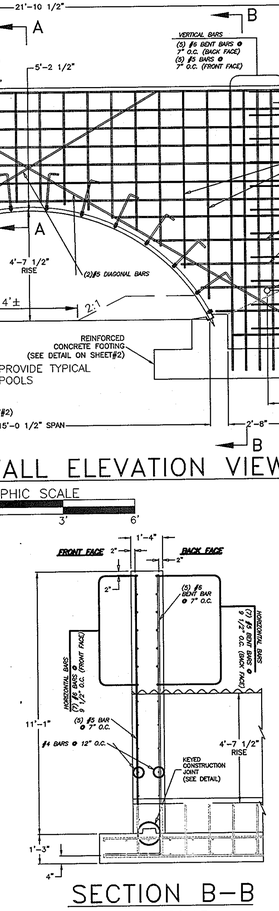
SECTION A–A

GRAPHIC SCALE
3' 1.5' 0 3' 6'



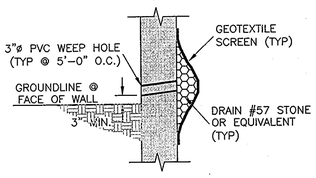
UPSTREAM ENDWALL ELEVATION VIEW

GRAPHIC SCALE
3' 1.5' 0 3' 6'



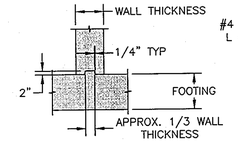
SECTION B–B

GRAPHIC SCALE
3' 1.5' 0 3' 6'



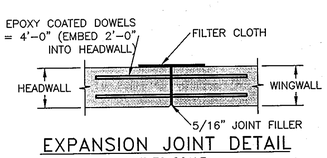
WEEP HOLE DETAIL

NOT TO SCALE



KEYED CONSTRUCTION JOINT DETAIL

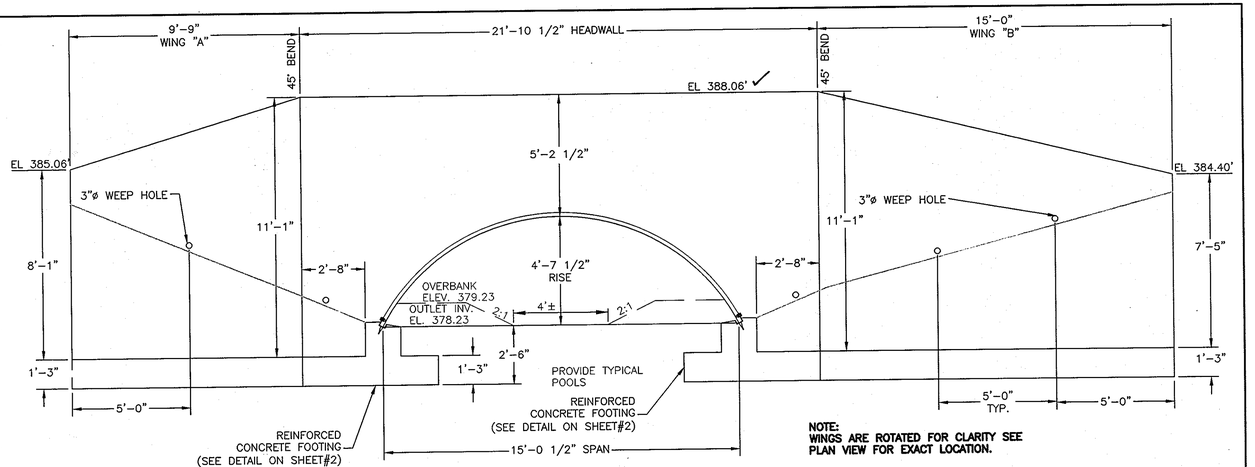
NOT TO SCALE



EXPANSION JOINT DETAIL

NOT TO SCALE

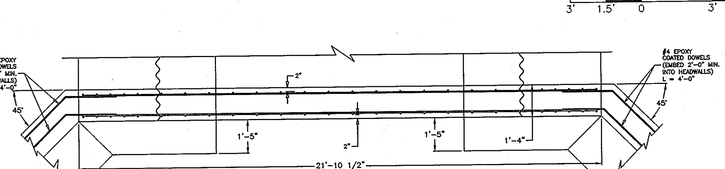
NOTES FOR EXPANSION JOINT:
A FILTER CLOTH THREE FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE APPLIED TO ALL TRANSVERSE JOINTS IN THE FOOTING AND WALLS. THE MATERIAL SHALL BE CENTERED ON THE JOINT AND THE EDGES SEALED WITH A MASTIC OR WITH TWO SIDED TAPE. THE FILTER CLOTH SHALL BE A GEOTEXTILE MEETING THE APPROVAL OF THE ENGINEER.



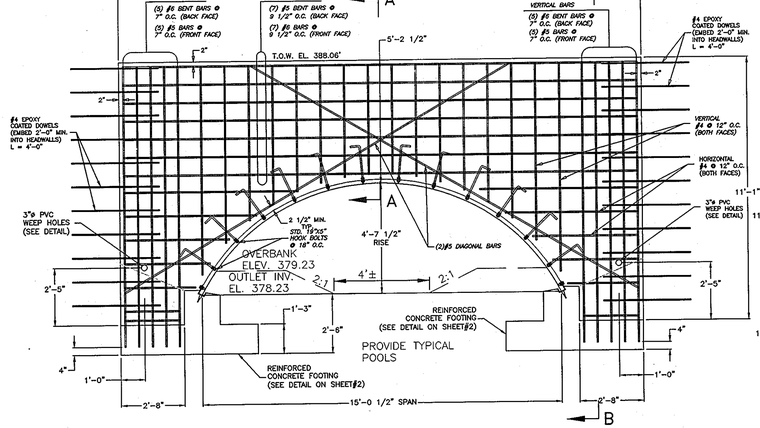
NOTE:
WINGS ARE ROTATED FOR CLARITY SEE PLAN VIEW FOR EXACT LOCATION.

DOWNSTREAM ENDWALL ELEVATION VIEW

GRAPHIC SCALE
3' 1.5' 0 3' 6'

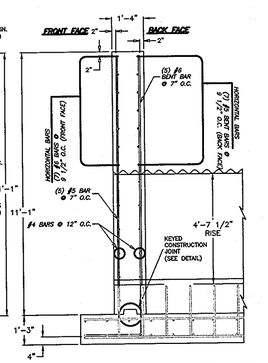


PLAN VIEW



DOWNSTREAM ENDWALL ELEVATION VIEW

GRAPHIC SCALE
3' 1.5' 0 3' 6'



SECTION B–B

GRAPHIC SCALE
3' 1.5' 0 3' 6'

NO.	DATE	REVISION
1	5/06	CONVERT HEADWALLS TO CONCRETE

APPROVED: DEPARTMENT OF PUBLIC WORKS

William F. Weber II. 5-15-06
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

Cindy Hamer 5/26/06
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 5992-1-0905-05.

NOTES:
1.) CONCRETE SHALL BE f'c = 3,500 psi.
2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60
3.) FOOTING IS DESIGNED FOR A 2,000 psf ALLOWABLE BEARING CAPACITY

STATE OF MARYLAND — DONALD ALAN KEEL — No. 21443 — REGISTERED PROFESSIONAL ENGINEER
AS-BUILTS 7-09

BENCHMARK
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www.bei-civilengineering.com

STATE OF MARYLAND — DONALD MOAN — No. 21443 — REGISTERED PROFESSIONAL ENGINEER
Donald Moan 5/3/06

DEVELOPER:	ELJOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 88 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	REVISED ROAD CONSTRUCTION PLAN ARCH/DRAIN DETAILS HW-5 TO HW-6
DATE:	MAY, 2006 — PROJECT NO. 1132
SCALE:	AS SHOWN — SHEET 43 OF 55
DES: LDD	DRAFT: LDD — CHECK: DAM

F-04-82

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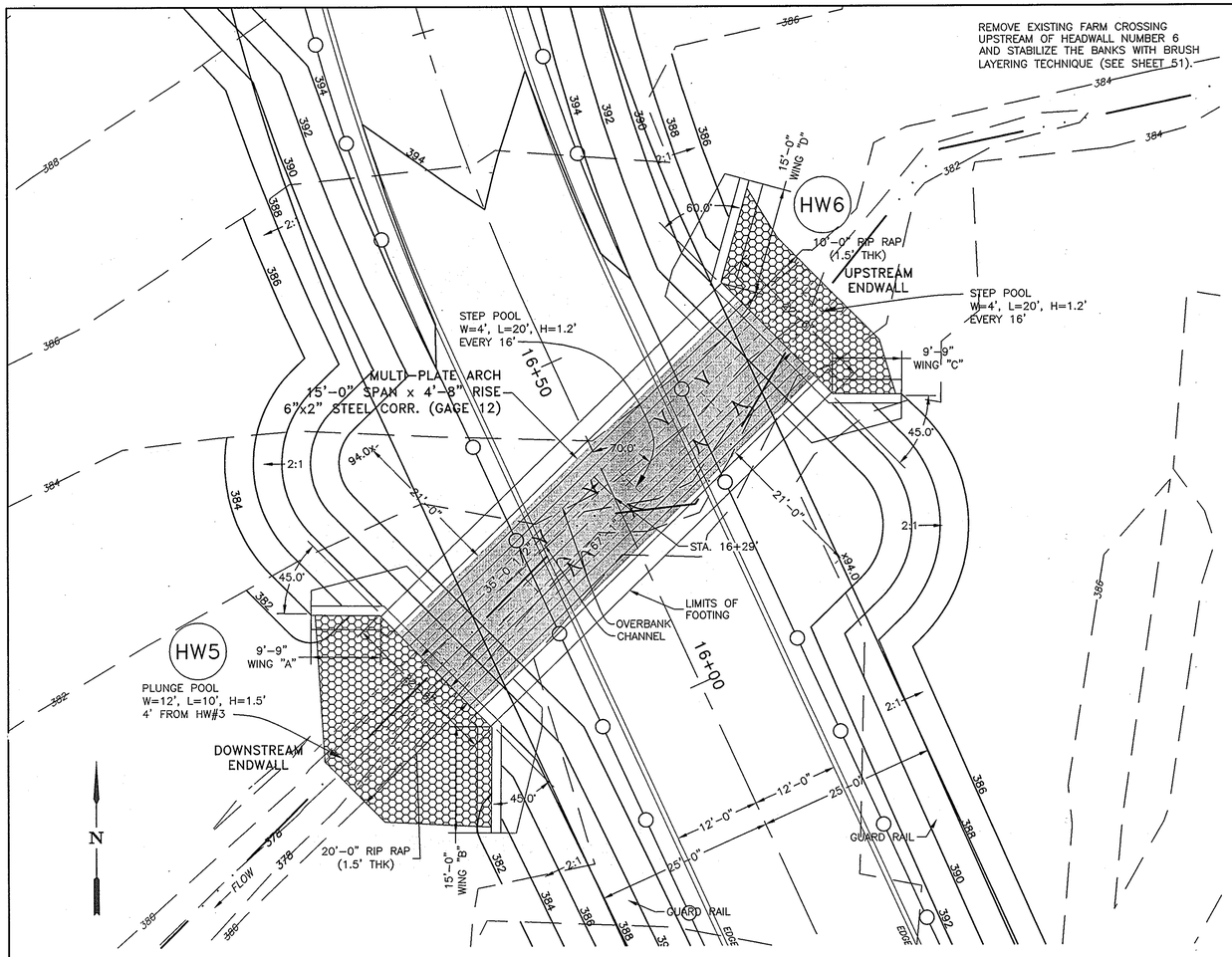
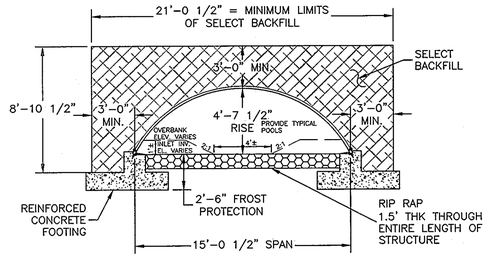


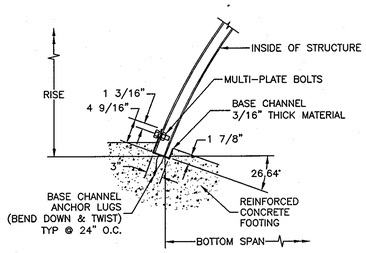
PLAN VIEW

GRAPHIC SCALE
10' 5' 0 10' 20'
CONTOUR INTERVAL = 2'



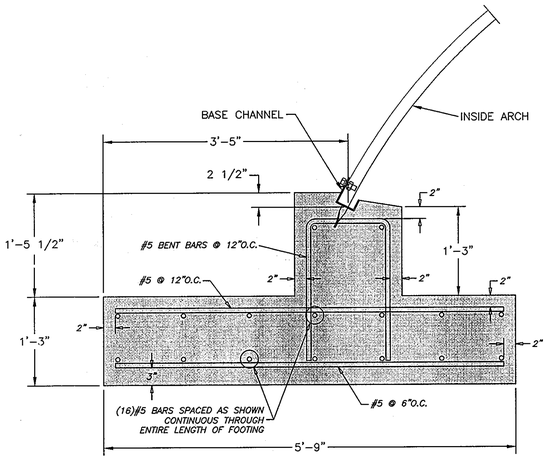
TYPICAL BACKFILL SECTION

GRAPHIC SCALE
5' 2.5' 0 5' 10'



BASE CHANNEL DETAIL

NOT TO SCALE



FOOTING DESIGN

GRAPHIC SCALE
1' 0.5' 0 1' 2'

NOTES:
1. USE SALVAGED MATERIALS FROM THE EXISTING STREAM AS THE INVERT MATERIAL OF THE CHANNEL TO THE EXTENT POSSIBLE.
2. SMALL SALVAGED MATERIAL SHALL BE PLACED IN THE RIP-RAP WATER IS INTENDED TO FLOW ON THE SURFACE OF THE RIP-RAP CLOG WITH NATIVE MATERIALS OR WITH SIMILIARLY SIZED NEW MATERIALS.

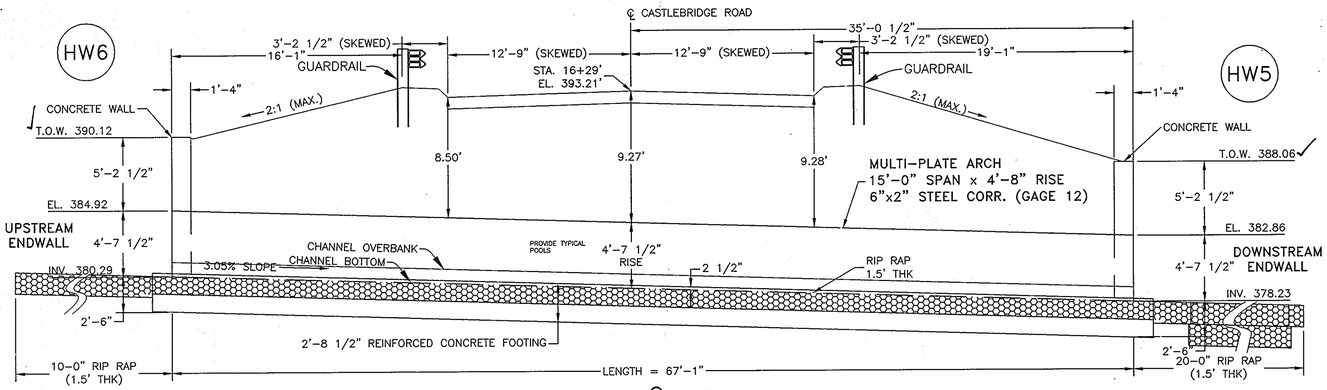
POOL DESIGN

CROSSING STATION	BANKFULL WIDTH	POOL SPACING	POOL RADIUS	POOL DIMENSIONS	CHANNEL DIMENSIONS
11+82 (RIFFLE)	8' (SECTION 10.3)	40'	24'	W=6', L=10', D=1', S=0.0025	4' AT 0.8%
16+29 (STEP)	8' (SECTION 14)	16'	NA	W=4', L=20', H=1.2', S=0.0305	4' AT 3.05%
35+56 (RIFFLE)	9' (SECTION 214 US)	45'	27'	W=6', L=10', D=1', S=0.0025	4' AT 0.5%

START POOLS AT UPPER END OF CULVERT AND CONTINUE POOL SPACING TO END OF DOWNSTREAM RIPRAP, MINIMUM OF TWO POOLS.

SEE CONTRACT DRAWING AND REPORT BY CBC ENGINEERS & ASSOCIATES 937-428-6150 CBC REPORT No. 5992-1-0905-05.

NOTES:
1.) CONCRETE SHALL BE f'c = 3,500 psi.
2.) ALL REINFORCEMENT SHALL BE ASTM A-615, GRADE 60
3.) FOOTING IS DESIGNED FOR A 2,000 psf ALLOWABLE BEARING CAPACITY



PROFILE ALONG ℄ OF STRUCTURE

GRAPHIC SCALE
5' 2.5' 0 5' 10'

PLUNGE POOL
W=12', L=10', H=1.5'
4' FROM HW#3

APPROVED: DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 5-15-06

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 5/25/06
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 5/22/06

NO.	DATE	REVISION
1	5/06	CONVERT HEADWALLS TO CONCRETE

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

Donald Moore 5/3/06

STATE OF MARYLAND DONALD ALAN MOORE No. 21143 PROFESSIONAL ENGINEER
Donald Moore 1-7-09

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20' & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	REVISED ROAD CONSTRUCTION PLAN ARCHDRAIN DETAILS HW-5 TO HW-6
DATE:	MAY, 2006
PROJECT NO.	1132
SCALE:	AS SHOWN
SHEET	42 OF 55
DES: LDD	DRAFT: LDD CHECK: DAM

F-04-82

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HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

Page 1 of 1

RECORD OF SOIL EXPLORATION

Project Name: Riverwood SWM — Boring Number: B-19
Location: Howard County, Maryland — Job #: 02545-A

SAMPLER

Datum: — Hammer Wt.: 140 Lbs. — Hole Diameter: 0.5 — Foreman: Palmer Jr.
Surf. Elev.: — Hammer Drop: 30 Inches — Rock Core Dia.: — Inspector: —
Date Started: 10/22/2002 — Pipe Size: 2.0 Inches OD — Boring Method: HSA — Completed: 10/22/2002

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					
	Brown, moist, soft silt, trace to little clay, trace fine sand trace mica (ML)			D	2-2-2	1	9"	2" top soil
								no ground water encountered while drilling
				D	2-2-3	2	11"	
			5.0					
				I	3-3-5	3	12"	Caved in at 10.0' at completion
								Caved in at 10.0' after 24 hours
		8.0						
	Brown, moist, medium stiff micaceous silt, trace fine sand (ML)		10.0	I	2-3-5	4	9"	Backfilled after 24 hours
			12.0					
	Tan and white, moist, dense sand trace rock fragments (SP) (Decomposed Rock)			D	12-21-41	5	13"	
			15.0					
	Bottom of Hole at 15.0'		15.0					
			20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE CA-CONTINUOUS FLIGHT AUGER RC-ROCK CORE

SAMPLE CONDITIONS: D-DISINTEGRATED I-INTACT U-UNDISTURBED L-LOST

GROUND WATER DEPTH: AT COMPLETION ___ Dry ___ FT. AFTER 24 hrs ___ Dry ___ FT. AFTER ___ FT.

BORING METHOD: HSA-HOLLOW STEM AUGERS CFA-CONT. FLIGHT AUGERS DC-DRIVING CASING MD-MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

Page 1 of 1

RECORD OF SOIL EXPLORATION

Project Name: Riverwood SWM — Boring Number: B-20
Location: Howard County, Maryland — Job #: 02545-A

SAMPLER

Datum: — Hammer Wt.: 140 Lbs. — Hole Diameter: 0.5 — Foreman: Palmer Jr.
Surf. Elev.: — Hammer Drop: 30 Inches — Rock Core Dia.: — Inspector: —
Date Started: 10/22/2002 — Pipe Size: 2.0 Inches OD — Boring Method: HSA — Completed: 10/22/2002

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					
	Brown, moist very soft clayey silt, trace fine sand trace roots (ML)			I	2-2-1	1	9"	1" topsoil
			2.0					
	Brown, moist, medium stiff to very stiff micaceous silt little clay trace fine sand (ML)			I	3-4-5	2	10"	no ground water encountered while drilling
			5.0					
				D	5-7-9	3	2"	Caved in at 7.0' at completion
								Caved in at 7.1' after 24 hours
		8.0						
	Brown, moist, stiff sandy silt (ML)		10.0	D	6-7-8	4	10"	
		10.5						
	Auger Refusal at 10.5' Bottom of Hole at 10.5'		15.0					
			20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE CA-CONTINUOUS FLIGHT AUGER RC-ROCK CORE

SAMPLE CONDITIONS: D-DISINTEGRATED I-INTACT U-UNDISTURBED L-LOST

GROUND WATER DEPTH: AT COMPLETION ___ Dry ___ FT. AFTER 24 hrs ___ Dry ___ FT. AFTER ___ FT.

BORING METHOD: HSA-HOLLOW STEM AUGERS CFA-CONT. FLIGHT AUGERS DC-DRIVING CASING MD-MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

Page 1 of 1

RECORD OF SOIL EXPLORATION

Project Name: Riverwood SWM — Boring Number: B-21
Location: Howard County, Maryland — Job #: 02545-A

SAMPLER

Datum: — Hammer Wt.: 140 Lbs. — Hole Diameter: 0.5 — Foreman: Palmer Jr.
Surf. Elev.: — Hammer Drop: 30 Inches — Rock Core Dia.: — Inspector: —
Date Started: — Pipe Size: 2.0 Inches OD — Boring Method: HSA — Completed: —

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					1" Topsoil
	Brown, moist, soft micaceous silt, trace fine sand (ML)			I	2-2-3	1	6"	
			2.0					
	Brown, moist, medium stiff clayey silt trace fine sand (ML)			I	2-4-6	2	10"	Groundwater encountered at 9 ft while drilling
			4.5					
	Brown, moist, medium dense to very dense silty fine sand trace to some gravel (SM)		5.0	D	7-21-13	3	11"	Caved in at 9.5 ft at completion
			10.0	D	7-9-9	4	8"	
			12.5					
	Bottom of Hole at 15.0'		15.0	D	11-15-15	5	10"	
			20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE CA-CONTINUOUS FLIGHT AUGER RC-ROCK CORE

SAMPLE CONDITIONS: D-DISINTEGRATED I-INTACT U-UNDISTURBED L-LOST

GROUND WATER DEPTH: AT COMPLETION 9 FT. AFTER 24 hrs 4.5 FT. AFTER ___ FT.

BORING METHOD: HSA-HOLLOW STEM AUGERS CFA-CONT. FLIGHT AUGERS DC-DRIVING CASING MD-MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

Page 1 of 1

RECORD OF SOIL EXPLORATION

Project Name: Riverwood SWM — Boring Number: B-23
Location: Howard County, Maryland — Job #: 02545-A

SAMPLER

Datum: — Hammer Wt.: 140 Lbs. — Hole Diameter: 0.5 — Foreman: Palmer Jr.
Surf. Elev.: — Hammer Drop: 30 Inches — Rock Core Dia.: — Inspector: —
Date Started: 10/26/2002 — Pipe Size: 2.0 Inches OD — Boring Method: HSA — Completed: 10/26/2002

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					
	Brown, moist, very soft clayey silt, trace fine sand trace roots (ML)			D	2-1-1	1	7"	2" topsoil
			2.5					
	Reddish brown to tan, moist to dry medium stiff to very stiff sandy silt trace silt (ML)			I	3-6-10	2	8"	no groundwater encountered while drilling
			5.0					
				I	4-5-6	3	12"	Caved in at 6" at completion
			10.0	I	3-4-6	4	10"	
			15.0					
	Bottom of Hole at 15.0'		15.0	D	3-4-6	5	10"	
			20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE CA-CONTINUOUS FLIGHT AUGER RC-ROCK CORE

SAMPLE CONDITIONS: D-DISINTEGRATED I-INTACT U-UNDISTURBED L-LOST

GROUND WATER DEPTH: AT COMPLETION ___ Dry ___ FT. AFTER 24 hrs Dry FT. AFTER ___ FT.

BORING METHOD: HSA-HOLLOW STEM AUGERS CFA-CONT. FLIGHT AUGERS DC-DRIVING CASING MD-MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

Page 1 of 1

RECORD OF SOIL EXPLORATION

Project Name: Riverwood SWM — Boring Number: B-24
Location: Howard County, Maryland — Job #: 02545-A

SAMPLER

Datum: — Hammer Wt.: 140 Lbs. — Hole Diameter: 3 1/4" — Foreman: Jerome Hersl
Surf. Elev.: — Hammer Drop: 30 Inches — Rock Core Dia.: — Inspector: —
Date Started: 10-28-02 — Pipe Size: 2.0 Inches OD — Boring Method: HSA — Completed: 10-28-02

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					2" Topsoil
	Brown, moist, soft sandy silt trace fine sand trace mica, fine sand trace mica, trace roots (ML)			D	3-2-2	1	3"	
			2.5					
	Brown, moist, loose to medium dense silty fine sand trace mica (SM)		5.0	D	4-4-4	2	12"	No groundwater encountered while drilling
				D	5-5-6	3	15"	
			10.0	D	3-5-7	4	13"	Caved in at 9.0' at Completion
								Caved in at 6.5' after 24 hous
	Bottom of Hole at 15.0'		15.0	D	5-5-8	5	12"	Backfilled after 24 hours
			20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE CA-CONTINUOUS FLIGHT AUGER RC-ROCK CORE

SAMPLE CONDITIONS: D-DISINTEGRATED I-INTACT U-UNDISTURBED L-LOST

GROUND WATER DEPTH: AT COMPLETION ___ Dry ___ FT. AFTER 24 hrs ___ Dry ___ FT. AFTER ___ FT.

BORING METHOD: HSA-HOLLOW STEM AUGERS CFA-CONT. FLIGHT AUGERS DC-DRIVING CASING MD-MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

Page 1 of 1

RECORD OF SOIL EXPLORATION

Project Name: Riverwood SWM — Boring Number: B-25
Location: Howard County, Maryland — Job #: 02545-A

SAMPLER

Datum: — Hammer Wt.: 140 Lbs. — Hole Diameter: 0.5 — Foreman: Palmer Jr.
Surf. Elev.: — Hammer Drop: 30 Inches — Rock Core Dia.: — Inspector: —
Date Started: 10/26/2002 — Pipe Size: 2.0 Inches OD — Boring Method: HSA — Completed: 10/26/2002

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					
	Brown, moist, soft clayey silt trace fine sand trace roots (ML)			D	2-2-3	1	3"	2" topsoil
			2.0					
	Brown, moist, medium dense silty fine sand and gravel (SM-GM)			D	6-12-13	2	10"	No ground water encountered while drilling
			5.0					Caved in at 5.8' at completion
	Tan, moist, medium dense silty fine sand trace mica (SM)			D	7-12-8	3	6"	
			10.0	D	3-5-7	4	10"	
			15.0					
	Bottom of Hole at 15.0'		15.0	I	4-7-8	5	14"	
			20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE CA-CONTINUOUS FLIGHT AUGER RC-ROCK CORE

SAMPLE CONDITIONS: D-DISINTEGRATED I-INTACT U-UNDISTURBED L-LOST

GROUND WATER DEPTH: AT COMPLETION ___ Dry ___ FT. AFTER 24 hrs ___ Dry ___ FT. AFTER ___ FT.

BORING METHOD: HSA-HOLLOW STEM AUGERS CFA-CONT. FLIGHT AUGERS DC-DRIVING CASING MD-MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

Page 1 of 1

RECORD OF SOIL EXPLORATION

Project Name: Riverwood SWM — Boring Number: B-26
Location: Howard County, Maryland — Job #: 02545-A

SAMPLER

Datum: — Hammer Wt.: 140 Lbs. — Hole Diameter: 3 1/4" — Foreman: Jerome Hersl
Surf. Elev.: — Hammer Drop: 30 Inches — Rock Core Dia.: — Inspector: —
Date Started: 10-28-02 — Pipe Size: 2.0 Inches OD — Boring Method: HSA — Completed: 10-28-02

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					2" Topsoil
	Brown, moist, loose to medium dense silty fine sand trace mica (SM)			D	4-4-5	1	10"	
			5.0	D	5-7-8	2	10"	No groundwater encountered while drilling
				D	6-7-9	3	10"	
			10.0	D	5-7-8	4	13"	Caved in at 8.2' at Completion
								Caved in at 7.5' after 24 hours
	Bottom of Hole at 15.0'		15.0	D	6-8-8	5	14"	Backfilled after 24 hours
			20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE CA-CONTINUOUS FLIGHT AUGER RC-ROCK CORE

SAMPLE CONDITIONS: D-DISINTEGRATED I-INTACT U-UNDISTURBED L-LOST

GROUND WATER DEPTH: AT COMPLETION ___ Dry ___ FT. AFTER 24 hrs ___ Dry ___ FT. AFTER ___ FT.

BORING METHOD: HSA-HOLLOW STEM AUGERS CFA-CONT. FLIGHT AUGERS DC-DRIVING CASING MD-MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

Page 1 of 1

RECORD OF SOIL EXPLORATION

Project Name: Riverwood SWM — Boring Number: B-32
Location: Howard County, Maryland — Job #: 02545-A

SAMPLER

Datum: — Hammer Wt.: 140 Lbs. — Hole Diameter: 0.5 — Foreman: Palmer Jr.
Surf. Elev.: — Hammer Drop: 30 Inches — Rock Core Dia.: — Inspector: —
Date Started: 10/25/2002 — Pipe Size: 2.0 Inches OD — Boring Method: HSA — Completed: 10/25/2002

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					1" Topsoil
	Brown, moist, loose, silty fine sand trace mica trace roots (SM)			I	2-2-3	1	6"	No Groundwater encountered while drilling
			2.5					
	Brown, moist loose to medium dense silty fine sand trace mica (SM)			I	3-6-6	2	7"	Caved in at 8.5' at completion
			5.0					Caved in at 8.5' after 24 hours
				I	4-3-5	3	9"	
			10.0	D	4-5-5	4	11"	
	Brown, moist, medium dense silty fine sand trace gravel (SM) (Decomposed Rock)		12.5					
			15.0	D	50/5"	5	4"	Backfilled after 24 hours
	Bottom of Hole at 15.0'		15.0					
			20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE CA-CONTINUOUS FLIGHT AUGER RC-ROCK CORE

SAMPLE CONDITIONS: D-DISINTEGRATED I-INTACT U-UNDISTURBED L-LOST

GROUND WATER DEPTH: AT COMPLETION ___ Dry ___ FT. AFTER 24 hrs ___ Dry ___ FT. AFTER ___ FT.

BORING METHOD: HSA-HOLLOW STEM AUGERS CFA-CONT. FLIGHT AUGERS DC-DRIVING CASING MD-MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

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RECORD OF SOIL EXPLORATION

Project Name: Riverwood SWM — Boring Number: B-33
Location: Howard County, Maryland — Job #: 02545-A

SAMPLER

Datum: — Hammer Wt.: 140 Lbs. — Hole Diameter: 0.5 — Foreman: Palmer Jr.
Surf. Elev.: — Hammer Drop: 30 Inches — Rock Core Dia.: — Inspector: —
Date Started: 10/25/2002 — Pipe Size: 2.0 Inches OD — Boring Method: HSA — Completed: 10/25/2002

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					
	Brown moist, soft to medium stiff micaceous silt (ML)			I	2-2-3	1	6"	1" Topsoil
			5.0	I	2-2-5	2	8"	No ground water encountered
	Brown moist, dense micaceous silty fine sand (SM)			D	11-19-19	3	10"	Caved in at 5.5 at completion
			8.5					
	Brown, moist, very dense micaceous silty fine sand trace gravel, trace mica (SM) (Decomposed Rock)		10.0	D	8-20-40	4	11"	
			12.0					
	Brown, dry, very dense fine sand and gravel sized rock fragments (SP-DF) (Decomposed Rock)		13.8	D	50/4"	5	3"	
	Bottom of Hole at 13.8'		15.0					
			20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE CA-CONTINUOUS FLIGHT AUGER RC-ROCK CORE

SAMPLE CONDITIONS: D-DISINTEGRATED I-INTACT U-UNDISTURBED L-LOST

GROUND WATER DEPTH: AT COMPLETION ___ Dry ___ FT. AFTER 24 hrs ___ Dry ___ FT. AFTER ___ FT.

BORING METHOD: HSA-HOLLOW STEM AUGERS CFA-CONT. FLIGHT AUGERS DC-DRIVING CASING MD-MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

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RECORD OF SOIL EXPLORATION

Project Name: Riverwood SWM — Boring Number: B-34
Location: Howard County, Maryland — Job #: 02545-A

SAMPLER

Datum: — Hammer Wt.: 140 Lbs. — Hole Diameter: 0.5 — Foreman: Palmer Jr.
Surf. Elev.: — Hammer Drop: 30 Inches — Rock Core Dia.: — Inspector: —
Date Started: 10/25/2002 — Pipe Size: 2.0 Inches OD — Boring Method: HSA — Completed: 10/25/2002

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					
	Brown, moist, soft to medium stiff micaceous silty fine sand trace gravel, trace gravel trace fine sandy (ML)			I	3-3-2	1	5"	1" Topsoil
								No groundwater encountered
			5.0	I	2-2-2	2	10"	Caved in at 7.5' at completion
				D	2-2-3	3	10"	Caved in at 7.5' after 24 hours
			10.0	D	4-4-3	4	9"	
	Bottom of Hole at 15.0'		15.0	D	2-5-5	5	10"	
			20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE CA-CONTINUOUS FLIGHT AUGER RC-ROCK CORE

SAMPLE CONDITIONS: D-DISINTEGRATED I-INTACT U-UNDISTURBED L-LOST

GROUND WATER DEPTH: AT COMPLETION ___ Dry ___ FT. AFTER 24 hrs ___ Dry ___ FT. AFTER ___ FT.

BORING METHOD: HSA-HOLLOW STEM AUGERS CFA-CONT. FLIGHT AUGERS DC-DRIVING CASING MD-MUD DRILLING

HILLIS-CARNES GEOTECHNICAL ENGINEERING RECOMMENDATIONS:

EMBANKMENT AND CUT-OFF TRENCH CONSTRUCTION

THE AREAS OF THE PROPOSED SWM FACILITY SHOULD BE STRIPPED OF TOP SOIL AND ANY OTHER UNSUITABLE MATERIALS FROM THE EMBANKMENT OR STURCTURE AREAS IN ACCORDANCE WITH SOIL CONSERVATION GUIDELINES. AFTER STRIPPING OPERATIONS HAVE BEEN COMPLETED, THE EXPOSED SUBGRADE MATERIALS SHOULD BE PROOFROLLED WITH A LOADED DUMP TRUCK OR SIMILAR EQUIPMENT IN THE PRESENCE OF A GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE UTILIZING A DYNAMIC CONE PENETROMETER. ANY EXCESSIVELY SOFT OR LOOSE MATERIALS IDENTIFIED BY PROOFROLLING OR PENETROMETER TESTING SHOULD BE EXCAVATED TO SUITABLE FIRM SOIL, AND THEN GRADES RE-ESTABLISHED BY BACKFILLING WITH SUITABLE FIRM SOIL.

A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER SHOULD BE PRESENT TO MONITOR PLACEMENT AND COMPACTION OF FILL FOR THE EMBANKMENT AND CUT-OF TRENCH. IN ACCORDANCE WITH MARYLAND SOIL CONSERVATION SPECIFICATION 378 SOILS CONSIDERED SUITABLE FOR THE CENTER OF EMBANKMENT AND CUT-OFF TRENCH SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION GC, SC, CH, OR OR CL.

IT IS OUR PROFESSIONAL OPINION THAT IN ADDITION TO THE SOIL MATERIALS DESCRIBED ABOVE A FINE-GRAINED SOIL, INCLUDING SILT(ML) WITH A PLASTICITY INDEX OF 10 OR MORE CAN BE UTILIZED FOR THE CENTER OF THE EMBANKMENT AND CORE TRENCH. ALL FILL MATERIALS MUST BE PLACED AND COMPACTED IN ACCORDANCE WITH MD SCS 378 SPECIFICATIONS.

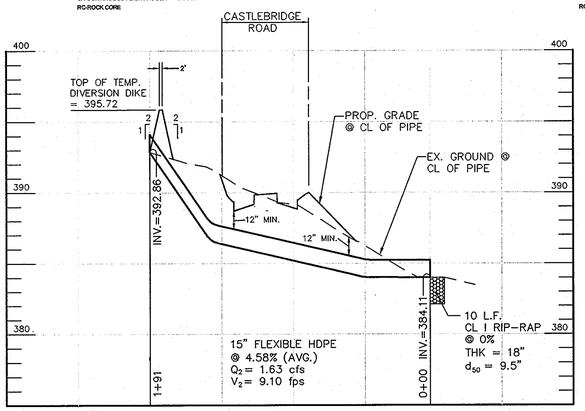
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

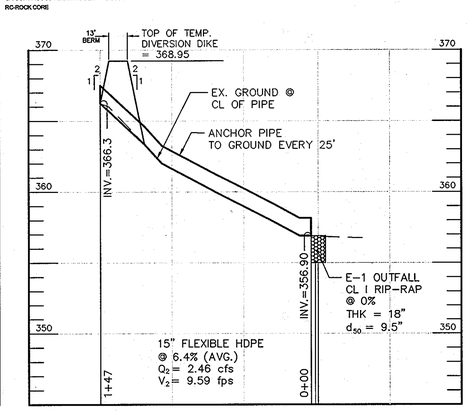
APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

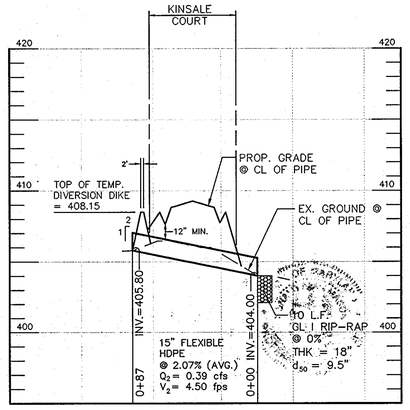
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/26/05



TEMPORARY DIVERSION PIPE 1
SCALE: 1"=50' HORIZ., 1"=5' VERT.



TEMPORARY DIVERSION PIPE 2
SCALE: 1"=50' HORIZ., 1"=5' VERT.



TEMPORARY DIVERSION PIPE 3
SCALE: 1"=50' HORIZ., 1"=5' VERT.

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK ENGINEERING, INC.
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

Donald Moon 6/2/05

DEVELOPER: ELJOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86 — TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: STORMWATER MANAGEMENT NOTES, BORING LOGS AND TEMPORARY DIVERSION PIPE PROFILES

DATE: JUNE, 2005 — PROJECT NO. 1132

SCALE: AS SHOWN — SHEET 41 OF 55

DES: JMC/DBT — DRAFT: LDD — CHECK: DAM

F-04-82

P:\1132 Homewoodlwg\7024P2.dwg, Sheet 41, 6/2/2005 4:44:00 PM, inx. Oce TDS600 3.x 2 for mvinx.nc3

HILLIS - CARNES
ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Page 1 of 1

Project Name Riverwood SWM | Boring Number B-3
Location Howard County, Maryland | Job # 02545-A

SAMPLER
Datum ____ | Hammer Wt. 140 Lbs. | Hole Diameter 3 1/4" | Foreman Harry Hines
Surf. Elev. ____ | Hammer Drop 30 Inches | Rock Core Dia. ____ | Inspector ____
Date Started 10-31-02 | Pipe Size 2.0 Inches OD | Boring Method HSA | Completed 10-31-02

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					3" Topsoil
	Brown moist loose silty sand trace rock fragments (SM)	2.0		D	2-2-3	1	4"	
	White moist dense silty sand some rock fragments (SM-GM)			D	13-12-21	2	12"	No groundwater encountered while drilling
			5.0	D	18-16-24	3	12"	
	Brown moist dense micaceous silty sand (SM)	7.0						Caved in at 8.6' at Completion
			10.0		11-16-15	4	13"	
		15.0	15.0		15-21-19	5	14"	
	Bottom of Hole at 15.0'		20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE; CA-CONTINUOUS FLIGHT AUGER; RC-ROCK CORE
SAMPLE CONDITIONS: D-DISINTEGRATED; I-INTACT; U-UNDISTURBED; L-LOST
GROUND WATER DEPTH: AT COMPLETION Dry FT.; AFTER ____ FT.; AFTER ____ FT.
BORING METHOD: HSA-HOLLOW STEM AUGERS; CFA-CONT. FLIGHT AUGERS; DC-DRIVING CASING; MD-MUD DRILLING

HILLIS - CARNES
ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Page 1 of 1

Project Name Riverwood SWM | Boring Number B-4
Location Howard County, Maryland | Job # 02545-A

SAMPLER
Datum ____ | Hammer Wt. 140 Lbs. | Hole Diameter 3 1/4" | Foreman Harry Hines
Surf. Elev. ____ | Hammer Drop 30 Inches | Rock Core Dia. ____ | Inspector ____
Date Started 10-31-02 | Pipe Size 2.0 Inches OD | Boring Method HSA | Completed 10-31-02

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					2" Topsoil
	Topsoil	0.5"						
	Brown moist medium stiff sandy silt trace clay (ML)	2.0		D	2-2-3	1	14"	
	Brown moist medium dense micaceous silty sand trace gravel (SM)	4.5		D	5-7-8	2	14"	No groundwater encountered while drilling
	Brown to black moist loose to medium dense micaceous fine silty sand trace rock fragments (SM)		5.0	D	3-3-4	3	12"	
			10.0	D	4-4-11	4	11"	Caved in at 8.5' at Completion
		15.0	15.0	D	7-12-13	5	12"	
	Bottom of Hole at 15.0'		20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE; CA-CONTINUOUS FLIGHT AUGER; RC-ROCK CORE
SAMPLE CONDITIONS: D-DISINTEGRATED; I-INTACT; U-UNDISTURBED; L-LOST
GROUND WATER DEPTH: AT COMPLETION Dry FT.; AFTER ____ FT.; AFTER ____ FT.
BORING METHOD: HSA-HOLLOW STEM AUGERS; CFA-CONT. FLIGHT AUGERS; DC-DRIVING CASING; MD-MUD DRILLING

HILLIS - CARNES
ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Page 1 of 1

Project Name Riverwood SWM | Boring Number B-5
Location Howard County, Maryland | Job # 02545-A

SAMPLER
Datum ____ | Hammer Wt. 140 Lbs. | Hole Diameter 3 1/4" | Foreman Harry Hines
Surf. Elev. ____ | Hammer Drop 30 Inches | Rock Core Dia. ____ | Inspector ____
Date Started 10-31-02 | Pipe Size 2.0 Inches OD | Boring Method HSA | Completed 10-29-02

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE	0.5"	0.0					2" Topsoil
	Brown moist stiff silt with some clay trace roots (ML)			D	3-4-6	1	8"	
	Dark gray moist medium dense to very dense silty sand trace rock fragments (SM)			D	6-13-11	2	12"	
			5.0	D	5-9-8	3	13"	
	Dark gray, moist, very dense micaceous silty fine sand trace rock fragments (SM) (Decomposed Rock)	8.0	10.0	D	21-41-44	4	15"	Groundwater encountered at 9.0' while drilling; Caved in at 9.0' at Completion
		15.0	15.0	D	26-46-50/2"	5	12" s	
	Bottom of Hole at 15.0'		20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE; CA-CONTINUOUS FLIGHT AUGER; RC-ROCK CORE
SAMPLE CONDITIONS: D-DISINTEGRATED; I-INTACT; U-UNDISTURBED; L-LOST
GROUND WATER DEPTH: AT COMPLETION Dry FT.; AFTER ____ FT.; AFTER ____ FT.
BORING METHOD: HSA-HOLLOW STEM AUGERS; CFA-CONT. FLIGHT AUGERS; DC-DRIVING CASING; MD-MUD DRILLING

HILLIS - CARNES
ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Page 1 of 1

Project Name Riverwood SWM | Boring Number B-8
Location Howard County, Maryland | Job # 02545-A

SAMPLER
Datum ____ | Hammer Wt. 140 Lbs. | Hole Diameter 3 1/4" | Foreman Palmer Junior
Surf. Elev. ____ | Hammer Drop 30 Inches | Rock Core Dia. ____ | Inspector ____
Date Started 10-31-02 | Pipe Size 2.0 Inches OD | Boring Method HSA | Completed 10-31-02

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					2" Topsoil
	Brown, moist, soft clayey silt trace fine sand trace roots (ML)			I	1-2-2	1	7"	No groundwater encountered while drilling
	Reddish brown, moist very stiff clayey silt, trace fine sand trace mica (ML)	5.0	5.0	I	3-6-10	2	14"	
	Brown, moist, medium dense micaceous silty fine sand (SM)			I	6-8-10	3	14"	Caved in at 7.0' at Completion; Caved in at 7.0' after 1 hour
			10.0	I	7-12-13	4	10"	
		15.0	15.0	I	6-17-14	5	14"	Backfilled after 1 hour
	Bottom of Hole at 15.0'		20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE; CA-CONTINUOUS FLIGHT AUGER; RC-ROCK CORE
SAMPLE CONDITIONS: D-DISINTEGRATED; I-INTACT; U-UNDISTURBED; L-LOST
GROUND WATER DEPTH: AT COMPLETION Dry FT.; AFTER 1hr Dry FT.; AFTER ____ FT.
BORING METHOD: HSA-HOLLOW STEM AUGERS; CFA-CONT. FLIGHT AUGERS; DC-DRIVING CASING; MD-MUD DRILLING

HILLIS - CARNES
ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Page 1 of 1

Project Name Riverwood SWM | Boring Number B-9
Location Howard County, Maryland | Job # 02545-A

SAMPLER
Datum ____ | Hammer Wt. 140 Lbs. | Hole Diameter 3 1/4" | Foreman Palmer Junior
Surf. Elev. ____ | Hammer Drop 30 Inches | Rock Core Dia. ____ | Inspector ____
Date Started 10-31-02 | Pipe Size 2.0 Inches OD | Boring Method HSA | Completed 10-31-02

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					2" Topsoil
	Brown, moist, medium stiff clayey silt, trace fine sand trace roots (ML)	2.5		I	2-3-4	1	10"	No groundwater encountered while drilling
	Brown, moist, medium stiff to very stiff micaceous sandy silt (ML)			I	2-4-6	2	14"	
			5.0	I	6-8-11	3	12"	Caved in at 7.6' at Completion; Caved in at 7.6' after 1 hour
			10.0	I	3-4-7	4	10"	
		15.0	15.0	I	4-12-17	5	13"	Backfilled after 1 hour
	Bottom of Hole at 15.0'		20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE; CA-CONTINUOUS FLIGHT AUGER; RC-ROCK CORE
SAMPLE CONDITIONS: D-DISINTEGRATED; I-INTACT; U-UNDISTURBED; L-LOST
GROUND WATER DEPTH: AT COMPLETION Dry FT.; AFTER 1hr Dry FT.; AFTER ____ FT.
BORING METHOD: HSA-HOLLOW STEM AUGERS; CFA-CONT. FLIGHT AUGERS; DC-DRIVING CASING; MD-MUD DRILLING

HILLIS - CARNES
ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Page 1 of 1

Project Name Riverwood SWM | Boring Number B-10
Location Howard County, Maryland | Job # 02545-A

SAMPLER
Datum ____ | Hammer Wt. 140 Lbs. | Hole Diameter 3 1/4" | Foreman Palmer Junior
Surf. Elev. ____ | Hammer Drop 30 Inches | Rock Core Dia. ____ | Inspector ____
Date Started 10-31-02 | Pipe Size 2.0 Inches OD | Boring Method HSA | Completed 10-31-02

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					2" Topsoil
	Brown, moist, soft clayey silt, trace fine sand trace roots (ML)	2.0		I	2-2-3	1	7"	No groundwater encountered while drilling
	Brwon, moist, medium stiff clayey silt trace fine sand trace mica (ML)	5.0	5.0	I	3-3-8	2	10"	
	Brown, moist, medium dense to dense micaceous silty fine sand (SM)			I	8-11-12	3	10"	Caved in at 6.8' at Completion; Caved in at 6.8' after 1 hour
			10.0	D	5-6-13	4	12"	
		15.0	15.0	I	9-21-33	5	14"	Backfilled after 1 hour
	Bottom of Hole at 15.0'		20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE; CA-CONTINUOUS FLIGHT AUGER; RC-ROCK CORE
SAMPLE CONDITIONS: D-DISINTEGRATED; I-INTACT; U-UNDISTURBED; L-LOST
GROUND WATER DEPTH: AT COMPLETION Dry FT.; AFTER 1hr Dry FT.; AFTER ____ FT.
BORING METHOD: HSA-HOLLOW STEM AUGERS; CFA-CONT. FLIGHT AUGERS; DC-DRIVING CASING; MD-MUD DRILLING

HILLIS - CARNES
ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Page 1 of 1

Project Name Riverwood SWM | Boring Number B-11
Location Howard County, Maryland | Job # 02545-A

SAMPLER
Datum ____ | Hammer Wt. 140 Lbs. | Hole Diameter 0.5 | Foreman Jerome Hersl
Surf. Elev. ____ | Hammer Drop 30 Inches | Rock Core Dia. ____ | Inspector ____
Date Started 10-28-02 | Pipe Size 2.0 Inches OD | Boring Method HSA | Completed 10-28-02

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					2" Topsoil
	Brown, moist, loose, silty fine sand trace clay trace roots (SM)	2.0			1-2-3	1	7"	
	Brown moist stiff to very stiff micaceous silt trace fine sand trace rock fragments (ML)		5.0		4-9-11	2	14"	
					3-5-6	3	14"	Caved in at 8.5' at Completion; Caved in at 7.5' after 24 hours
			10.0		5-8-9	4	14"	
		15.0	15.0		8-10-10	5	17"	Groundwater encountered at 13.0' while drilling
	Bottom of Hole at 15.0'		20.0					Backfilled after 24 hours

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE; CA-CONTINUOUS FLIGHT AUGER; RC-ROCK CORE
SAMPLE CONDITIONS: D-DISINTEGRATED; I-INTACT; U-UNDISTURBED; L-LOST
GROUND WATER DEPTH: AT COMPLETION 8.0' FT.; AFTER 24 hrs 7.0' FT.; AFTER ____ FT.
BORING METHOD: HSA-HOLLOW STEM AUGERS; CFA-CONT. FLIGHT AUGERS; DC-DRIVING CASING; MD-MUD DRILLING

HILLIS - CARNES
ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Page 1 of 1

Project Name Riverwood SWM | Boring Number B-12
Location Howard County, Maryland | Job # 02545-A

SAMPLER
Datum ____ | Hammer Wt. 140 Lbs. | Hole Diameter 3 1/4" | Foreman Jerome Hersl
Surf. Elev. ____ | Hammer Drop 30 Inches | Rock Core Dia. ____ | Inspector ____
Date Started 10-28-02 | Pipe Size 2.0 Inches OD | Boring Method HSA | Completed 10-28-02

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					2" Topsoil
	Brown, moist, loose silty fine sand trace gravel trace roots (SM)	2.0			1-2-3	1	10"	
	Brown, tan and white, moist very loosde to medium dense silty fine sand trace rock fragments (SM)		5.0		3-9-9	2	8"	No groundwater encountered while drilling
					3-2-3	3	12"	
			10.0		1-1-2	4	13"	Caved in at 9.2' at Completion; Caved in at 8.5' after 24 hours
	Brown, moist, soft, micaceous sandy silt, trace rock fragments (ML)	13.0	15.0		1-2-2	5	16"	Backfilled after 24 hours
	Bottom of Hole at 15.0'		20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE; CA-CONTINUOUS FLIGHT AUGER; RC-ROCK CORE
SAMPLE CONDITIONS: D-DISINTEGRATED; I-INTACT; U-UNDISTURBED; L-LOST
GROUND WATER DEPTH: AT COMPLETION Dry FT.; AFTER 24 hrs 7.0' FT.; AFTER ____ FT.
BORING METHOD: HSA-HOLLOW STEM AUGERS; CFA-CONT. FLIGHT AUGERS; DC-DRIVING CASING; MD-MUD DRILLING

HILLIS - CARNES
ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Page 1 of 1

Project Name Riverwood SWM | Boring Number B-13
Location Howard County, Maryland | Job # 02545-A

SAMPLER
Datum ____ | Hammer Wt. 140 Lbs. | Hole Diameter 3 1/4" | Foreman Palmer Junior
Surf. Elev. ____ | Hammer Drop 30 Inches | Rock Core Dia. ____ | Inspector ____
Date Started 10-29-02 | Pipe Size 2.0 Inches OD | Boring Method HSA | Completed 10-29-02

ELEV.	SOIL DESCRIPTION (Color, Moisture, Density, Size, Proportion)	STRA. DEPTH	DEPTH SCALE	CON	SAMPLE BLOWS 6"	NO.	REC	BORING & SAMPLING NOTES
	SURFACE		0.0					2" Topsoil
	Brown, moist, loose to medium dense silty fine sand trace mica (SM)	2.5		I	3-4-4	1	8"	
	Brown and white, moist medium stiff micaceous silt trace fine sand (ML)		5.0	I	4-5-6	2	9"	
		7.0		I	3-3-5	3	8"	Groundwater encountered at 7.0' while drilling
	Dark gray and brown, moist to wet, very dense fine sand, little silt, trace rock fragments (SP) (Decomposed Rock)		10.0	I	5-15-35	4	10"	Caved in at 8.5' at Completion
		14.0		D	50/5"	5	4"	
	Bottom of Hole at 14.0'		15.0 / 20.0					

SAMPLER TYPE: DRIVEN SPLIT SPOON UNLESS OTHERWISE NOTED. PT-PRESSED SHELBY TUBE; CA-CONTINUOUS FLIGHT AUGER; RC-ROCK CORE
SAMPLE CONDITIONS: D-DISINTEGRATED; I-INTACT; U-UNDISTURBED; L-LOST
GROUND WATER DEPTH: AT COMPLETION 4.5' FT.; AFTER ____ FT.; AFTER ____ FT.
BORING METHOD: HSA-HOLLOW STEM AUGERS; CFA-CONT. FLIGHT AUGERS; DC-DRIVING CASING; MD-MUD DRILLING

CONSTRUCTION SPECIFICATIONS

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

Site Preparation

Areas designated for borrow areas, embankment, and structural works shall be cleared, grubbed and stripped to topsoil. All trees, vegetation, roots and other objectionable material shall be removed. Channel banks and sharp breaks shall be sloped to no steeper than 1:1. All trees shall be cleared and grubbed within 15 feet of the toe of the embankment.

