

- General Notes:**
- All construction shall be in accordance with the latest standards and specifications of Howard County plus MSHA standards and specifications if applicable.
 - The contractor shall notify the Department of Public Works/Bureau of Engineering/Construction Inspection Division at (410) 318-1800 at least five (5) working days prior to the start of work.
 - The contractor shall notify "Miss Utility" at 1-800-251-7777 at least 48 hours prior to any excavation work being done.
 - Traffic control devices, markings and signing shall be in accordance with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD).
 - Street light placement and the type of fixtures and poles shall be in accordance with the Howard County Design Manual, Volume III (2006), Section 5.5.A. A minimum of 20' shall be maintained between any street light and any tree.
 - All sign posts used for traffic control signs installed in the County right-of-way shall be mounted on a 2" galvanized steel, perforated, square tube sleeve (2 gages) - 9' long. A galvanized steel pole cap shall be mounted on top of each post.
 - 45% compaction in filled areas shall meet AASHTO T-180 requirements.
 - Zoning: Site is being developed under the Amended 5th Edition of the Subdivision and Land Development Regulations for RA-15 (including the Supplementary Regulations for Traditional Residential Neighborhoods). This plan is subject to the Amended Zoning Regulations per ZRA-65.
 - Applicable DPZ File Reference: S 04-04, NP 04-