Areas to be covered by the reservoir will be cleared of all trees, brush, logs, fences, rubbish and other objectionable material unless otherwise designated on the plans. Trees, brush, and stumps shall be cut approximately level with the ground surface. For dry stormwater management ponds, a minimum of a 25-foot radius around the inlet structure shall be cleared.

All cleared and grubbed material shall be disposed of outside and below the limits of the dam and reservoir as directed by the owner or his representative. When specified, a sufficient quantity of topsoil will be stockpiled in a suitable location for use on the embankment and other designated areas.

Earth Fill

Material – The fill material shall be taken from approved designated borrow areas. If shall be free of roots, stumps, wood, rubbish, stones greater than 6", frozen or other objectionable material. Fill material for the center of the embankment, and cut off trench shall conform to Unified Soil Classification GC, SC, CH, or CL and must have at least 30% passing the #200 sieve. Consideration may be given to the use of other materials in the embankment if designed by a geotechnical engineer. Such special designs must have construction supervised by a geotechnical engineer.

Materials used in the outer shell of the embankment must have the capability to support vegetation of the quality required to prevent erosion of the embankment.

Placement – Areas on which fill is to be placed shall be scarified prior to placement of fill. Fill materials shall be placed in maximum 8 inch thick (before compaction) layers which are to be continuous over the entire length of the fill. The most permeable borrow material shall be placed in the downstream portions of the embankment. The principal spillway must be installed concurrently with fill placement and not excavated into the embankment.

Compaction – the movement of the hauling and spreading equipment over the fill shall be controlled so that the entire surface of each lift shall be traversed by not less than one tread track of heavy equipment or compaction shall be achieved by a minimum of four complete passes of a sheepsfoot, rubber tired or vibratory roller. Fill material shall contain sufficient moisture such that the required degree of compaction will be obtained with teh equipment used. The fill material shall contain sufficient moisture so that if formed into a ball it will not crumble, yet not be so wet that water can be squeezed out.

When required by the reviewing agency the minimum required density shall not be less than 95% of maximum dry density with a moisture content within ± 2% of the optimum. Each layer of fill shall be compacted as necessary to obtain that density, and is to be certified by the Engineer at the time of construction. All compaction is to be determined by AASHTO Method T-99 (Standard Proctor).

Cut Off Trench – The cutoff trench shall be excavated into impervious material along or parallel to the centerline of the embankment as shown on the plans. The bottom width of the trench shall be governed by the equipment used for excavation, with the minimum width being four feet. The depth shall be a least four feet below existing grade or as shown on the plans. The side slopes of the trench shall be 1 to 1 or flatter. The backfill shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability.

Embankment Core – The core shall be parallel to the centerline of the embankment as shown on the plans. The top width of the cores shall be a minimum of four feet. The height shall extend up to at least the 10 year water elevation or as shown on the plans. The side slopes shall be 1 to 1 or flatter. The core shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability. In addition, the core shall be placed concurrently with the outer shell of the embankment.

Structure Backfill

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

Structure backfill may be flowable fill meeting the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 313 as modified. The mixture shall have a 100–200 psi; 28 day unconfined compressive strength. The flowable fill shall have a minimum pH of 4.0 and a minimum resistively of 2,000 ohm–cm. Material shall be placed such that a minimum of 6" (measured perpendicular to the outside of the pipe) of flowable fill shall be under (bedding), over and, on the sided of the pipe. It only needs to extend up to the spring line for rigid conduits. Average slump of the fill shall be 7" to assure flowability of the material. Adequate measures shall be taken (sand bags, etc.) to prevent floating the pipe. When using flowable fill, all metal pipe shall be bituminous coated. Any adjoining soil fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material shall completely fill all voids adjacent to the flowable fill zone. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a structure or pipe unless there is a compacted fill of 24' or greater over the structure or pipe. Backfill material outside the structural backfill (flowable fill) zone shall be of the type and quality conforming to that specified for the core of the embankment or other embankment materials.

Pipe Conduits

All pipes shall be circular in cross section

Corrugated Metal Pipe – all of the following criteria shall apply for corrugated metal pipe:

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

Maerials – (Aluminum Coated Steel Pipe) – This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-274 with watertight coupling bands or flanges. Aluminum Coated Steel Pipe, when used with flowable fill or when soil and/or water conditions warrant the need for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Any aluminum coating damaged or otherwise removed shall be replaced with cold applied bituminous coating compound. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt.

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

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

3. Connections – All connections with pipes must be completely watertight. The drain pipe or barrel connection to the riser shall be welded all around when the pipe and riser are metal. Anti-seep collars shall be connected to the pipe in such a manner as to be completely watertight. Dimple bands are not considered to be watertight.

All connection shall use a rubber or neoprene gasket when joining pipe sections. The end of each pipe shall be re-rolled an adequate number of corrugations to accommodate the bandwidth. The following type connections are acceptable for pipes less than 24 inches in diameter: flanges on both ends of the pipe with a circular 3/8 inch closed cell neoprene gasket, prepunched to the flange bolt circle, sandwiched between adjacent flanges; a 12-inch wide standard lap type band with 12-inch wide by 3/8-inch thick closed cell circular neoprene gasket; and a 12-inch wide hugger type band with o-ring gaskets having a minimum diameter of 1/2 inch greater than the corrugation depth. Pipes 24 inches in diameter and larger shall be connected by a 24 inch long annular corrugated band using a minimum of 4 (four) rods and lugs, 2 on each connecting pipe end. A 24-inch wide by 3/8-inch thick closed cell circular neoprene gasket will be installed with 12 inches on the end of each pipe. Flanged joints with 3/8 inch closed cell gaskets the full width of the flange is also acceptable.

Helically corrugated pipe shall have either continuously welded seams or have lock seams with internal caulking or a neoprene bead.

4. Bedding – The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.

5. Backfilling shall conform to "Structure Backfill".

6. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

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

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

2. Bedding – Reinforced concrete pipe conduits shall be laid in a concrete bedding/cradle for their entire length. This bedding/cradle shall consist of high slump concrete placed under the pipe and up the sides of the pipe at least 50% of its outside diameter with a minimum thickness of 6 inches. Where a concrete cradle is not needed for structural reasons, flowable fill may be used a described in the "Structure Backfill" section of this standard. Gravel bedding is not permitted.

3. Laying pipe – Bell and spigot pipe shall be places with the bell end upstream. Joints shall be made in accordance with recommendations of the manufacturer of the material. After the joints are sealed for the entire line, the bedding shall be placed so that all spaces under the pipe are filled. Care shall be exercised to prevent any deviation form the original line and grade of the pipe. The first joint must be located within 4 feet from the riser.

4. Backfilling shall conform to "Structure Backfill".

5. Other details (anti-seep collars, valves, etc.) shall be shown on the drawings.

Plastic Pipe – The following criteria shall apply for plastic pipe:

1. Materials – PVC pipe shall be PVC-1120 or PVC-1220 conforming to ASTM D-1785 or ASTM D-2241. Corrugated High Density Polyethylene (HDPE) pipe, couplings and fittings shall conform to the following: 4" – 10" inch pipe shall meet the requirements of AASHTO M252 Type S, and 12" through 24" inch shall meet the requirements of AASHTO M294 Type S.

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

3. Bedding – The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.

4. Backfilling shall conform to "Structure Backfill".

5. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Drainage Diaphragms – When a drainage diaphragm is used, a registered professional engineer will supervise the design and construction inspection.

Concrete

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

Rock Riprap

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

Geotextile shall be placed under all riprap and shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 921.09, Class C.

Care of Water during Construction

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

Stabilization

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

Erosion and Sediment Control

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

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William I. Malcolm J. (signature) — 7-18-05
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING
Cindy Hamilton (signature) — 7/25/05
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE
(signature) — 7/19/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

Donald Mason (signature) 6/2/05

DEVELOPER: ELIOAK, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: HOMEWOOD, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL, c/o JOHN LEE CARROLL, 515 MADISON AVENUE, 32nd FLOOR, NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21, PARCELS: 86; TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86; THIRD ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

TITLE: STORMWATER MANAGEMENT NOTES AND BORING LOGS

DATE: JUNE, 2005 | PROJECT NO. 1132
DES: JMC/DBT | DRAFT: LDD | CHECK: DAM | SCALE: AS SHOWN | SHEET 40 OF 55

F-04-82

PROFILE ALONG CL OF EMBANKMENT
SCALE: 1"=50' HORIZ., 1"=5' VERT.

NOTES:

1. IF WATER IS ENCOUNTERED DURING THE CONSTRUCTION OF THE CORE TRENCH, IT IS TO BE REMOVED BY PUMPING.
2. CORE TRENCH SHALL CONSIST OF IMPERVIOUS MATERIAL (GC, SC, CL, CH) AS DIRECTED BY A GEOTECHNICAL ENGINEER ONSITE AND MAY REQUIRE TO BE HAULED FROM AN OFFSITE LOCATION.

CORE TRENCH SECTION
NOT TO SCALE

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

6" PIPE DETAIL AND LOW FLOW CONTROL ORIFICE
NOT TO SCALE

TSWM PERFORATION DETAIL
NOT TO SCALE

FOREBAY
Q=28.11 cfs
H=0.96'
L=12.0'
C=2.5

PROFILE THROUGH FOREBAY WEIR
NOT TO SCALE

GABION BASKET LAYOUT
SCALE: 1"=20'

TYPICAL SECTION OF GABION CHANNEL NORTH SIDE OF POND
N.T.S.

ANTI-SEEP COLLAR
NOT TO SCALE

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

TYPE A-2 CONCRETE CRADLE
NOT TO SCALE

NOTES:

1. TRASH RACK SHALL BE GALVANIZED AFTER FABRICATION
2. TRASH RACK SHALL BE PAINTED BATTLESHIP GRAY.
2. TRASH RACK TO BE INSTALLED UPON CONVERSION TO SWM POND.

TRASH RACK DETAIL
SCALE: 1" = 4'

BLOCKING DETAIL FOR POND #6 TEMPORARY SWM DURING CONSTRUCTION
NOT TO SCALE

36" ASTM C-361 (B-25) @ 0.6%

Q_{100}CLOGGED= 84.53 CFS	V_{100}= 11.96 FPS	D_{100}= 3.0'
Q_{10}CLOGGED= 54.11 CFS	V_{10}= 8.29 FPS	D_{10}= 2.61'
Q_1 = 0.77 CFS	V_1 = 2.65 FPS	D_1 = 0.26'
Q_{BASIN} = 0.26 cfs	V=1.90 fps	

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

CONTROL STRUCTURE – POND #6
SCALE: 1" = 4'

AS-BUILT 1-7-09

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

ROUTINE MAINTENANCE:

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

NON-ROUTINE MAINTENANCE:

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

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

Donald Mason — DONALD A. MASON   PE NO. 21443   DATE 1-7-09

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

BY THE DEVELOPER:

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

DEVELOPER — STEVEN K BREEDEN, MEMBER — DATE 6/2/05

BY THE ENGINEER:

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

ENGINEER – DONALD A. MASON, P.E. # 21443 — DATE 6/2/05

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

USDA – NATURAL RESOURCES CONSERVATION SERVICE — DATE 6/19/05

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

HOWARD SOIL CONSERVATION DISTRICT — DATE 6/19/05

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

Donald Mason 6/2/05

DEVELOPER: ELIOAK, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: HOMEWOOD, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL, 515 MADISON AVENUE, 32nd FLOOR, NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

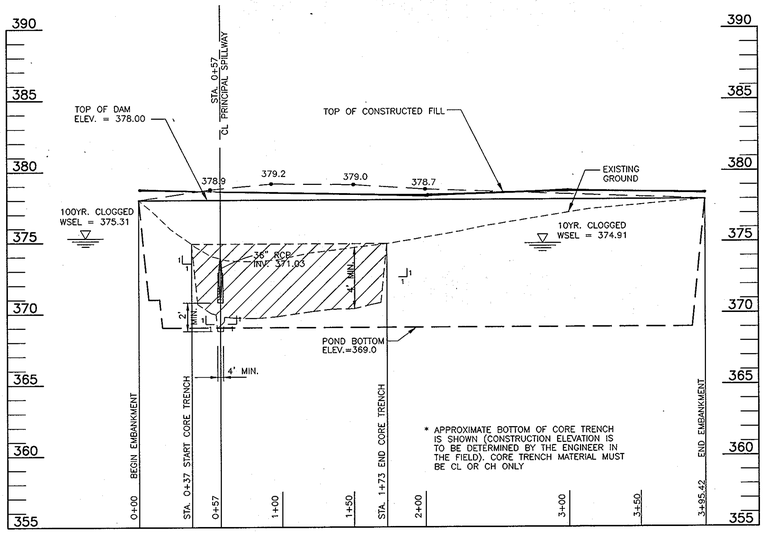
LOCATION: TAX MAP: 23, GRID: 21, PARCELS: 86; TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86; THIRD ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

TITLE: STORMWATER MANAGEMENT DETAILS POND #6

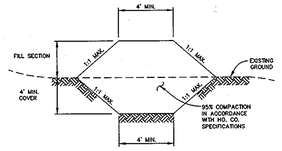
DATE: JUNE, 2005 — PROJECT NO. 1132

DES: JMC/DBT — DRAFT: JMC/RPS — CHECK: DAM — SCALE: AS SHOWN — SHEET 39 OF 55

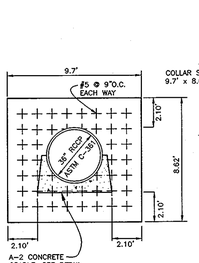
F-04-82



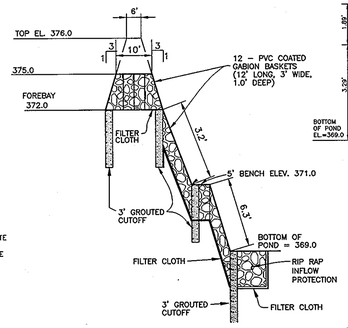
PROFILE ALONG CL OF EMBANKMENT
SCALE: 1"=50' HORZ. 1"=5' VERT.



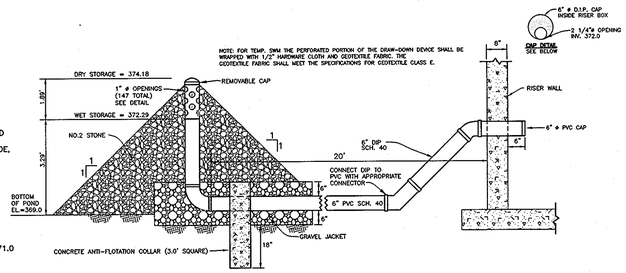
CORE TRENCH SECTION
NOT TO SCALE



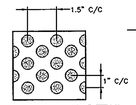
ANTI-SEEP COLLAR
NOT TO SCALE



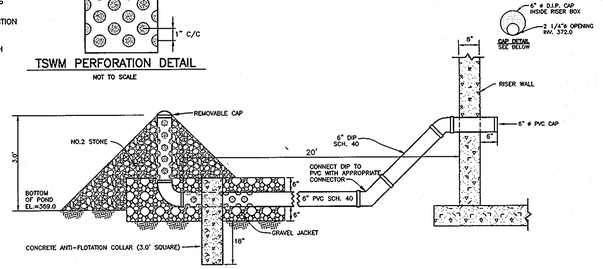
TYPICAL SECTION OF GABION WEIR AT FOREBAY
NOT TO SCALE



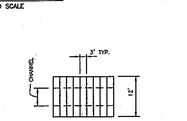
6" TEMPORARY SWM VERTICAL DRAW-DOWN DEVICE
NOT TO SCALE



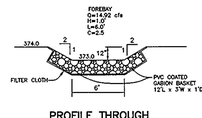
TSWM PERFORATION DETAIL
NOT TO SCALE



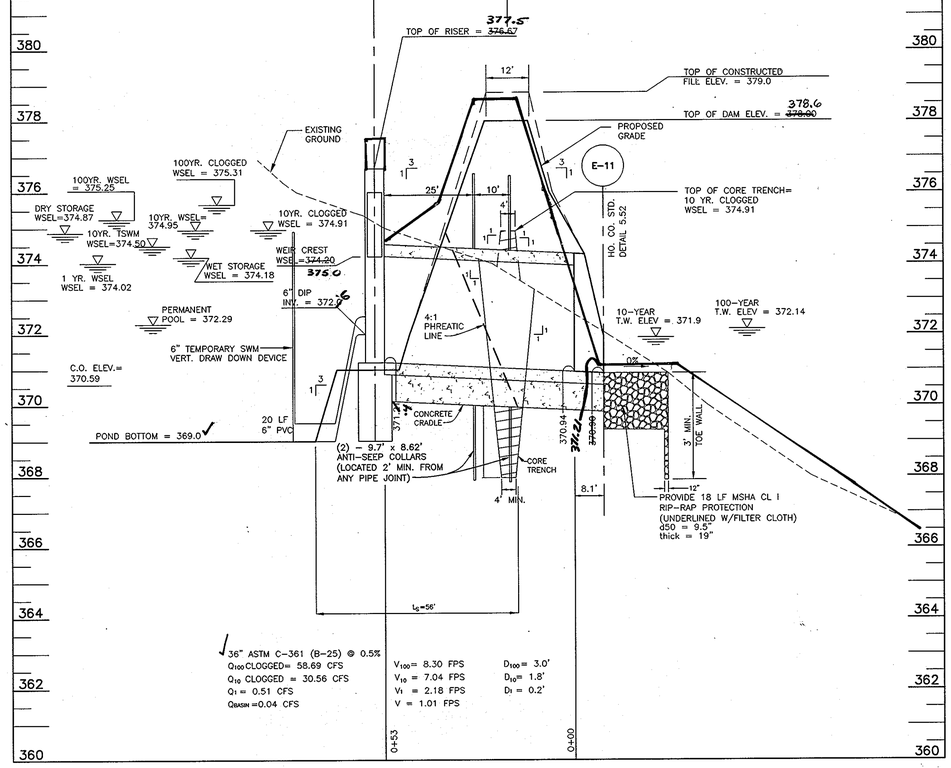
6" PIPE DETAIL AND LOW FLOW CONTROL ORIFICE
NOT TO SCALE



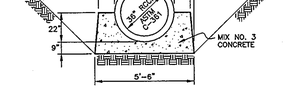
GABION BASKET LAYOUT
NOT TO SCALE



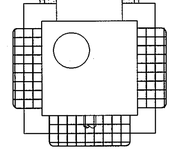
PROFILE THROUGH FOREBAY WEIR
NOT TO SCALE

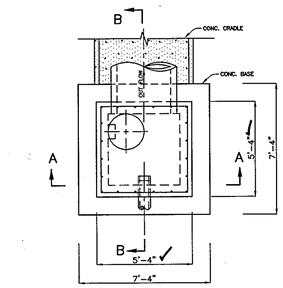


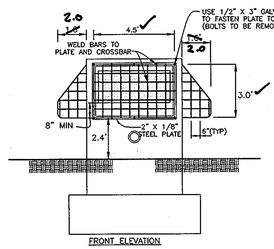
SECTION THRU PRINCIPAL SPILLWAY
SCALE: 1"=20' HORIZ., 1"=2' VERT.



TYPE A-2 CONCRETE CRADLE
NOT TO SCALE

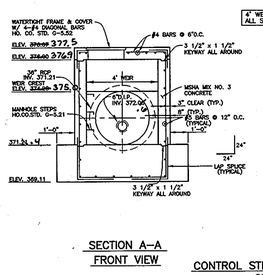




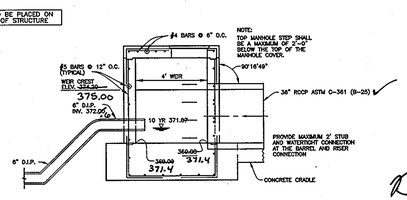


TRASH RACK DETAIL
SCALE: 1" = 4'

NOTES:
1. TRASH RACK SHALL BE GALVANIZED AFTER FABRICATION
2. TRASH RACK SHALL BE PAINTED BATTLESHIP GRAY.
2. TRASH RACK TO BE INSTALLED UPON CONVERSION TO SWM POND.



SECTION A-A
FRONT VIEW



SECTION B-B
SIDE VIEW

CONTROL STRUCTURE - POND #5
SCALE: 1" = 4'

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

ROUTINE MAINTENANCE:

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

NON-ROUTINE MAINTENANCE:

1. STRUCTURAL COMPONENTS OF THE POND SUCH AS THE DAM, THE RISER, AND THE PIPES SHALL BE REPAIRED UPON THE DETECTION OF ANY DAMAGE. THE COMPONENTS SHALL BE INSPECTED DURING ROUTINE MAINTENANCE OPERATIONS.
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AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

DONALD A. MASON — PE NO. 21443 — DATE 1-7-09

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

BY THE DEVELOPER:

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

MEMBER — 4/4/05
DEVELOPER — STEVEN K. BROEGER — DATE

BY THE ENGINEER:

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

Donald Mason — 6/2/05
ENGINEER - DONALD A. MASON, P.E. # 21443 — DATE

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

USDA - NATURAL RESOURCES CONSERVATION SERVICE — 6/10/05 DATE

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

HOWARD SOIL CONSERVATION DISTRICT — 6/10/05 DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — 7-18-05 DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — 7/25/05 DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 7/27/05 DATE

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

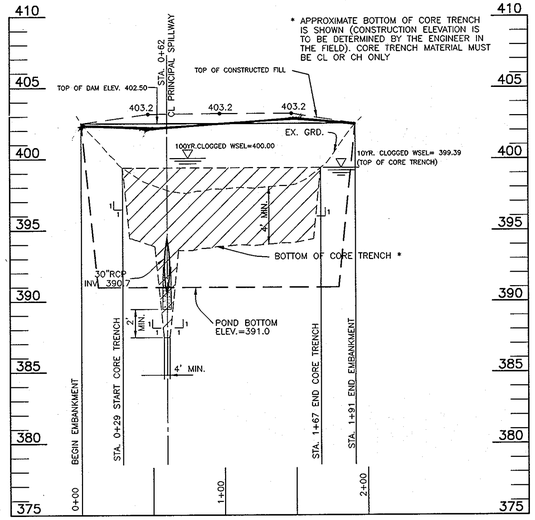
BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

Donald Mason — 6/2/05

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21043 410-465-4244	PROJECT:	RIVERWOOD - PHASE 1 LOTS 1 - 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q' AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244	LOCATION:	TAX MAP: 23, GRID: 21 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 86 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022	TITLE:	STORMWATER MANAGEMENT DETAILS POND #5
		DATE:	JUNE, 2005
		SCALE:	AS SHOWN
		PROJECT NO.	1132
		SHEET	38 OF 55
DES: LDD	DRAFT: LDD	CHECK: DAM	

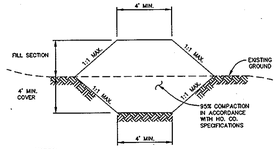
F-04-82

P:\1132 Homewoodsdwg\7024F5.dwg, Sheet 38, 6/2/2005 4:49:00 PM,
imc. Oce TDS600 3.x 2 for mylar.pc3



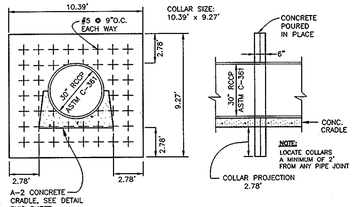
* APPROXIMATE BOTTOM OF CORE TRENCH IS SHOWN (CONSTRUCTION ELEVATION IS TO BE DETERMINED BY THE ENGINEER IN THE FIELD). CORE TRENCH MATERIAL MUST BE CL OR CH ONLY

PROFILE ALONG CL OF EMBANKMENT
SCALE: 1"=50' HORIZ., 1"=5' VERT.

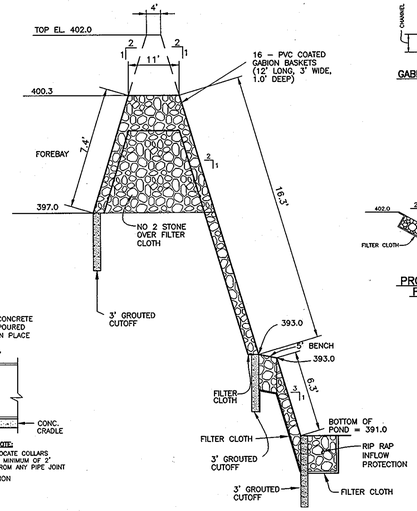


NOTES:
1. IF WATER IS ENCOUNTERED DURING THE CONSTRUCTION OF THE CORE TRENCH, IT IS TO BE REMOVED BY PUMPING.
2. CORE TRENCH SHALL CONSIST OF IMPERVIOUS MATERIAL (GC, SC, CL, CH) AS DIRECTED BY A GEOTECHNICAL ENGINEER ONSITE AND MAY REQUIRE TO BE HAULED FROM AN OFFSITE LOCATION.

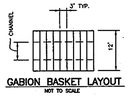
CORE TRENCH SECTION
NOT TO SCALE



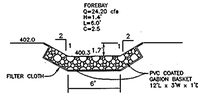
ANTI-SEEP COLLAR
NOT TO SCALE



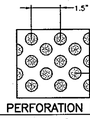
TYPICAL SECTION OF GABION WEIR AT FOREBAY
NOT TO SCALE



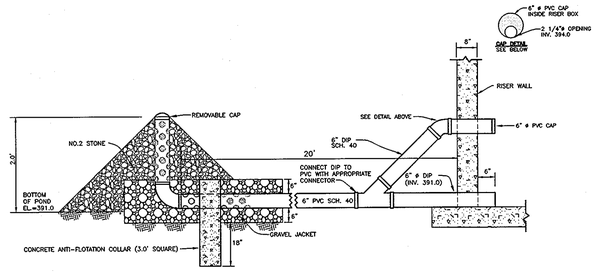
GABION BASKET LAYOUT
NOT TO SCALE



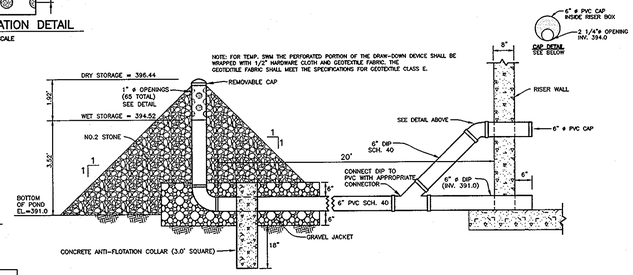
PROFILE THROUGH FOREBAY WEIR
NOT TO SCALE



TSWM PERFORATION DETAIL
NOT TO SCALE

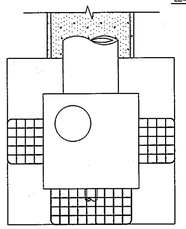


6" PIPE DETAIL AND LOW FLOW CONTROL ORIFICE
NOT TO SCALE



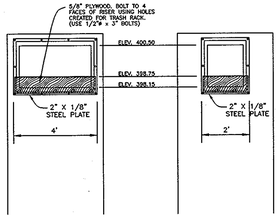
NOTE: FOR TEMP. SWM THE PERFORATED PORTION OF THE DRAW-DOWN DEVICE SHALL BE WRAPPED WITH 1/2" HARDWARE CLOTH AND GEOTEXTILE FABRIC. THE GEOTEXTILE FABRIC SHALL MEET THE SPECIFICATIONS FOR GEOTEXTILE CLASS E.

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



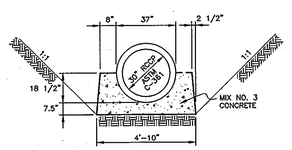
TOP

NOTES:
1. TRASH RACK SHALL BE GALVANIZED AFTER FABRICATION
2. TRASH RACK SHALL BE PAINTED BATTLESHIP GRAY.
3. TRASH RACK TO BE INSTALLED UPON CONVERSION TO SWM POND.

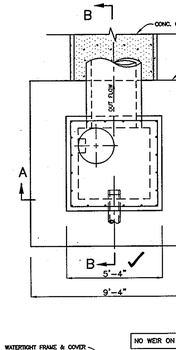


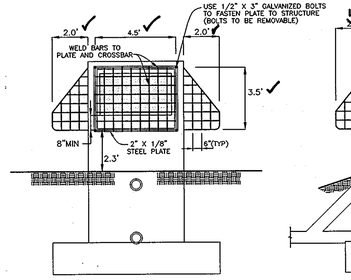
FRONT ELEVATION SIDE ELEVATION

BLOCKING DETAIL FOR POND #4 TEMPORARY SWM DURING CONSTRUCTION
NOT TO SCALE



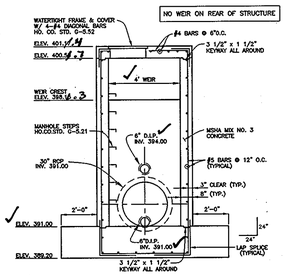
TYPE A-2 CONCRETE CRADLE
NOT TO SCALE



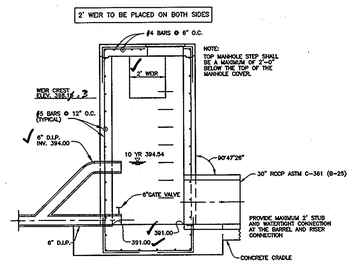


FRONT ELEVATION SIDE ELEVATION

TRASH RACK DETAIL
SCALE: 1" = 4'

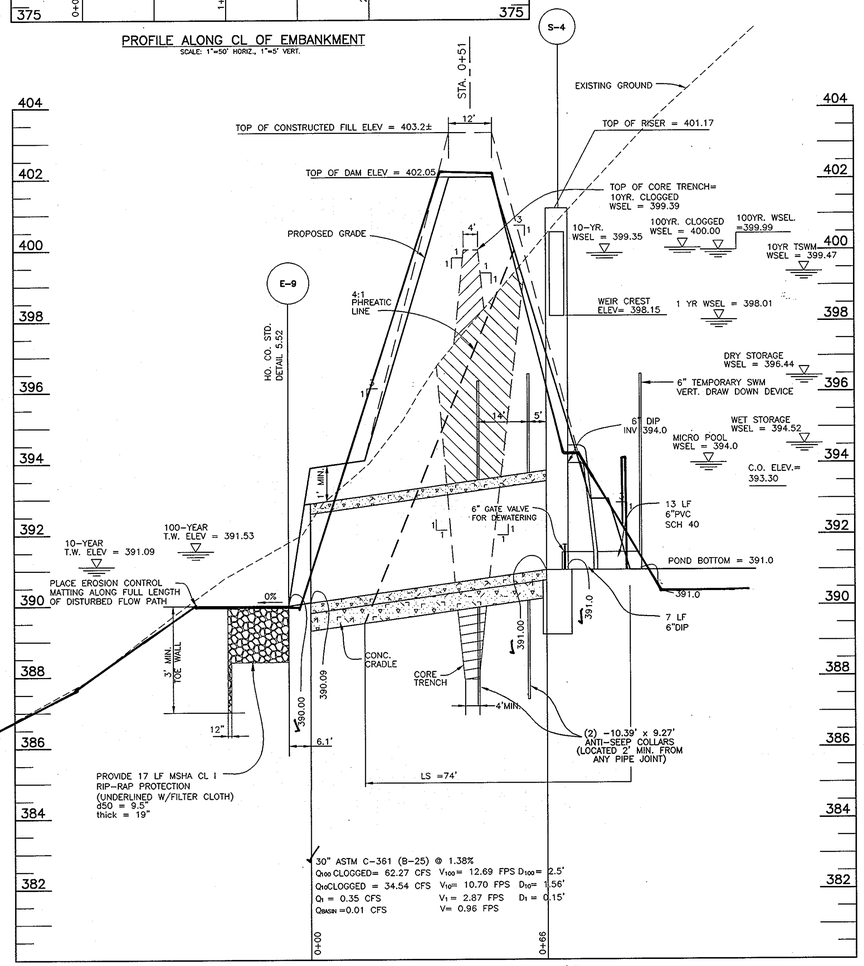


SECTION A-A FRONT VIEW



SECTION B-B SIDE VIEW

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



30" ASTM C-361 (B-25) @ 1.38%
Q_{100} CLOGGED= 62.27 CFS V_{100}= 12.69 FPS D_{100}= 2.5'
Q_{10}CLOGGED = 34.54 CFS V_{10}= 10.70 FPS D_{10}= 1.56'
Q_1 = 0.35 CFS V_1 = 2.87 FPS D_1 = 0.15'
Q_{BASIN} =0.01 CFS V_m = 0.96 FPS

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

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

ROUTINE MAINTENANCE:

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

NON-ROUTINE MAINTENANCE:

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

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

Donald Mason — DONALD A. MASON — PE NO. 21443 — DATE 1-7-09

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

BY THE DEVELOPER:

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

DEVELOPER — STEVEN K. BREEDEN — 4/4/05 DATE

BY THE ENGINEER:

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

Donald Mason — ENGINEER - DONALD A. MASON, P.E. # 21443 — 4/4/05 DATE

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

USDA - NATURAL RESOURCES CONSERVATION SERVICE — 6/10/05 DATE

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

HOWARD SOIL CONSERVATION DISTRICT — 6/10/05 DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — 7-18-05 DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — 7/25/05 DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 7/19/05 DATE

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bel-civilengineering.com

Donald Mason 6/6/06

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER

AS-Built 1-7-09

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
DES: JMC/DBT	DRAFT: JMC/RPS — CHECK: DAM

PROJECT:	RIVERWOOD - PHASE 1 LOTS 1 - 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21, PARCELS: 86 — TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	STORMWATER MANAGEMENT DETAILS POND #4
DATE:	JUNE, 2005 — PROJECT NO. 1132
SCALE:	AS SHOWN — SHEET 37 OF 55

F-04-82

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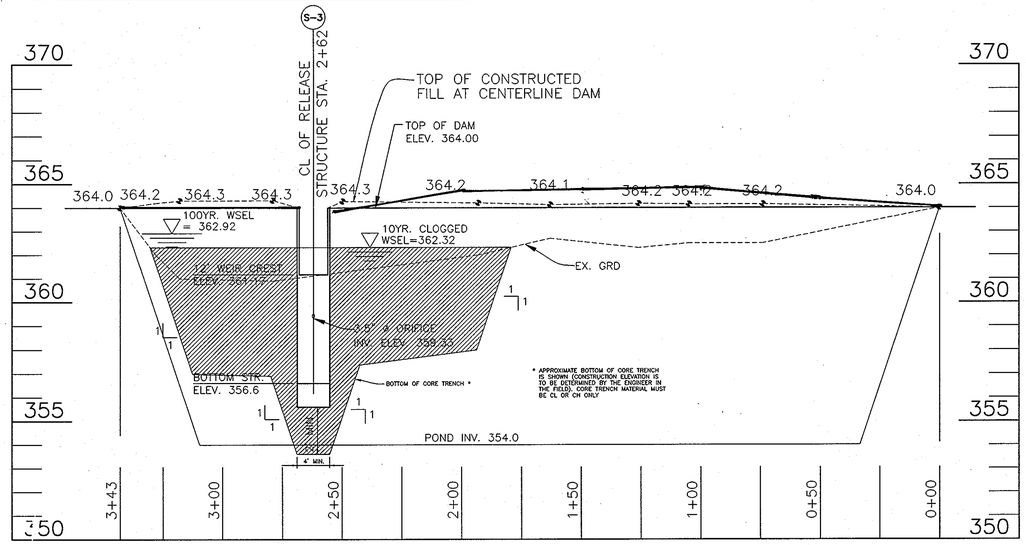
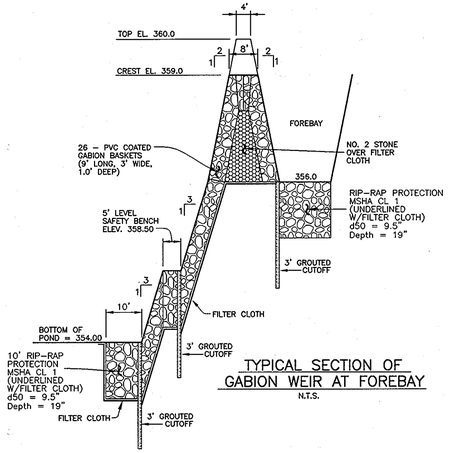
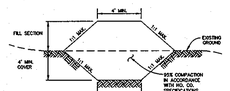


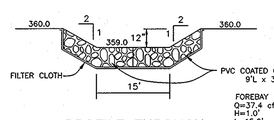
PROFILE ALONG CL OF EMBANKMENT
SECTION A–A
SCALE: 1"=30' HORIZ., 1"=3' VERT.



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

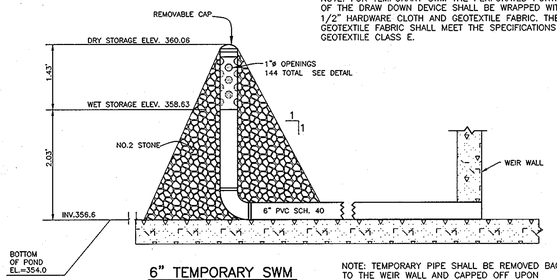


CORE TRENCH SECTION
NOT TO SCALE



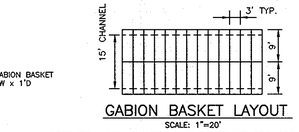
PROFILE THROUGH FOREBAY WEIR
NOT TO SCALE

NOTE: FOR TEMPORARY SWM THE PERFORATED PORTION OF THE DRAW DOWN DEVICE SHALL BE WRAPPED WITH 1/2" HARDWARE CLOTH AND GEOTEXTILE FABRIC. THE GEOTEXTILE FABRIC SHALL MEET THE SPECIFICATIONS FOR GEOTEXTILE CLASS E.



6" TEMPORARY SWM VERTICAL DRAW–DOWN DEVICE
NOT TO SCALE

NOTE: TEMPORARY PIPE SHALL BE REMOVED BACK TO THE WEIR WALL AND CAPPED OFF UPON CONVERSION TO A PERMANENT SWM FACILITY.



GABION BASKET LAYOUT
SCALE: 1"=20'

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

ROUTINE MAINTENANCE:

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AS–BUILT CERTIFICATION

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DONALD A. MASON — PE NO. 21443 — DATE 1-7-09

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

BY THE DEVELOPER:

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

STEVEN K BREEDEN — DEVELOPER — 6/2/05 DATE

BY THE ENGINEER:

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

DONALD A. MASON, P.E. # 21443 — 6/2/05 DATE

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

USDA – NATURAL RESOURCES CONSERVATION SERVICE — 6/10/05 DATE

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

HOWARD SOIL CONSERVATION DISTRICT — 6/10/05 DATE

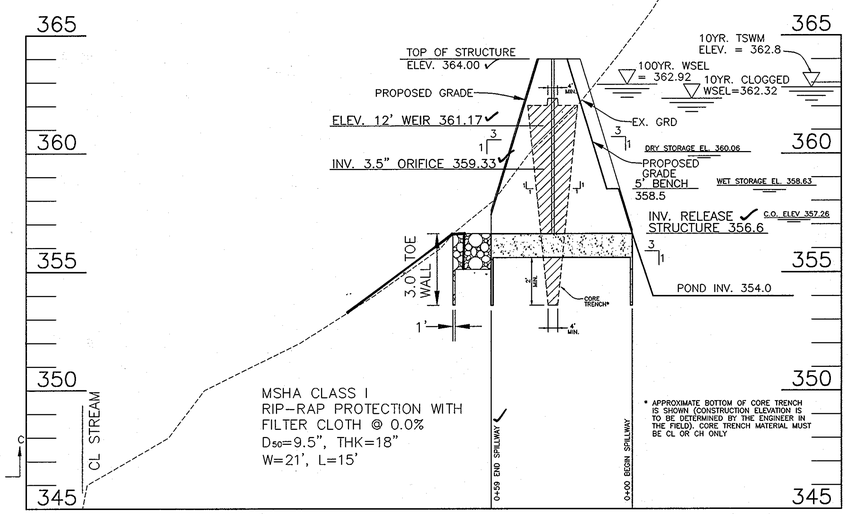
APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — 7-18-05 DATE

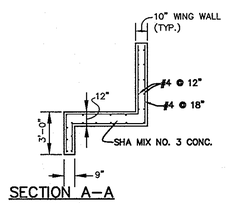
APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — 7/25/05 DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 7/14/05 DATE

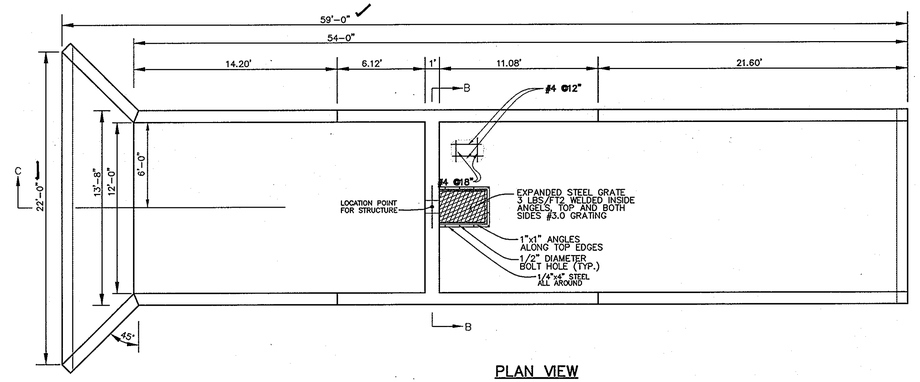


PRINCIPAL SPILLWAY PROFILE
SCALE: 1"=30' HORIZ., 1"=3' VERT.

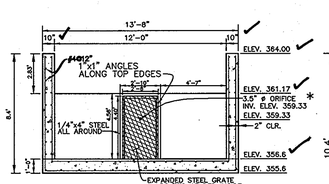


TYPICAL SECTION OF GABION CHANNEL AT NORTH SIDE
N.T.S.

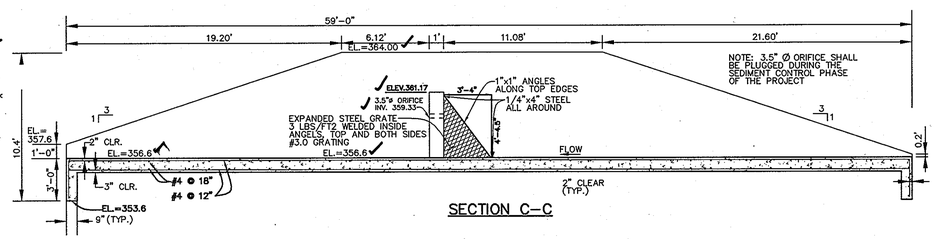
SECTION A–A



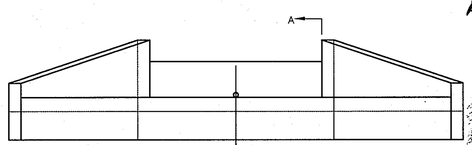
PLAN VIEW



SECTION B–B
* PROVIDE TRASH RACK OVER ORIFICE.



SECTION C–C



FRONT ELEVATION

NOTES:
1. ALL EXPOSED EDGES TO HAVE 3/4"x3/4" CHAMFER OR AS DIRECTED.
2. CONCRETE SHALL BE SHA MIX NO. 3 (f'c= 3500 PSI @ 28 DAYS)
3. REINFORCING STEEL SHALL BE ASTM A–615 GRADE 60.

RELEASE STRUCTURE DETAILS POND #3
SCALE: 1"=5'

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER — AS-BUILT 1-7-09

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK ENGINEERING, INC.
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410–465–6105 ▲ fax: 410–465–6644
www.bei–civilengineering.com

DONALD A. MASON — 6/2/05

DEVELOPER:	ELJOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410–465–4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410–465–4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON–BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON–BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 PARCEL: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	STORMWATER MANAGEMENT DETAILS POND #3
DATE:	JUNE, 2005
PROJECT NO.	1132
SCALE:	AS SHOWN
SHEET	36 OF 55
DES: JMC/DBT	DRAFT: JMC/RPS CHECK: DAM

F–04–82

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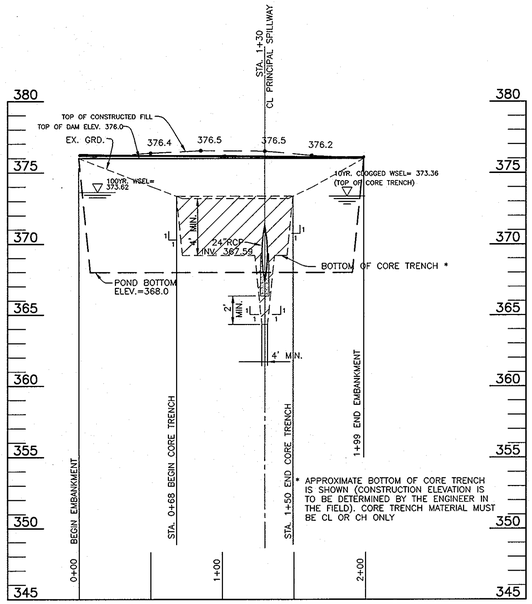
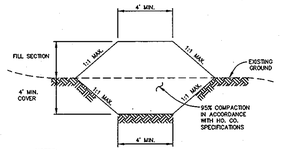


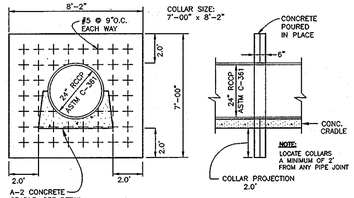
* APPROXIMATE BOTTOM OF CORE TRENCH IS SHOWN (CONSTRUCTION ELEVATION IS TO BE DETERMINED BY THE ENGINEER IN THE FIELD). CORE TRENCH MATERIAL MUST BE CL OR CH ONLY

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

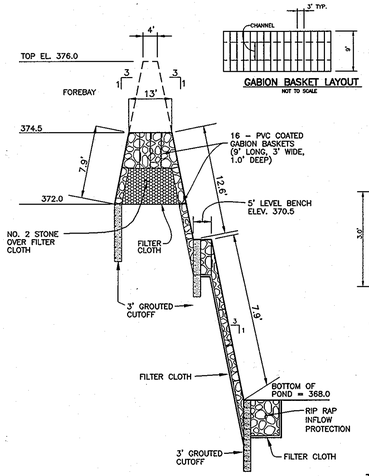


NOTES:
1. IF WATER IS ENCOUNTERED DURING THE CONSTRUCTION OF THE CORE TRENCH, IT IS TO BE REMOVED BY PUMPING.
2. CORE TRENCH SHALL CONSIST OF IMPERVIOUS MATERIAL (GC, SC, CL, CH) AS DIRECTED BY A GEOTECHNICAL ENGINEER ONSITE AND MAY REQUIRE TO BE HAULED FROM AN OFFSITE LOCATION.

CORE TRENCH SECTION
NOT TO SCALE

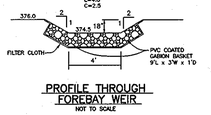


ANTI-SEEP COLLAR – POND #2
NOT TO SCALE



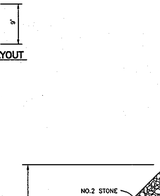
GABION BASKET LAYOUT
NOT TO SCALE

TYPICAL SECTION OF GABION WEIR AT FOREBAY
NOT TO SCALE

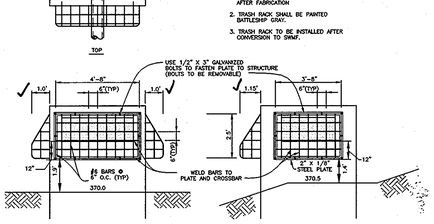


PROFILE THROUGH FOREBAY WEIR
NOT TO SCALE

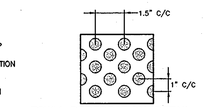
POND #2 TYPE A-2 CONCRETE CRADLE
NOT TO SCALE



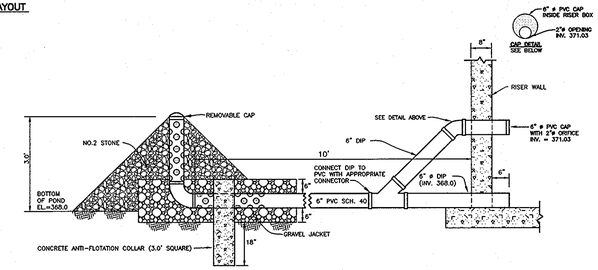
NOTES:
1. TRASH RACK SHALL BE GALVANIZED AFTER FABRICATION
2. TRASH RACK SHALL BE PAINTED BATTLESHIP GRAY.
3. TRASH RACK TO BE INSTALLED AFTER CONVERSION TO SWMF.



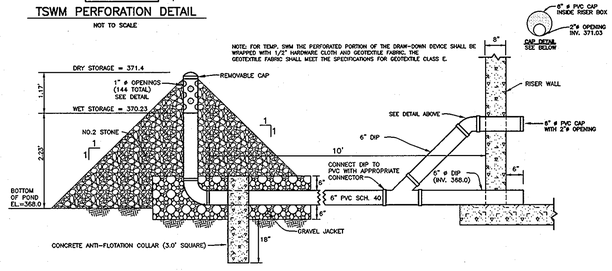
TRASH RACK DETAIL – POND #2
SCALE: 1" = 4'



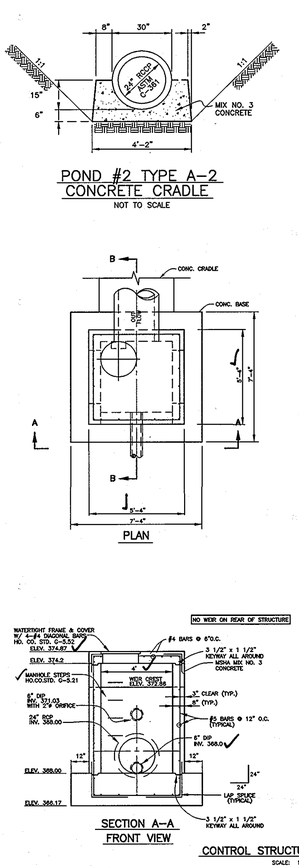
TSWM PERFORATION DETAIL
NOT TO SCALE



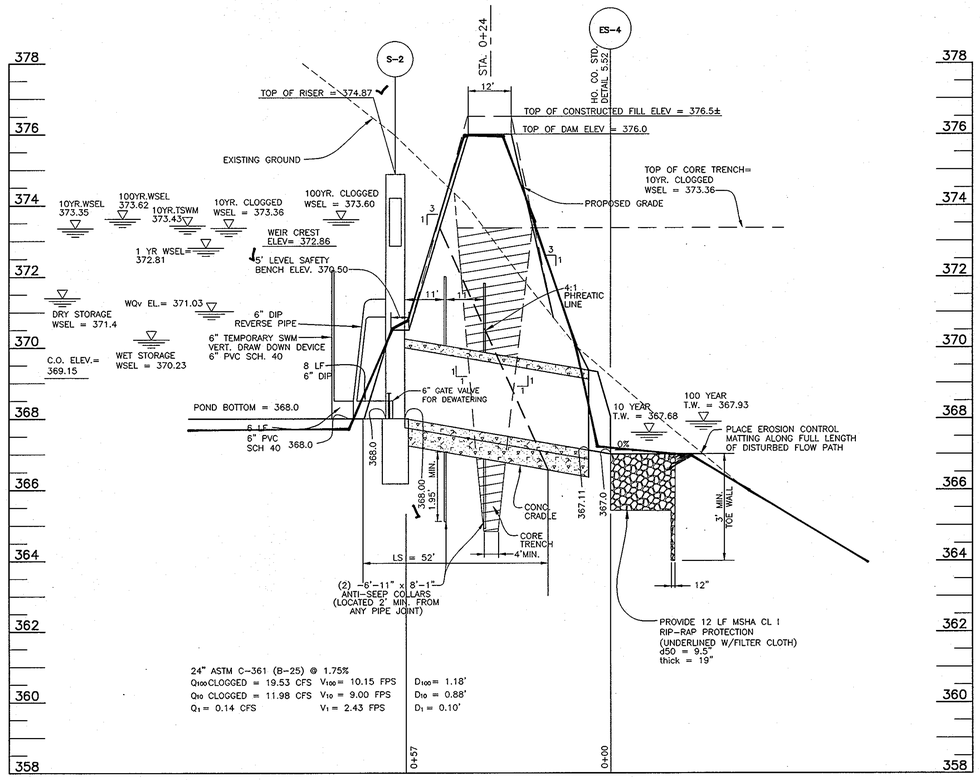
6" PIPE DETAIL AND LOW FLOW CONTROL ORIFICE
NOT TO SCALE



POND #2 6" TEMPORARY SWM VERTICAL DRAW-DOWN DEVICE
NOT TO SCALE



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



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

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

ROUTINE MAINTENANCE:

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

NON–ROUTINE MAINTENANCE:

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

AS–BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS–BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

DONALD A. MASON — PE NO. 21443 — DATE 1-7-09

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

BY THE DEVELOPER:

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

DEVELOPER — STEVEN K. BREEDEN, MEMBER — 4/2/05 DATE

BY THE ENGINEER:

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

ENGINEER – DONALD A. MASON, P.E. # 21443 — 6/1/05 DATE

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

USDA – NATURAL RESOURCES CONSERVATION SERVICE — 6/16/05 DATE

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

HOWARD SOIL CONSERVATION DISTRICT — 6/16/05 DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — 7-18-05 DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — 7/25/05 DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 7/19/05 DATE

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410–465–6105 ▲ fax: 410–465–6644
www.bei–civilengineering.com

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER

Donald Mason 6/1/05

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER

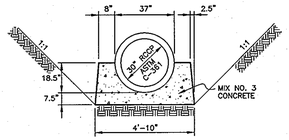
AS-BUILT 1-7-09

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410–465–4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410–465–4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
DES: JMC/DBT	DRAFT: JMC/RPS — CHECK: DAM

PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON–BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON–BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21, PARCELS: 86 — TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	STORMWATER MANAGEMENT DETAILS POND #2
DATE:	JUNE, 2005 — PROJECT NO. 1132
SCALE:	AS SHOWN — SHEET 35 OF 55

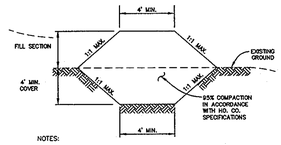
F-04-82

P:\1132 Homewoodwg\7024F2.dwg, Sheet 35, 6/2/2005 4:43:20 PM, inc. Oce TDS600 3.x 2 for mylar.oc3



TYPE A-2 CONCRETE CRADLE

NOT TO SCALE

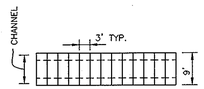


NOTES:

1. IF WATER IS ENCOUNTERED DURING THE CONSTRUCTION OF THE CORE TRENCH, IT IS TO BE REMOVED BY PUMPING.
2. CORE TRENCH SHALL CONSIST OF IMPERVIOUS MATERIAL (GC, SC, CL, CH) AS DIRECTED BY A GEOTECHNICAL ENGINEER ONSITE AND MAY REQUIRE TO BE HAULED FROM AN OFFSITE LOCATION.

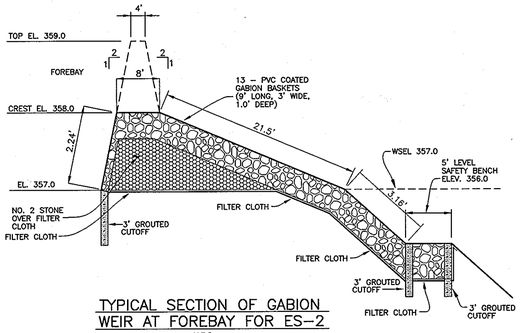
CORE TRENCH SECTION

NOT TO SCALE



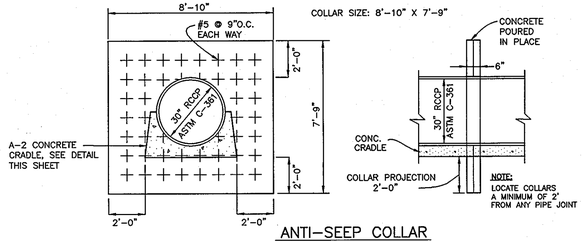
GABION BASKET LAYOUT

SCALE: 1"=20'



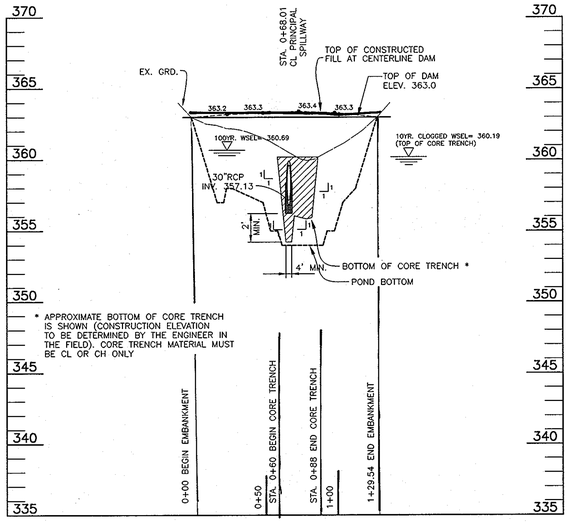
TYPICAL SECTION OF GABION WEIR AT FOREBAY FOR ES-2

N.T.S.



ANTI-SEEP COLLAR

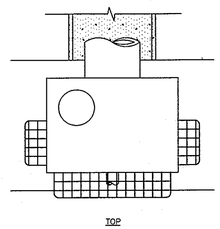
NOT TO SCALE



* APPROXIMATE BOTTOM OF CORE TRENCH IS SHOWN (CONSTRUCTION ELEVATION TO BE DETERMINED BY THE ENGINEER IN THE FIELD). CORE TRENCH MATERIAL MUST BE CL OR CH ONLY

PROFILE ALONG CL OF EMBANKMENT

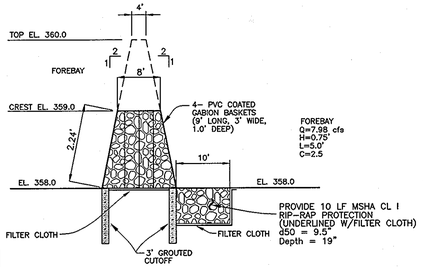
SCALE: 1"=50' HORIZ., 1"=5' VERT.



TOP

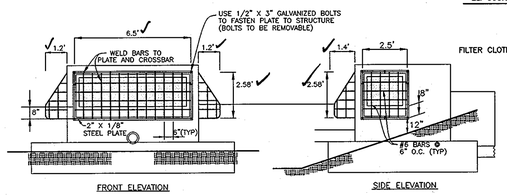
NOTES:

1. TRASH RACK SHALL BE GALVANIZED AFTER FABRICATION
2. TRASH RACK SHALL BE PAINTED BATTLESHIP GRAY.
2. TRASH RACK TO BE INSTALLED UPON CONVERSION TO SWM POND.



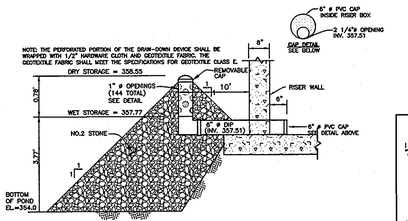
TYPICAL SECTION OF GABION WEIR AT FOREBAY

N.T.S.



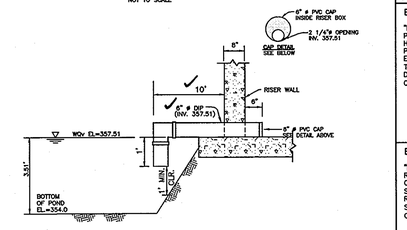
TSWM PERFORATION DETAIL

NOT TO SCALE



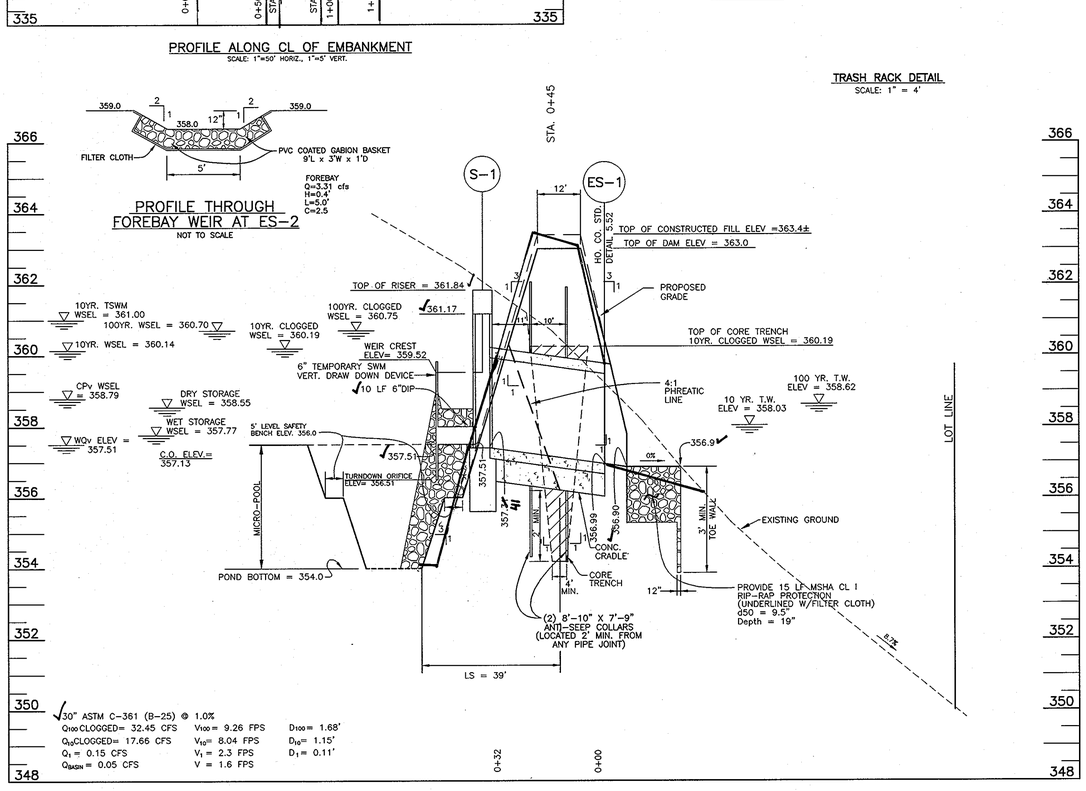
6" TEMPORARY SWM VERTICAL DRAW-DOWN DEVICE

NOT TO SCALE



6" PIPE DETAIL AND LOW FLOW CONTROL ORIFICE

N.T.S.

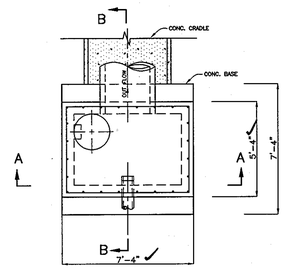


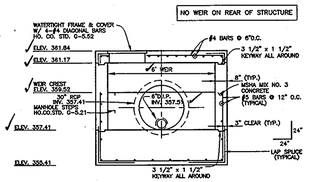
SECTION THRU PRINCIPAL SPILLWAY

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

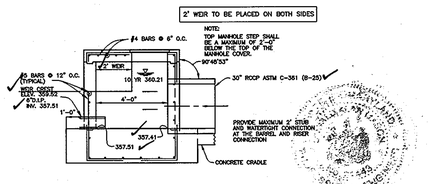
TRASH RACK DETAIL

SCALE: 1" = 4'





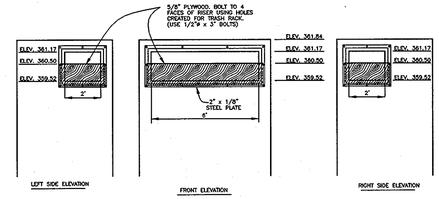
SECTION A-A FRONT VIEW



SECTION B-B SIDE VIEW

CONTROL STRUCTURE - POND #1

SCALE: 1" = 4'



BLOCKING DETAIL FOR POND #1 TEMPORARY SWM DURING CONSTRUCTION

SCALE: 1" = 4'

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER

AS-BUILT 1-7-09

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

ROUTINE MAINTENANCE:

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

NON-ROUTINE MAINTENANCE:

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

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

Donald Mason — DONALD A. MASON — PE NO. 21443 — DATE 1-7-09

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

BY THE DEVELOPER:

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

DEVELOPER — STEVEN K. BREEDEN — DATE 6/2/05

BY THE ENGINEER:

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

Donald Mason — ENGINEER - DONALD A. MASON, P.E. # 21443 — DATE 6/2/05

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

USDA - NATURAL RESOURCES CONSERVATION SERVICE — DATE 6/10/05

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

HOWARD SOIL CONSERVATION DISTRICT — DATE 6/10/05

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

NO.	DATE	REVISION
1	5-9-06	RENUMBER PLANS IN SET

BENCHMARK
ENGINEERING, INC.
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER

Donald Mason 6/2/05

DEVELOPER:	ELJOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
DES: JMC/DBT	DRAFT: JMC/RPS — CHECK: DAM

PROJECT:	RIVERWOOD - PHASE 1 LOTS 1 - 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 PARCELS: 86 — TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 88 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	STORMWATER MANAGEMENT DETAILS POND #1
DATE:	JUNE, 2005 — PROJECT NO. 1132
SCALE:	AS SHOWN — SHEET 34 OF 55

F-04-82

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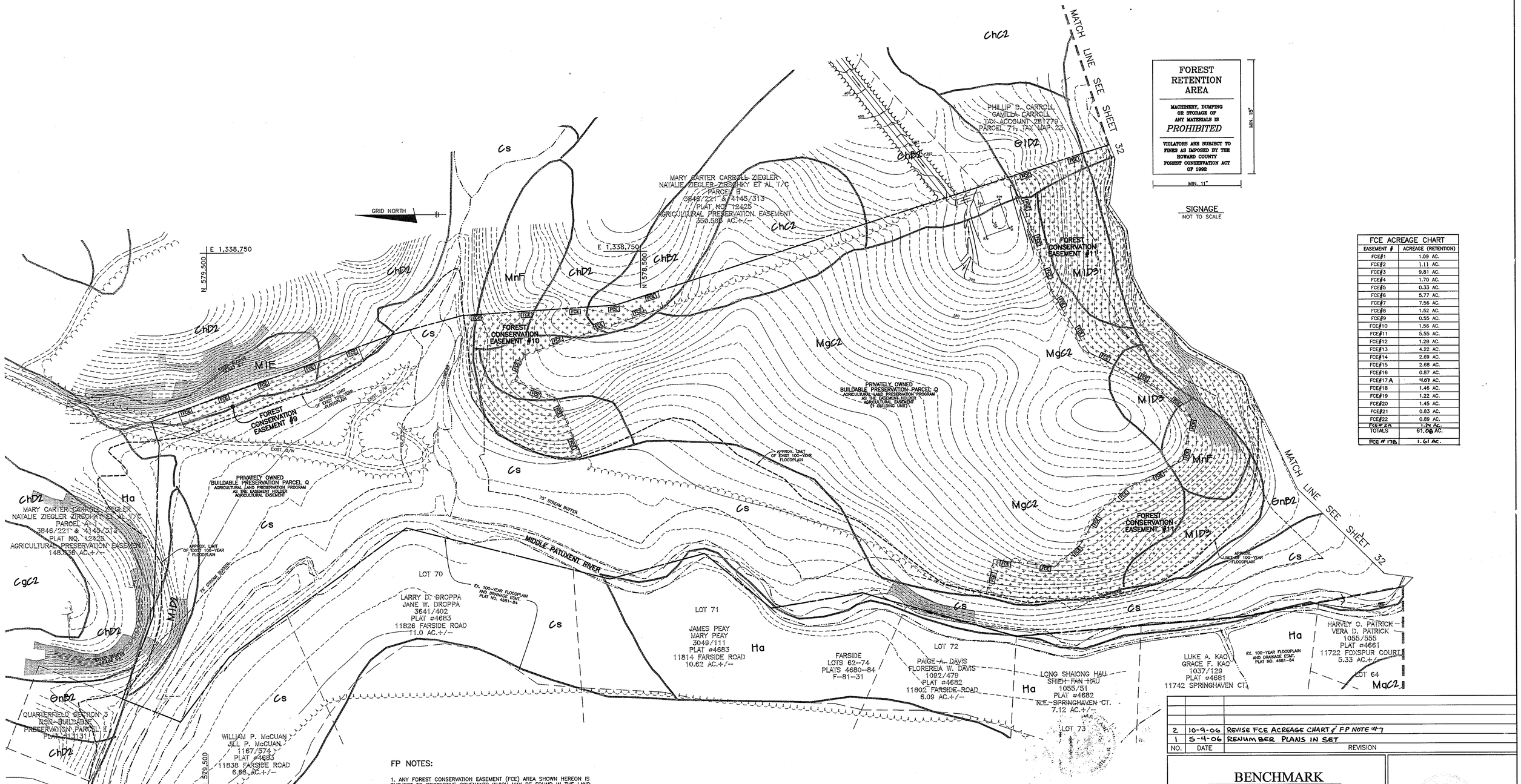

FOREST RETENTION AREA

MACHINERY, DUMPING OR STORAGE OF ANY MATERIALS IS *PROHIBITED*

VIOLATORS ARE SUBJECT TO FINES AS IMPOSED BY THE HOWARD COUNTY FOREST CONSERVATION ACT OF 1992

MIN. 15" × MIN. 11"

SIGNAGE
NOT TO SCALE

FCE ACREAGE CHART	
EASEMENT #	ACREAGE (RETENTION)
FCE#1	1.09 AC.
FCE#2	1.11 AC.
FCE#3	9.81 AC.
FCE#4	1.70 AC.
FCE#5	0.33 AC.
FCE#6	5.77 AC.
FCE#7	7.56 AC.
FCE#8	1.52 AC.
FCE#9	0.55 AC.
FCE#10	1.56 AC.
FCE#11	5.55 AC.
FCE#12	1.28 AC.
FCE#13	4.22 AC.
FCE#14	2.69 AC.
FCE#15	2.68 AC.
FCE#16	0.87 AC.
FCE#17A	4.67 AC.
FCE#18	1.46 AC.
FCE#19	1.22 AC.
FCE#20	1.45 AC.
FCE#21	0.83 AC.
FCE#22	0.89 AC.
FCE#23	1.24 AC.
TOTALS	61.06 AC.
FCE # 17B	1.61 AC.

FP NOTES:

1. ANY FOREST CONSERVATION EASEMENT (FCE) AREA SHOWN HEREON IS SUBJECT TO PROTECTIVE COVENANTS WHICH MAY BE FOUND IN THE LAND RECORDS OF HOWARD COUNTY WHICH RESTRICT THE DISTURBANCE AND USE OF THESE AREAS.

2. FORESTED AREAS OCCURRING OUTSIDE OF THE FCE SHALL NOT BE CONSIDERED PART OF THE FCE AND SHALL NOT BE SUBJECT TO PROTECTIVE LAND COVENANTS

3. LIMITS OF DISTURBANCE SHALL BE RESTRICTED TO AREAS OUTSIDE THE LIMIT OF TEMPORARY FENCING OR THE FCE BOUNDARY, WHICHEVER IS GREATER.

4. THERE SHALL BE NO CLEARING, GRADING, CONSTRUCTION OR DISTURBANCE OF VEGETATION IN THE FOREST CONSERVATION EASEMENT, EXCEPT AS PERMITTED BY HOWARD COUNTY DPZ.

5. NO STOCKPILES, PARKING AREAS, EQUIPMENT CLEANING AREAS, ETC. SHALL OCCUR WITHIN AREAS DESIGNATED AS FOREST CONSERVATION EASEMENTS.

6. TEMPORARY FENCING SHALL BE USED TO PROTECT FOREST RESOURCES DURING CONSTRUCTION. FENCING SHALL BE INSTALLED ALONG LIMITS OF DISTURBANCE OCCURRING WITHIN 50 FEET OF THE PROPOSED FCE LIMITS. PERMANENT SIGNAGE WILL BE POSTED AT 50-100 FOOT INTERVALS ALONG ALL FCE LIMITS.

7. THE TOTAL FOREST CONSERVATION OBLIGATION HAS BEEN MET BY THE ON-SITE RETENTION OF 78.2 ACRES OF NET TRACT AREA FOREST (61.06ACRES WITHIN THE LIMITS OF A FOREST CONSERVATION EASEMENT). THE 16.5 ACRES NOT WITHIN A FOREST CONSERVATION EASEMENT IS LOCATED ON THE BULK PARCELS THAT SHALL BE SUBDIVIDED AS PART OF PHASE 2. THAT 16.5 ACRES SHALL BE TAKEN AS "CLEARED" UNDER THE PHASE 2 SUBDIVISION PLANS. ANY REFORESTATION REQUIREMENT AS A RESULT OF THE PHASE 2 CLEARING SHALL BE DONE UNDER THE PHASE 2 PLANS. FINANCIAL SURETY FOR THE REQUIRED FOREST CONSERVATION IN THE AMOUNT OF $537,531.00 SHALL BE PAID AS PART OF THE DEVELOPER'S AGREEMENT.

FLOODPLAIN NOTE:

PORTIONS OF THE SITE OCCURRING WITHIN THE 100-YEAR FLOODPLAIN ARE NOT INCLUDED AS PART OF THE NET TRACT AREA OF THE SITE. AREAS OF FLOODPLAIN FOREST OCCURRING WITHIN THE LIMITS OF A FOREST CONSERVATION EASEMENT WILL BE PROTECTED BY THE EASEMENT RESTRICTIONS BUT HAVE NOT BEEN CREDITED TOWARD THE PROJECTS FCA OBLIGATIONS.

****SEE THE FINAL RECORD PLAT FOR FOREST****
CONSERVATION EASEMENT BEARINGS AND DISTANCES.

****SEE SHEET 32 FOR FOREST CONSERVATION CALCULATIONS****

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

NO.	DATE	REVISION
2	10-9-06	REVISE FCE ACREAGE CHART & FP NOTE #7
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
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Donald M. Moore 6/6/05

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USACE Wetland Delineator
Certificate # WDCP0MD0404033

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
DES: JMC/DBT	DRAFT: JMC/DBT | CHECK: CAM

PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R' BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 PARCELS: 88 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	FOREST CONSERVATION PLAN
DATE:	JUNE, 2005
PROJECT NO.	1132
SCALE:	1" = 100'
SHEET	33 OF 55

F-04-82

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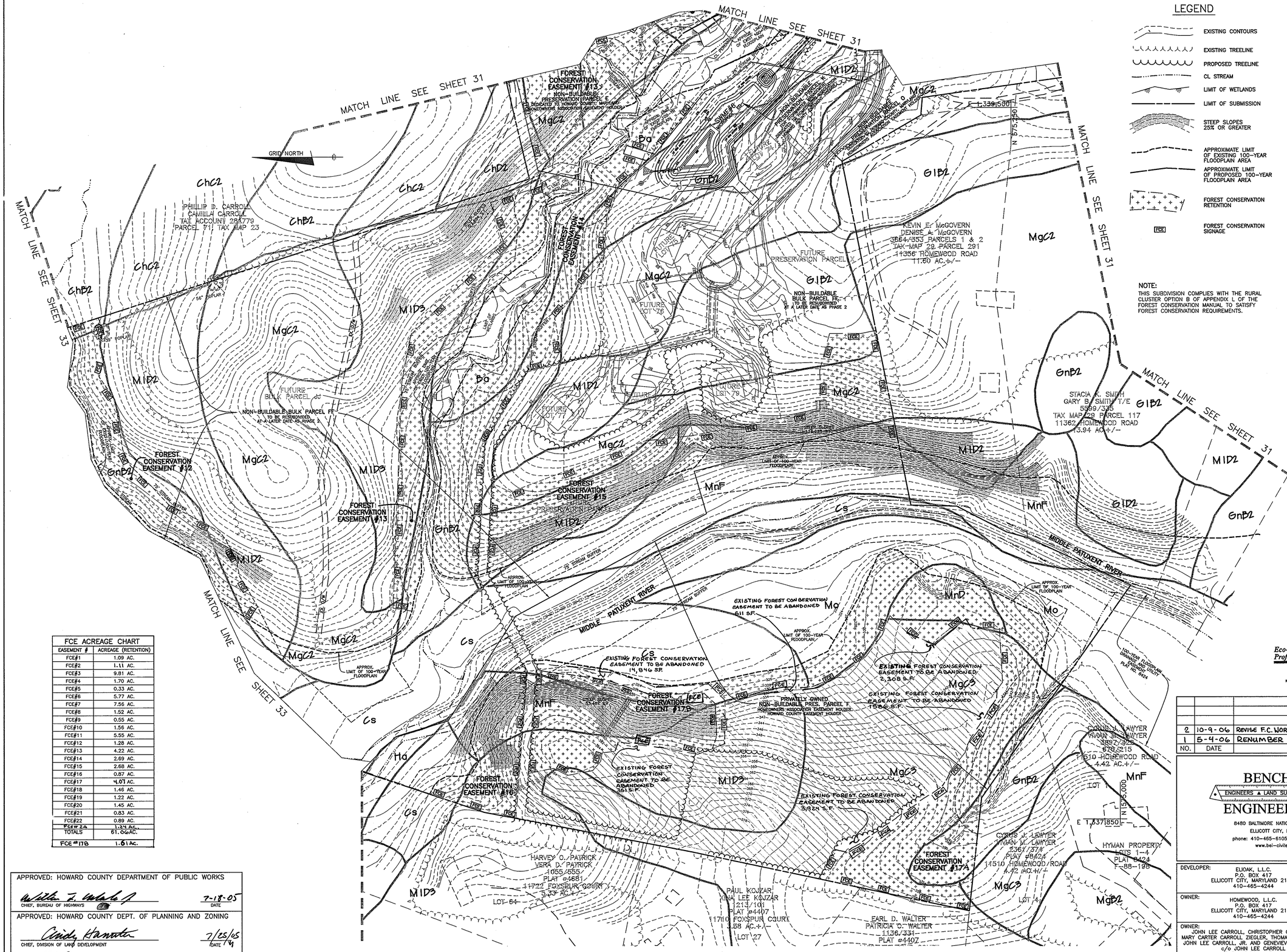

LEGEND

- EXISTING CONTOURS
- EXISTING TREELINE
- PROPOSED TREELINE
- CL STREAM
- LIMIT OF WETLANDS
- LIMIT OF SUBMISSION
- STEEP SLOPES 25% OR GREATER
- APPROXIMATE LIMIT OF EXISTING 100-YEAR FLOODPLAIN AREA
- APPROXIMATE LIMIT OF PROPOSED 100-YEAR FLOODPLAIN AREA
- FOREST CONSERVATION RETENTION
- FCE — FOREST CONSERVATION SIGNAGE

NOTE:
THIS SUBDIVISION COMPLIES WITH THE RURAL CLUSTER OPTION B OF APPENDIX L OF THE FOREST CONSERVATION MANUAL TO SATISFY FOREST CONSERVATION REQUIREMENTS.

APPENDIX G
FOREST CONSERVATION WORKSHEET

	ACRES (1/10 acre)
I. BASIC SITE DATA	
GROSS SITE AREA	269.9
AREA WITHIN 100 YEAR FLOODPLAIN	44.8
AREA WITHIN AGRICULTURAL USE OR PRESERVATION PARCEL (IF APPLICABLE)	N/A
NET TRACT AREA	225.1
LAND USE CATEGORY (R-RLD, R-RMD, R-S, C/I/O, I)	RC-DEO
II. INFORMATION FOR CALCULATIONS	
A. NET TRACT AREA	225.1
B. REFORESTATION THRESHOLD (25% x A)	56.3
C. AFFORESTATION MINIMUM (20% x A)	45.0
D. EXISTING FOREST ON NET TRACT AREA	117.3
E. FOREST AREAS TO BE CLEARED	39.1*
F. FOREST AREAS TO BE RETAINED	78.2**

* CLEARING FOR PHASE 1 ONLY.
**61.1 ACRES WITHIN RETENTION EASEMENTS

III. DETERMINIG REQUIREMENTS: AFFORESTATION OR REFORESTATION

1. Reforestation

If existing forest areas equal or exceed the afforestation minimum (if D equals or is more than C), and clearing of forest areas is proposed, reforestation requirements may apply.

GO TO SECTION IV

If existing forest areas equal or exceed the afforestation minimum (if D equals or is more than C), and no clearing of existing forest resources is proposed, no reforestation is required. No further calculations are needed.

2. Afforestation

If existing forest areas are less than the afforestation minimum (if D is less than C), afforestation requirements apply.

GO TO SECTION V

	ACRES (1/10 acre)
IV. REFORESTATION CALCULATIONS	
A. NET TRACT AREA	225.1
B. REFORESTATION THRESHOLD (25% x A)	56.3
D. EXISTING FOREST ON NET TRACT AREA	117.3
E. FOREST AREAS TO BE CLEARED	39.1
F. FOREST AREAS TO BE RETAINED	78.2
G. FOREST AREAS CLEARED ABOVE REFORESTATION THRESHOLD (D-F, if F equals or is greater than B, Alternate 1) (D-B, if F is less than B, Alternate 2)	39.1
H. FOREST AREAS CLEARED BELOW REFORESTATION THRESHOLD (B-F, if applicable)	N/A
I. FOREST AREAS RETAINED ABOVE REFORESTATION THRESHOLD (F-B, Retention Credit, if applicable)	21.9

SELECT THE ALTERNATE THAT APPLIES:

1. Clearing above the threshold only

If forest areas to be retained equal or are greater than the reforestation threshold (if F equals or is greater than B), the following calculations apply:

REFORESTATION FOR CLEARING ABOVE THRESHOLD G x 1/4	9.8
CREDIT FOR FOREST AREAS RETAINED ABOVE THRESHOLD I = Retention Credit	21.9
TOTAL REFORESTATION REQUIRED (G x 1/4) - I	0.0

If the total reforestation requirement is equal to or less than 0, no reforestation is required.

2. Clearing below the threshold

If forest areas to be retained are less than the reforestation threshold (if F is less than B), the following calculations apply:

REFORESTATION FOR CLEARING ABOVE THRESHOLD G x 1/4	N/A
REFORESTATION FOR CLEARING BELOW THRESHOLD H x 2	N/A
TOTAL REFORESTATION REQUIRED (G x 1/4) + (H x 2)	N/A

Since clearing occurs below the threshold, no forest retention credit is possible

FOREST AREA CLEARING ADJUSTED FOR FIRST PHASE OF DEVELOPEMENT TO BE REVISED IN FUTURE PHASE(S) TO ACCOUNT FOR THE FUTURE CLEARING.

FCE ACREAGE CHART	
EASEMENT #	ACREAGE (RETENTION)
FCE#1	1.09 AC.
FCE#2	1.11 AC.
FCE#3	9.81 AC.
FCE#4	1.70 AC.
FCE#5	0.33 AC.
FCE#6	5.77 AC.
FCE#7	7.56 AC.
FCE#8	1.52 AC.
FCE#9	0.55 AC.
FCE#10	1.56 AC.
FCE#11	5.55 AC.
FCE#12	1.28 AC.
FCE#13	4.22 AC.
FCE#14	2.69 AC.
FCE#15	2.68 AC.
FCE#16	0.87 AC.
FCE#17	4.01 AC.
FCE#18	1.46 AC.
FCE#19	1.22 AC.
FCE#20	1.45 AC.
FCE#21	0.83 AC.
FCE#22	0.89 AC.
FCE#2A	1.34 AC.
TOTALS	61.06AC.
FCE #17B	1.61 AC.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS	
CHIEF, BUREAU OF HIGHWAYS	DATE 7-18-05
APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 7/25/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 7/19/05

SEE SHEET 33 FOR FOREST CONSERVATION NOTES AND SIGNAGE DETAIL

**SEE THE FINAL RECORD PLAT FOR FOREST CONSERVATION EASEMENT BEARINGS AND DISTANCES.

Eco-Science Professionals, Inc.
CONSULTING ECOLOGISTS
P.O. Box 5006 Glen Arm, MD 21057 (410) 592-6352

MD DNR Qualified Professional
USACOE Wetland Delineator
Certified Arborist #MA-0474
John F. Colestin

NO.	DATE	REVISION
2	10-9-06	REVISE F.C. WORKSHEET & ACREAGE CHART
1	5-9-06	RENUMBER PLANS IN SET

BENCHMARK
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Donald Moon 6/6/05

DEVELOPER: ELJOAK, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: HOMEWOOD, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL, c/o JOHN LEE CARROLL, 515 MADISON AVENUE, 32nd FLOOR, NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD - PHASE 1
LOTS 1 - 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'F' & 'R'
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: FOREST CONSERVATION PLAN

DATE: JUNE, 2005 PROJECT NO. 1132

DES: JMC/DBT DRAFT: JMC/DBT CHECK: CAM SCALE: 1" = 100' SHEET 32 OF 55

F-04-82

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LEGEND

- EXISTING CONTOURS
- EXISTING TREELINE
- PROPOSED TREELINE
- CL STREAM
- LIMIT OF WETLANDS
- LIMIT OF SUBMISSION
- STEEP SLOPES 25% OR GREATER
- APPROXIMATE LIMIT OF EXISTING 100-YEAR FLOODPLAIN AREA
- APPROXIMATE LIMIT OF PROPOSED 100-YEAR FLOODPLAIN AREA
- FOREST CONSERVATION RETENTION
- FCE — FOREST CONSERVATION SIGNAGE

FCE ACREAGE CHART	
EASEMENT #	ACREAGE (RETENTION)
FCE#1	1.09 AC.
FCE#2	1.11 AC.
FCE#3	9.81 AC.
FCE#4	1.70 AC.
FCE#5	0.33 AC.
FCE#6	5.77 AC.
FCE#7	7.56 AC.
FCE#8	1.52 AC.
FCE#9	0.55 AC.
FCE#10	1.56 AC.
FCE#11	5.55 AC.
FCE#12	1.28 AC.
FCE#13	4.22 AC.
FCE#14	2.69 AC.
FCE#15	2.68 AC.
FCE#16	0.87 AC.
FCE#17 A	4.01 AC.
FCE#18	1.46 AC.
FCE#19	1.22 AC.
FCE#20	1.45 AC.
FCE#21	0.83 AC.
FCE#22	0.89 AC.
FCE # 23	1.24 AC.
TOTALS	61.04 AC.
FCE #11B	1.61 AC.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/15/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

SEE THE FINAL RECORD PLAT FOR FOREST CONSERVATION EASEMENT BEARINGS AND DISTANCES.

SEE SHEET 32 FOR FOREST CONSERVATION CALCULATIONS

SEE SHEET 33 FOR FOREST CONSERVATION NOTES AND SIGNAGE DETAIL

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MD DNR Qualified Professional URA/FOR Forestry/Arborist Certificate # MD-RFA-2002084422
John F. Cassias

NO.	DATE	REVISION
2	10-9-06	REVISE FCE ACREAGE CHART
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
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DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
DES: JMC/DBT	DRAFT: JMC/DBT CHECK: CAM

PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R' BUILDABLE PRESERVATION PARCEL 'Q', AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	FOREST CONSERVATION PLAN
DATE:	JUNE, 2005
PROJECT NO.	1132
SCALE:	1" = 100'
SHEET	31 OF 55

F-04-82

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LEGEND

- EXISTING CONTOURS
- EXISTING TREELINE
- PROPOSED TREELINE
- CL STREAM
- LIMIT OF WETLANDS
- LIMIT OF SUBMISSION
- STEEP SLOPES 25% OR GREATER
- APPROXIMATE LIMIT OF EXISTING 100-YEAR FLOODPLAIN AREA
- APPROXIMATE LIMIT OF PROPOSED 100-YEAR FLOODPLAIN AREA
- FOREST CONSERVATION RETENTION
- FCE — FOREST CONSERVATION SIGNAGE

SOILS LEGEND		
MAP SYMBOL	SOIL GROUP	SOIL TYPE
Ba	D*	BAILE SILT LOAM
CgB2	B	CHESTER GRAVELLY SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
CgC2	B	CHESTER GRAVELLY SILT LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED
ChA	B	CHESTER SILT LOAM, 0 TO 3 PERCENT SLOPES
ChB2	B	CHESTER SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
ChC2	B	CHESTER SILT LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED
ChC3	B	CHESTER SILT LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
ChD2	B	CHESTER SILT LOAM, 0 TO 3 PERCENT SLOPES
Co	B	COMUS SILT LOAM
ElkB2	B	ELIOAK SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
ElC3	B	ELIOAK SILTY CLAY LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
GlB2	B	GLENELG LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
GlC2	B	GLENELG LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED
GlD2	B	GLENELG LOAM, 15 TO 25 PERCENT SLOPES, MODERATELY ERODED
GnB2	C*	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
Ha	D*	HATBORO SILT LOAM
MgB2	B	MANOR GRAVELLY LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
MgC2	B	MANOR GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED
MgC3	B	MANOR GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
MlD2	B	MANOR LOAM, 15 TO 25 PERCENT SLOPES, MODERATELY ERODED
MlD3	B	MANOR LOAM, 15 TO 25 PERCENT SLOPES, SEVERELY ERODED
MlE	B	MANOR LOAM, 25 TO 45 PERCENT SLOPES
MnD	B	MANOR VERY STONY LOAM, 3 TO 25 PERCENT SLOPES
MnF	B	MANOR VERY STONY LOAM, 25 TO 60 PERCENT SLOPES
Mo	B*	MIXED ALLUVIAL LAND

* INDICATES HYDRIC SOILS

TAKEN FROM SOIL SURVEY, HOWARD COUNTY, MARYLAND (ISSUED JULY 1968) MAP NO. 31

SITE ANALYSIS DATA CHART

GENERAL SITE DATA

1.) PRESENT ZONING: RC-DEO

2.) APPLICABLE DPZ FILE REFERENCES: WP-02-64, S-02-009, P-03-010

3.) PROPOSED USE OF SITE: SFD

4.) PROPOSED WATER AND SEWER SYSTEMS: PRIVATE

AREA TABULATION

1.) GROSS TRACT AREA 269.88 AC.±

2.) AREA WITHIN 100-YEAR FLOODPLAIN 44.83 AC.±

3.) NET TRACT AREA 225.05 AC.±

FCE ACREAGE CHART	
EASEMENT #	ACREAGE (RETENTION)
FCE#1	1.09 AC.
FCE#2	1.11 AC.
FCE#3	9.81 AC.
FCE#4	1.70 AC.
FCE#5	0.33 AC.
FCE#6	5.77 AC.
FCE#7	7.56 AC.
FCE#8	1.52 AC.
FCE#9	0.55 AC.
FCE#10	1.56 AC.
FCE#11	5.55 AC.
FCE#12	1.28 AC.
FCE#13	4.22 AC.
FCE#14	2.69 AC.
FCE#15	2.68 AC.
FCE#16	0.87 AC.
FCE#17 A	4.07 AC.
FCE#18	1.46 AC.
FCE#19	1.22 AC.
FCE#20	1.45 AC.
FCE#21	0.83 AC.
FCE#22	0.89 AC.
FCE # 2 A	1.34 AC.
TOTALS	61.06 AC.
FCE #17B	1.61 AC.

SEE THE FINAL RECORD PLAT FOR FOREST CONSERVATION EASEMENT BEARINGS AND DISTANCES.

SEE SHEET 32 FOR FOREST CONSERVATION CALCULATIONS

SEE SHEET 33 FOR FOREST CONSERVATION NOTES AND SIGNAGE DETAIL

NO.	DATE	REVISION
4	2-20-08	REVISE GRADING AT HEADWALL # 2.
3	1-5-07	ADD 1605F OF FOREST / REMOVE 2375F OF FOREST FROM FCE # 20
2	10-9-06	SHOW THE PORTION OF FCE # 2 # 17 TO BE ABANDONED & REVISE FCE ACREAGE CHART
1	5-4-06	RENUMBER PLANS IN SET

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

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MD DNR Qualified Professional
USACOE Wetland Delineator
Certification # WDCP2004100044122

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www.bei-civilengineering.com

Donald Mason 6/16/05

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244	PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R' BUILDABLE PRESERVATION PARCEL 'Q' AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244	LOCATION:	TAX MAP: 23, GRID: 21 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 86 PARCELS: 2(& 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022	TITLE:	FOREST CONSERVATION PLAN
DES: JMC/DBT	DRAFT: JMC/DBT	CHECK: CAM	DATE: JUNE, 2005 PROJECT NO. 1132 SCALE: 1" = 100' SHEET 30 OF 55

F-04-82

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MGWC 1.4: Diversion Pipe

Temporary measure for dewatering in-channel construction sites

Description

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

Effective Uses & Limitations

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

Material Specifications

Materials for stream diversions shoulld meet the following requirements:

* Riprap: Stone should be washed and have a minimum diameter of 6 inches (15 centimeters).
* Sandbags: Sandbags should consist of materials which are resistant to ultra-violet radiation, tearing, and puncture and should be woven tightly enough to prevent leakage of fill material (i.e., sand, fine gravel, etc.).
* Sheeting: Sheeting should consist of polyethylene or other material which is imprevious and resistant to puncture and tearing.

Installation Guidelines

All erosion and sediment control devices including mandatory filter bags should be installed as the first order of business according to a plan approved by the WMA or local authority. Installation should proceed from upstream to downstream during low flow conditions. If necessary, silt fence or straw bales should be installed around the perimeter of the work area.

Diversion pipes with sandbag or stone barriers should be completed as follows (refer to detail 1.4):

1. Sandbag/stone barriers should be sized and installed as detailed in MGWC 1.5: Sandbag/Stone Diversion. The materials should be sized to withstand baseflow velocities.
2. All excavated material should be deposited and stabilized in an approved area outside the 100-year floodplain unless otherwise authorized by the WMA.
3. Sediment-laden water from the construction area should be pumped to a filter bag.
4. The diversion pipe should have a minimum capacity sufficient to convey the 2-year flow for projects with a duration of two weeks or greater. For projects of shorter duration, the capacity of the pipe can be reduced accordingly.
5. If necessary, silt fence or straw bales should be installed around the perimeter of the work area.
6. Sediment control devices are to remain in place until all disturbed areas are stabilized and the inspecting authority approves their removal.

Maryland's Guidelines To Waterway Construction

DETAIL 1.4: DIVERSION PIPE

TEMPORARY INSTREAM CONSTRUCTION MEASURES	*REVISED NOVEMBER 2000 PAGE 14 - 2*	MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

FILTER BAG DETAIL

NOTES:

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

MGWC 4.8: Temporary Access Bridge

Temporary stream crossing intended for minimum corridor disturbance

Description

A temporary access bridge is a stream crossing made of wood, metal, or other materials designed to limit the amount of disturbance to the stream banks and bed.

Effective Uses & Limitations

Temporary access bridges are the preferred method of waterway crossing since they typically cause the least disturbance to the waterway bed and banks, pose the least chance for interference with fish migration, and can be quickly removed and reused.

Material Specifications

- *Stringers*: Stringers should either be logs, sawn timber, prestressed concrete beams, metal beams, or other approved materials.
- *Deck Materials*: Deck materials should be of sufficient strength to support the anticipated load.

Construction Sequence

All erosion and sediment control devices, including stream diversions, should be implemented as the first order of business according to a plan approved by the WMA or local authority. Dewatering basins should be built as needed and swales or ditches should be used to prevent surface drainage from entering the stream via the bridge crossing. (See the *1994 Maryland Standards and Specifications for Soil Erosion and Sediment Control*.) The proposed construction, maintenance, and removal sequence is as follows:

1. Abutments should be placed parallel to, and on, stable banks such that the structure is at or above bankfull depth to prevent the entrapment of floating materials and debris.
2. Temporary access bridges should be constructed to span the entire channel. If the bankfull channel width exceeds 8 feet (2.5 meters), then a footing, pier, or other bridge support may be constructed within the waterway. No support will be permitted within the channel for waterways less than 8 feet wide. One additional bridge support will be permitted for each additional 8-foot width of the channel.
3. All decking members should be placed perpendicularly to the stringers, butted tightly, and securely fastened to the stringers. Decking materials must be butted tightly to prevent any soil material tracked onto the bridge from falling into the waterway.
4. Although run planks are optional, they may be necessary to properly distribute loads. One run plank should be provided for each track of the equipment wheels and should be securely fastened to the length of the span.
5. Curbs or fenders may be installed along the outer sides of the deck to provide additional safety.
6. Bridges should be securely anchored at one end using steel cable or chain to prevent the bridge from floating downstream and possibly causing an obstruction to the flow. Anchoring at only one end will prevent channel obstruction in the event that flood waters float the bridge. Acceptable anchors are large trees, boulders, or driven steel anchors.
7. All areas disturbed during installation should be stabilized within 14 calendar days in accordance with a revegetation plan approved by the WMA.
8. Periodic inspection should be performed by the user to ensure that the bridge, streambed, and stream banks are maintained and not damaged.
9. Maintenance should be performed as needed to ensure that the structure complies with all standards and specifications. This should include the removal of trapped sediment and debris which should then be disposed of and stabilized outside the floodplain.
10. When the temporary bridge is no longer needed, all structures including abutments and other bridging materials should be removed within 14 calendar days. In all cases, the bridge materials should be removed within 1 year of installation. Removal of the bridge and clean-up of the area, including protection and stabilization of disturbed stream banks, should be accomplished without the use of construction equipment in the waterway.

Maryland's Guidelines To Waterway Construction

DETAIL 4.8: TEMPORARY ACCESS BRIDGE

SKETCH

STREAM CROSSINGS	*PAGE 4.8 - 3*	MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

LEGEND

	EXISTING TREELINE
	PROPOSED TREELINE
	CL STREAM
	LIMIT OF WETLANDS
	LIMIT OF SUBMISSION
	PROPOSED FOREST CONSERVATION EASEMENT
	APPROXIMATE LIMIT OF EXISTING 100-YEAR FLOODPLAIN AREA
	APPROXIMATE LIMIT OF PROPOSED 100-YEAR FLOODPLAIN AREA
8	LANDSCAPE PERIMETER DESIGNATION
	15' NO WOODY VEGETATION ZONE

DEVELOPER'S/BUILDER'S CERTIFICATE

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

STEVE R. BREEDEN, ELIOAK, L.L.C. — DATE 6/2/05

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK ENGINEERING, INC.
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

6/2/05

DEVELOPER: ELIOAK, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: HOMEWOOD, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL, 515 MADISON AVENUE, 32nd FLOOR, NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21, PARCELS: 86; TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86; THIRD ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

TITLE: LANDSCAPE PLAN AND STREAM DIVERSION DETAILS

DATE: JUNE, 2005	PROJECT NO. 1132
SCALE: 1" = 100'	SHEET 29 OF 55

DES: JMC/DBT | DRAFT: JMC/DBT | CHECK: CAM

F-04-82

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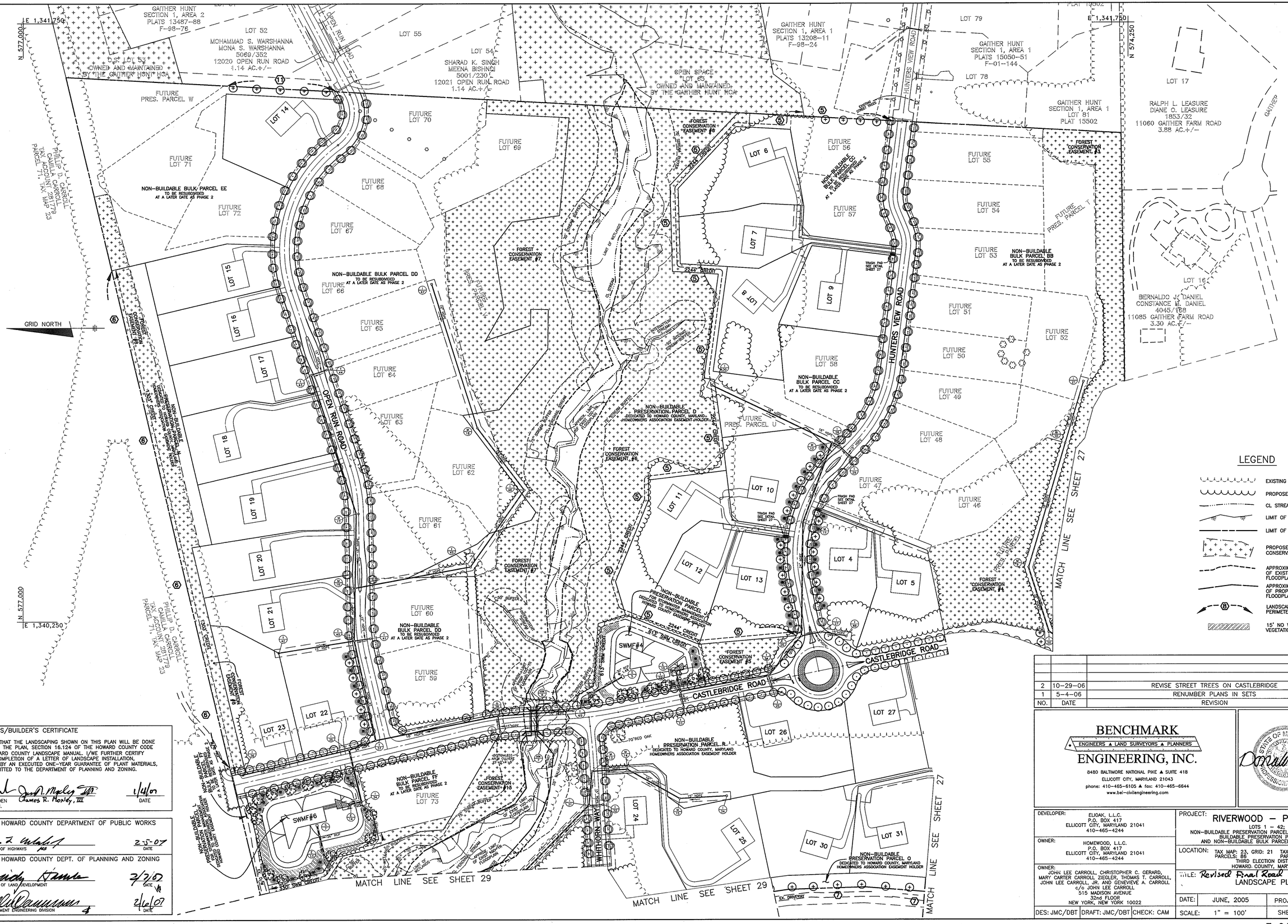

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STEVE BREEDEN
ELJOAK, L.L.C.

James R. Morley, III — 1/4/07
DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 2-5-07

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 2/2/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 2/6/07

NO.	DATE	REVISION
2	10-29-06	REVISE STREET TREES ON CASTLEBRIDGE
1	5-4-06	RENUMBER PLANS IN SETS

BENCHMARK
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ENGINEERING, INC.
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ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bel-civilengineering.com

STATE OF MARYLAND — DONALD MASON — PROFESSIONAL ENGINEER — 1-4-07

DEVELOPER: ELJOAK, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: HOMEWOOD, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL
c/o JOHN LEE CARROLL
515 MADISON AVENUE
32nd FLOOR
NEW YORK, NEW YORK 10022

DES: JMC/DBT | DRAFT: JMC/DBT | CHECK: CAM

PROJECT: RIVERWOOD - PHASE 1
LOTS 1 - 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 88 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: Revised Final Road Construction Plan
LANDSCAPE PLAN

DATE: JUNE, 2005 | PROJECT NO. 1132

SCALE: 1" = 100' | SHEET 28 OF 55

F-04-82

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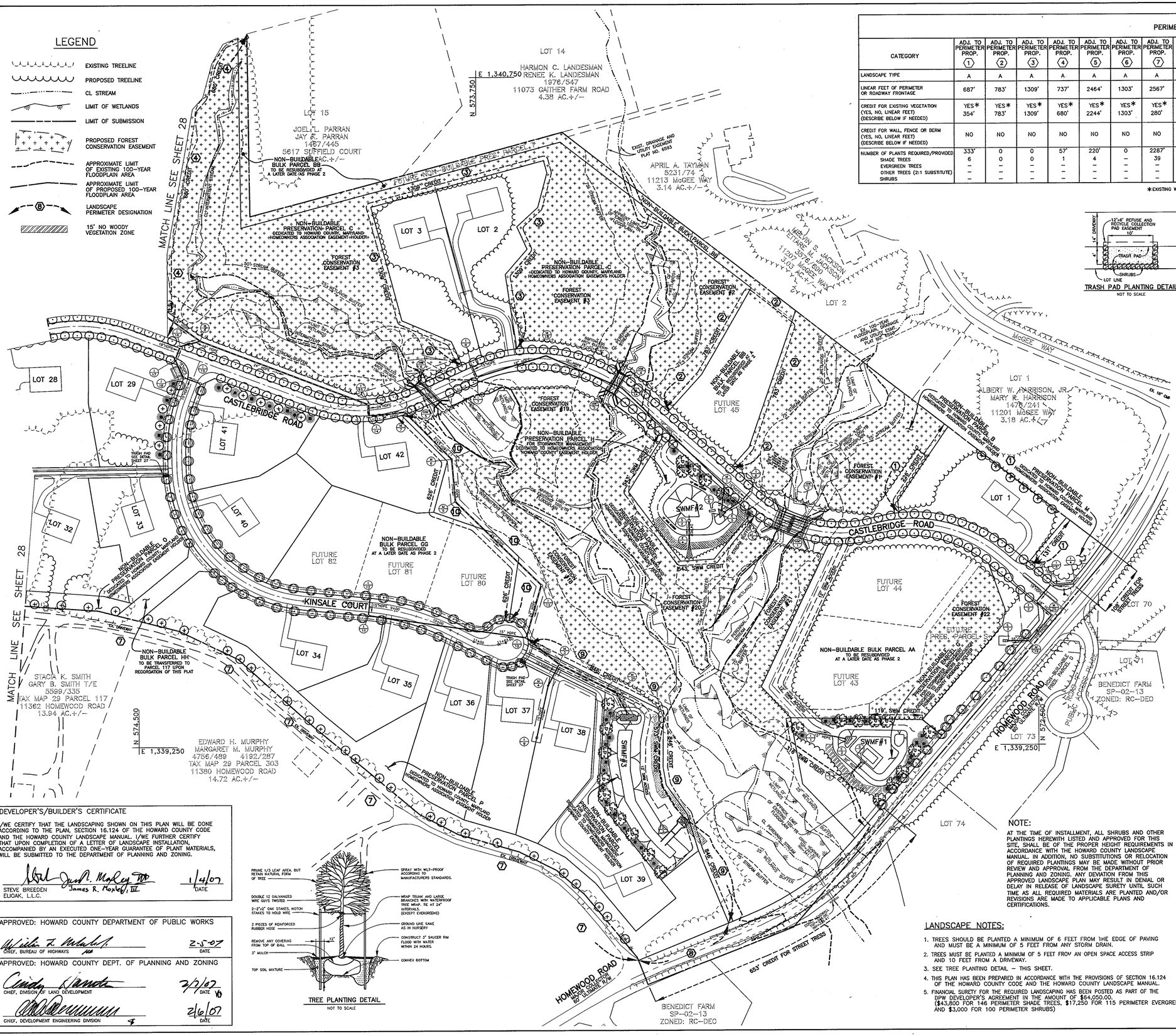
LEGEND

- EXISTING TREELINE
- PROPOSED TREELINE
- CL STREAM
- LIMIT OF WETLANDS
- LIMIT OF SUBMISSION
- PROPOSED FOREST CONSERVATION EASEMENT
- APPROXIMATE LIMIT OF EXISTING 100-YEAR FLOODPLAIN AREA
- APPROXIMATE LIMIT OF PROPOSED 100-YEAR FLOODPLAIN AREA
- LANDSCAPE PERIMETER DESIGNATION
- 15' NO WOODY VEGETATION ZONE



TRASH PAD PLANTING DETAIL
NOT TO SCALE

SCHEDULE A
PERIMETER LANDSCAPE EDGE

CATEGORY	ADJ. TO PERIMETER PROP. 1	ADJ. TO PERIMETER PROP. 2	ADJ. TO PERIMETER PROP. 3	ADJ. TO PERIMETER PROP. 4	ADJ. TO PERIMETER PROP. 5	ADJ. TO PERIMETER PROP. 6	ADJ. TO PERIMETER PROP. 7	ADJ. TO ROAD 8	ADJ. TO PERIMETER PROP. 9	ADJ. TO PERIMETER PROP. 10	ADJ. TO PERIMETER PROP. 11	ADJ. TO ROADWAY LOT 4	ADJ. TO ROADWAY LOT 5	ADJ. TO ROADWAY LOT 10	ADJ. TO ROADWAY LOT 13	ADJ. TO ROADWAY LOT 22	ADJ. TO ROADWAY LOT 29	ADJ. TO ROADWAY LOT 41	ADJ. TO TRASH PADS
LANDSCAPE TYPE	A	A	A	A	A	A	A	B	A	A	A	B	B	B	B	B	B	B	B
LINEAR FEET OF PERIMETER OR ROADWAY FRONTAGE	687'	783'	1309'	737'	2464'	1303'	2567'	218'	846'	626'	275'	404'	226'	224'	248'	225'	200'	248'	5 PADS 36' EACH
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	YES* 354'	YES* 783'	YES* 1309'	YES* 680'	YES* 2244'	YES* 1303'	YES* 280'	YES* 218'	YES* 846'	YES* 626'	NO	YES* 127'	YES* 226'	NO	NO	NO	NO	NO	NO
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
NUMBER OF PLANTS REQUIRED/PROVIDED	333'	0	0	57'	220'	0	2287'	0	0	0	275'	277'	0	224'	248'	225'	200'	248'	36' EACH
SHADE TREES	6	0	0	1	4	–	39	0	0	0	5	6	0	5	5	5	4	5	–
EVERGREEN TREES	–	–	–	–	–	–	–	0	–	–	–	7	0	6	7	6	5	7	–
OTHER TREES (2:1 SUBSTITUTE)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SHRUBS	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	100**

*EXISTING WOODS 20' OR GREATER IN WIDTH.

**20 SHRUBS SUBSTITUTED FOR THE REQUIRED 1 SHADE TREE AND 1 EVERGREEN
20 SHRUBS x 5 PADS = 100 SHRUBS TOTAL

SCHEDULE D
SWM AREA LANDSCAPING

	FACILITY 1	FACILITY 2	FACILITY 3	FACILITY 4	FACILITY 5	FACILITY 6
LINEAR FEET OF PERIMETER	914	803	1063	946	1290	1028
LINEAR FEET OF EXISTING WOODS LINE	435	543	573	613	550	330
LINEAR FEET OF REQUIRED PLANTING	479	260	490	333	740	698
BUFFER TYPE	"B"	"B"	"B"	"B"	"B"	"B"
NUMBER OF TREES REQUIRED/PROVIDED						
SHADE TREES	10	5	10	7	15	14
EVERGREEN TREES	12	7	13	8	19	18
CREDIT FOR EXISTING VEGETATION (NO, YES AND %)	YES, 48%	YES, 68%	YES, 54%	YES, 65%	YES, 43%	YES, 32%
CREDIT FOR OTHER LANDSCAPING (NO, YES AND %)	NO	NO	NO	NO	NO	NO

STREET TREE SCHEDULE

ROAD NAME	PERIMETER	TREES REQ.	TREES PROV.
HOMEWOOD ROAD	544'	14	14
CASTLEBRIDGE ROAD**	8145'	272**	272**
KINSALE COURT	2395'	60	60
HUNTERS VIEW ROAD	2771'	70	70
WHITHORN WAY	654'	17	17
OPEN RUN ROAD	3388'	85	85
TOTAL		450	450

** CASTLEBRIDGE ROAD WILL BE PROVIDED "SMALL TREES" AT 1 PER 30 LF OF RIGHT-OF-WAY

PUBLIC STREET TREE PLANTING LIST

SYMBOL	QUANTITY	NAME	REMARKS	
⊙	246	PLATANUS X ACERIFOLIA 'BLOODGOOD' (Bloodgood London Plane)	2 1/2" MIN. CAL. B&B FULL HEAD	STREET TREES TO BE PROVIDED BY THE DEVELOPER
⊙	272	PRUNUS SERRULATA 'KWANZAN' (Kwanzan Cherry)	1 1/2" MIN. CAL. B&B FULL HEAD	

LANDSCAPE PLANTING LIST

SYMBOL	QUANTITY	NAME	REMARKS	DESCRIPTION
⊕	85	QUERCUS RUBRA (Red Oak)	2-1/2" – 3"cal.	SHADE TREES ALONG PERIMETER TO BE PROVIDED BY THE DEVELOPER
✳	115	PINUS STROBUS (Eastern White Pine)	6' – 8' ht.	EVERGREEN TREES ALONG SWM FACILITIES TO BE PROVIDED BY THE DEVELOPER
❀	61	TILIA CORDATA 'GREENSPIRE' (Greenspire Littleleaf Linden)	2-1/2" – 3"cal.	SHADE TREES ALONG SWM FACILITIES TO BE PROVIDED BY THE DEVELOPER
⊘	100	ABELIA X GRANDIFLORA 'GLOSSY ABELIA'	2.5" – 3" HEIGHT	SHRUBS ALONG TRASH PADS TO BE PROVIDED BY THE DEVELOPER

NOTE:
LANDSCAPING FOR THIS SUBDIVISION IS PROVIDED IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL.

DEVELOPER'S/BUILDER'S CERTIFICATE

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STEVE BREEDEN, ELIOAK, L.L.C. — James R. Moxley, III — 1/4/07 DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — 2-5-07 DATE

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — 2/1/07 DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 2/6/07 DATE

TREE PLANTING DETAIL
NOT TO SCALE

NOTE:
AT THE TIME OF INSTALLMENT, ALL SHRUBS AND OTHER PLANTINGS HEREWITH LISTED AND APPROVED FOR THIS SITE, SHALL BE OF THE PROPER HEIGHT REQUIREMENTS IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL. IN ADDITION, NO SUBSTITUTIONS OR RELOCATION OF REQUIRED PLANTINGS MAY BE MADE WITHOUT PRIOR REVIEW AND APPROVAL FROM THE DEPARTMENT OF PLANNING AND ZONING. ANY DEVIATION FROM THIS APPROVED LANDSCAPE PLAN MAY RESULT IN DENIAL OR DELAY IN RELEASE OF LANDSCAPE SURETY UNTIL SUCH TIME AS ALL REQUIRED MATERIALS ARE PLANTED AND/OR REVISIONS ARE MADE TO APPLICABLE PLANS AND CERTIFICATIONS.

LANDSCAPE NOTES:

1. TREES SHOULD BE PLANTED A MINIMUM OF 6 FEET FROM THE EDGE OF PAVING AND MUST BE A MINIMUM OF 5 FEET FROM ANY STORM DRAIN.
2. TREES MUST BE PLANTED A MINIMUM OF 5 FEET FROM AN OPEN SPACE ACCESS STRIP AND 10 FEET FROM A DRIVEWAY.
3. SEE TREE PLANTING DETAIL – THIS SHEET.
4. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL.
5. FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE DPW DEVELOPER'S AGREEMENT IN THE AMOUNT OF $64,050.00. ($43,800 FOR 146 PERIMETER SHADE TREES, $17,250 FOR 115 PERIMETER EVERGREENS AND $3,000 FOR 100 PERIMETER SHRUBS)

NO.	DATE	REVISION
2	10-29-06	REVISE STREET TREES ON CASTLEBRIDGE AND REVISE CULVERT AND SWM ACCESS
1	5-4-06	RENUMBER PLANS IN SETS

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bel-civilengineering.com

STATE OF MARYLAND — CARROLL BOONE — PROFESSIONAL ENGINEER — 1-4-07

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q'
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 88 — TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: Revised Final Road Construction Plan
LANDSCAPE PLAN

DES: JMC/DBT	DRAFT: JMC/DBT	CHECK: CAM

DATE: OCTOBER, 2006 — PROJECT NO. 1132
SCALE: 1" = 100' — SHEET 27 OF 55

F-04-82

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SEDIMENT CONTROL NOTES

1. A MINIMUM OF 24 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTION, LICENSES AND PERMITS, SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION, (313-1850).
2. ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE MOST CURRENT "MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL", REVISIONS THERETO.
3. FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN: A) 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DIKES, PERIMETER SLOPES AND ALL SLOPES GREATER THAN 3:1, B) 14 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
4. ALL SEDIMENT TRAPS/BASINS SHOWN MUST BE FENCED AND WARNING SIGNS POSTED AROUND THEIR PERIMETER IN ACCORDANCE WITH VOL. 1, CHAPTER 12, OF THE HOWARD COUNTY DESIGN MANUAL, STORM DRAINAGE.
5. ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR PERMANENT SEEDINGS (SEC. 51) SOD (SEC. 54), TEMPORARY SEEDING (SEC. 50) AND MULCHING (SEC. 52). TEMPORARY STABILIZATION WITH MULCH ALONE CAN ONLY BE DONE WHEN RECOMMENDED SEEDING DATES DO NOT ALLOW FOR PROPER GERMINATION AND ESTABLISHMENT OF GRASSES.
6. ALL SEDIMENT CONTROL STRUCTURES ARE TO REMAIN IN PLACE AND ARE TO BE MAINTAINED IN OPERATIVE CONDITION UNTIL PERMISSION FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
7. SITE ANALYSIS:

TOTAL AREA OF SITE	269.88	ACRES
AREA DISTURBED	41.0	ACRES
AREA TO BE ROOFED OR PAVED	5.58	ACRES
AREA TO BE VEGETATIVELY STABILIZED	35.4	ACRES
TOTAL CUT	23,500	CY
TOTAL FILL	32,000	CY
OFFSITE WASTE/BORROW AREA LOCATION	SEE NOTE #12	

8. ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
9. ADDITIONAL SEDIMENT CONTROL MUST BE PROVIDED, IF DEEMED NECESSARY BY THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
10. ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES, APPROVAL OF THE INSPECTION AGENCY SHALL BE REQUESTED UPON COMPLETION OF INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
11. TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH CAN BE BACK FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.
12. WASTE WILL BE HAULED TO AN APPROVED WASTE DISPOSAL SITE, WITH A ACTIVE GRADING PERMIT.

TOPSOIL SPECIFICATIONS

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

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

i. Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Regardless, topsoil shall not be a mixture of contrasting texture subsoils and shall contain less than 5% by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1-1/2" in diameter.

ii. Topsoil must be free of plants or plant parts such as Bermuda grass, quack grass, Johnson grass, nutsedge, poison ivy, thistle, or others as specified.

iii. Where the subsoil is either highly acidic or composed of heavy clays, ground limestone shall be spread at the rate of 4-8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.

III. For sites having disturbed areas under 5 acres:

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

IV. For sites having disturbed areas over 5 acres:

i. On soil meeting Topsoil specifications, obtain test results dictating fertilizer and lime amendments required to bring the soil into compliance with the following:

a. pH for topsoil shall be between 6.0 and 7.5. If the tested soil demonstrates a pH of less than 6.0, sufficient lime shall be prescribed to raise the pH to 6.5 or higher.

b. Organic content or topsoil shall be not less than 1.5 percent by weight.

c. Topsoil having soluble salt content greater than 500 parts per million shall not be used.

d. No sod or seed shall be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phyto-toxic materials.

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

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

V. Topsoil Application

i. When topsoiling, maintain needed erosion and sediment control practices such as diversions, grade stabilization structures, earth dikes, slope silt fence and sediment traps and basins.

ii. Grades on the areas to be topsoiled, which have been previously established, shall be maintained, albeit 4" - 8" higher in elevation.

iii. Topsoil shall be uniformly distributed in a 4" - 8" layer and lightly compacted to a minimum thickness of 4". Spreading shall be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations shall be corrected in order to prevent the formation of depressions or water pockets.

iv. Topsoil shall not be placed while the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.

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

i. Composted Sludge Material for use as a soil conditioner for sites having distributed areas over 5 acres shall be tested to prescribe amendments and for sites having disturbed areas under 5 acres shall conform to the following requirements:

a. Composted sludge shall be supplied by, or originate from, a person or persons that are permitted (at the time of acquisition of the compost) by the Maryland Department of the Environment under COMAR 26.04.06.

b. Composted sludge shall contain at least 1 percent nitrogen, 1.5 percent phosphorus, and 0.2 percent potassium and have a pH of 7.0 to 8.0. If compost does not meet these requirements, the appropriate constituents must be added to meet the requirements prior to use.

c. Composted sludge shall be applied at a rate of 1 ton/1,000 square feet.

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

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

TEMPORARY SEEDBED PREPARATIONS

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

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

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

SEEDING: FOR PERIOD MARCH 1 THROUGH APRIL 30 AND FROM AUGUST 15 THROUGH NOVEMBER 15, SEED WITH 2-1/2 BUSHELS PER ACRE OF ANNUAL RYE (3.2 LBS/1000 SQ FT). FOR THE PERIOD MAY 1 THROUGH AUGUST 14, SEED WITH 3 LBS PER ACRE OF WEEPING LOVEGRASS (.07 LBS/1000 SQ FT). FOR THE PERIOD NOVEMBER 16 THROUGH FEBRUARY 28, PROTECT SITE BY APPLYING 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING, OR USE SOD.

MULCHING: APPLY 1-1/2 TO 2 TONS PER ACRE (70 TO 90 LBS/1000 SQ FT) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER ACRE (5 GAL/1000 SQ FT) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES, 8 FT. OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1000 SQ FT) FOR ANCHORING.

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

DETAIL 22 - SILT FENCE

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

1. Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 11/2" x 11/2" square (minimum) cut, or 13/4" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighing not less than 1.00 pond per linear foot.
2. Geotextile shall be fastened securely to each fence post with wire ties or staples at top and mid-section and shall meet the following requirements for Geotextile Class F:

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

3. Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
4. Silt Fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reached 50% of the fabric height.

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DETAIL 1 - EARTH DIKE

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

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

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

CONSTRUCTION SPECIFICATIONS

1. All temporary earth dikes shall have uninterrupted positive grade to an outlet. Spot elevations may be necessary for grades less than 1%.
2. Runoff diverted from a disturbed area shall be conveyed to a sediment trapping device.
3. Runoff diverted from an undisturbed area shall outlet directly into an undisturbed, stabilized area at a non-erosive velocity.
4. All trees, brush, stumps, obstructions, and other objectional material shall be removed and disposed of so as not to interfere with the proper functioning of the dike.
5. The dike shall be excavated or shaped to line, grade and cross section as required to meet the criteria specified herein and be free of bank projections or other irregularities which will impede normal flow.
6. Fill shall be compacted by earth moving equipment.
7. All earth removed and not needed for construction shall be placed so that it will not interfere with the functioning of the dike.
8. Inspection and maintenance must be provided periodically and after each rain event.

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DETAIL 5 - RIP-RAP INFLOW PROTECTION

CONSTRUCTION SPECIFICATIONS

1. All lined inflow channels shall be 1' in depth, have a trapezoidal cross section with 2:1 or flatter side slopes and 3' (min.) bottom width. The channel shall be lined with 4" to 12" rip-rap to a depth of 18".
2. Filter cloth shall be installed under all rip-rap. Filter cloth shall be Geotextile Class C.
3. Entrance and exit sections shall be installed as shown on the detail section.
4. Rip-Rap used for the lining may be recycled for permanent outlet protection if the basin is to be converted to a stormwater management facility.
5. Gabion Inflow Protection may be used in lieu of Rip-Rap Inflow Protection.
6. Rip-Rap should blend into existing ground.
7. Rip-Rap Inflow Protection shall be used where the slope is between 4:1 and 10:1, for slopes flatter than 10:1 use Earth Dike or Temporary Swale lining criteria.

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DETAIL 6 - GABION INFLOW PROTECTION

CONSTRUCTION SPECIFICATIONS

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

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DETAIL 18 - SEDIMENT BASIN BAFFLES

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DETAIL 33 - SUPER SILT FENCE

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SUPER SILT FENCE

CONSTRUCTION SPECIFICATIONS

1. Fencing shall be 42" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 6' fence shall be used, substituting 42" fabric and 6' length posts.
2. Chain link fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, brace and truss rods, drive anchors and post caps are not required except on the ends of the fence.
3. Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.
4. Filter cloth shall be embedded a minimum of 8" into the ground.
5. When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and folded.
6. Maintenance shall be performed as needed and silt buildups removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height
7. Filter cloth shall be fastened securely to each fence post with wire ties or staples at top and mid section and shall meet the following requirements for Geotextile Class F:

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

SUPER SILT FENCE DESIGN CRITERIA

Slope	Slope Steepness	Slope Length (maximum)	Silt Fence Length (maximum)
0 - 10%	0 - 10:1	Unlimited	Unlimited
10 - 20%	10:1 - 5:1	200 feet	1,500 feet
20 - 33%	5:1 - 3:1	100 feet	1,000 feet
33 - 50%	3:1 - 2:1	100 feet	500 feet
50% +	2:1 +	50 feet	250 feet

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DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE

Construction Specifications

1. Length — minimum of 50' (*30' for single residence lot).
2. Width— 10' minimum, should be flared at the existing road to provide a turning radius.
3. Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. **The plan approval authority may not require single family residence to use geotextile.
4. Stone — crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.
5. Surface Water — all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mounted berg with 5:1 slopes and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.
6. Location — A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized construction entrance.

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DETAIL 20A - REMOVABLE PUMPING STATION

Construction Specifications

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

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BAFFLE DESIGN					
BASIN	D	A	We	Le	We/Le
1	80'	6450 SF	81'	61+51+55=178'	2.2
2	36'	4156 SF	115'	26+21+29+31+28+25+23+28+32=243'	2.1
3	210'	10722 SF	51'	210'	4.1
4	100'	6046 SF	60'	53+21+47=121'	2.0
5	265'	11277 SF	43'	265'	6.2
6	50'	12099 SF	242'	99+92+92+96+66+44=489'	2.0

SEQUENCE OF CONSTRUCTION

NOTIFY SEDIMENT CONTROL DIVISION 48 HOURS PRIOR TO START OF CONSTRUCTION

DAY 1 — OBTAIN GRADING PERMIT. A LETTER OF AUTHORIZATION FROM MDE MUST BE OBTAINED PRIOR TO DISTURBANCE OF THE STREAM OR WETLANDS FOR THE ROAD AND/OR UTILITY CROSSING. STREAM CLOSURE SHALL BE BETWEEN MARCH 1st AND JUNE 15th. CONTRACTOR TO ADHERE TO THE DUST CONTROL SPECIFICATIONS AS SHOWN ON THIS SHEET.

DAY 2-12 — INSTALL STABILIZED CONSTRUCTION ENTRANCES, TREE PROTECTION FENCES, SUPER SILT FENCE, TEMPORARY SWALE,TEMPORARY DIVERSION PIPES, TEMPORARY ACCESS BRIDGES AND TEMPORARY CLEANWATER DIVERSION DIKES.

DAY 13-30 — CONSTRUCT BOTTOMLESS ARC CULVERTS PER CBC ENGINEERS AND ASSOCIATES CONTRACT DRAWINGS. COVER ARCHES WITH ADEQUATE FILL TO PREVENT DRAINAGE TO CULVERTS BEFORE MASS GRADING OF SITE. LOD FOR CULVERT CONSTRUCTION IS 70' EACH SIDE OF STREAM AND 45' EACH SIDE SIDE OF THE ROAD CENTERLINE.

DAY 31-65 — INSTALL SEDIMENT BASINS.

DAY 66-70 — INSTALL ANY REMAINING SEDIMENT CONTROL DEVICES.

DAY 71-99 — UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, INSTALL STORM DRAIN RUNS E-2 TO I-1, E-3 TO I-4, E-5 TO I-6, E-6 TO I-8, E-8 TO I-19 (SEE NOTE #9 REGARDING I-13), M-3 TO I-9, I-10 TO I-12, E-10 TO I-23, I-22 TO I-29, I-24 TO I-25, I-26 TO I-48, E-12 TO I-33, I-31 TO I-32, E-14 TO I-39, I-35 TO I-36, I-37 TO I-44, I-40 TO I-41 AND I-40 TO I-42. THESE STORM DRAIN RUNS ARE INTENDED TO DIRECT RUNOFF TO THE BASINS.

DAY 99-123 — UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, BRING ROAD BEDS TO SUBGRADE AND STABILIZE SLOPES IN ACCORDANCE WITH TEMPORARY SEEDBED NOTES. STORM DRAINS DRAINING SUMPS ARE TO BE INSTALLED TO THE BASINS PRIOR TO STARTING ROAD GRADING.

DAY 124-145 — INSTALL THE CURB AND GUTTER AND PAVING. TEMPORARILY PAVE OVER TEMPORARY DIVERSION PIPE #1 (STA. 0+80 CASTLEBRIDGE RD).

DAY 146-153 — COMPLETE GRADING OF SITE AND STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES.

DAY 153-200 — UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, INSTALL THE REMAINING STORM DRAIN SYSTEMS M-8 THROUGH I-21, M-12 TO I-30 AND M-16 THROUGH I-47. THESE RUNS SHALL BE INSTALLED STARTING UPSTREAM AND WORKING DOWNSTREAM. THE INLETS NEED TO BE BLOCKED DURING INSTALLATION.

DAY 201-211 — UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, CONVERT SEDIMENT BASINS TO STORMWATER MANAGEMENT FACILITIES. SHAPE FACILITIES PER FINAL GRADES SHOWN ON THE PLANS AND STABILIZE DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES. CONTRACTOR SHALL REMOVE ALL OLD AND NEW TRASH, JUNK AND DEBRIS FROM ALL BUFFER AND FLOODPLAIN AREAS.

DAY 212-214 — UPON APPROVAL OF THE HOWARD COUNTY SEDIIMENT CONTROL INSPECTOR, REMOVE TEMPORARY DIVERSION PIPES AND STABLIIZE DISTURBANCES, PATCH PAVEMENT AS NECESSARY.

DAY 215-226 — UPON APPROVAL OF THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, REMOVE REMAINING SEDIMENT CONTROL DEVICES, AND STABILIZED DISTURBE AREAS IN ACCORDANCE WITH THE PERMANENT SEEDBED NOTES.

AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

PE NO. 21443

DONALD A. MASON

DATE

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

BY THE DEVELOPER:

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

[signature] MEMBER 6/2/05
DEVELOPER STEVEN K BREEDEN — DATE

BY THE ENGINEER:

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

Donald Mason 6/2/05
ENGINEER — DONALD A. MASON, P.E. # 21443 — DATE

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

[signature] 6/10/05
NATURAL RESOURCES CONSERVATION SERVICE — DATE

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

[signature] 6/14/05
HOWARD SOIL CONSERVATION DISTRICT — DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

[signature] 7-18-05
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 7/25/05
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

[signature] 7/19/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

TREE PROTECTION FENCE

NOTES:

1. FOREST PROTECTION DEVICE ONLY.
2. RETENTION AREA WILL BE SET AS PART OF THE REVIEW PROCESS.
3. BOUNDARIES OF RETENTION AREA SHOULD BE STAKED AND FLAGGED PRIOR TO INSTALLING DEVICES.
4. AVOID ROOT DAMAGE WHEN PLACING ANCHOR POSTS.
5. DEVICE SHOULD BE PROPERLY MAINTAINED DURING CONSTRUCTION
6. PROTECTIVE SIGNAGE IS ALSO REQUIRED.

CONSTRUCTION SPECIFICATIONS

1. KEY-IN THE MATTING BY PLACING THE TOP ENDS OF THE MATTING IN A NARROW TRENCH. 6" IN DEPTH. BACKFILL THE TRENCH AND TAMP FIRMLY TO CONFORM TO THE CHANNEL CROSS-SECTION. SECURE WITH A ROW OF STAPLES ABOUT 4" DOWN SLOPE FROM THE TRENCH, SPACING BETWEEN STAPLES IS 6".
2. STAPLE THE 4" OVERLAP IN THE CHANNEL CENTER USING AN 18" SPACING BETWEEN STAPLES.
3. BEFORE STAPLING THE OUTER EDGES OF THE MATTING, MAKE SURE THE MATTING IS SMOOTH AND IN FIRM CONTACT WITH THE SOIL.
4. STAPLES SHALL BE PLACED 2' APART WITH 4 ROWS FOR EACH STRIP, 2 OUTER ROWS, AND 2 ALTERNATING ROWS DOWN THE CENTER.
5. WHERE ONE ROLL OF MATTING ENDS AND ANOTHER BEGINS, THE END OF THE TOP STRIP SHALL OVERLAP THE UPPER END OF THE LOWER STRIP BY 4", SHIPLAP FASHION. REINFORCE THE OVERLAP WITH A DOUBLE ROW OF STAPLES SPACED 6" APART IN A STAGGERED PATTERN ON EITHER SIDE.
6. THE DISCHARGE END OF THE MATTING LINER SHOULD BE SIMILARLY SECURED WITH 2 DOUBLE ROWS OF STAPLES.

NOTE: IF FLOW WILL ENTER FROM THE EDGE OF THE MATTING THEN THE AREA EFFECTED BY THE FLOW MUST BE KEYED-IN.

SOIL STABILIZATION MATTING - (ECM)
NOT TO SCALE

DETAIL 4 - PIPE SLOPE DRAIN

Table 6 Design Criteria for Pipe Slope Drain

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

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PIPE SLOPE DRAIN

Construction Specifications — Pipe Slope Drain

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

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30.0 Dust Control

Definition

Controlling dust blowing and movement on construction sites and roads.

Purpose

To prevent blowing and movement of dust from exposed soil surfaces, reduce on and off-site damage, health hazards, and improve traffic safety.

Conditions Where Practice Applies

This practice is applicable to areas subject to dust blowing and movement where on and off-site damage is likely without treatment.

Specifications

Temporary Methods
1. Mulches — See standards for vegetative stabilization with mulches only. Mulch should be crimped or tracked to prevent blowing.
2. Vegetative Cover — See standards for temporary vegetative cover.
3. Tillage — To roughen surface and bring clods to the surface. This is an emergency measure which should be used before soil blowing starts. Begin plowing on windward side of site. Chisel-type plows spaced about 12" apart, spring-toothed harrows, and similar plows are examples of equipment which may produce the desired effect.
4. Irrigation — This is generally done as an emergency treatment. Site is sprinkled with water until the surface is moist. Repeat as needed. At no time should the site be irrigated to the point that runoff begins to flow.
5. Barriers — Solid board fences, silt fences, snow fences, burlap fences, straw bales, and similar material can be used to control air currents and soil blowing. Barriers placed at right angles to prevailing currents at intervals of about 10 times their height are effective in controlling soil blowing.
6. Calcium Chloride — Apply at rates that will keep surface moist. May need retreatment.

Permanent Methods
1. Permanent Vegetation — See standards for permanent vegetative cover, and permanent stabilization with sod. Existing trees or large shrubs may afford valuable protection if left in place.
2. Topsoiling — Covering with less erosive soil materials. See standards for topsoiling.
3. Stone — Cover surface with crushed stone or coarse gravel.

References
1. Agriculture Handbook 346. Wind Erosion Forces in the United States and Their Use in Predicting Soil Loss.
2. Agriculture Information Bulletin 354. How to Control Wind Erosion, USDA-ARS.

PERMANENT SEEDBED PREPARATIONS

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

SOIL AMENDMENTS: IN LIEU OF SOIL TEST RECOMMENDATIONS, USE ON OF THE FOLLOWING SCHEDULES:

1. PREFERRED — APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ FT) AND 600 LBS PER ACRE 10-10-10 FERTILIZER (14 LBS/1000 SQ FT) BEFORE SEEDING. HARROW OR DISC INTO UPPER THREE INCHES OF SOIL. AT TIME OF SEEDING, APPLY 400 LBS PER ACRE 30-0-0- UREAFORM FERTILIZER (9 LBS/1000 SQ FT).
2. ACCEPTABLE — APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ FT) AND 1000 LBS PER ACRE 10-10-10 FERTILIZER (23 LBS/1000 SQ FT) BEFORE SEEDING. HARROW OR DISC INTO UPPER THREE INCHES OF SOIL.

SEEDING: FOR THE PERIODS MARCH 1 THROUGH APRIL 30 AND AUGUST 1 THROUGH OCTOBER 15, SEED WITH 60 LBS PER ACRE (1.4 LBS/1000 SQ FT) OF KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS PER ACRE (.05 LBS/1000 SQ FT) OF WEEPING LOVEGRASS. DURING THE PERIOD OF OCTOBER 16 THROUGH FEBRUARY 28, PROTECT SITE BY: OPTION (1) 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING. OPTION (2) USE SOD. OPTION (3) SEED WITH 60 LBS PER ACRE OF KENTUCKY 31 TALL FESCUE AND MULCH WITH 2 TONS PER ACRE OF WELL ANCHORED STRAW.

MULCHING: APPLY 1-1/2 TO 2 TONS PER ACRE (70 TO 90 LBS/1000 SQ FT) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER ACRE (5 GAL/1000 SQ FT) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1000 SQ FT) FOR ANCHORING.

MAINTENANCE: INSPECT ALL SEEDED AREAS AND MAKE NEEDED REPAIRS, REPLACEMENTS AND RESEEDINGS.

DETAIL 7 - STONE CHECK DAM

STANDARD STONE CHECK DAM DESIGN

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

Construction Specifications

1. Swales and ditches shall be prepared in accordance with the construction specifications described in Section A-2, Standards and Specifications for Temporary Swale.
2. The check dam shall be constructed of 4'-7' stone. The stone shall be placed so that it completely covers the width of the channel and keyed into the channel banks.
3. The top of the check dam shall be constructed so the the center is approximately 6" lower than the outer edges, forming a weir that water can flow across.
4. The maximum height of the check dam at the center shall not exced 2'.
5. The upstream sideof the check dam shall be lined with approximately 1' of 3/4' to 11/2' crushed aggregate.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE | PAGE B - 8 - 5 | MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

Construction Specifications

1. The subgrade for the filter, rip-rap, or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.
2. The rock or gravel shall conform to the specified grading limits when installed respectively in the rip-rap or filter.
3. Geotextile Class C[26] or better shall be protected from punching, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of geotextile fabric over the damaged part or by completely replacing the geotextile fabric. All overlaps whether for repairs or for joining two pieces of geotextile fabric shall be a minimum of one foot.
4. Stone for the rip-rap or gabion outlets may be placed by equipment. They shall be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The stone for rip-rap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogenous with the smaller stones and spalls filling the voids between the larger stones. Rip-rap shall be placed in a manner to prevent damage to the filter blanket or geotextile fabric. Hand placement will be required to the extent necessary to prevent damage to the permanent works.
5. The stone shall be placed so that it blends in with the existing ground. If the stone is placed too high then the flow will be forced out of the channel and scour adjacent to the stone will occur.

SEE DETAIL ON SHEET 20

F-18-5

[26] Refer to Table 27

1994

NO.	DATE	REVISION
1	5-4-06	REVISE SITE ANALYSIS & RENUMBER PLAN IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

Donald Mason 6/2/05

DEVELOPER: ELIOAK, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: HOMEWOOD, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL, 515 MADISON AVENUE, 32nd FLOOR, NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD - PHASE 1
LOTS 1 - 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21, PARCELS: 86; TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86; THIRD ELECTION DISTRICT; HOWARD COUNTY, MARYLAND

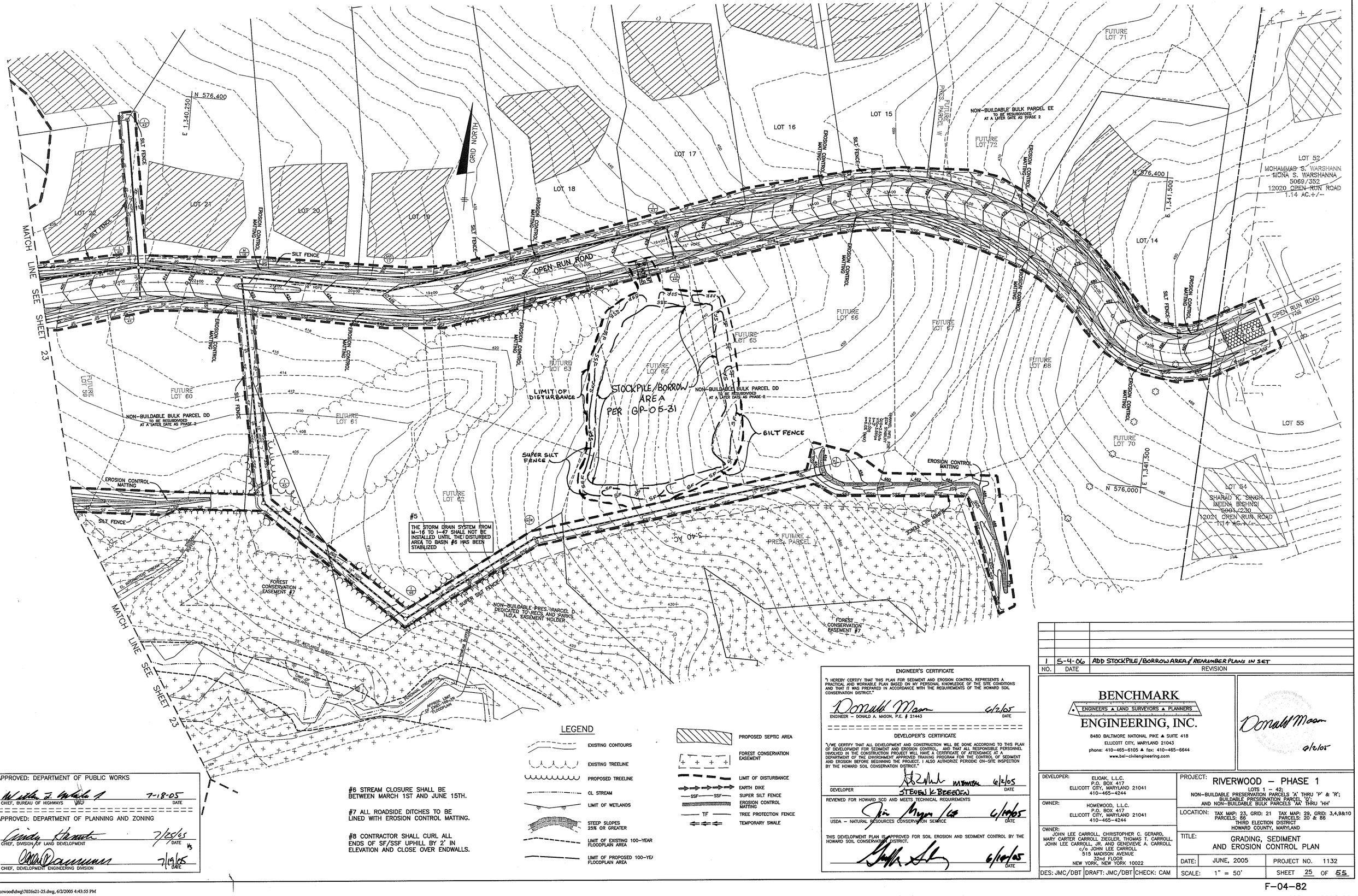
TITLE: SEDIMENT AND EROSION CONTROL DETAILS

DATE:	JUNE, 2005	PROJECT NO.	1132
SCALE:	AS SHOWN	SHEET 26	OF 55

DES: JMC/DBT | DRAFT: JMC/RPS | CHECK: DAM

F-04-82

P:\1132 Homewood\dwg\7023s26.dwg, 6/2/2005 4:50:34 PM



APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

ENGINEER'S CERTIFICATE

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

ENGINEER – DONALD A. MASON, P.E. # 21443 — DATE 6/2/05

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 THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT."

DEVELOPER — STEVEN K. BEESON — DATE 6/2/05

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS

USDA – NATURAL RESOURCES CONSERVATION SERVICE — DATE 6/10/05

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

DATE 6/10/05

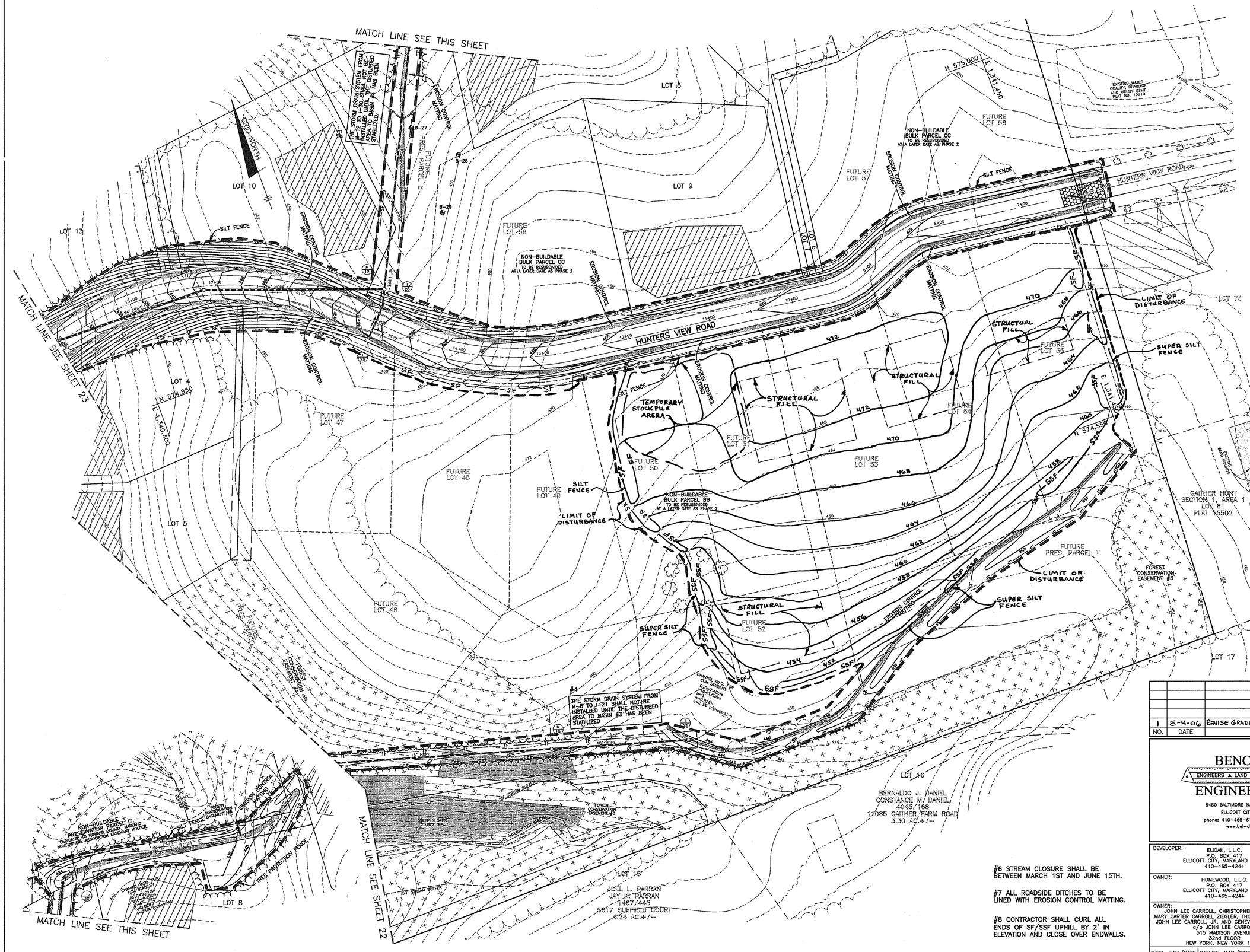
NO.	DATE	REVISION
1	5-4-06	ADD STOCKPILE/BORROW AREA & RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bel-civilengineering.com

Donald Mason 6/2/05

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21, PARCELS: 88 — TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	GRADING, SEDIMENT AND EROSION CONTROL PLAN
DATE:	JUNE, 2005 — PROJECT NO. 1132
SCALE:	1" = 50' — SHEET 25 OF 55
DES: JMC/DBT	DRAFT: JMC/DBT — CHECK: CAM

F-04-82



#6 STREAM CLOSURE SHALL BE BETWEEN MARCH 1ST AND JUNE 15TH.

#7 ALL ROADSIDE DITCHES TO BE LINED WITH EROSION CONTROL MATTING.

#8 CONTRACTOR SHALL CURL ALL ENDS OF SF/SSF UPHILL BY 2' IN ELEVATION AND CLOSE OVER ENDWALLS.

ENGINEER'S CERTIFICATE

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

Donald Mason 6/2/05
ENGINEER – DONALD A. MASON, P.E. # 21443 DATE

DEVELOPER'S CERTIFICATE

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MEMBER 6/2/05
DEVELOPER STEVEN K. BREEDEN DATE

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS

Jim Myers/GS 6/19/05
USDA – NATURAL RESOURCES CONSERVATION SERVICE DATE

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

6/19/05
HOWARD SCD DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

7-18-05
CHIEF, BUREAU OF HIGHWAYS HS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

Cindy Hannitta 7/25/05
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

7/19/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

LEGEND

- EXISTING CONTOURS
- EXISTING TREELINE
- PROPOSED TREELINE
- CL STREAM
- LIMIT OF WETLANDS
- STEEP SLOPES 25% OR GREATER
- LIMIT OF EXISTING 100-YEA FLOODPLAIN AREA
- LIMIT OF PROPOSED 100-YE FLOODPLAIN AREA
- PROPOSED SEPTIC AREA
- FOREST CONSERVATION EASEMENT
- LIMIT OF DISTURBANCE
- EARTH DIKE
- SSF SUPER SILT FENCE
- EROSION CONTROL MATTING
- TF TREE PROTECTION FENCE
- TEMPORARY SWALE

NO.	DATE	REVISION
1	5-4-06	REVISE GRADING & SEDIMENT & EROSION CONTROLS AND RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

Donald Mason 6/2/05

DEVELOPER: ELJOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND

TITLE: GRADING, SEDIMENT AND EROSION CONTROL PLAN

DATE: JUNE, 2005 PROJECT NO. 1132
SCALE: 1" = 50' SHEET 24 OF 55

DES: JMC/DBT DRAFT: JMC/DBT CHECK: CAM

F-04-82

P:\1132 Homewood\dwg\7026s21-25.dwg, 6/2/2005 4:43:12 PM

MATCH LINE SEE SHEET 25

MATCH LINE SEE SHEET 24

MATCH LINE SEE SHEET 22

MATCH LINE SEE THIS SHEET

SEE SHEETS 54 & 55 FOR CULVERT SPECIFICATIONS

LOT 11 — LOT 13 — LOT 4 — LOT 5 — LOT 22 — LOT 23 — LOT 24 — LOT 26 — LOT 27

HUNTERS VIEW ROAD

CASTLEBRIDGE ROAD

NON-BUILDABLE PRESERVATION PARCEL 'J' DEDICATED TO STORMWATER MANAGEMENT FOR HOMEOWNERS ASSOCIATION HOWARD COUNTY EASEMENT HOLDER

NON-BUILDABLE PRES. PARCEL 'I' FOR STORMWATER MGMT. H.O.A. OWNED H.CO. EASEMENT HOLDER

NON-BUILDABLE PRESERVATION PARCEL 'R' DEDICATED TO HOWARD COUNTY, MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

NON-BUILDABLE PRESERVATION PARCEL 'L' FOR STORMWATER MANAGEMENT DEDICATED TO HOWARD COUNTY, MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

NON-BUILDABLE BULK PARCEL 'FF' AT A LATER DATE AS PHASE 2

NON-BUILDABLE PRESERVATION PARCEL 'Q' DEDICATED TO HOWARD COUNTY, MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

BUILDABLE PARCEL 'E' OWNED PARKS MENT HOLDER

FUTURE LOT 55 — FUTURE LOT 74 — FUTURE LOT 75

OPEN RUN ROAD

WHITHORN WAY

FOREST CONSERVATION EASEMENT #5 — #6 — #7 — #8 — #9 — #10 — #11 — #12 — #13 — #15

SWM #5 MICROPOOL ED — SWM #4 MICROPOOL ED

BASIN #6
EXISTING D.A. = 10.28AC.
PROPOSED D.A. = 15.94 AC.
STORAGE REQ'D & PROVIDED:
WET = 28692 C.F. (ELEV. 383.56)
DRY = 28692 C.F. (ELEV. 382.98)
EMBANKMENT ELEV. = 390.3
RISER CREST ELEV. = 382.66
Q1 EXIST. = 0.51 CFS
Q1 PROP. = 0.26 CFS
Q1 ULT. = 0.77 CFS
CLEANOUT ELEV. = 382.25
BOTTOM ELEV. = 380.00
BOTTOM DIMS. = 36'w x 106'l

BASIN #4
EXISTING D.A. = 0.89 AC.
RROPOSED D.A. = 7.69 AC.
STORAGE REQ'D & PROVIDED:
WET = 13842 C.F. (ELEV. 394.52)
DRY = 13842 C.F. (ELEV. 393.44)
EMBANKMENT ELEV. = 402.25
RISER CREST ELEV. = 398.75
Q1 EXIST. = 0.09 CFS
Q1 PROP. = 0.01 CFS
Q1 ULT. = 0.35 CFS
CLEANOUT ELEV. = 393.30
BOTTOM ELEV. = 391.00
BOTTOM DIMS. = 60' x 90'

BASIN #5
EXISTING D.A. = 17.854AC.
PROPOSED D.A. = 13.22 AC.
STORAGE REQ'D & PROVIDED:
WET = 32130 C.F. (ELEV. 373.23)
DRY = 32130 C.F. (ELEV. 374.87)
EMBANKMENT ELEV. = 378.00
RISER CREST ELEV. = 374/18
Q1 EXIST. = 0.63 CFS
Q1 PROP. = 0.01 CFS
Q1 ULT. = 0.51 CFS
CLEANOUT ELEV. = 370.58
BOTTOM ELEV. = 369.00
BOTTOM DIMS. = 50' x 320'

STRUCTURAL FILL — NON-BUILDABLE BULK PARCEL 'FF' TO BE RESURVEYED AT A LATER DATE AS PHASE 2

EXIST. 36" CMP TO BE REMOVED — EX. D/W TO BE REMOVED — EXISTING FARM ROAD TO BE REMOVED — EXISTING FARM ROAD CROSSING TO BE REMOVED — EX. DRIVEWAY

CHANNEL INFO. FOR ESC STABILITY
S1=2.23ft/ft
V1=2.23ft/s
S=1
n=0.060
S=3.0% (crossflow)

BOTTOMLESS ARCH CULVERT 15'-0"x7'-0"

TEMPORARY SWALE

EARTH DIKE #1 — #2

SILT FENCE — SUPER SILT FENCE — LIMIT OF DISTURBANCE

EROSION CONTROL MATTING — EROSION CONTROL MATTING WIDE — MOUNTABLE BERM

TREE PROTECTION FENCE — GRID NORTH

FOREST CONSERVATION EASEMENT #13 — #15

TO SIDDALL RIVER — TO PATUXENT RIVER

CL INTERMITTENT STREAM — CL PERENNIAL STREAM — 75' STREAM BUFFER — 25' WETLANDS BUFFER — LIMIT OF WETLANDS — APPROX. LIMIT OF 100YR FLOODPLAIN — TOP OF STEEP SLOPE — TOP OF STREAM BANK

PHILLIP D. CARROLL CAMILLA CARROLL 2942 TAX ACCOUNT # PARCEL 71, TAX MAP 23

KEVIN E. McGOVERN DENISE A. McGOVERN 3664/353 PARCELS 1 & 2 TAX MAP 29 PARCEL 294 11356 HOMEWOOD ROAD 11.60 AC.+/-

KEVIN E. McGOVERN DENISE A. McGOVERN 3664/353 PARCELS 1 & 2 TAX MAP 29 PARCEL 294 11356 HOMEWOOD ROAD 11.60 AC.+/-

N 575,506
E 1,339,500

#6 STREAM CLOSURE SHALL BE BETWEEN MARCH 1ST AND JUNE 15TH.

#7 ALL ROADSIDE DITCHES TO BE LINED WITH EROSION CONTROL MATTING.

#8 CONTRACTOR SHALL CURL ALL ENDS OF SF/SSF UPHILL BY 2' IN ELEVATION AND CLOSE OVER ENDWALLS.

ENGINEER'S CERTIFICATE

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

Donald Mason — 6/2/05
ENGINEER – DONALD A. MASON, P.E. # 21443 — DATE

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 THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT."

MEMBER — 6/2/05
DEVELOPER — DATE
STEVEN K BREEDEN

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS

6/14/05
USDA – NATURAL RESOURCES CONSERVATION SERVICE — DATE

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

6/14/05
HOWARD SCD — DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

7-18-05
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

7/25/05
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

7/19/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER

AS-BUILTED 7-09

LEGEND

- EXISTING CONTOURS
- EXISTING TREELINE
- PROPOSED TREELINE
- CL STREAM
- LIMIT OF WETLANDS
- STEEP SLOPES 25% OR GREATER
- LIMIT OF EXISTING 100-YEAR FLOODPLAIN AREA
- LIMIT OF PROPOSED 100-YEAR FLOODPLAIN AREA
- PROPOSED SEPTIC AREA
- FOREST CONSERVATION EASEMENT
- LIMIT OF DISTURBANCE
- EARTH DIKE
- SSF — SSF — SUPER SILT FENCE
- EROSION CONTROL MATTING
- TF — TF — TREE PROTECTION FENCE
- TEMPORARY SWALE

NO.	DATE	REVISION
1	5-4-06	REVISE GRADING & SEDIMENT AND EROSION CONTROLS & RENUMBER PLANS IN SET

BENCHMARK
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Donald Mason 6/2/05

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OWNER: HOMEWOOD, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

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PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21, PARCELS: 86; TAX MAP: 28, GRID: 3,4,9&10, PARCELS: 20 & 86; THIRD ELECTION DISTRICT, HOWARD COUNTY, MARYLAND

TITLE: GRADING, SEDIMENT AND EROSION CONTROL PLAN

DES: JMC/DBT	DRAFT: JMC/DBT	CHECK: CAM

DATE: JUNE, 2005 — PROJECT NO. 1132

SCALE: 1" = 50' — SHEET 23 OF 55

F-04-82

P:\1132 Homewood\dwg\7026s21-25.dwg, 6/2/2005 4:42:18 PM

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS

USDA – NATURAL RESOURCES CONSERVATION SERVICE — DATE 6/14/05

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

HOWARD SCD — DATE 6/16/05

LEGEND

- LIMIT OF DISTURBANCE
- EARTH DIKE
- SSF — SSF — SUPER SILT FENCE
- EROSION CONTROL MATTING
- TF — TREE PROTECTION FENCE
- TEMPORARY SWALE
- EXISTING CONTOURS
- EXISTING TREELINE
- PROPOSED TREELINE
- CL STREAM
- LIMIT OF WETLANDS
- STEEP SLOPES 25% OR GREATER
- LIMIT OF EXISTING 100-YEAR FLOODPLAIN AREA
- LIMIT OF PROPOSED 100-YEAR FLOODPLAIN AREA
- PROPOSED SEPTIC AREA
- FOREST CONSERVATION EASEMENT

#6 STREAM CLOSURE SHALL BE BETWEEN MARCH 1ST AND JUNE 15TH.

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#8 CONTRACTOR SHALL CURL ALL ENDS OF SF/SSF UPHILL BY 2' IN ELEVATION AND CLOSE OVER ENDWALLS.

ENGINEER'S CERTIFICATE

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ENGINEER – DONALD A. MASON, P.E. # 21443 — DATE 6/6/05

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 THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT."

DEVELOPER — STEVEN K. BREEDEN, MEMBER — DATE 6/2/05

APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-19-05

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

NO.	DATE	REVISION
2	1-5-07	REVISE GRADING FOR NEW VERT. ALLIGNMENT
1	5-4-06	SHOW SPOIL AREA, REVISE SEDIMENT CONTROL & RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bel-civilengineering.com

Donald Mason 6/2/05

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022

PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 PARCELS: 86 — TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	GRADING, SEDIMENT AND EROSION CONTROL PLAN
DATE:	JUNE, 2005 — PROJECT NO. 1132
SCALE:	1" = 50' — SHEET 22 OF 55
DES: JMC/DBT	DRAFT: JMC/DBT — CHECK: CAM

F-04-82

P:\1132 Homewood\dwg\7026s21-25.dwg, 6/2/2005 4:41:41 PM

ENGINEER'S CERTIFICATE

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

Donald Mason 1-4-07

ENGINEER – DONALD A. MASON, P.E. # 21443 DATE

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 THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT."

ELIOAK LLC

1/4/07

DEVELOPER Steven Breeden James R Moxley, III DATE

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS

2/1/07

USDA – NATURAL RESOURCES CONSERVATION SERVICE DATE

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

2/1/07

HOWARD SCD DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS

2-5-07

CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

2/7/07

CHIEF, DIVISION OF LAND DEVELOPMENT DATE

2/6/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

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

ROUTINE MAINTENANCE:

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

NON-ROUTINE MAINTENANCE:

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

LEGEND

- EXISTING CONTOURS
- EXISTING TREELINE
- PROPOSED TREELINE
- CL STREAM
- LIMIT OF WETLANDS
- STEEP SLOPES 25% OR GREATER
- LIMIT OF EXISTING 100-YEAR FLOODPLAIN AREA
- LIMIT OF PROPOSED 100-YEAR FLOODPLAIN AREA
- PROPOSED SEPTIC AREA
- FOREST CONSERVATION EASEMENT
- LIMIT OF DISTURBANCE
- EARTH DIKE
- SSF SUPER SILT FENCE
- EROSION CONTROL MATTING
- TF TREE PROTECTION FENCE
- TEMPORARY SWALE

STATE OF MARYLAND DONALD ALAN MASON No. 21443 PROFESSIONAL ENGINEER

AS-BUILT 1-7-09

#6 STREAM CLOSURE SHALL BE BETWEEN MARCH 1ST AND JUNE 15TH.

#7 ALL ROADSIDE DITCHES TO BE LINED WITH EROSION CONTROL MATTING.

#8 CONTRACTOR SHALL CURL ALL ENDS OF SF/SSF UPHILL BY 2' IN ELEVATION AND CLOSE OVER ENDWALLS.

NO.	DATE	REVISION
3	2-20-08	REVISE GRADING AT HEADWALL #2
2	10-29-06	REVISE GRADING OF CASTLEBRIDGE ROAD, REV. CROSSING #1
1	5-4-06	RENUMBER PLANS IN SET AND ADD STOCKPILE/BORROW AREA

BENCHMARK
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phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

STATE OF MARYLAND DONALD ALAN MASON REGISTERED PROFESSIONAL ENGINEER 1-4-07

DEVELOPER: ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86; TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86; THIRD ELECTION DISTRICT; HOWARD COUNTY, MARYLAND

TITLE: Revised Final Road Construction Plan GRADING, SEDIMENT AND EROSION CONTROL PLAN

DATE: JUNE, 2005 | PROJECT NO. 1132

DES: JMC/DBT | DRAFT: JMC/DBT | CHECK: CAM | SCALE: 1" = 50' | SHEET 21 OF 55

F-04-82

SECTION

PLAN

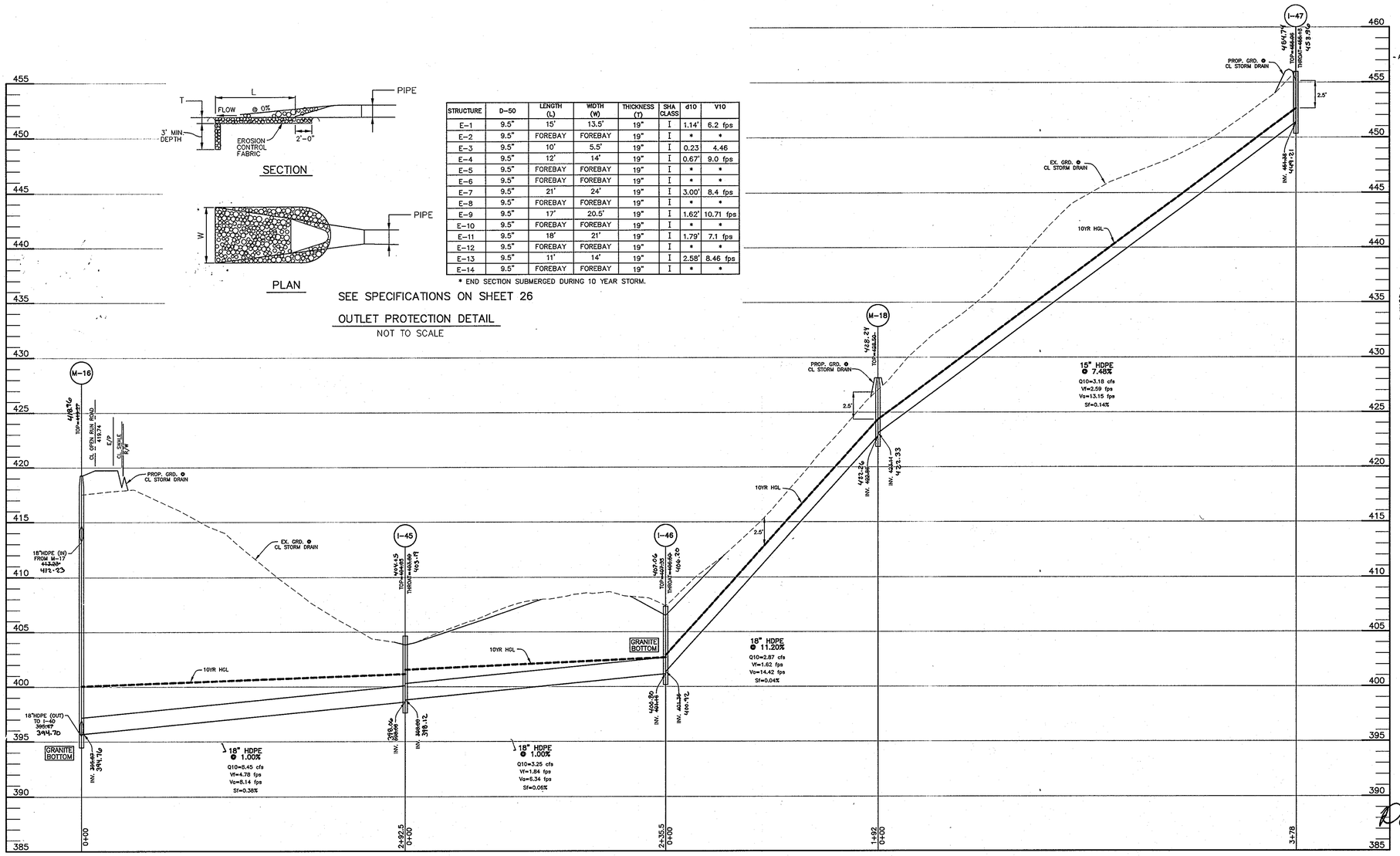
STRUCTURE	D-50	LENGTH (L)	WIDTH (W)	THICKNESS (T)	SHA CLASS	d10	V10
E-1	9.5"	15'	13.5'	19"	I	1.14'	6.2 fps
E-2	9.5"	FOREBAY	FOREBAY	19"	I	*	*
E-3	9.5"	10'	5.5'	19"	I	0.23	4.46
E-4	9.5"	12'	14'	19"	I	0.67'	9.0 fps
E-5	9.5"	FOREBAY	FOREBAY	19"	I	*	*
E-6	9.5"	FOREBAY	FOREBAY	19"	I	*	*
E-7	9.5"	21'	24'	19"	I	3.00'	8.4 fps
E-8	9.5"	FOREBAY	FOREBAY	19"	I	*	*
E-9	9.5"	17'	20.5'	19"	I	1.62'	10.71 fps
E-10	9.5"	FOREBAY	FOREBAY	19"	I	*	*
E-11	9.5"	18'	21'	19"	I	1.79'	7.1 fps
E-12	9.5"	FOREBAY	FOREBAY	19"	I	*	*
E-13	9.5"	11'	14'	19"	I	2.58'	8.46 fps
E-14	9.5"	FOREBAY	FOREBAY	19"	I	*	*

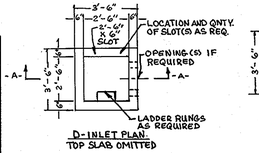
* END SECTION SUBMERGED DURING 10 YEAR STORM.

SEE SPECIFICATIONS ON SHEET 26

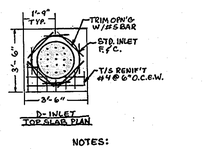
OUTLET PROTECTION DETAIL

NOT TO SCALE

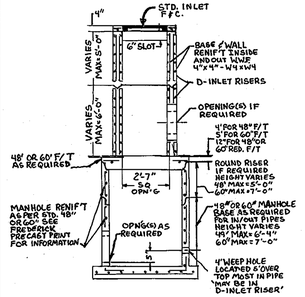




D-INLET PLAN
TOP SLAB OMITTED



D-INLET TOP SLAB PLAN



NOTES:

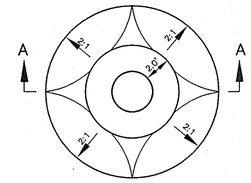
1. INLET TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C-913, MANHOLES TO BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M-199 / ASTM C-478.
2. CONCRETE MIX DESIGN PER MD STD. MIX 6, CONCRETE TO BE 4,500 PSI AT 28 DAYS MIN., TYPE II PORTLAND CEMENT.
3. WALL AND BASE REINFORCING BARS SHALL BE ASTM A-615 GR. 60. WELDED WIRE FABRIC REINFORCING IN ACCORDANCE WITH ASTM A185 / ABS GRADE 60.
4. LADDER RUNGS IF REQUIRED, INSTALLED IN VERTICAL ALIGNMENT DESIGNED TO PREVENT LATERAL SLIPPAGE, 1'-0" C/C MAX.
5. REINFORCING STEEL SHALL HAVE MINIMUM 2" COVER, UNLESS NOTED.
6. LIFT HOLES OR LIFTEYES PROVIDED IN EACH SECTION FOR HANDLING, AND THEY ARE TO BE FILLED WITH AN APPROVED NON-SHRINK GROUT OR CONCRETE AS SPECIFIED CIF APPLICABLE.
7. TRIM ALL OPENINGS WITH #4 BAR, UNLESS NOTED.
8. ANNULAR SPACE BETWEEN PIPE AND HOLE TO BE FILLED WITH AN APPROVED NON-SHRINK GROUT OR CONCRETE AS SPECIFIED.
9. CONTRACTOR TO FORM INSIDE BASE OF STRUCTURE WITH BRICK, MORTAR, AND OR CONCRETE AS REQUIRED.
10. PROVIDE BENT CONTINUOUS WWF OR BAR AT WALL CORNERS TO PROVIDE CONTINUOUS HORIZONTAL REINFORCING. BAR LAPS 32 DIAMS. MIN.
11. THE JOINTS ARE TO BE GROUTED WITH NON-SHRINK GROUT, INSIDE AND OUT AND SEALED BY THE CONTRACTOR TO A WATERTIGHT SEAL USING MORTAR AND BITUMINOUS MASTIC.

FREDERICK PRECAST CONCRETE INC.

PROJECT: RIVERWOOD PH-1 MODIFIED D-INLET

TITLE: D-INLET | DI

AMERICAN INFRASTRUCTURE | N.T.S. | DATE: 11-3-03 | 1 OF 1



PLAN VIEW

SECTION A-A

NOTES:

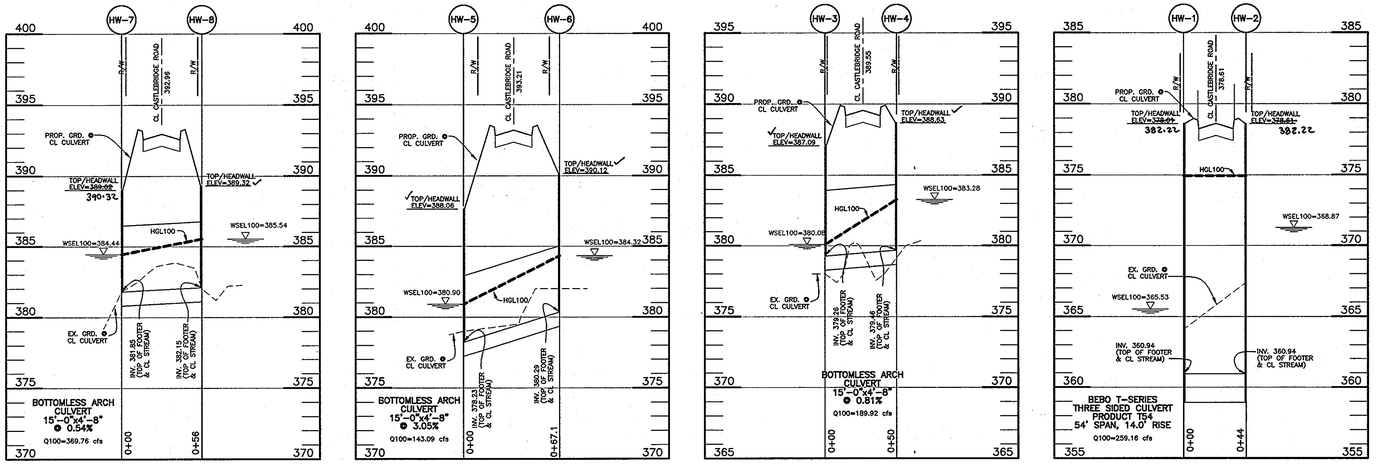
1.) ALL MANHOLE FRAME AND COVERS SHALL BE FLUSH WITH GRADE EXCEPT WHEN SHOWN ON PROFILE TO BE SET HIGHER THAN GRADE.
2.) MANHOLE FRAME AND COVERS TO BE SET HIGHER THAN GRADE SHALL BE SET IN ACCORDANCE WITH THIS DETAIL.

FILL AROUND MANHOLE

NOT TO SCALE

STATE OF MARYLAND — DONALD ALAN MOON — No. 21443 — PROFESSIONAL ENGINEER

1-7-09



NO.	DATE	REVISION
1	5-4-06	ADD MODIFIED 'D' INLET & RENUMBE PLANS IN SET

BENCHMARK ENGINEERING, INC.
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phone: 410-465-6105 ▲ fax: 410-465-6644
www.bai-civilengineering.com

Donald Moon 6/2/05

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
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PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 88 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	STORM DRAIN PROFILES
DATE:	JUNE, 2005 — PROJECT NO. 1132
SCALE:	1" = 50' HORIZ. 1" = 5' VERT. — SHEET 20 OF 55

DES: JMC/DBT | DRAFT: JMC/DBT | CHECK: CAM

F-04-82

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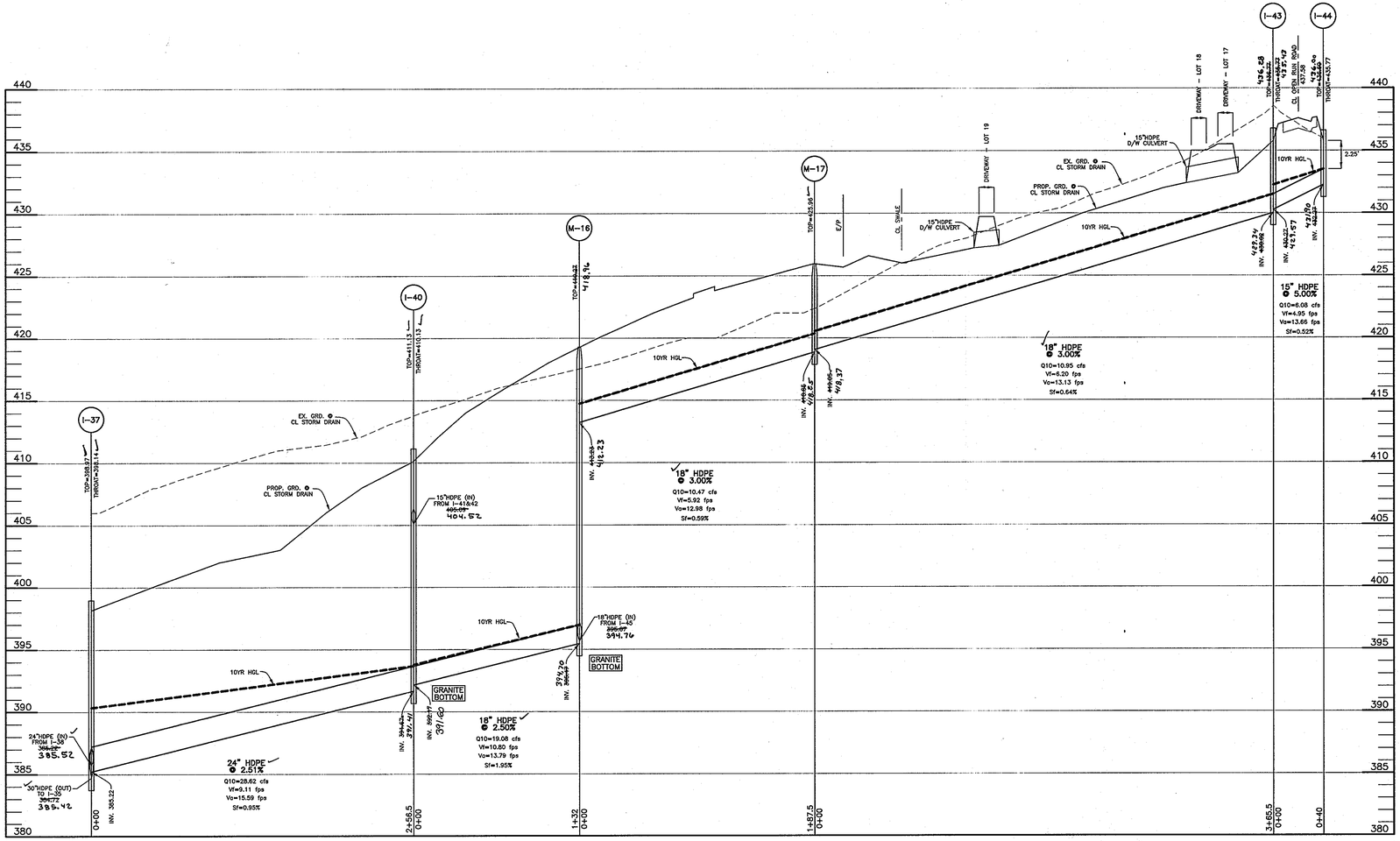

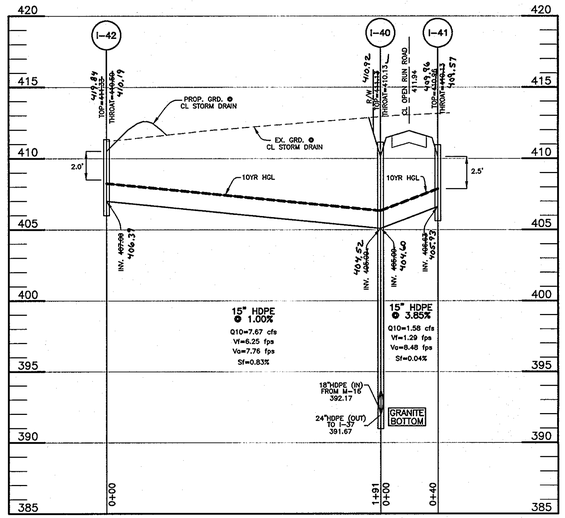

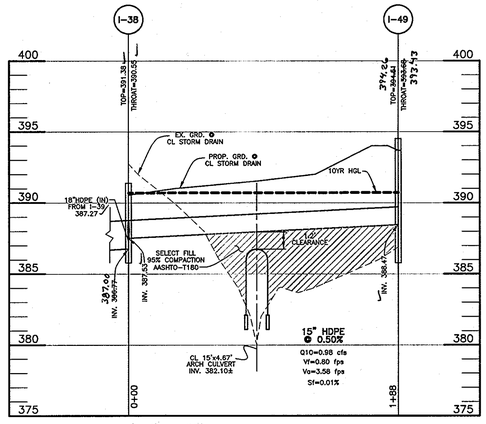

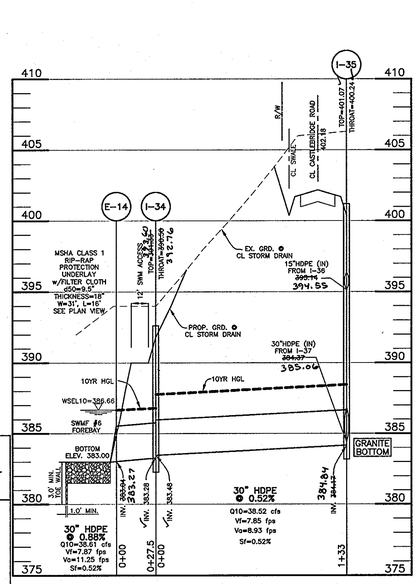

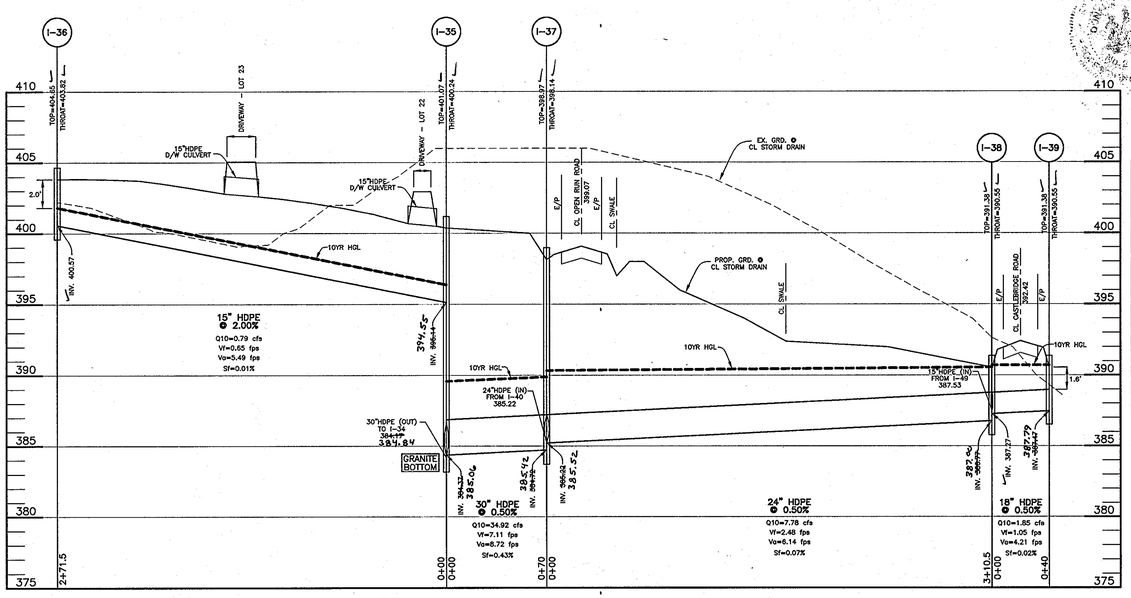

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/20/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

STATE OF MARYLAND — DONALD ALAN MASON — No. 21449 — PROFESSIONAL ENGINEER

7-7-09

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
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phone: 410-465-6105 ▲ fax: 410-465-6644
www.bel-civilengineering.com

STATE OF MARYLAND — DONALD ALAN MASON — No. 21449 — PROFESSIONAL ENGINEER

6/2/05

DEVELOPER: ELJOAK, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: HOMEWOOD, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL
c/o JOHN LEE CARROLL
515 MADISON AVENUE
32nd FLOOR
NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 88 — TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: STORM DRAIN PROFILES

DATE: JUNE, 2005 — PROJECT NO. 1132

SCALE: 1" = 50' HORIZ. 1" = 5' VERT. — SHEET 19 OF 55

DES: JMC/DBT | DRAFT: JMC/DBT | CHECK: CAM

F-04-82

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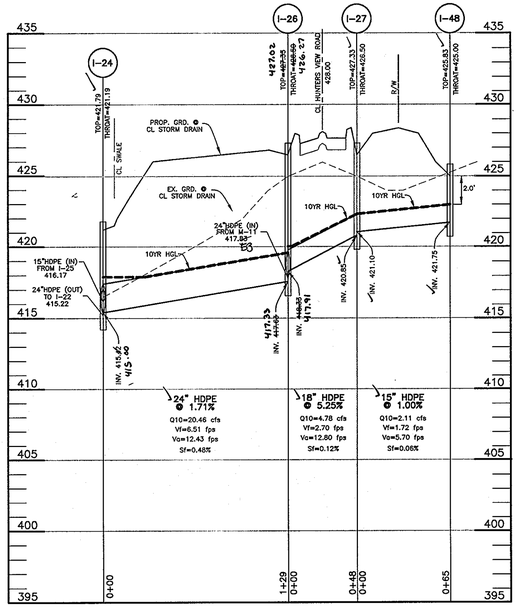

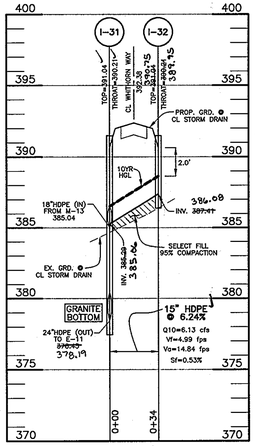

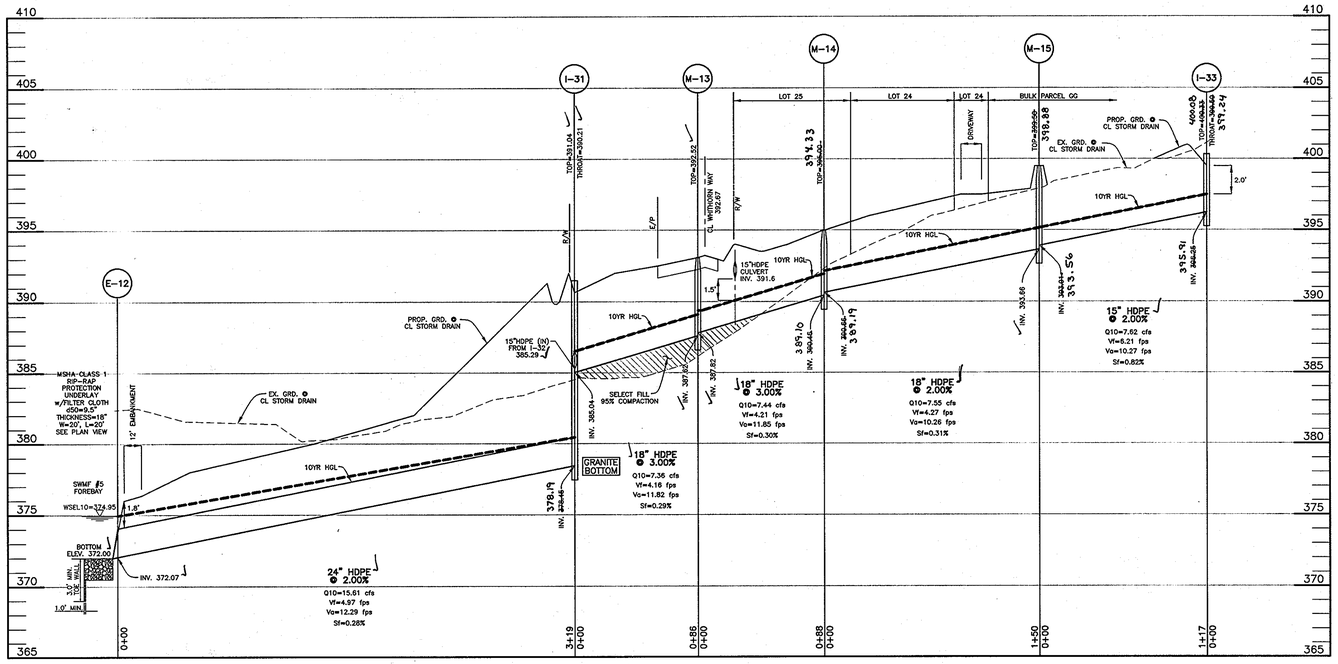

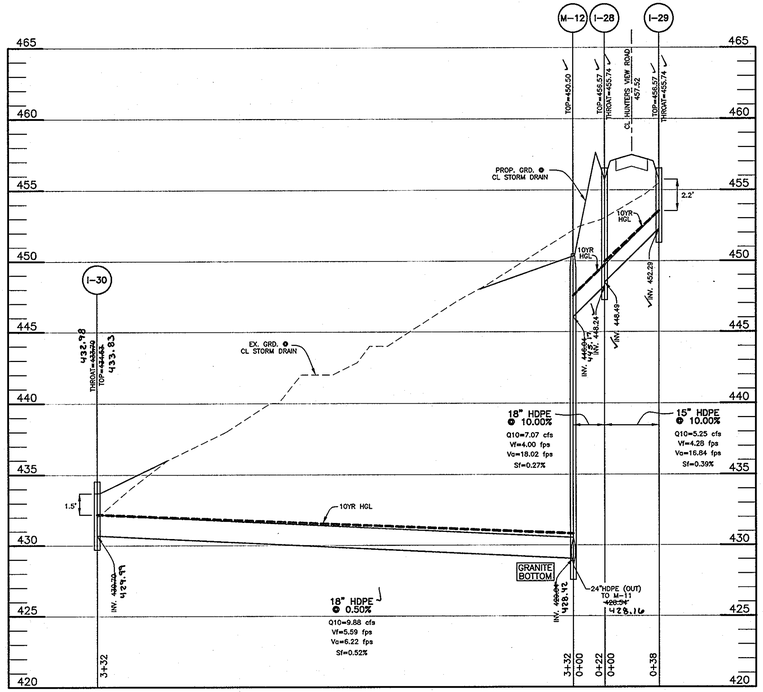

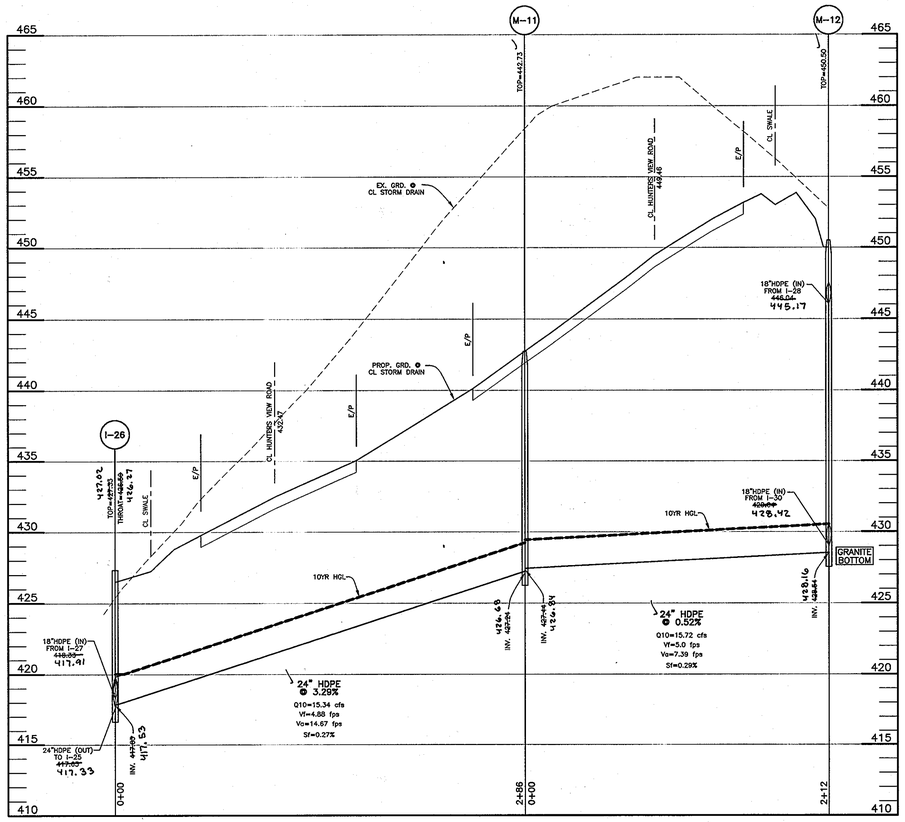

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS	
CHIEF, BUREAU OF HIGHWAYS	DATE 7-18-05
APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 7/25/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 7/9/05

STATE OF MARYLAND — DONALD ALAN MASON — No. 21445 — PROFESSIONAL ENGINEER

AS-BUILT 1-7-09

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
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8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
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STATE OF MARYLAND — DONALD ALAN MASON — No. 21445 — PROFESSIONAL ENGINEER

Donald Mason 6/2/05

DEVELOPER:	ELJOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
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DES: JMC/DBT	DRAFT: JMC/DBT CHECK: CAM

PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21, PARCELS: 88 — TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	STORM DRAIN PROFILES
DATE: JUNE, 2005	PROJECT NO. 1132
SCALE: 1" = 50' HORIZ. 1" = 5' VERT.	SHEET 18 OF 55

F-04-82

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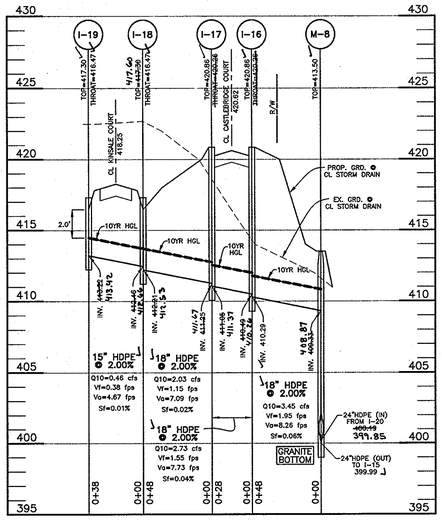

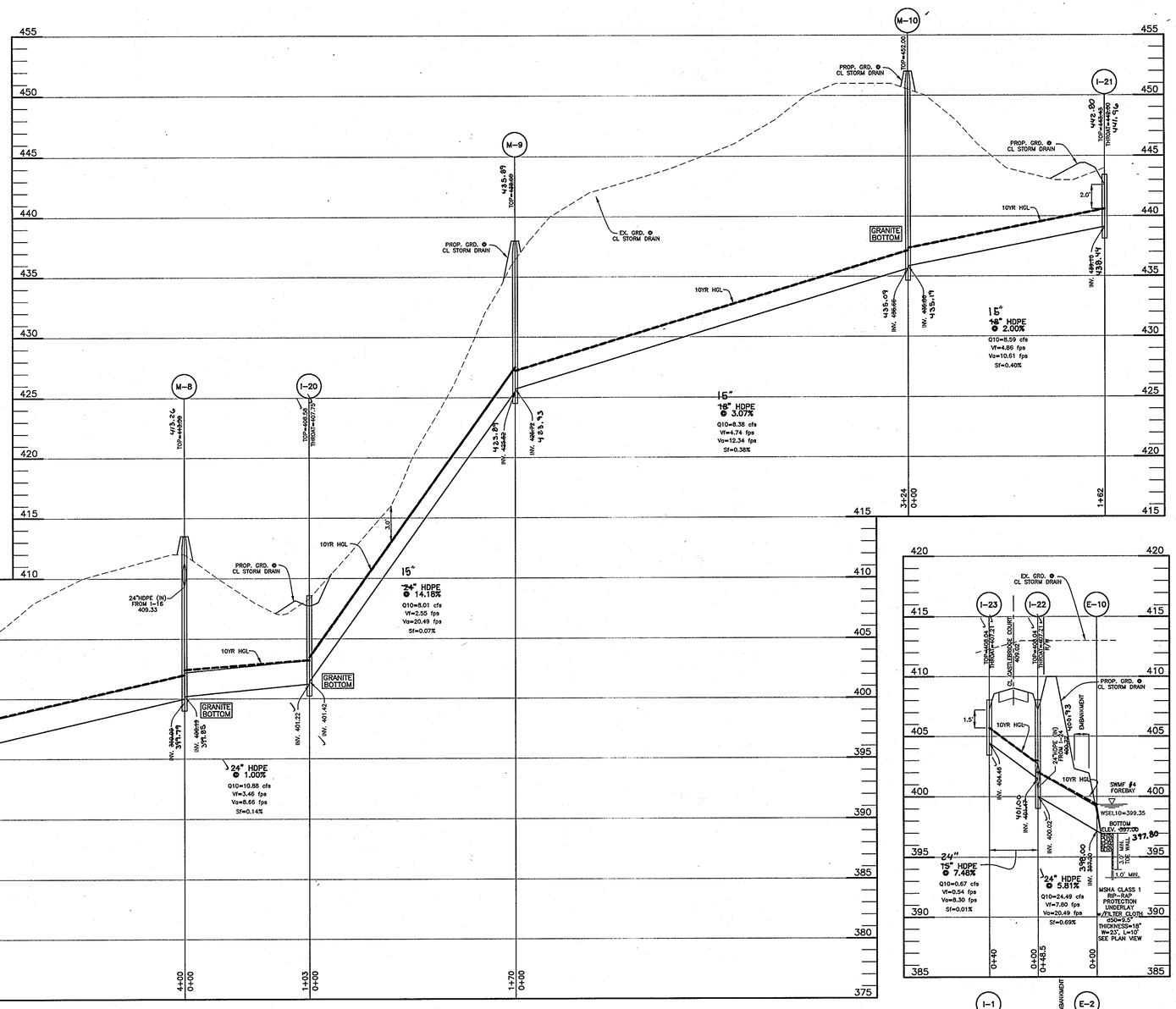

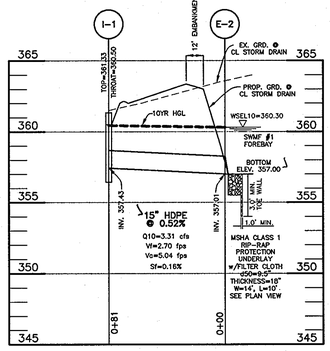

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS	
CHIEF, BUREAU OF HIGHWAYS	7-18-05 DATE
APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	7/26/05 DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	7/19/05 DATE

STATE OF MARYLAND — DONALD ALAN MOON — No. 21445 — PROFESSIONAL ENGINEER

AS-BUILT 1-7-09

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

Donald Moon 6/2/06

DEVELOPER:	ELJOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
DES: JMC/DBT	DRAFT: JMC/DBT | CHECK: CAM

PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON–BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON–BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	STORM DRAIN PROFILES
DATE:	JUNE, 2005
PROJECT NO.	1132
SCALE:	1" = 50' HORIZ. 1" = 5' VERT.
SHEET	17 OF 55

F-04-82

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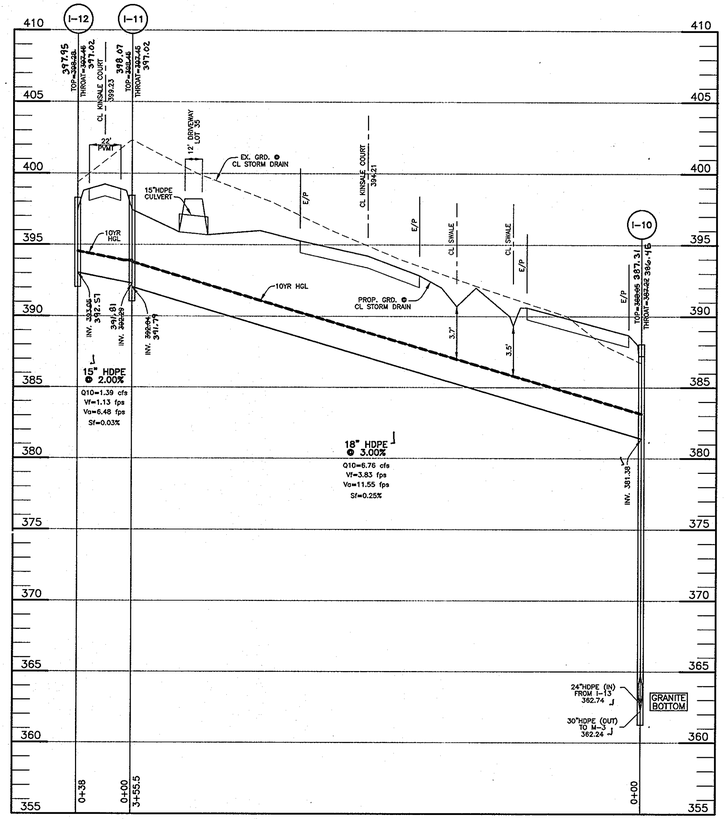

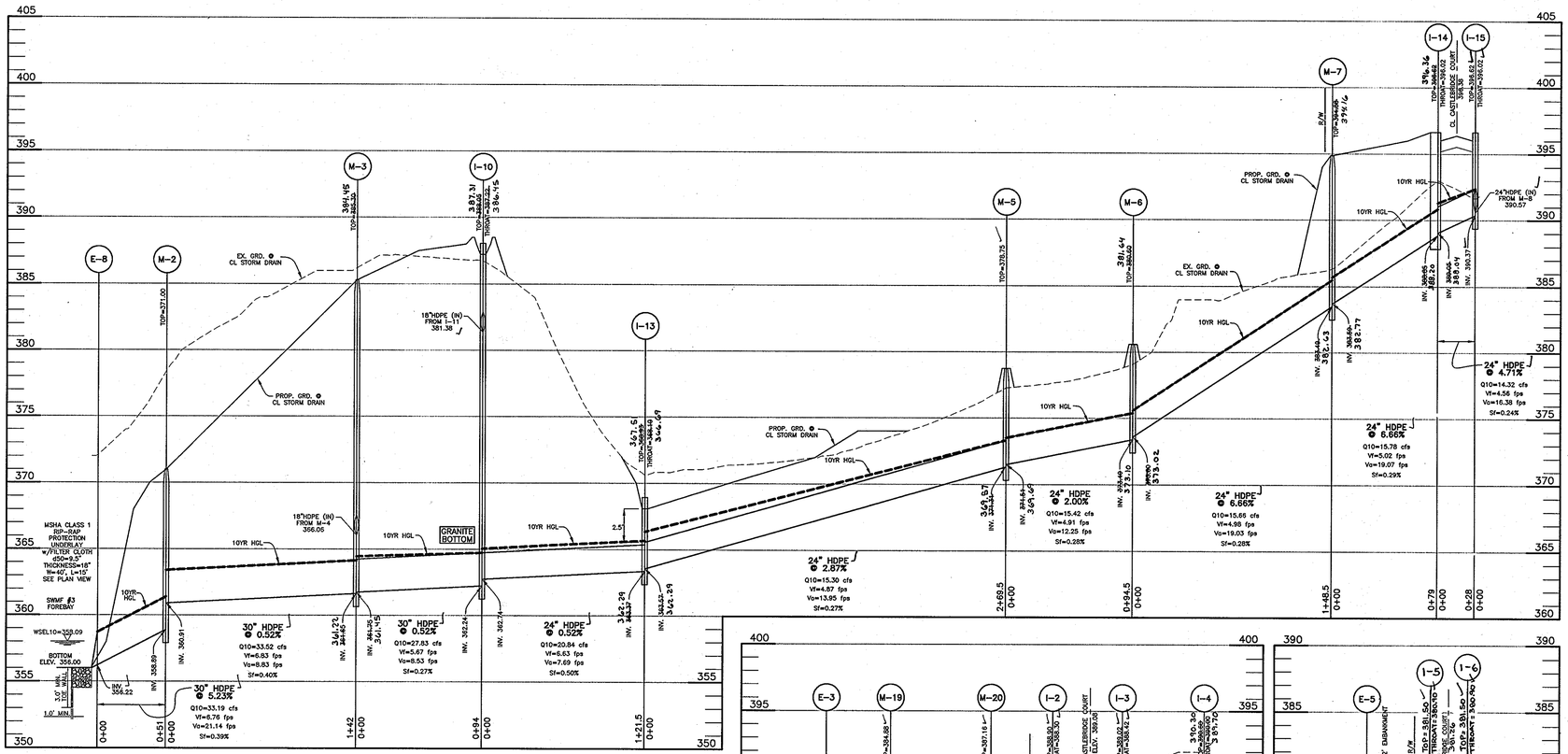

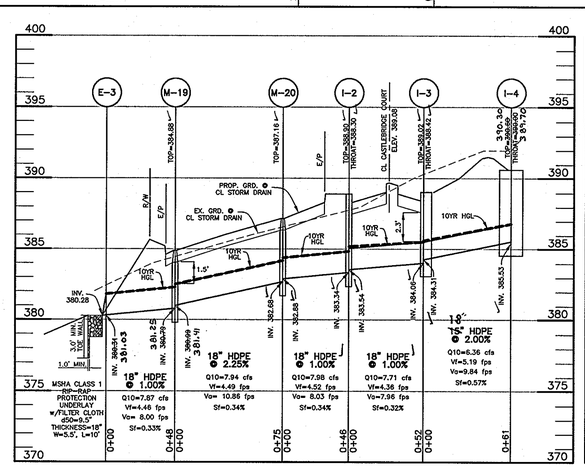

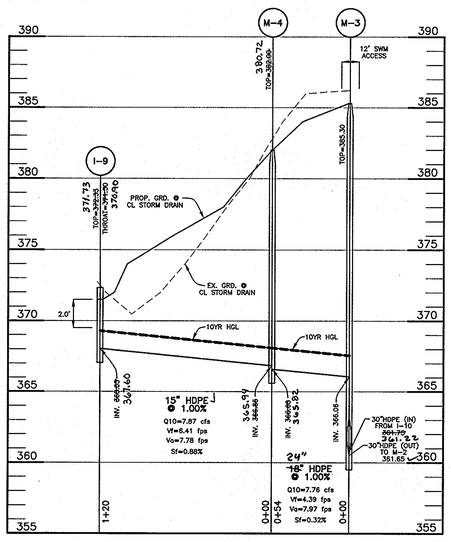

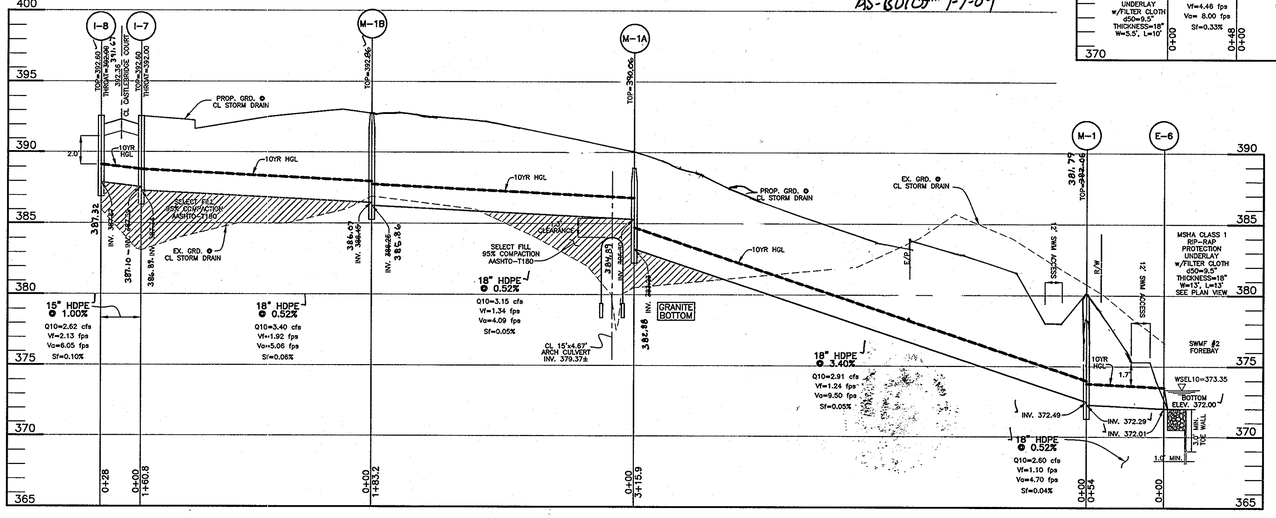

STATE OF MARYLAND
DONALD ALAN MAAG
No. 21443
PROFESSIONAL ENGINEER

DAS-BUILTS 1-7-09

NO.	DATE	REVISION
2	1-5-07	REVISE STORM DRAIN FOR NEW VERTICAL ALIGNMENT
1	5-4-06	RENUMBER PLANS IN SET

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/05/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

BENCHMARK
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STATE OF MARYLAND
DONALD ALAN MAAG
No. 21443
PROFESSIONAL ENGINEER
6/2/05

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 - 42,
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'O';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: STORM DRAIN PROFILES

DES: JMC/DBT	DRAFT: JMC/DBT	CHECK: CAM

DATE: JUNE, 2005 PROJECT NO. 1132
SCALE: 1" = 50' HORIZ. 1" = 5' VERT. SHEET 16 OF 55

F-04-82

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STRUCTURE SCHEDULE						
NO.	TYPE	LOCATION	INV. IN	INV. OUT	TOP ELEV.	HO. CO. STD.
E-1	30" CONC. END SECT.	N 572915.94 E 1339188.01	356.99 ✓	356.90 ✓	--	SD - 5.52
E-2	15" METAL END SECT.	N 572931.11 E 1339264.10	357.01 ✓	357.00 ✓	--	SD - 5.61
E-3	18" METAL END SECT.	CL STA. 26+33.30 OFFS. 56.05' RIGHT (HOMEWOOD)	381.06 ~~380.31~~	~~380.28~~ 381.03	--	SD - 5.61
E-4	24" CONC. END SECT.	N 573276.67 E 1339702.22	--	367.00 ✓	--	SD - 5.52
E-5	18" METAL END SECT.	CL STA. 8+09.55 OFFS. 59.05' LEFT (CASTLEBRIDGE)	372.05 ✓	372.00 ✓	--	SD - 5.61
E-6	18" METAL END SECT.	CL STA. 8+17.91 OFFS. 61.44' LEFT (CASTLEBRIDGE)	372.01 ✓	372.00 ✓	--	SD - 5.61
--	--	--	--	--	--	--
E-8	30" METAL END SECT.	N 573415.83 E 1339324.74	356.22 ✓	356.00 ✓	--	SD - 5.61
E-9	30" CONC. END SECT.	N 575572.30 E 1340073.44	--	390.00 ✓	--	SD - 5.52
E-10	24" METAL END SECT.	CL STA. 31+82.37 OFFS. 68.50' RIGHT (CASTLEBRIDGE)	398.0 ~~397.20~~	~~397.00~~ 397.80	--	SD - 5.61
E-11	36" CONC. END SECT.	N 576070.17 E 1339353.68	371.21 ~~370.94~~	370.90	--	SD - 5.52
E-12	24" METAL END SECT.	N 575798.65 E 1339572.03	372.07 ✓	372.00 ✓	--	SD - 5.61
E-13	36" CONC. END SECT.	N 576250.56 E 1339660.97	--	~~379.50~~ 379.68	--	SD - 5.52
E-14	30" METAL END SECT.	CL STA. 40+49.03 OFFS. 113.00' LEFT (CASTLEBRIDGE)	~~383.04~~ 383.31	~~383.00~~ 383.27	--	SD - 5.61
HW-1	E66T/O	CL STA. 6+79.43 OFFS. 22.65' LEFT (CASTLEBRIDGE)	--	364.5	382.29 ✓	SEE MANUFACT. SPECS.
HW-2	E66T/O	CL STA. 6+80.05 OFFS. 20.97' RIGHT (CASTLEBRIDGE)	366.1	--	382.29 ✓	SEE MANUFACT. SPECS.
HW-3	CONTECH #116F	CL STA. 11+79.37 OFFS. 26.32' LEFT (CASTLEBRIDGE)	--	379.26	387.09 ✓	SEE MANUFACT. SPECS.
HW-4	CONTECH #116F	CL STA. 11+83.31 OFFS. 23.48' RIGHT (CASTLEBRIDGE)	379.46	--	388.63 ✓	SEE MANUFACT. SPECS.
HW-5	CONTECH #116F	CL STA. 16+17.01 OFFS. 32.94' LEFT (CASTLEBRIDGE)	--	378.23	388.06 ✓	SEE MANUFACT. SPECS.
HW-6	CONTECH #116F	CL STA. 16+39.96 OFFS. 30.12' RIGHT (CASTLEBRIDGE)	380.29	--	390.12 ✓	SEE MANUFACT. SPECS.
HW-7	CONTECH #116F	CL STA. 35+57.27 OFFS. 27.92' LEFT (CASTLEBRIDGE)	--	381.85	389.02 390.32	SEE MANUFACT. SPECS.
HW-8	CONTECH #116F	CL STA. 35+54.98 OFFS. 28.02' RIGHT (CASTLEBRIDGE)	382.15	--	389.32 ✓	SEE MANUFACT. SPECS.
I-1	'D' INLET - 6"	N 573011.10 E 1339281.70	--	357.43	361.33	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-2	A-5 INLET	CL STA. 0+64.85 OFFS. 22.00' LEFT (CASTLEBRIDGE)	383.54 ✓	383.34 ✓	388.90 ✓	SD - 4.01 OR 4.40
I-3	A-10 INLET	CL STA. 0+64.85 OFFS. 22.00' RIGHT (CASTLEBRIDGE)	384.31 ✓	384.06 ✓	389.02 ✓	SD - 4.02 OR 4.41
I-4	COG 15'	CL STA. 24+34.14 OFFS. 23.06' RIGHT (HOMEWOOD)	--	385.53 ✓	390.60 ✓	MD-374.62
I-5	A-5 INLET	CL STA. 7+98.35 OFFS. 12.00' LEFT (CASTLEBRIDGE)	373.44 ~~373.14~~	373.? ~~372.89~~	381.50 ✓	SD - 4.01 OR 4.40
I-6	A-5 INLET	CL STA. 7+98.35 OFFS. 12.00' RIGHT (CASTLEBRIDGE)	--	373.42 ✓	381.50 ✓	SD - 4.01 OR 4.40
I-7	A-5 INLET	CL STA. 15+13.13 OFFS. 12.00' LEFT (CASTLEBRIDGE)	387.59 10	~~387.34~~ 386.89	392.60 ✓	SD - 4.01 OR 4.40
I-8	A-5 INLET	CL STA. 15+13.13 OFFS. 12.00' RIGHT (CASTLEBRIDGE)	--	387.87 32	~~392.60~~ 391.67	SD - 4.01 OR 4.40
I-9	'D' INLET - 6"	N 573616.43 E 1339268.88	-- 367.60	~~368.05~~	372.? ~~372.33~~	SD - 4.11 OR 4.39 OPEN 4 SIDES
I-10	'D' INLET - 6"	CL STA. 1+30.78 OFFS. 8.00' LEFT (KINSALE L.P.)	381.38 (18") 362.74 (24") ✓	362.24 ✓	387.31 ~~388.05~~	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-11	'D' INLET - 8"	CL STA. 8+43.42 OFFS. 19.00' RIGHT (KINSALE)	391.81 ~~392.29~~	391.79 ~~392.04~~	398.81 ~~398.48~~	SD - 4.11 OR 4.39 OPEN 1 SIDE
I-12	'D' INLET - 6"	CL STA. 8+43.42 OFFS. 19.00' RIGHT (KINSALE)	--	392.5 ~~393.05~~	397.95 ~~398.28~~	SD - 4.11 OR 4.39 OPEN 1 SIDE
I-13	'D' INLET - 6"	N 573605.01 E 1339610.56	362.29 ~~363.57~~	362.27 ~~363.37~~	367.51 ~~368.93~~	SD - 4.11 OR 4.39 OPEN 4 SIDES
I-14	A-10 INLET	CL STA. 17+64.48 OFFS. 11.95' LEFT (CASTLEBRIDGE)	389.04 ~~389.05~~	388.2 ~~388.85~~	396.62 36	SD - 4.02 OR 4.41
I-15	A-5 INLET	CL STA. 17+64.48 OFFS. 12.02' RIGHT (CASTLEBRIDGE)	390.57 ✓	390.37 ✓	396.62 ✓	SD - 4.01 OR 4.40
I-16	A-5 INLET	CL STA. 22+11.65 OFFS. 12.00' RIGHT (CASTLEBRIDGE)	410.49 36	410.29 ✓	420.86 ✓	SD - 4.01 OR 4.40
I-17	A-5 INLET	CL STA. 22+11.65 OFFS. 12.00' LEFT (CASTLEBRIDGE)	411.25 .67	411.05 .32	420.86 ✓	SD - 4.01 OR 4.40
I-18	'D' INLET - 6"	CL STA. 0+47.15 OFFS. 19.00' RIGHT (KINSALE)	412.46 .66	412.21 .53	417.30 .60	SD-4.11 OR 4.39, 2 SIDES
I-19	'D' INLET - 6"	CL STA. 0+47.15 OFFS. 19.00' LEFT (KINSALE)	--	413.22 .42	417.30 ✓	SD-4.11 OR 4.39, 2 SIDES
I-20	'D' INLET - 6"	CL STA. 22+73.25 OFFS. 69.02' RIGHT (CASTLEBRIDGE)	401.42 ✓	401.22 ✓	408.58 ✓	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-21	'D' INLET - 6"	N 574360.76 E 1340849.71	-- 438.44	~~439.10~~	442.80 ~~443.45~~	SD - 4.11 OR 4.39 OPEN 4 SIDES
I-22	'D' INLET - 6"	CL STA. 31+82.37 OFFS. 20.00' RIGHT (CASTLEBRIDGE)	401.47 (15") 400.72 (24")	400.02 ✓	408.04 ✓	SD - 4.11 OR 4.39 OPEN 1 SIDES
I-23	'D' INLET - 6"	CL STA. 31+82.37 OFFS. 20.00' LEFT (CASTLEBRIDGE)		404.46 ✓	408.04 ✓	SD - 4.11 OR 4.39 OPEN 1 SIDE
I-24	A-5 INLET	CL STA. 29+59.43 OFFS. 13.64' RIGHT (CASTLERIDGE)	415.33 ~~416.17 (15")~~ ~~415.42 (24")~~	414.7 ~~415.22~~	421.79 ✓	SD - 4.01 OR 4.40
I-25	A-5 INLET	CL STA. 29+56.52 OFFS. 13.89' LEFT (CASTLERIDGE)	414.76 417.97	417.27 ✓	421.95 ✓	SD - 4.01 OR 4.40
I-26	'D' INLET - 6"	CL STA. 20+00.00 OFFS. 23.75' RIGHT (HUNTERS VIEW)	418.33 (18") 417.83 (24") 417.33	417.63 33	427.36 02	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-27	'D' INLET - 6"	CL STA. 20+00.00 OFFS. 24.42' LEFT (HUNTERS VIEW)	421.10 ✓	420.85 ✓	427.33 ✓	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-28	'D' INLET - 6"	CL STA. 15+04.31 OFFS. 19.00' RIGHT (HUNTERS VIEW)	448.49 ✓	448.24 ✓	456.57 ✓	SD - 4.11 OR 4.39 OPEN 1 SIDE
I-29	'D' INLET - 6"	CL STA. 15+04.31 OFFS. 19.00' LEFT (HUNTERS VIEW)	--	452.29 ✓	456.57 ✓	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-30	'D' INLET - 8"	N 575285.82 E 1340841.33	-- 429.99	~~430.70~~	432.98 ~~434.53~~	SD - 4.11 OR 4.39 OPEN 3 SIDES
I-31	'D' INLET - 6"	CL STA. 2+21.53 OFFS. 17.00' RIGHT (WHITHORN)	384.81 ~~386.09 (18")~~ ~~385.84 (15")~~	378.46 .19	391.04 ✓	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-32	'D' INLET - 6"	CL STA. 2+21.53 OFFS. 17.00' LEFT (WHITHORN)	--	386.6 ~~387.41~~	390.75 ~~391.04~~	SD - 4.11 OR 4.39 OPEN 3 SIDES
I-33	'D' INLET - 6"	N 575248.47 E 1339810.43	-- 395.91	~~396.25~~	400.33 .08	SD - 4.11 OR 4.39 OPEN 4 SIDES
I-34	'D' INLET - 6"	CL STA. 40+21.44 OFFS. 113.00' LEFT (CASTLEBRIDGE)	383.48 ✓	383.28 ✓	~~391.33~~	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-35	'D' INLET - 6"	CL STA. 40+21.44 OFFS. 20.00' RIGHT (CASTLEBRIDGE)	~~385.16 (15")~~ ~~384.37 (30")~~ 384.55	384.17 .84	401.07 ✓	SD - 4.11 OR 4.39 OPEN 3 SIDES
I-36	'D' INLET - 6"	CL STA. 42+92.86 OFFS. 20.00' RIGHT (CASTLEBRIDGE)	~~385.00~~ .52	400.57 ✓	404.65 ✓	SD - 4.11 OR 4.39 OPEN 1 SIDE
I-37	'D' INLET - 6"	CL STA. 39+51.79 OFFS. 27.35' RIGHT (CASTLEBRIDGE)	385.22 (24") 385.22 (24") ✓	~~384.72~~ 385.12	398.97 ✓	SD - 4.11 OR 4.39 OPEN 1 SIDE
I-38	'D' INLET - 6"	CL STA. 36+43.10 OFFS. 20.00' RIGHT (CASTLEBRIDGE)	387.53 (15") 392.27 (18") ✓	~~386.77~~ 387.?0	391.38 ✓	SD - 4.11 OR 4.39 OPEN 4 SIDES
I-39	'D' INLET - 6"	CL STA. 36+43.10 OFFS. 20.00' LEFT (CASTLEBRIDGE)	407.62	387.?? .79	391.38 ✓	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-40	'D' INLET - 8"	CL STA. 22+74.30 OFFS. 20.00' RIGHT (OPEN RUN)	2-~~405.09~~ (15") ~~392.17~~ (18")	391.67 41	411.13 ✓	SD - 4.11 OR 4.39 OPEN 1 SIDE
I-41	'D' INLET - 6"	CL STA. 22+74.30 OFFS. 20.00' LEFT (OPEN RUN)	391.62	405.93 ~~406.63~~	409.90 ~~410.06~~	SD - 4.11 OR 4.39 OPEN 1 SIDE
I-42	'D' INLET - 6"	CL STA. 22+76.79 OFFS. 210.74' RIGHT (OPEN RUN)	-- 406.39	~~407.00~~	410.84 ~~411.33~~	SD - 4.11 OR 4.39 OPEN 4 SIDES
I-43	'D' INLET - 8"	CL STA. 15+87.88 OFFS. 20.00' RIGHT (OPEN RUN)	429.57 ~~430.27~~	429.34 ~~430.02~~	436.77 .28	SD - 4.11 OR 4.39 OPEN 1 SIDES
I-44	'D' INLET - 6"	CL STA. 15+87.88 OFFS. 20.00' LEFT (OPEN RUN)	-- 431.90	~~432.27~~	436.60 .00	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-45	'D' INLET - 6"	N 575886.30 E 1340385.65	398.30 .12	398.60 .06	404.65 .05	SD - 4.11 OR 4.39 OPEN 3 SIDES
I-46	'D' INLET - 6"	N 575752.61 E 1340579.05	400.92 ~~401.30~~	400.80 ~~401.10~~	407.35 .06	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-47	'D' INLET - 6"	N 575983.23 E 1341095.44	-- 449.21	~~451.38~~	454.74 ~~455.98~~	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-48	'D' INLET - 6"	CL STA. 27+50.23 OFFS. 71.89' RIGHT (CASTLEBRIDGE)	--	421.75 ✓	425.83 ✓	SD - 4.11 OR 4.39 OPEN 2 SIDES
I-49	'D' INLET - 6"	CL STA. 34+56.60 OFFS. 20.00' RIGHT (CASTLEBRIDGE)	--	388.47 ✓	394.51 .26	SD - 4.11 OR 4.39 OPEN 2 SIDES
M-1	4'-0" MANHOLE	CL STA. 8+50.00 OFFS. 17.00' LEFT (CASTLEBRIDGE)	372.49 ✓	372.29 ✓	~~382.06~~ 381.79	G - 5.12
M-1A	4'-0" MANHOLE	CL STA. 12+11.08 OFFS. 9.00' LEFT (CASTLEBRIDGE)	383.99 ~~386.30~~	382.88 383.23	390.06 ✓	G - 5.12
M-1B	4'-0" MANHOLE	CL STA. 13+50.25 OFFS. 7.00' RIGHT (CASTLEBRIDGE)	386.45 .07	386.25 385.86	392.86 ✓	G - 5.12
M-2	4'-0" MANHOLE	N 573439.62 E 1339369.85	360.91 ✓	358.89 ✓	371.00 ✓	G - 5.12
M-3	4'-0" MANHOLE	N 573566.51 E 1339434.13	361.45 366.06 (18") 361.75 (30") ✓	361.65 .22	~~386.30~~ 384.46	G - 5.12
M-4	4'-0" MANHOLE	N 573590.84 E 1339386.10	365.94 ~~366.85~~	365.8 ~~366.60~~	~~382.00~~ 380.72	G - 5.12
M-5	4'-0" MANHOLE	N 573796.51 E 1339800.05	369.69 ~~371.54~~	369.57 ~~371.31~~	378.75 ✓	G - 5.12
M-6	4'-0" MANHOLE	N 573804.77 E 1339894.40	373.60 .02	373.40 .10	~~380.00~~ 381.64	G - 5.12
M-7	4'-0" MANHOLE	CL STA. 16+89.80 OFFS. 20.00' LEFT (CASTLEBRIDGE)	382.77 ~~383.59~~	382.63 ~~383.49~~	394.85 .16	G - 5.12
M-8	4'-0" MANHOLE	CL STA. 21+74.16 OFFS. 42.45' RIGHT (CASTLEBRIDGE)	409.33 (24") 408.19 (24") ✓	~~399.09~~	413.50 .26	G - 5.12
M-9	4'-0" MANHOLE	N 574497.02 E 1340383.63	399.85 423.93 ~~425.72~~	~~425.52~~ 423.89	~~438.00~~ 435.89	G - 5.12
M-10	4'-0" MANHOLE	N 574382.69 E 1340720.66	435.86 .19	435.66 .09	452.00 ✓	G - 5.12
M-11	4'-0" MANHOLE	CL STA. 17+13.69 OFFS. 4.32' LEFT (HUNTERS VIEW)	426.84 ~~427.44~~	426.63 ~~427.24~~	442.73 ✓	G - 5.12
M-12	4'-0" MANHOLE	CL STA. 15+10.62 OFFS. 40.68' RIGHT (HUNTERS VIEW)	446.04 (18") 445.17	~~428.64~~ 428.16	450.50 ✓	G - 5.12
M-13	4'-0" MANHOLE	CL STA. 1+36.23 OFFS. 5.00' RIGHT (WHITHORN)	387.82 ✓	387.62 ✓	392.52 ✓	G - 5.12
M-14	4'-0" MANHOLE	CL STA. 1+36.23 OFFS. 83.00' RIGHT (WHITHORN)	389.19 ~~390.66~~	~~390.46~~ 389.?0	~~395.00~~ 394.33	G - 5.12
M-15	4'-0" MANHOLE	N 575365.34 E 1339803.82	412.23 393.94 .86	393.66 ✓	399.50	G - 5.12
M-16	4'-0" MANHOLE	CL STA. 21+44.44 OFFS. 12.13' RIGHT (OPEN RUN)	394.76 ~~413.20 (18")~~ ~~395.07 (18")~~	394.70 ~~395.47~~	~~419.27~~ 418.96	G - 5.12
M-17	4'-0" MANHOLE	CL STA. 19+57.27 OFFS. 6.00' RIGHT (OPEN RUN)	418.37 ~~419.05~~	418.88 .25	425.96 ✓	G - 5.12
M-18	4'-0" MANHOLE	N 575869.50 E 1340734.47	422.33 ~~423.11~~	~~422.86~~ 422.26	~~428.50~~ 428.24	G - 5.12
M-19	4'-0" MANHOLE	CL STA. 26+02.97 OFFS. 19.31' RIGHT (HOMEWOOD)	381.41 ~~380.99~~	~~380.79~~ 381.25	384.88 ✓	G - 5.12
M-20	4'-0" MANHOLE	CL STA. 0+19.09 OFFS. 28.00' LEFT (CASTLEBRIDGE)	382.88 ✓	382.68 ✓	387.16 ✓	G - 5.12
S-1	SEE DETAIL	N 572892.84 E 1339213.92	--	--	--	SEE SWM DETAILS
S-2	SEE DETAIL	N 573277.23 E 1339755.30	--	--	--	
S-3	SEE DETAIL	N 573313.86 E 1339055.61	--	--	--	
S-4	SEE DETAIL	N 575507.58 E 1340110.04	--	--	--	
S-5	SEE DETAIL	N 576012.87 E 1339358.74	--	--	--	
S-6	SEE DETAIL	N 576268.68 E 1339737.87	--	--	--	

1) STRUCTURE ELEVATION AND LOCATION FOR MANHOLES IS AT THE TOP AND CENTER OF RIM.
2) STRUCTURE ELEVATION AND LOCATION FOR INLETS IS AT THE TOP OF CURB AT MIDPOINT OF THE INLET OR AT THE CENTER OF SLAB FOR "D" INLETS.
3) STRUCTURE ELEVATION AND LOCATION FOR ENDSECTIONS IS AT THE CONNECTION OF PIPE AND END SECTION.
4) PRECAST STRUCTURES MEETING HS-20 LOADING MAY BE USED.
5) ALL STORM DRAINS SHALL BE SMOOTH CORE HIGH DENSITY POLYETHYLENE PIPE.

SOILS LEGEND		
MAP SYMBOL	SOIL GROUP	SOIL TYPE
Ba	D*	BAILE SILT LOAM
CgB2	B	CHESTER GRAVELLY SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
CgC2	B	CHESTER GRAVELLY SILT LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED
ChA	B	CHESTER SILT LOAM, 0 TO 3 PERCENT SLOPES
ChB2	B	CHESTER SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
ChC2	B	CHESTER SILT LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED
ChC3	B	CHESTER SILT LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
ChD2	B	CHESTER SILT LOAM, 0 TO 3 PERCENT SLOPES
Cs	B	COMUS SILT LOAM
EkB2	B	ELIOAK SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
ElC3	B	ELIOAK SILTY CLAY LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
GlB2	B	GLENELG LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
GlC2	B	GLENELG LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED
GlD2	B	GLENELG LOAM, 15 TO 25 PERCENT SLOPES, MODERATELY ERODED
GnB2	C*	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
Ha	D*	HATBORO SILT LOAM
MgB2	B	MANOR GRAVELLY LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED
MgC2	B	MANOR GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED
MgC3	B	MANOR GRAVELLY LOAM, 8 TO 15 PERCENT SLOPES, SEVERELY ERODED
MlD2	B	MANOR LOAM, 15 TO 25 PERCENT SLOPES, MODERATELY ERODED
MlD3	B	MANOR LOAM, 15 TO 25 PERCENT SLOPES, SEVERELY ERODED
MlE	B	MANOR LOAM, 25 TO 45 PERCENT SLOPES
MnD	B	MANOR VERY STONY LOAM, 3 TO 25 PERCENT SLOPES
MnF	B	MANOR VERY STONY LOAM, 25 TO 60 PERCENT SLOPES
Mo	B*	MIXED ALLUVIAL LAND

* INDICATES HYDRIC SOILS
TAKEN FROM SOIL SURVEY, HOWARD COUNTY, MARYLAND (ISSUED JULY 1968) MAP NO. 31

RIGHT OF WAY ELEVATION CHART NAD.83		
R/W PT. NO.	DISCRIPTION	ELEVATION
508	REBAR & CAP	392.77'
509	REBAR & CAP	389.54'
510	REBAR & CAP	402.28'
601	REBAR & CAP	402.40'
602	REBAR & CAP	392.70'
603	REBAR & CAP	388.29'
512	REBAR & CAP	431.64'
513	CONCRETE MONUMENT	431.18'
514	REBAR & CAP	428.44'
515	REBAR & CAP	427.56'
516	REBAR & CAP	429.29'
535	REBAR & CAP	428.33'
536	REBAR & CAP	427.01'
537	REBAR & CAP	424.79'
538	REBAR & CAP	421.85'
576	REBAR & CAP	419.96'
577	REBAR & CAP	419.09'
578	REBAR & CAP	426.53'
579	REBAR & CAP	430.60'
580	REBAR & CAP	431.81'
502	REBAR & CAP	493.05'
545	REBAR & CAP	409.33'
546	REBAR & CAP	415.96'
547	REBAR & CAP	425.32'
548	REBAR & CAP	427.67'
549	REBAR & CAP	451.50'
550	REBAR & CAP	482.36'
551	REBAR & CAP	491.24'
553	REBAR & CAP	491.19'
554	REBAR & CAP	483.20'
555	REBAR & CAP	452.12'
556	REBAR & CAP	427.76'
557	REBAR & CAP	424.41'
558	REBAR & CAP	415.16'
559	REBAR & CAP	408.83'
500	REBAR & CAP	397.50'
501	REBAR & CAP	392.35'
502	REBAR & CAP	390.85'
503	CONCRETE MONUMENT	390.00'
604	REBAR & CAP	394.24'
607	REBAR & CAP	393.30'
608	REBAR & CAP	388.59'
609	REBAR & CAP	388.02'
610	REBAR & CAP	352.21'
611	REBAR & CAP	354.43'
612	REBAR & CAP	369.60'
505	REBAR & CAP	388.23'
506	REBAR & CAP	381.47'
507	REBAR & CAP	387.00'
511	REBAR & CAP	424.62'
581	REBAR & CAP	425.59'
582	REBAR & CAP	419.74'
583	REBAR & CAP	416.42'
584	REBAR & CAP	417.18'
585	REBAR & CAP	418.37'
586	REBAR & CAP	417.57'
596	REBAR & CAP	416.83'
597	REBAR & CAP	417.88'
598	REBAR & CAP	418.12'
599	X-CUT	417.52'
604	REBAR & CAP	386.88'
605	REBAR & CAP	380.88'
540	REBAR & CAP	392.67'
541	REBAR & CAP	390.08'
542	REBAR & CAP	391.99'
564	REBAR & CAP	391.40'
565	REBAR & CAP	389.20'
566	REBAR & CAP	391.34'
567	REBAR & CAP	392.32'
568	REBAR & CAP	393.08'
569	REBAR & CAP	392.25'
570	REBAR & CAP	393.92'
571	REBAR & CAP	394.11'
572	REBAR & CAP	392.08'
573	REBAR & CAP	393.74'
574	CONCRETE MONUMENT	396.59'
575	REBAR & CAP	398.23'
600	CONCRETE MONUMENT	415.20'

STORM DRAIN DATA						
INLET NO.	ZONING	AREA (AC)	'C' FACTOR	% IMPERVIOUS	Q2	Q10
I-1	RC-DEO	1.93	0.26	20	2.26	3.31
I-2	RC-DEO	0.12	0.49	43	0.26	0.39
I-3	RC-DEO	0.96	0.28	20	1.21	1.77
I-4	RC-DEO	4.55	0.27	14	4.41	6.36
I-5	RC-DEO	0.93	0.44	37	1.84	2.70
I-6	RC-DEO	1.30	0.40	35	2.34	3.43
I-7	RC-DEO	0.22	0.56	50	0.55	0.81
I-8	RC-DEO	1.24	0.32	23	1.79	2.62
I-9	RC-DEO	4.77	0.25	17	5.37	7.87
I-10	RC-DEO	0.88	0.44	40	1.74	2.56
I-11	RC-DEO	2.90	0.29	23	3.78	5.55
I-12	RC-DEO	0.43	0.49	45	0.95	1.39
I-13	RC-DEO	4.53	0.26	20	5.30	7.77
I-14	RC-DEO	0.71	0.39	34	1.25	1.83
I-15	RC-DEO	0.25	0.56	52	0.63	0.92
I-16	RC-DEO	0.22	0.58	55	0.57	0.84
I-17	RC-DEO	0.22	0.58	55	0.57	0.84
I-18	RC-DEO	0.90	0.29	21	1.17	1.72
I-19	RC-DEO	0.20	0.35	30	0.32	0.46
I-20	RC-DEO	2.84	0.21	11	2.68	3.94
I-21	RC-DEO	5.40	0.25	17	5.94	8.59
I-22	RC-DEO	1.26	0.27	17	1.53	2.25
I-23	RC-DEO	0.24	0.42	38	0.45	0.67
I-24	RC-DEO	0.41	0.56	46	0.94	1.38
I-25	RC-DEO	0.37	0.53	49	0.88	1.29
I-26	RC-DEO	0.81	0.35	30	1.28	1.87
I-27	RC-DEO	1.27	0.32	26	1.83	2.68
I-28	RC-DEO	0.60	0.47	41	1.27	1.86
I-29	RC-DEO	2.41	0.33	25	3.58	5.25
I-30	RC-DEO	6.53	0.25	17	6.89	9.88
I-31	RC-DEO	0.35	0.47	41	0.74	1.09
I-32	RC-DEO	5.02	0.28	20	5.24	6.13
I-33	RC-DEO	5.29	0.26	20	4.65	7.62
I-34	RC-DEO	0.32	0.26	20	0.37	0.55
I-35	RC-DEO	2.35	0.27	21	2.68	3.84
I-36	RC-DEO	0.50	0.24	16	0.54	0.79
I-37	RC-DEO	0.28	0.48	44	0.60	0.89
I-38	RC-DEO	2.75	0.32	26	3.47	5.08
I-39	RC-DEO	0.56	0.50	46	1.26	1.84
I-40	RC-DEO	1.55	0.33	28	2.30	3.37
I-41	RC-DEO	0.49	0.49	44	1.08	1.58
I-42	RC-DEO	4.47	0.26	19	5.23	7.67
I-43	RC-DEO	2.27	0.33	26	3.37	4.94
I-44	RC-DEO	2.97	0.31	26	4.14	6.08
I-45	RC-DEO	3.97	0.26	19	4.27	6.09
I-46	RC-DEO	0.40	0.26	19	0.47	0.69
I-47	RC-DEO	1.93	0.25	18	2.17	3.18
I-48	RC-DEO	1.23	0.26	20	1.44	2.11
I-49	RC-DEO	0.17	0.87	100	0.67	0.98

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — 7-18-05 DATE

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — 7/25/05 DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION — 7/19/05 DATE

NO.	DATE	REVISION
2	1-5-07	REVISE STORM DRAIN & CROSSING NUMBERS FOR NEW HOR. & VERT.
1	5-4-06	RENUMBER PLANS IN SET & CORRECT I-18 AND I-19 TO 'D' INLETS

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER
AS-BUILT 1-7-09

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

6/2/05

DEVELOPER: ELIOAK, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: HOMEWOOD, L.L.C., P.O. BOX 417, ELLICOTT CITY, MARYLAND 21041, 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL, 515 MADISON AVENUE, 32nd FLOOR, NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21, PARCELS: 86; TAX MAP: 29, GRID: 3,4,9&10, PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: STORM DRAIN DRAINAGE AREA MAP

DATE: JUNE, 2005 — PROJECT NO. 1132

DES: JMC/DBT — DRAFT: JMC/DBT — CHECK: CAM — SCALE: 1" = 100' — SHEET 15 OF 55

F-04-82

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
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Donald Mason 6/2/05

DEVELOPER: ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022

PROJECT: **RIVERWOOD – PHASE 1**
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: STORM DRAIN DRAINAGE AREA MAP

DATE: JUNE, 2005	PROJECT NO. 1132
SCALE: 1" = 100'	SHEET 14 OF 55

DES: JMC/DBT | DRAFT: JMC/DBT | CHECK: CAM

SEE SHEET 15 FOR STORM DRAIN DATA CHART

F-04-82

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

[signature] 7-18-05
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

Cindy Hamilton 7/25/05
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

[signature] 7/19/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

P:\1132 Homewood\dwg\7025s13-15.dwg, 6/2/2005 11:32:56 AM

MATCH LINE SEE SHEET 14

MATCH LINE SEE SHEET 14

LOT 14

HARMON C. LANDESMAN
RENEE K. LANDESMAN
/ 19767547
11013 GAITHER FARM ROAD
4.38 AC.+/-

E 1,340,750
N 523,750

LOT 4

GRID NORTH

LOT 5

LOT 3

APRIL L. TAYMAN
5231/74
11213 McGEE WAY
3.14 AC.+/-

POINT OF HOMEWOOD
LOTS 1-10
PLATS 6593-94
F-86-54

LOT NS
GEL L. PARRAN
JAY K. PARRAN
0467/445
5619 SUFFIELD COURT
3.34 AC.+/-

NON-BUILDABLE BULK PARCEL BB TO BE RESUBDIVIDED AT A LATER DATE AS PHASE 2

FOUNDRY PRESERVATION PARCEL 'I'

NON-BUILDABLE PRESERVATION PARCEL C DEDICATED TO HOWARD COUNTY, MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

NON-BUILDABLE PRESERVATION PARCEL C DEDICATED TO HOWARD COUNTY, MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

NON-BUILDABLE BULK PARCEL BB TO BE RESUBDIVIDED AT A LATER DATE AS PHASE 2

NON-BUILDABLE PRESERVATION PARCEL H FOR STORMWATER MANAGEMENT DEDICATED TO HOMEOWNERS ASSOCIATION HOWARD COUNTY EASEMENT HOLDER

NON-BUILDABLE PRESERVATION PARCEL E DEDICATED TO HOWARD COUNTY MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

NON-BUILDABLE PRESERVATION PARCEL D DEDICATED TO HOWARD COUNTY MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

NON-BUILDABLE BULK PARCEL GG TO BE RESUBDIVIDED AT A LATER DATE AS PHASE 2

NON-BUILDABLE BULK PARCEL AA TO BE RESUBDIVIDED AT A LATER DATE AS PHASE 2

NON-BUILDABLE PRESERVATION PARCEL O DEDICATED TO HOWARD COUNTY, MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

NON-BUILDABLE BULK PARCEL 'HH' TO BE TRANSFERRED TO PARCEL 117 UPON RECORDATION OF THIS PLAT

NON-BUILDABLE PRESERVATION PARCEL 'P' DEDICATED TO HOWARD COUNTY MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

NON-BUILDABLE PRESERVATION PARCEL 'G' DEDICATED TO HOWARD COUNTY MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

NON-BUILDABLE PRESERVATION PARCEL 'F' DEDICATED TO HOWARD COUNTY MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

NON-BUILDABLE PRESERVATION PARCEL 'D' DEDICATED TO HOWARD COUNTY MARYLAND HOMEOWNERS ASSOCIATION EASEMENT HOLDER

CASTLEBRIDGE ROAD

KINSALE COURT

HOMEWOOD ROAD

McGEE WAY

LOT 1
ALBERT W. HARRISON, JR.
MARY R. HARRISON
1470/441
11211 McGEE WAY
3.07 AC.+/-

LOT 6

LOT 28

LOT 29

LOT 41

LOT 42

LOT 40

LOT 32

LOT 33

LOT 34

LOT 35

LOT 36

LOT 37

LOT 38

LOT 39

LOT 79

LOT 74

LOT 73

LOT 72

FUTURE LOT 82

FUTURE LOT 81

FUTURE LOT 80

FUTURE LOT 43

FUTURE PARCEL 'D'

STACIA K. SMITH
GARY B. SMITH IKE
5598/235
TAX MAP 29 PARCEL 117
11362 HOMEWOOD ROAD
13.94 AC.+/-

N 574,500
E 1,339,250

EDWARD H. MURPHY
MARGARET M. MURPHY
4756/489 4192/287
TAX MAP 29 PARCEL 303
11390 HOMEWOOD ROAD
14.72 AC.+/-

BENEDICT FARM
SP-02-13
ZONED: RC-DEO

BENEDICT FARM
SP-02-13
ZONED: RC-DEO

SWM 'A'

DESIGNATED SEPTIC AREA

SEE SHEET 15 FOR STORM DRAIN DATA CHART

LEGEND

- EXISTING CONTOURS
- EXISTING TREELINE
- PROPOSED TREELINE
- CL STREAM
- LIMIT OF WETLANDS
- LIMIT OF SUBMISSION
- STEEP SLOPES 25% OR GREATER
- SLOPES 15-24.99%
- APPROXIMATE LIMIT OF EXISTING 100-YEAR FLOODPLAIN AREA
- APPROXIMATE LIMIT OF PROPOSED 100-YEAR FLOODPLAIN AREA
- DRAINAGE DIVIDE
- FOREST CONSERVATION EASEMENT

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 2-5-07

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 2/7/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 2/6/07

NO.	DATE	REVISION
3	2-20-08	REVISE GRADING AT HEADWALL #2
2	10-26-06	REVISE GRADING, SWM ACCESS AND CROSSING NUMBER 1 OF CASTLEBRIDGE ROAD
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
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www.bel-civilengineering.com

1-4-07

DEVELOPER:
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P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

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c/o JOHN LEE CARROLL
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NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD - PHASE 1
LOTS 1 - 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'
BUILDABLE PRESERVATION PARCEL 'Q'
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 86 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

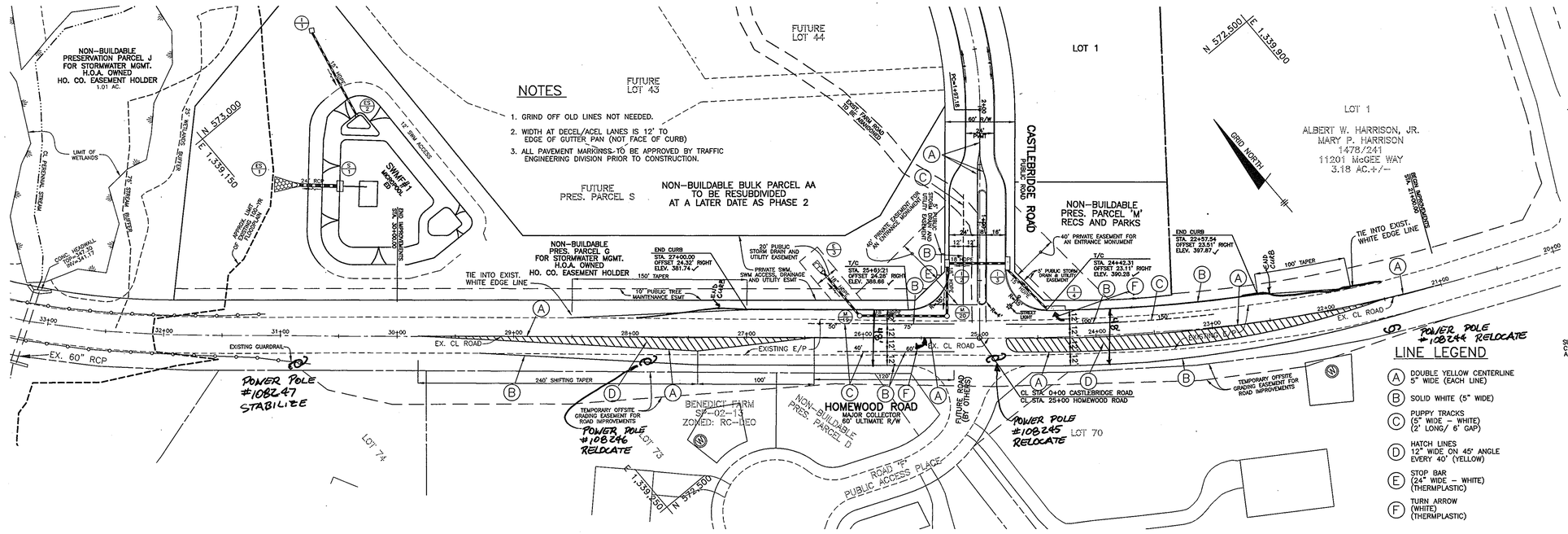
TITLE: Revised Final Road Construction Plan
STORM DRAIN
DRAINAGE AREA MAP

DES: JMC/DBT	DRAFT: JMC/DBT	CHECK: CAM

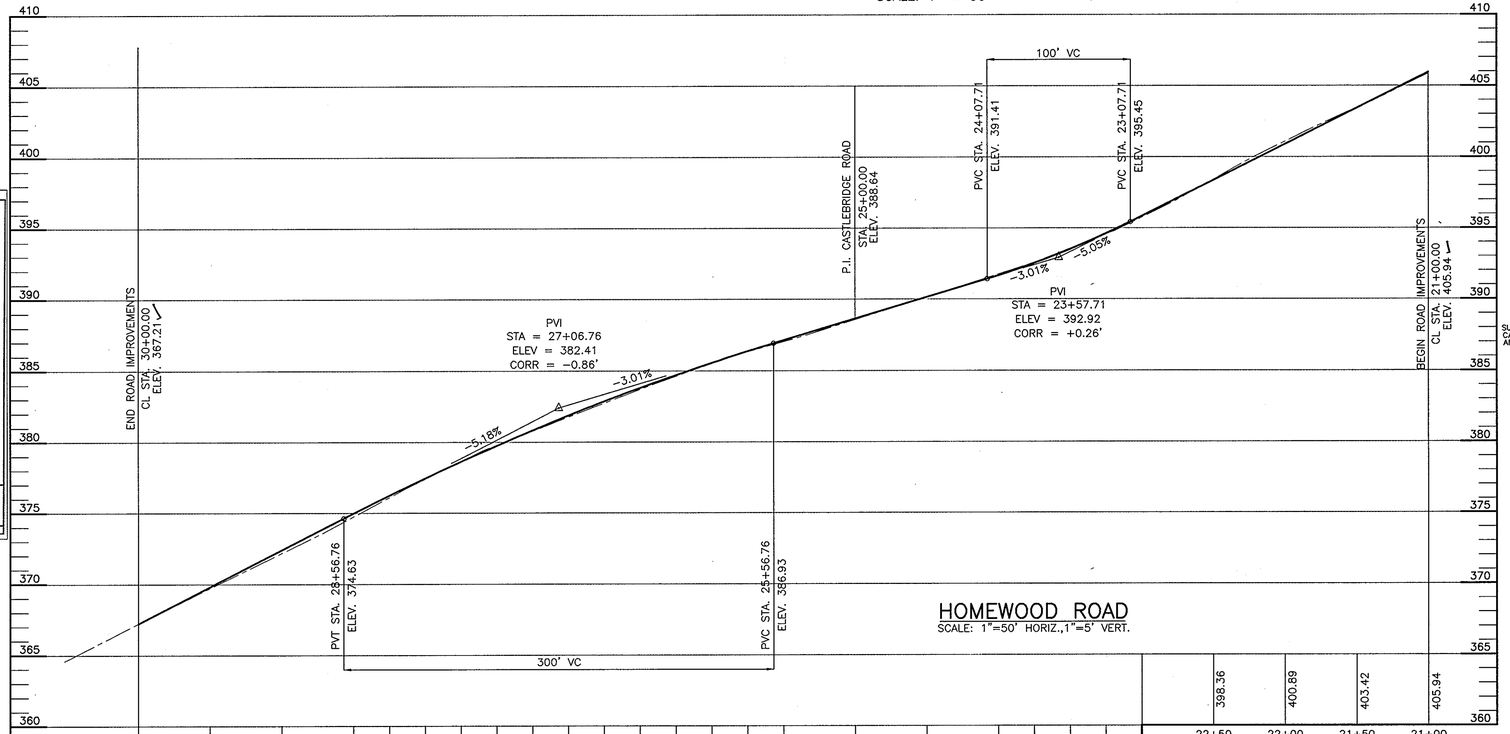
DATE:	JUNE, 2005	PROJECT NO.	1132
SCALE:	1" = 100'	SHEET	13 OF 55

F-04-82

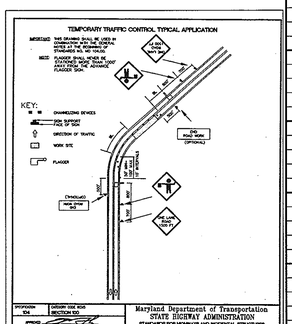
P:\1132 Homewood\dwg\7025s13-15.dwg, Sheet 13, 1/4/2007 9:02:04 AM, imc, Oce TDS600 HBI for mvfar.pc3

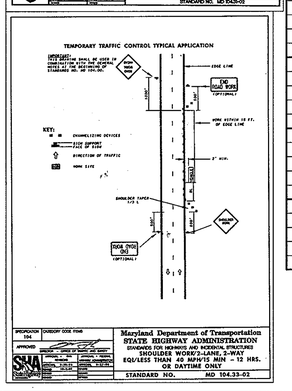


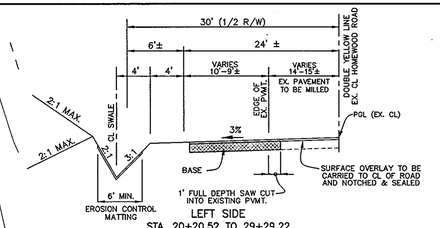
PLAN VIEW
SCALE: 1" = 50'



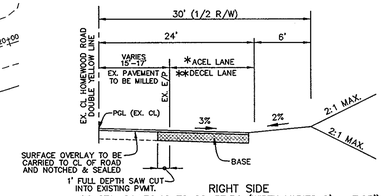
HOMEWOOD ROAD
SCALE: 1"=50' HORIZ.,1"=5' VERT.



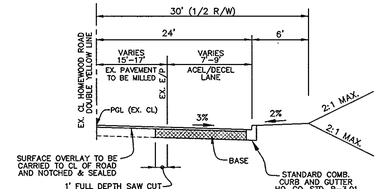




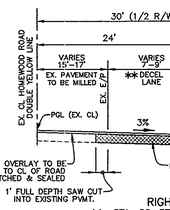
LEFT SIDE
STA. 20+20.52 TO 29+29.22
TYPICAL WIDENING SECTION
NOT TO SCALE
REFER TO HO.CO.STD. R-10.01



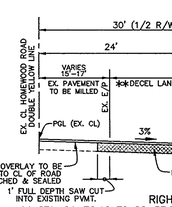
RIGHT SIDE
** STA. 21+76.12 TO 22+57.54 (WIDTH VARIES 0' – 7.95')
* STA. 27+00.00 TO 28+50.00 (WIDTH VARIES 8.32' TO 0')
TYPICAL WIDENING SECTION
NOT TO SCALE
REFER TO HO.CO.STD. R-10.01



RIGHT SIDE
** STA. 24+00 TO 24+42.31
*STA. 25+57.21 TO 27+00.00
TYPICAL WIDENING SECTION
NOT TO SCALE
REFER TO HO.CO.STD. R-10.01



RIGHT SIDE
** STA. 22+57.54 TO 24+00
TYPICAL WIDENING SECTION
NOT TO SCALE
REFER TO HO.CO.STD. R-10.01



RIGHT SIDE
** STA. 21+76.12 TO 22+57.54 (WIDTH VARIES 0' – 7.95')
TYPICAL WIDENING SECTION
NOT TO SCALE
REFER TO HO.CO.STD. R-10.01

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET & CLARIFY LINES & ARROWS

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bai-civilengineering.com

Donald Mason 6/2/05

DEVELOPER: ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'
BUILDABLE PRESERVATION PARCEL 'Q'
NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

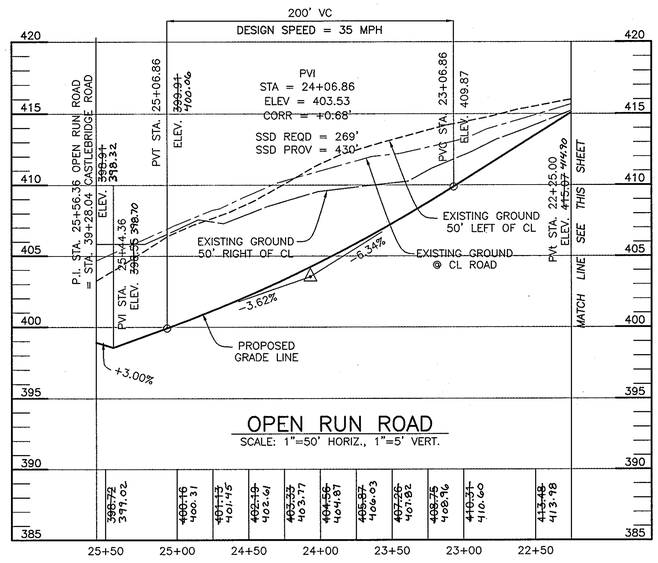
TITLE: HOMEWOOD ROAD IMPROVEMENT PLAN

DATE: JUNE, 2005 PROJECT NO. 1132

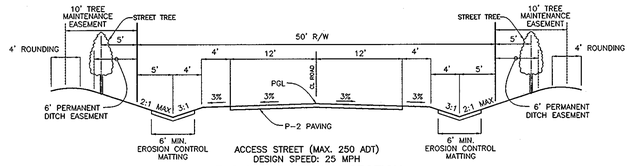
DES: JMC/DBT DRAFT: JMC/DBT CHECK: CAM SCALE: AS SHOWN SHEET 12 OF 55

F-04-82

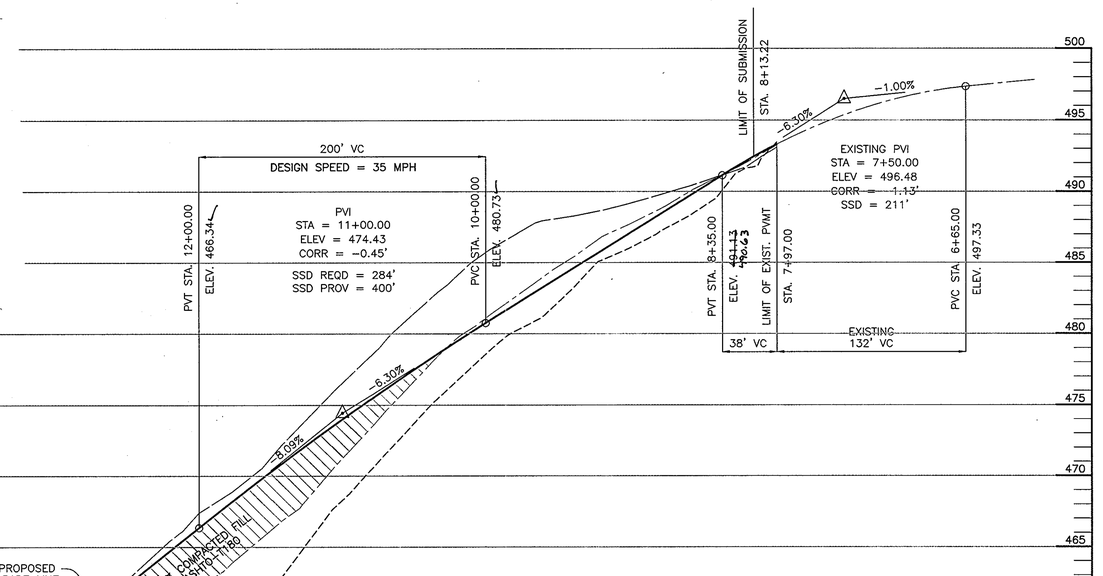
P:\1132 Homewood\dwg\7000s12.dwg, 6/2/2005 11:44:39 AM



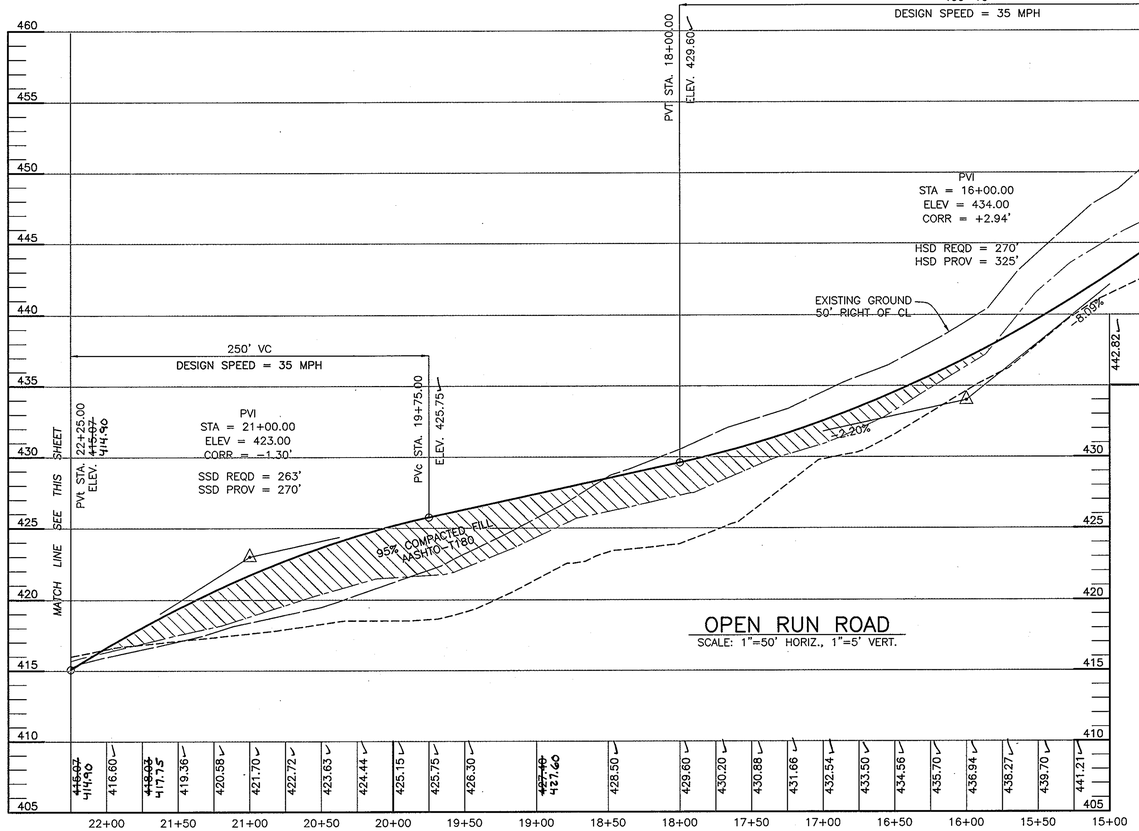
OPEN RUN ROAD
SCALE: 1"=50' HORIZ., 1"=5' VERT.

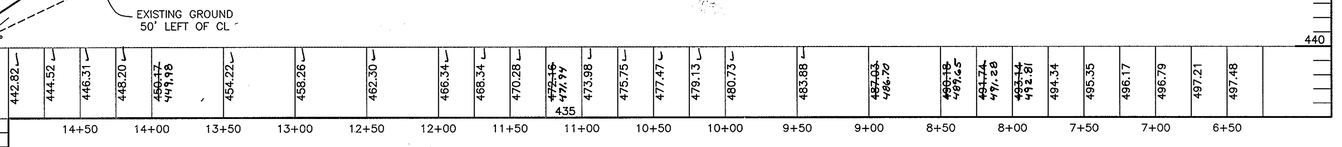


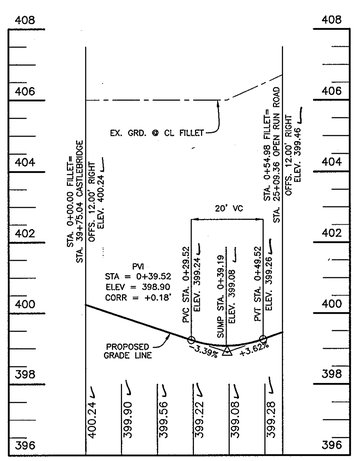
TYPICAL ROADWAY SECTION
OPEN RUN ROAD
NOT TO SCALE
STA. 8+13.23 TO 25+09.36



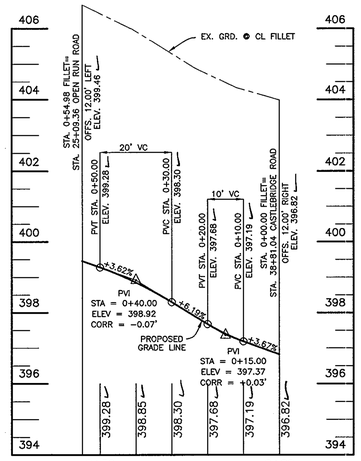
OPEN RUN ROAD
SCALE: 1"=50' HORIZ., 1"=5' VERT.







FILLET PROFILE
NORTH CORNER
CASTLEBRIDGE ROAD/OPEN RUN ROAD
SCALE: 1"=20' HORIZ., 1"=2' VERT.



FILLET PROFILE
SOUTH CORNER
CASTLEBRIDGE ROAD/OPEN RUN ROAD
SCALE: 1"=20' HORIZ., 1"=2' VERT.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/6/05

Donald Moon
PROFESSIONAL ENGINEER
AS-BUILT 7-7-09

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET & REMOVE SPEED CONTROL DEVICES

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
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www.bel-civilengineering.com

Donald Moon
6/6/05

DEVELOPER: ELJOAK, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: HOMEWOOD, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL
c/o JOHN LEE CARROLL
515 MADISON AVENUE
32nd FLOOR
NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

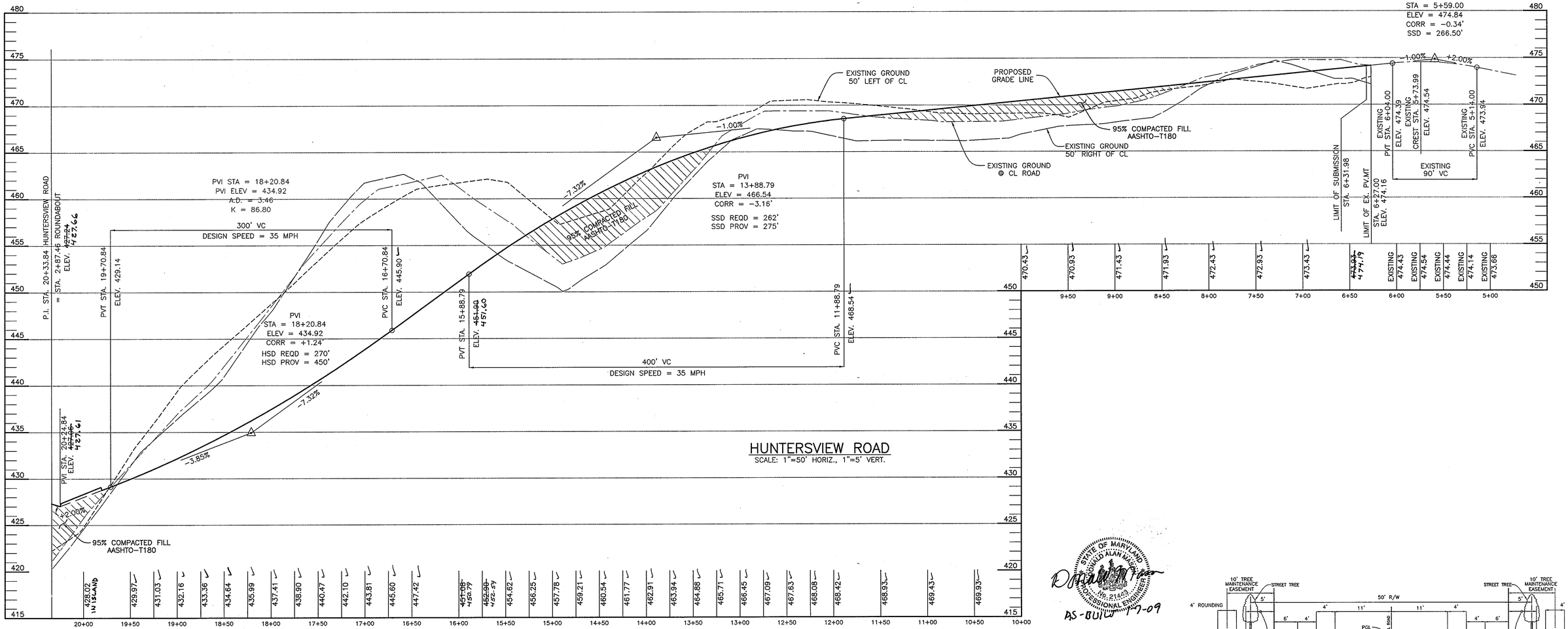
TITLE: ROAD PROFILES

DES: JMC/DBT	DRAFT: JMC/DBT	CHECK: CAM

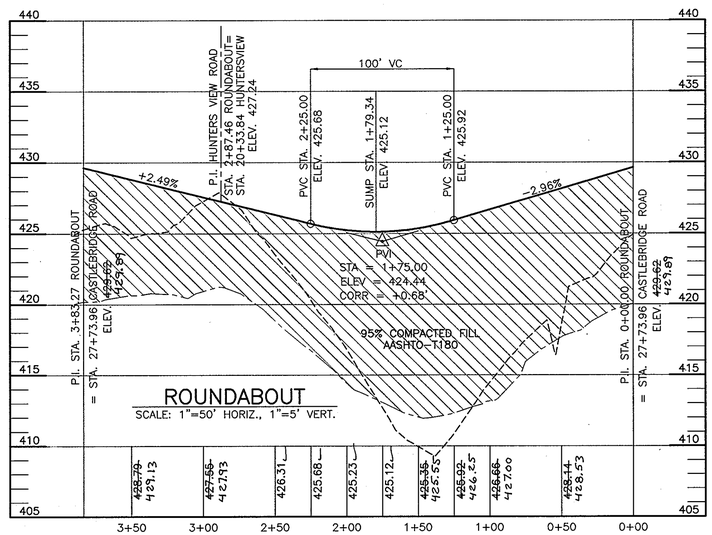
DATE: JUNE, 2005 PROJECT NO. 1132
SCALE: AS SHOWN SHEET 11 OF 55

F-04-82

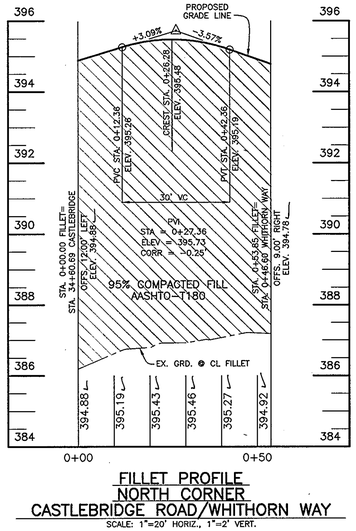
P:\1132 Homewood\dwg\7017s07-11.dwg, 6/2/2005 4:18:32 PM



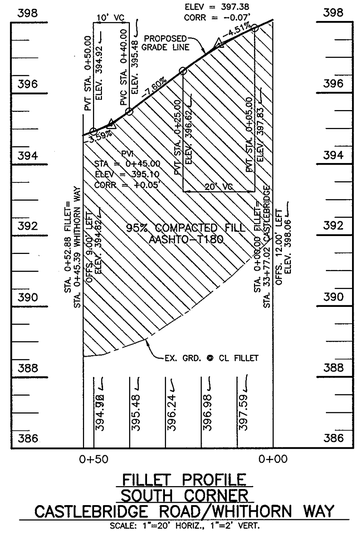
HUNTERSVIEW ROAD
SCALE: 1"=50' HORIZ., 1"=5' VERT.



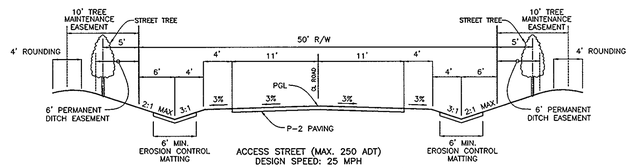
ROUNDABOUT
SCALE: 1"=50' HORIZ., 1"=5' VERT.



FILLET PROFILE
NORTH CORNER
CASTLEBRIDGE ROAD/WHITHORN WAY
SCALE: 1"=20' HORIZ., 1"=2' VERT.



FILLET PROFILE
SOUTH CORNER
CASTLEBRIDGE ROAD/WHITHORN WAY
SCALE: 1"=20' HORIZ., 1"=2' VERT.



TYPICAL ROADWAY SECTION
HUNTERS VIEW ROAD
NOT TO SCALE
STA. 6+31.98 TO STA. 19+98.51

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

STATE OF MARYLAND — DONALD ALAN MASON — No. 21443 — PROFESSIONAL ENGINEER

AS-BUILT 7-7-09

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS INSET & REMOVE SPEED CONTROL DEVICES

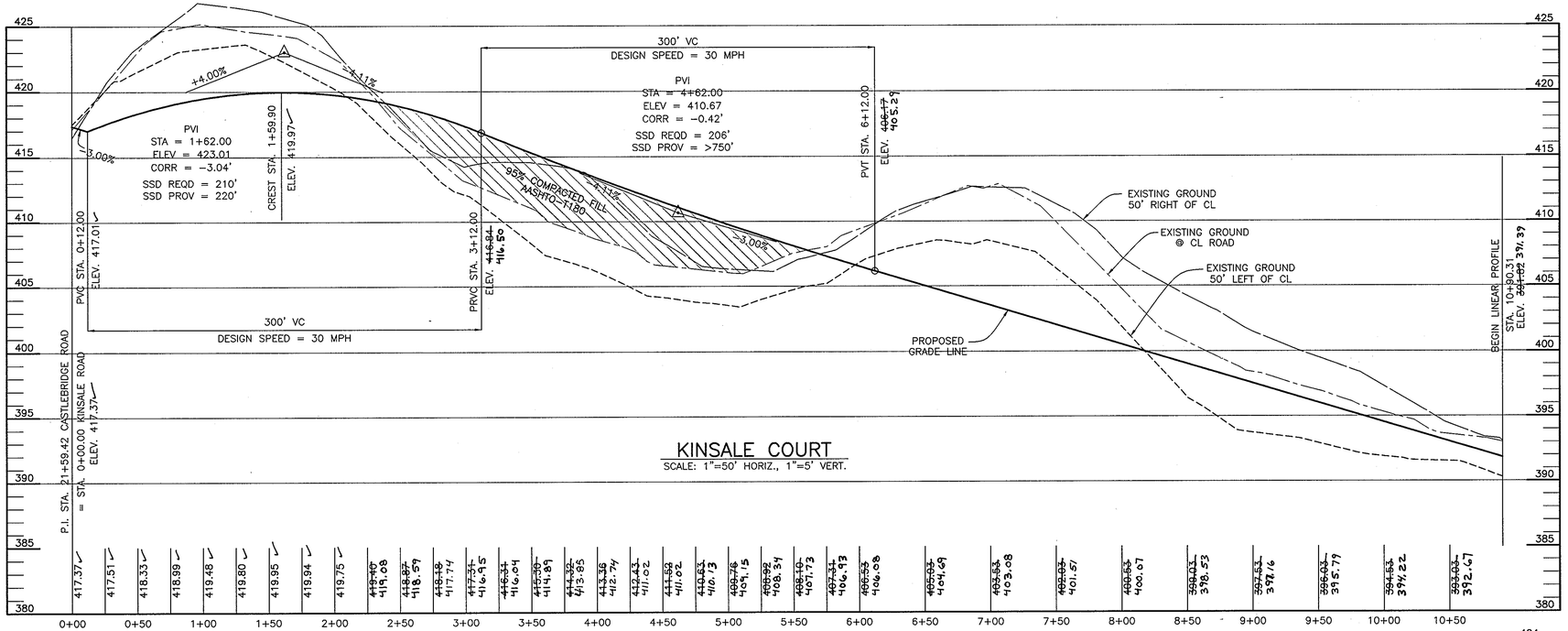
BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

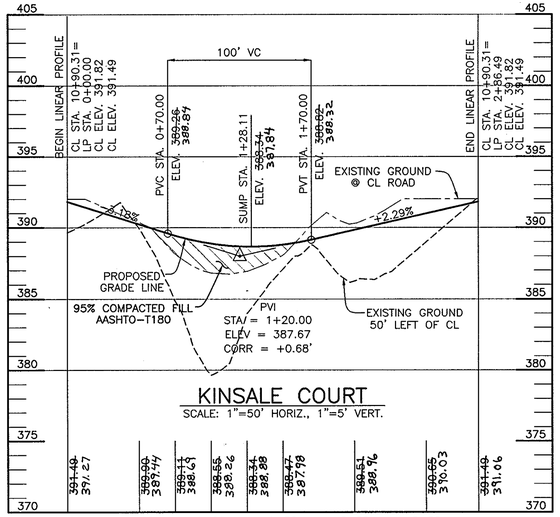
Donald Mason 6/2/05

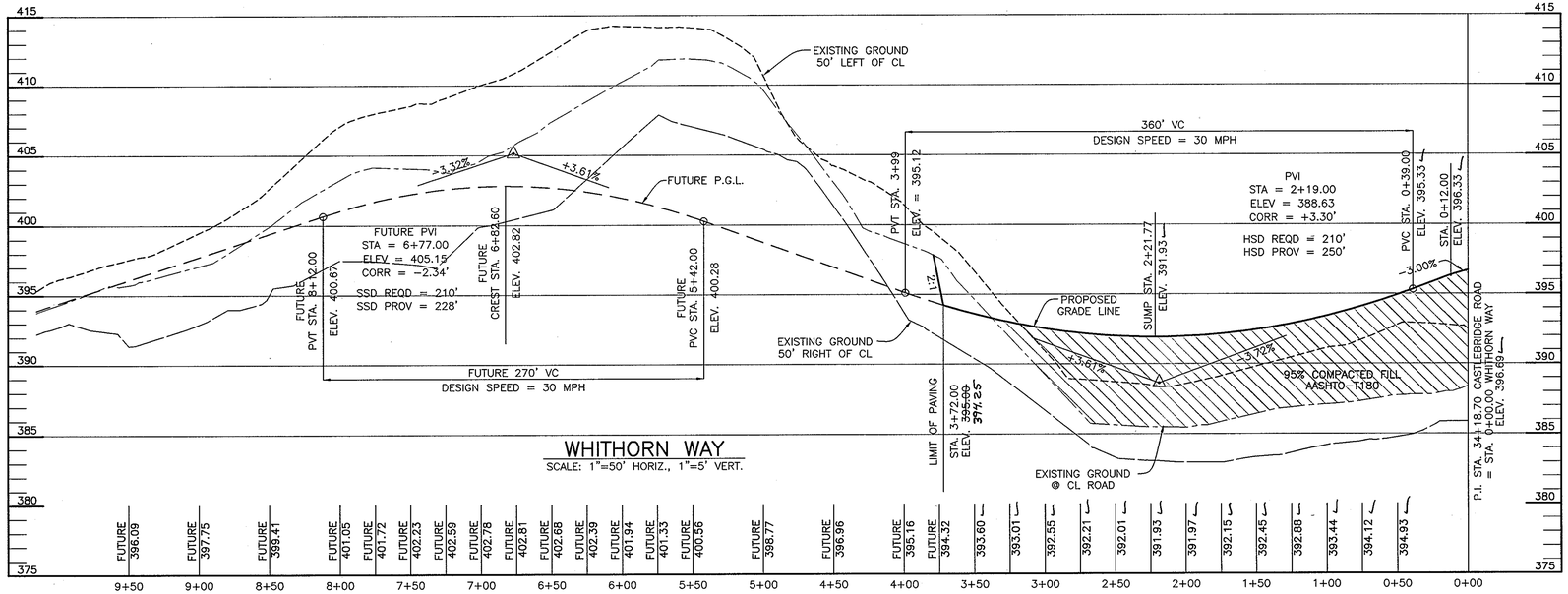
DEVELOPER:	ELJOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
DES: JMC/DBT	DRAFT: JMC/DBT — CHECK: CAM

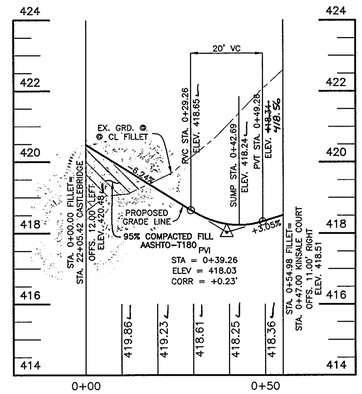
PROJECT:	RIVERWOOD – PHASE 1 LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'
LOCATION:	TAX MAP: 23, GRID: 21 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 86 PARCELS: 20 & 86 THIRD ELECTION DISTRICT HOWARD COUNTY, MARYLAND
TITLE:	ROAD PROFILES
DATE: JUNE, 2005	PROJECT NO. 1132
SCALE: AS SHOWN	SHEET 10 OF 55

F-04-82

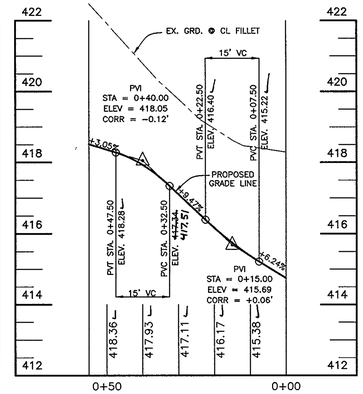






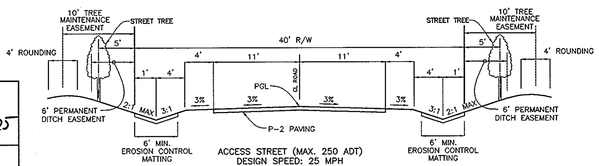


FILLET PROFILE
NORTH CORNER
CASTLEBRIDGE ROAD/KINSALE COURT
SCALE: 1"=20' HORIZ., 1"=2' VERT.

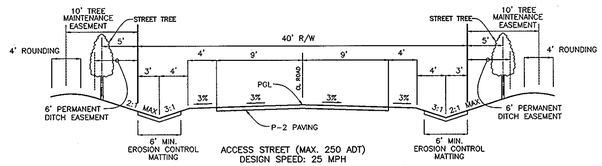


FILLET PROFILE
SOUTH CORNER
CASTLEBRIDGE ROAD/KINSALE COURT
SCALE: 1"=20' HORIZ., 1"=2' VERT.

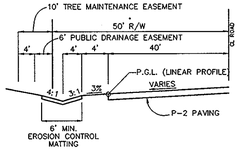
NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET



TYPICAL ROADWAY SECTION
KINSALE COURT
NOT TO SCALE
STA. 0+47 TO 10+90.31



TYPICAL ROADWAY SECTION
WHITHORN WAY
NOT TO SCALE
STA. 0+47 TO 3+30.00



TYPICAL ROADWAY SECTION
AT CUL-DE-SAC
LINEAR PROFILE
NOT TO SCALE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

STATE OF MARYLAND
DONALD ALAN MASON
No. 21443
PROFESSIONAL ENGINEER
AS-BUILT 7-7-09

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Donald Mason 6/2/05

DEVELOPER: ELJOAK, L.L.C.
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515 MADISON AVENUE
32nd FLOOR
NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 TAX MAP: 29, GRID: 3,4,9&10
PARCELS: 86 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: ROAD PROFILES

DES: JMC/DBT | DRAFT: JMC/DBT | CHECK: CAM

DATE: JUNE, 2005 | PROJECT NO. 1132

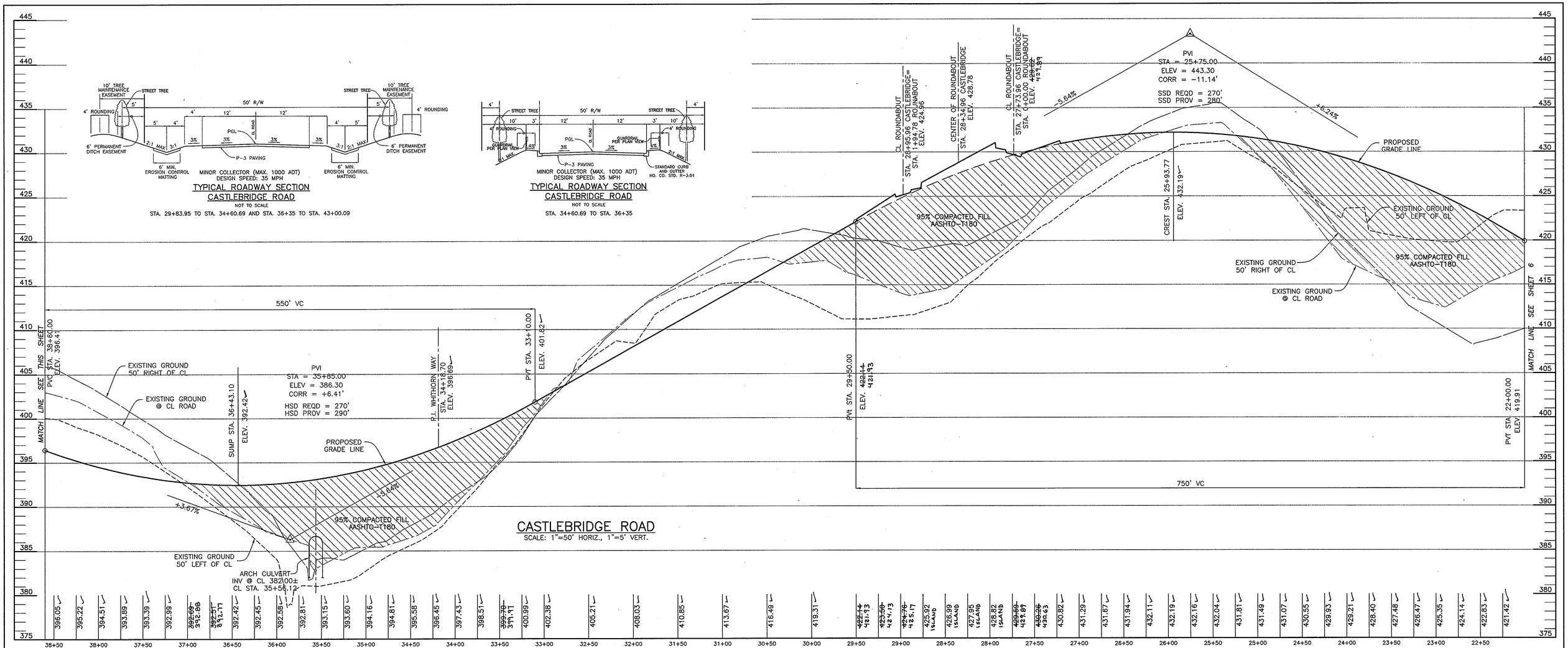
SCALE: AS SHOWN | SHEET 9 OF 55

F-04-82

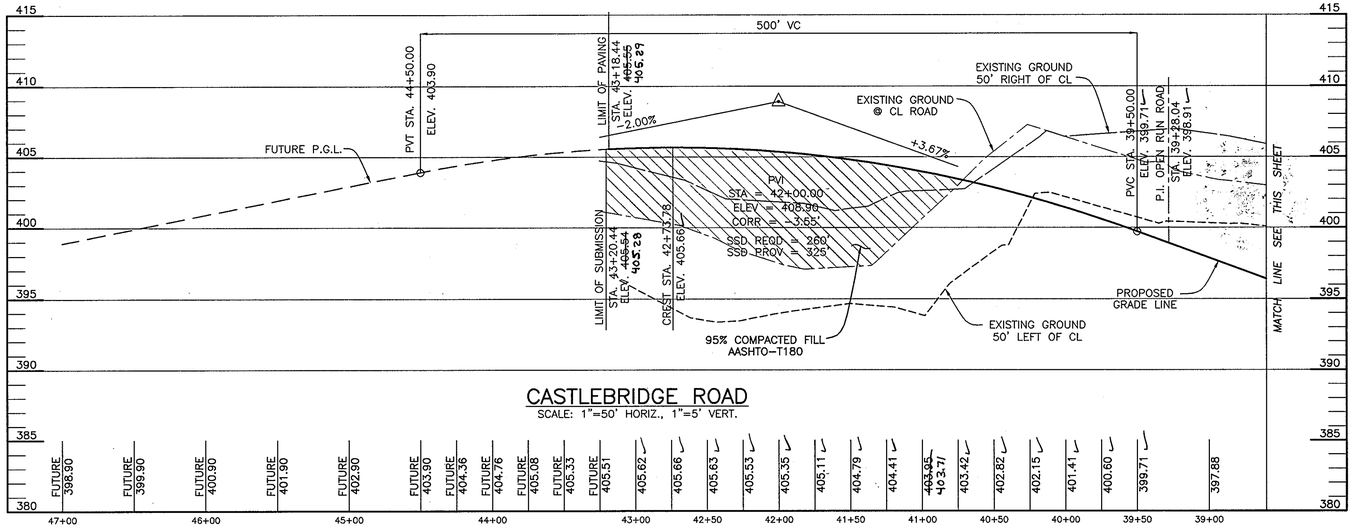
P:\1132 Homewood\dwg\7017s07-11.dwg, 6/2/2005 4:14:47 PM

TYPICAL ROADWAY SECTION
CASTLEBRIDGE ROAD
NOT TO SCALE
STA. 29+83.95 TO STA. 34+60.69 AND STA. 36+35 TO STA. 43+00.09

TYPICAL ROADWAY SECTION
CASTLEBRIDGE ROAD
NOT TO SCALE
STA. 34+60.69 TO STA. 36+35



CASTLEBRIDGE ROAD
SCALE: 1"=50' HORIZ., 1"=5' VERT.



CASTLEBRIDGE ROAD
SCALE: 1"=50' HORIZ., 1"=5' VERT.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

STATE OF MARYLAND — DONALD ALAN MASON — No. 21448 — PROFESSIONAL ENGINEER

AS-BUILT — 7-7-09

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
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STATE OF MARYLAND — DONALD ALAN MASON — No. 21448 — PROFESSIONAL ENGINEER — 6/6/05

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
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DES: JMC/DBT	DRAFT: JMC/DBT	CHECK: CAM

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

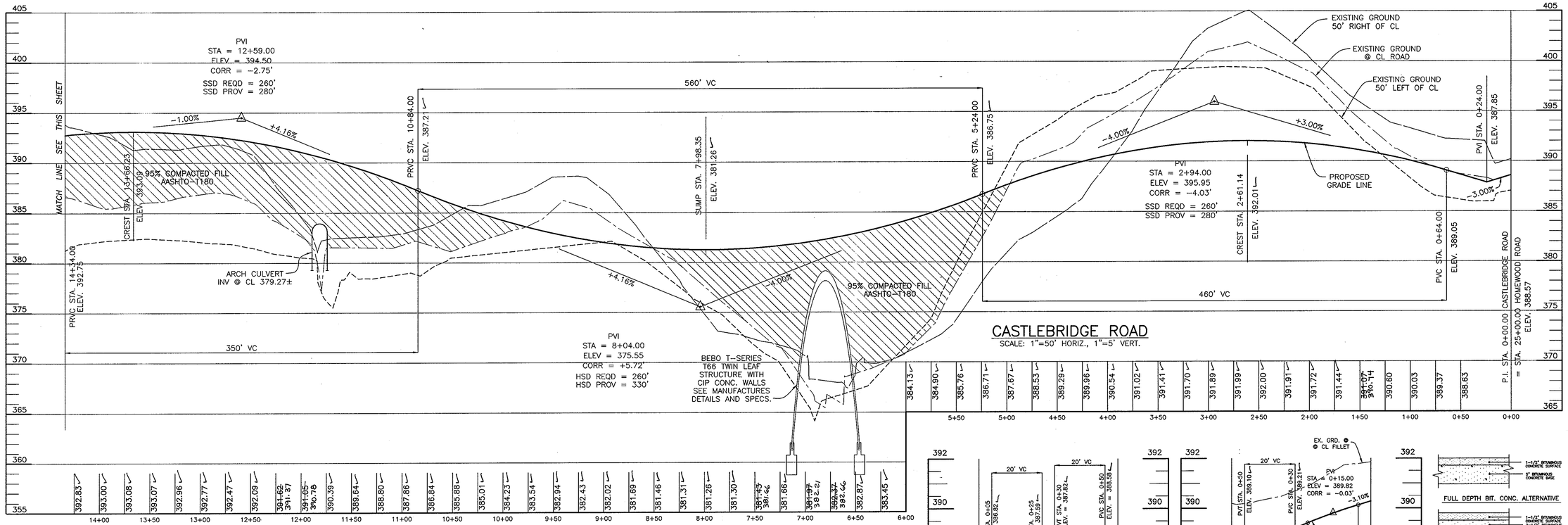
LOCATION: TAX MAP: 23, GRID: 21 TAX MAP: 29, GRID: 3,4,9&10
PARCELS: 88 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: ROAD PROFILES

DATE:	JUNE, 2005	PROJECT NO. 1132
SCALE:	AS SHOWN	SHEET 8 OF 55

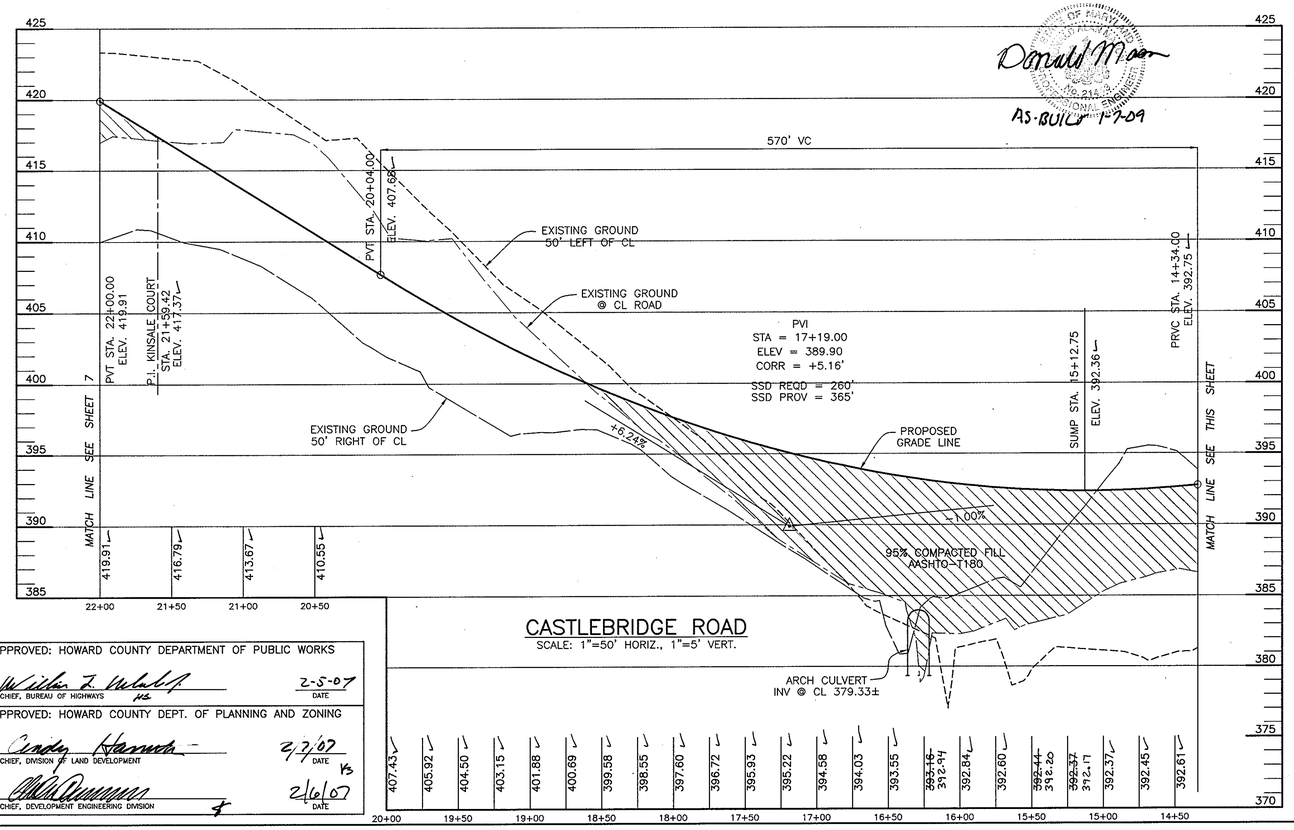
F-04-82

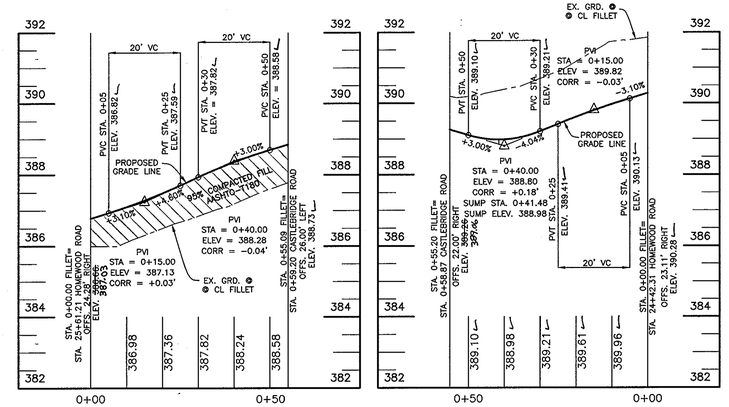
P:\1132 Homewood\dwg\7017s07-11.dwg, 6/2/2005 4:16:42 PM



CASTLEBRIDGE ROAD

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



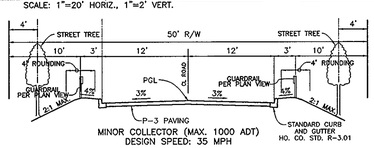


FILLET PROFILE WEST CORNER CASTLEBRIDGE ROAD/HOMEWOOD ROAD

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

FILLET PROFILE EAST CORNER CASTLEBRIDGE ROAD/HOMEWOOD ROAD

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

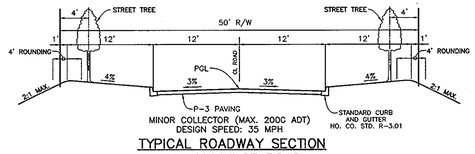


MINOR COLLECTOR (MAX. 1000 ADT)
DESIGN SPEED: 35 MPH

TYPICAL ROADWAY SECTION CASTLEBRIDGE ROAD

NOT TO SCALE

STA. 5+50 TO STA. 7+80, STA. 10+50 TO STA. 17+00
(SHOULDER WIDTH IS ADJUSTED AT STREAM CROSSINGS)
TRANSITION TO 3' SHOULDER WIDTH FROM STA. 5+30 TO 5+50
TRANSITION TO 12' SHOULDER WIDTH FROM STA. 7+80 TO 8+00
TRANSITION TO 3' SHOULDER WIDTH FROM STA. 10+30 TO 10+50
TRANSITION TO 12' SHOULDER WIDTH FROM STA. 17+00 TO 17+20

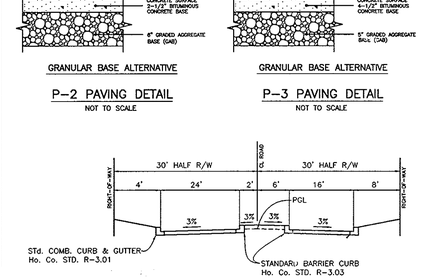


MINOR COLLECTOR (MAX. 2000 ADT)
DESIGN SPEED: 35 MPH

TYPICAL ROADWAY SECTION CASTLEBRIDGE ROAD

NOT TO SCALE

STA. 1+60.96 TO STA. 5+30, STA. 8+00 TO STA. 10+30,
STA. 17+20 TO STA. 26+85.97 (SHOULDER WIDTH IS ADJUSTED AT STREAM CROSSINGS)
TRANSITION TO 3' SHOULDER WIDTH FROM STA. 5+30 TO 5+50
TRANSITION TO 12' SHOULDER WIDTH FROM STA. 7+80 TO 8+00
TRANSITION TO 3' SHOULDER WIDTH FROM STA. 10+30 TO 10+50
TRANSITION TO 12' SHOULDER WIDTH FROM STA. 17+00 TO 17+20



MINOR COLLECTOR (MAX. 1000 ADT)
DESIGN SPEED: 25 MPH

TYPICAL 1/2 ROADWAY SECTION CASTLEBRIDGE ROAD

NOT TO SCALE

STA. 0+59.20 TO STA. 1+24.00

NO.	DATE	REVISION
2	10-26-06	REVISE ROAD PROFILE AND ARCH TYPE FOR CROSSING NUMBER 1
1	5-4-06	RENUMBER PLANS IN SET

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 2-5-07

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 2/2/07

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 2/6/07

STATE OF MARYLAND — DONALD MAAS — No. 21432 — PROFESSIONAL ENGINEER

AS-BUILT 1-7-09

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

STATE OF MARYLAND — DONALD MAAS — No. 21432 — PROFESSIONAL ENGINEER

1-4-07

DEVELOPER:	ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022
DES: JMC/DBT	DRAFT: JMC/DBT | CHECK: CAM

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R';
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

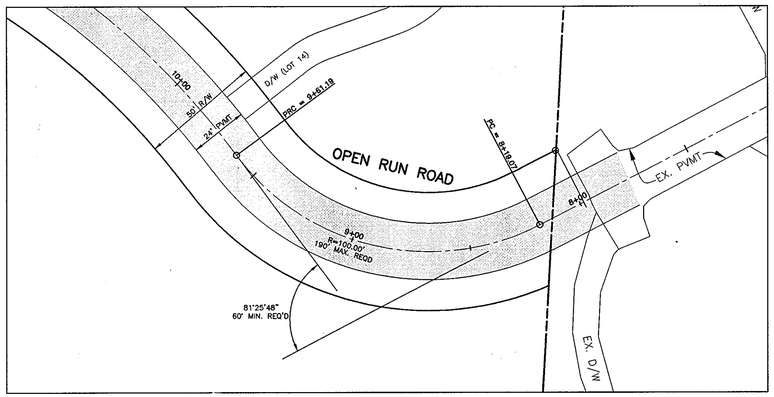
LOCATION: TAX MAP: 23, GRID: 21 TAX MAP: 28, GRID: 3,4,9&10
PARCELS: 86 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: Revised Final Road Construction Plan
ROAD PROFILES

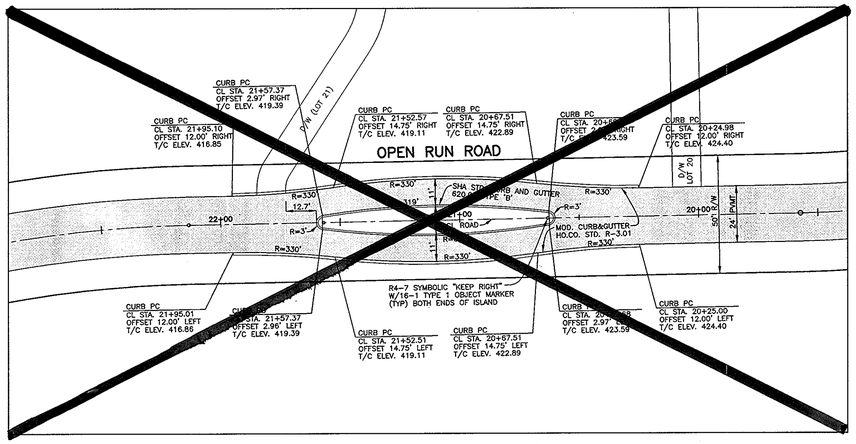
DATE:	JUNE, 2005	PROJECT NO.	1132
SCALE:	AS SHOWN	SHEET	7 OF 55

F-04-82

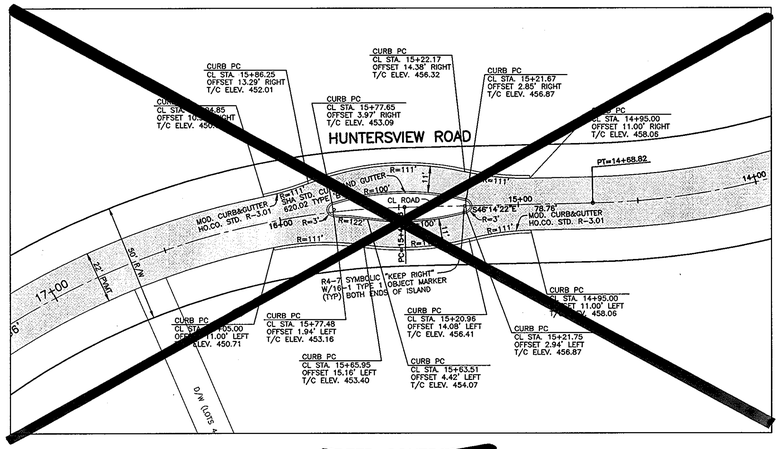
P:\1132 Homewood\dwg\7017s07-11.dwg, Sheet 7, 1/4/2007 9:01:13 AM,
imc, Oce TDS600 HSI for mylar.pc3



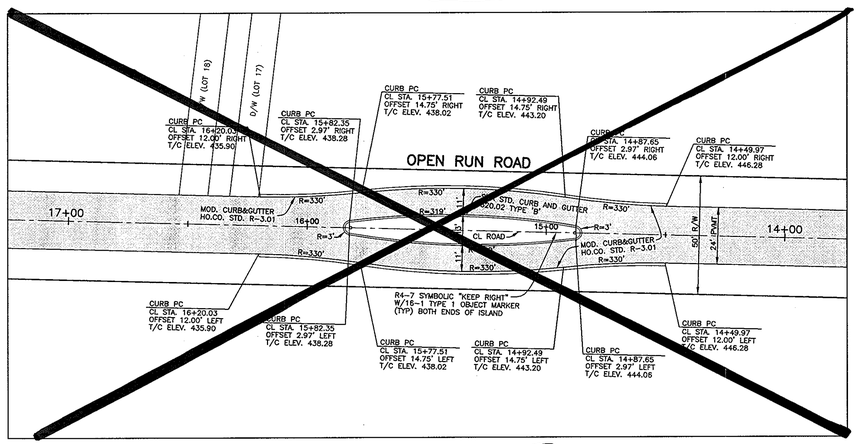
SPEED CONTROL #4
SINGLE CRITICAL BEND
SCALE: 1" = 30'



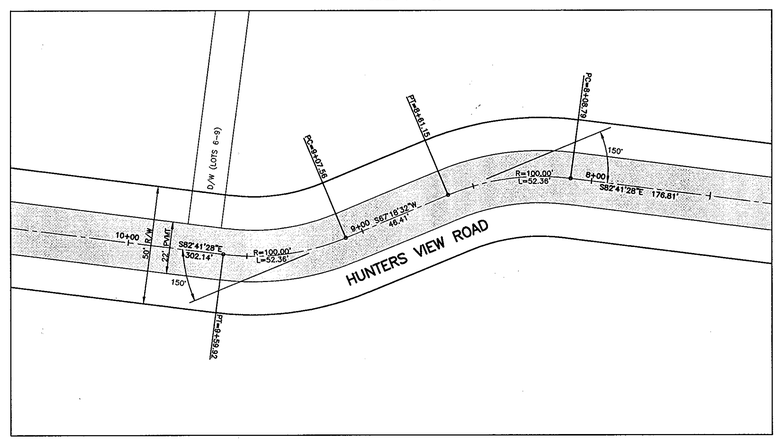
SPEED CONTROL #2
CENTRAL MEDIAN ISLAND
SCALE: 1" = 30'



SPEED CONTROL #5
CENTRAL MEDIAN ISLAND
SCALE: 1" = 30'



SPEED CONTROL #3
CENTRAL MEDIAN ISLAND
SCALE: 1" = 30'



SPEED CONTROL #6
REVRSE CURVES
SCALE: 1" = 30'

NOTE:
SPEED CONTROL #1 IS THE ROUNDABOUT AT THE INTERSECTION OF CASTLEBRIDGE ROAD AND HUNTERS VIEW ROAD. SEE SHEET 5 FOR DETAILS.

NO.	DATE	REVISION
1	5-4-06	REMOVE SPEED CONTROL DEVICES & RENUMBER PLANS IN SET

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/26/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

BENCHMARK
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phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

Donald Moon 6/2/05

DEVELOPER: ELIOAK, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: HOMEWOOD, L.L.C.
P.O. BOX 417
ELLICOTT CITY, MARYLAND 21041
410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL
c/o JOHN LEE CARROLL
515 MADISON AVENUE
32nd FLOOR
NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42;
NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86
TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

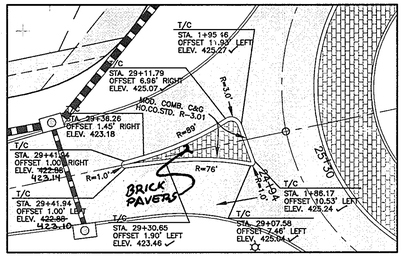
TITLE: SPEED CONTROL DETAILS

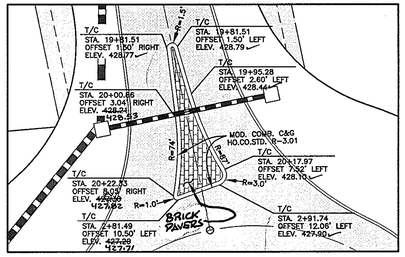
DES: JMC/DBT | DRAFT: JMC/DBT | CHECK: CAM

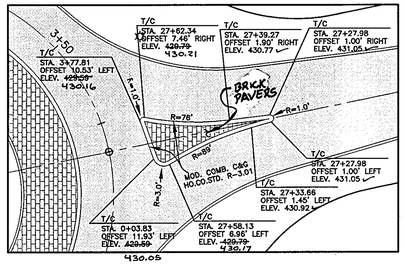
DATE: JUNE, 2005 | PROJECT NO. 1132

SCALE: 1" = 30' | SHEET 6 OF 55

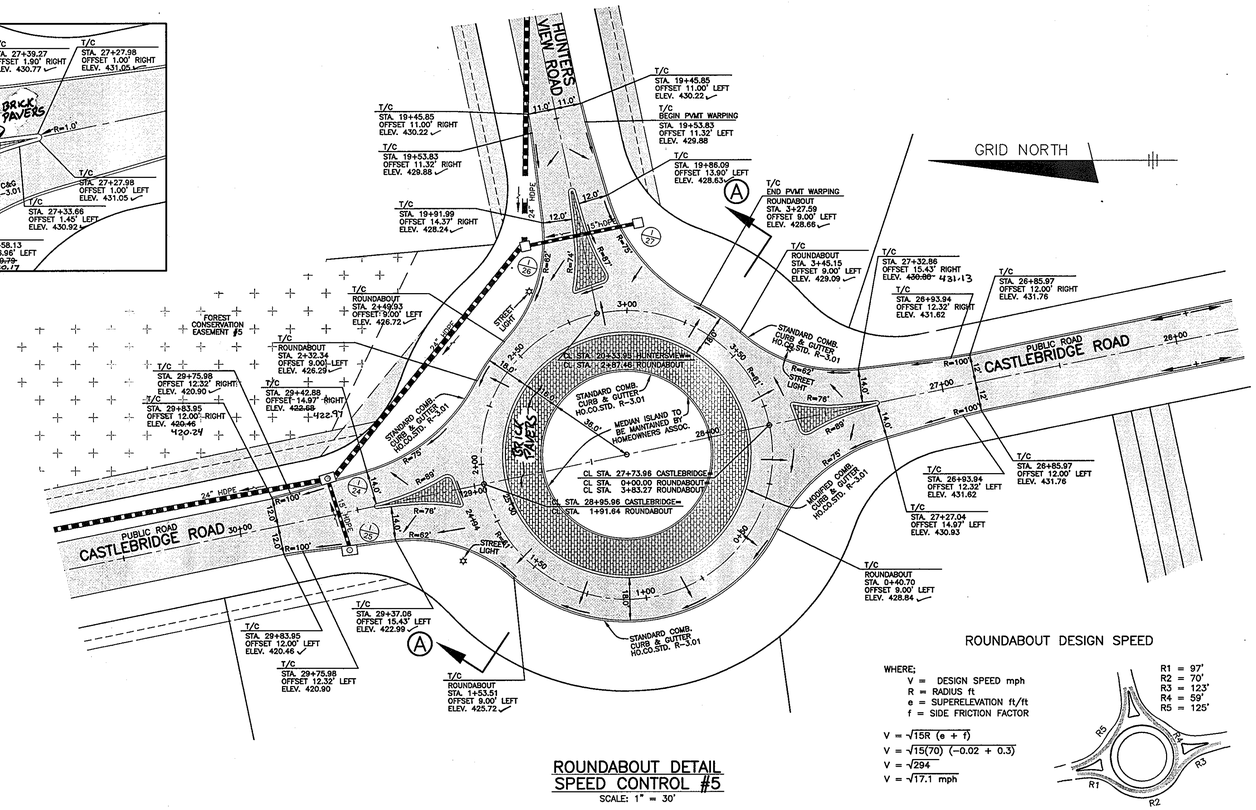
F-04-82







SPLITTER ISLAND DETAILS
SCALE: 1" = 20'

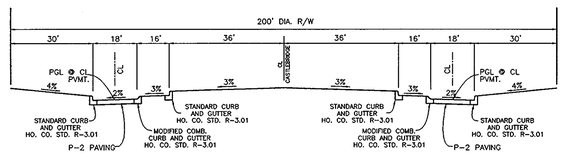


ROUNDABOUT DESIGN SPEED

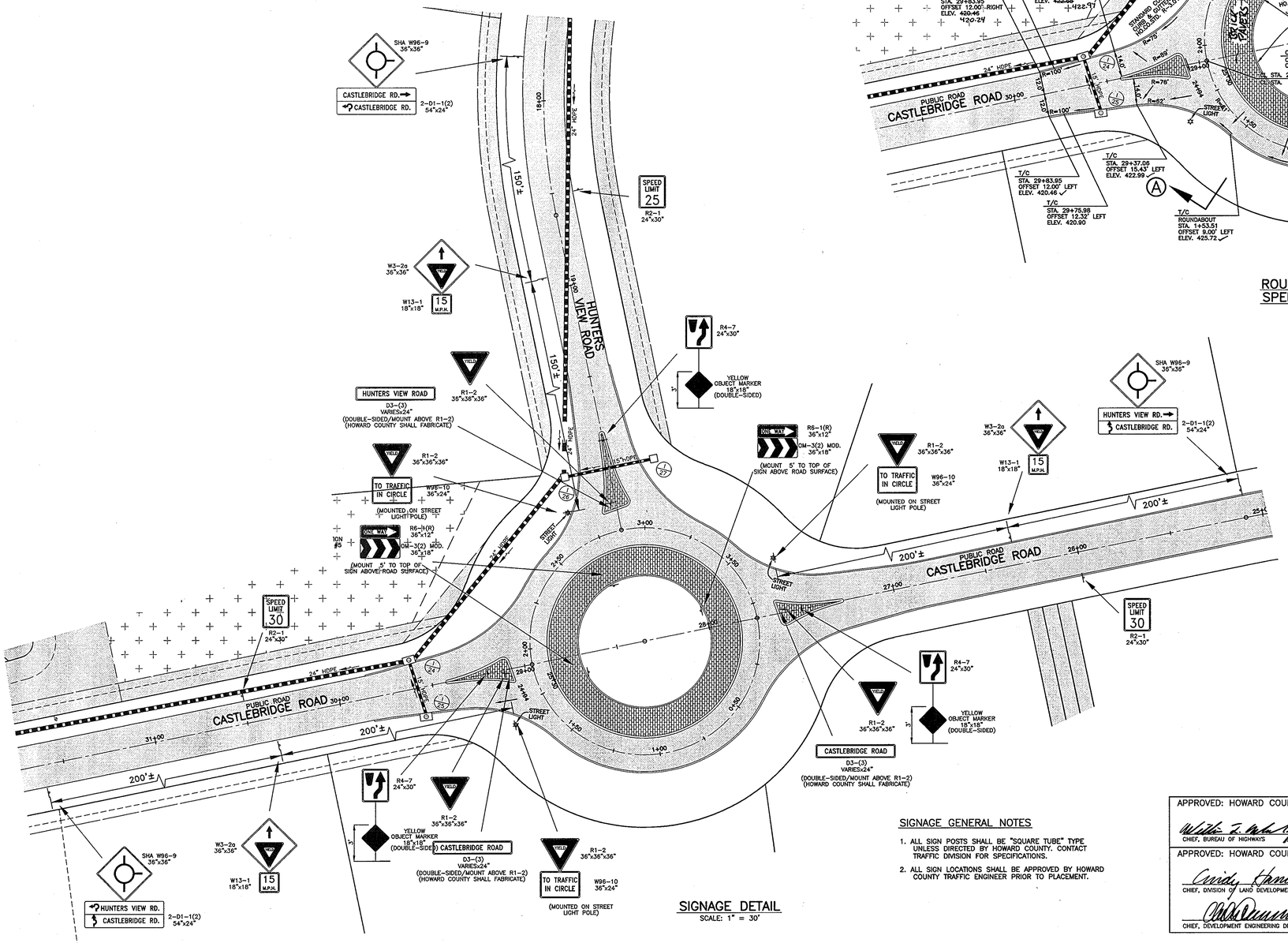
WHERE;
V = DESIGN SPEED mph
R = RADIUS ft
e = SUPERELEVATION ft/ft
f = SIDE FRICTION FACTOR

$V = \sqrt{15R\ (e + f)}$
$V = \sqrt{15(70)\ (-0.02 + 0.3)}$
$V = \sqrt{294}$
$V = \sqrt{17.1}$ mph

ROUNDABOUT DETAIL
SPEED CONTROL #5
SCALE: 1" = 30'



SECTION A–A
TYPICAL ROUNDABOUT SECTION
NOT TO SCALE



SIGNAGE DETAIL
SCALE: 1" = 30'

SIGNAGE GENERAL NOTES

1. ALL SIGN POSTS SHALL BE "SQUARE TUBE" TYPE UNLESS DIRECTED BY HOWARD COUNTY. CONTACT TRAFFIC DIVISION FOR SPECIFICATIONS.
2. ALL SIGN LOCATIONS SHALL BE APPROVED BY HOWARD COUNTY TRAFFIC ENGINEER PRIOR TO PLACEMENT.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-19-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

STATE OF MARYLAND — DONALD ALAN MOON — No. 21443 — PROFESSIONAL ENGINEER

AS-BUILT 1-7-09

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

DONALD MOON — 6/6/05

DEVELOPER:	ELJOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244
OWNER:	JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 42;
NON–BUILDABLE PRESERVATION PARCELS 'A' THRU 'F' & 'R'
BUILDABLE PRESERVATION PARCEL 'Q';
AND NON–BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: ROUNDABOUT DETAILS

DES: JMC/DBT	DRAFT: JMC/DBT	CHECK: CAM

DATE: JUNE, 2005 — PROJECT NO. 1132
SCALE: 1" = 50' — SHEET 5 OF 55

F-04-82

CENTERLINE CONTROL DATA			
STREET NAME	STATION	NORTH	EAST
HUNTERS VIEW ROAD	LOS=6+31.98	574811.4451	1341502.8137
	PC=8+08.79	574833.9383	1341327.4422
	PT=8+61.15	574827.0106	1341276.1441
	PC=9+07.56	574809.1073	1341233.3262
	PT=9+59.92	574802.1796	1341182.0280
	PC=12+62.06	574840.6176	1340882.3415
	PT=14+68.82	574928.2496	1340698.9029
	PC=15+47.58	574982.7238	1340642.0192
	PT=18+61.95	575066.2897	1340351.5501
	END=20+32.85	575031.7504	1340184.1797
OPEN RUN ROAD	LOS=8+13.23	576189.7923	1341577.9314
	PC=8+19.07	576187.0866	1341572.7583
	PRC=9+61.19	576216.6654	1341445.6962
	PT=13+71.50	576332.9868	1341080.1658
	PC=18+35.19	576185.7408	1340640.4681
	PT=19+57.27	576165.1021	1340520.6269
	PC=22+13.42	576160.5058	1340264.5237
	PT=23+20.16	576147.2551	1340158.8074
	END=25+56.36	576093.0775	1339928.9105

CENTER LINE CURVE DATA							
STREET NAME	STATION	RADIUS	ARC	DELTA	TANGENT	CHORD	
HUNTERS VIEW ROAD	STA. 8+08.79 TO 8+61.15	100.00'	52.36'	30°00'00"	26.79'	S82°18'32"W	51.76'
	STA. 9+07.56 TO 9+59.92	100.00'	52.36'	30°00'00"	26.79'	S82°18'32"W	51.76'
	STA. 12+62.06 TO 14+68.82	325.00'	206.77'	36°27'06"	107.02'	N64°27'55"W	203.30'
	STA. 15+47.58 TO 18+61.95	325.00'	314.36'	55°25'14"	170.70'	N73°56'59"W	302.25'
OPEN RUN ROAD	STA. 8+19.07 TO 9+61.19	100.00'	142.12'	81°25'48"	86.06'	N76°53'44"W	130.46'
	STA. 9+61.19 TO 13+71.50	325.00'	410.30'	72°20'03"	237.58'	N72°20'51"W	383.59'
	STA. 18+35.19 TO 19+57.27	400.00'	122.08'	17°19'11"	61.52'	S80°13'43"W	121.61'
	STA. 22+13.42 TO 23+20.16	500.00'	106.75'	12°13'56"	53.58'	S82°51'21"W	106.54'

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

[signature] 7-18-05
CHIEF, BUREAU OF HIGHWAYS — DATE

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

[signature] 7/25/05
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

[signature] 7/19/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

[Seal: STATE OF MARYLAND, DONALD ALAN MASON, No. 21449, PROFESSIONAL ENGINEER] Donald Mason
AS-BUILT 1-7-09

NO.	DATE	REVISION
1	5-4-06	REMOVE SPEED CONTROL DEVICES & CHANGE NUMBER OF PLAN IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
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Donald Mason 6/2/05

DEVELOPER: ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86 TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: ROAD PLAN

DATE: JUNE, 2005	PROJECT NO. 1132
SCALE: 1" = 50'	SHEET 4 OF 55

DES: JMC/DBT | DRAFT: JMC/DBT | CHECK: CAM

F-04-82

P:\1132 Homewood\dwg\7000s02-04.dwg, 6/2/2005 4:09:53 PM

CENTERLINE CONTROL DATA			
STREET NAME	STATION	NORTH	EAST
CASTLEBRIDGE ROAD	PC=33+44.98	575518.7172	1340020.3805
	PT=34+77.28	575649.7789	1340003.2445
	PC=35+80.04	575752.3804	1339997.4401
	PT=37+11.24	575882.0516	1339978.6407
	END=43+20.44	576475.0081	1339838.9045
WHITHORN WAY	BEGIN=0+00.00	575591.4477	1340008.4529
	PC=0+23.59	575588.5860	1339985.0338
	PT=1+27.72	575579.3267	1339881.3339
	END=3+77.00	575565.2472	1339632.4571
KINSALE COURT	PC=0+91.06	574395.9215	1340031.5128
	PT=2+05.91	574415.6177	1339919.0336
	PC=2+42.66	574415.1809	1339882.2855
	PT=6+96.43	574134.6526	1339577.3717
	PC=8+45.50	573986.2527	1339563.2098
	PT=10+32.35	573807.8216	1339511.5151
	PC=10+90.31	573756.1202	1339485.3272
	PT=11+46.60	573701.3597	1339478.8893
	END=11+63.60	573684.8262	1339482.8442

CENTER LINE CURVE DATA							
STREET NAME	STATION	RADIUS	ARC	DELTA	TANGENT	CHORD	
CASTLEBRIDGE ROAD	STA. 33+44.98 TO 34+77.28	900.00'	132.30'	08°25'20"	66.27'	N07°26'56"W	132.18'
	STA. 35+80.04 TO 37+11.24	750.00'	131.19'	10°01'21"	65.76'	N08°14'57"W	131.03'
KINSALE COURT	STA. 0+91.06 TO 2+05.91	310.00'	114.85'	21°13'35"	58.09'	N80°04'04"W	114.19'
	STA. 2+42.66 TO 6+96.43	310.00'	453.77'	83°52'04"	278.49'	S47°23'07"W	414.33'
	STA. 8+45.50 TO 10+32.35	500.00'	186.85'	21°24'43"	94.53'	S16°09'26"W	185.77'
	STA. 10+90.31 TO 11+46.60	80.00'	56.29'	40°18'57"	29.37'	S06°42'19"W	55.14'

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS — DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/25/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 7/19/05

STATE OF MARYLAND DONALD ALAN MASON No. 21443 PROFESSIONAL ENGINEER

AS-BUILT 1-7-09

NO.	DATE	REVISION
1	5-4-06	RENUMBER PLANS IN SET

BENCHMARK
ENGINEERS ▲ LAND SURVEYORS ▲ PLANNERS
ENGINEERING, INC.
8480 BALTIMORE NATIONAL PIKE ▲ SUITE 418
ELLICOTT CITY, MARYLAND 21043
phone: 410-465-6105 ▲ fax: 410-465-6644
www.bei-civilengineering.com

Donald Mason 6/2/05

DEVELOPER: ELIOAK, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: HOMEWOOD, L.L.C. P.O. BOX 417 ELLICOTT CITY, MARYLAND 21041 410-465-4244

OWNER: JOHN LEE CARROLL, CHRISTOPHER C. GERARD, MARY CARTER CARROLL ZIEGLER, THOMAS T. CARROLL, JOHN LEE CARROLL, JR. AND GENEVIEVE A. CARROLL c/o JOHN LEE CARROLL 515 MADISON AVENUE 32nd FLOOR NEW YORK, NEW YORK 10022

PROJECT: RIVERWOOD – PHASE 1
LOTS 1 – 42; NON-BUILDABLE PRESERVATION PARCELS 'A' THRU 'P' & 'R'; BUILDABLE PRESERVATION PARCEL 'Q'; AND NON-BUILDABLE BULK PARCELS 'AA' THRU 'HH'

LOCATION: TAX MAP: 23, GRID: 21 PARCELS: 86 — TAX MAP: 29, GRID: 3,4,9&10 PARCELS: 20 & 86
THIRD ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

TITLE: ROAD PLAN

DATE: JUNE, 2005 — PROJECT NO. 1132

DES: JMC/DBT — DRAFT: JMC/DBT — CHECK: CAM — SCALE: 1" = 50' — SHEET 3 OF 55

F-04-82

P:\1132 Homewood\dwg\7000s02-04.dwg, 6/2/2005 4:09:12 PM

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS	
CHIEF, BUREAU OF HIGHWAYS	DATE 7-18-05

APPROVED: HOWARD COUNTY DEPT. OF PLANNING AND ZONING	
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 7/25/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 7/19/05

CENTERLINE CONTROL DATA

STREET NAME	STATION	NORTH	EAST
CASTLEBRIDGE ROAD	BEGIN=0+00.00	572438.5323	1339548.9098
	PC=1+97.18	572589.2497	1339676.0554
	PRC=4+86.28	572860.6502	1339736.4449
	PT=7+83.27	573138.0181	1339802.0046
	PC=11+37.80	573402.8902	1340037.6576
	PT=15+13.12	573753.7399	1340090.5613
	PC=16+56.58	573884.2705	1340031.0494
	PT=18+92.49	574114.0083	1340023.0995
	PC=23+26.35	574520.2768	1340175.3653
	PT=25+09.03	574700.0206	1340189.3305

STREET LIGHT SCHEDULE

SYMBOL	LOCATION		DESCRIPTION
☼	CASTLEBRIDGE ROAD	CL STA. 27+59 OFFS. 30' RIGHT	150 WATT HPS VAPOR PREMIER POST TOP
		CL STA. 29+11 OFFS. 30' LEFT	
	HUNTERSVIEW ROAD	CL STA. 20+19 OFFS. 26' RIGHT	
☼	CASTLEBRIDGE ROAD	CL STA. 0+36 OFFS. 34' RIGHT	250 WATT HPS VAPOR PENDANT SAG FIXTURE MOUNTED ON 30' BRONZE FIBERGLASS POLE W/ 12' ARM

CENTER LINE CURVE DATA

STREET NAME	STATION	RADIUS	ARC	DELTA	TANGENT	CHORD	
CASTLEBRIDGE ROAD	STA. 1+97.18 TO 4+86.28	300.00'	289.09'	55°12'47"	156.88'	N12°32'40"E	278.04'
	STA. 4+86.28 TO 7+83.27	300.00'	296.99'	56°43'16"	161.94'	N13°17'55"E	285.01'
	STA. 11+37.80 TO 15+13.12	325.00'	375.33'	66°10'16"	211.74'	N08°34'30"E	354.82'
	STA. 16+56.58 TO 18+92.49	300.00'	235.91'	45°03'17"	124.43'	N01°58'55"W	229.88'
	STA. 23+26.35 TO 25+09.03	325.00'	182.68'	32°12'20"	93.82'	N04°26'34"E	180.29'

NO.	DATE	REVISION
2	1-5-07	REVISE FCE #20; I-5 / I-6; & HW1-HW2
1	5-4-06	REMOVE STREET LIGHTS ASSOCIATED WITH SPEED CONTROL DEVICES.

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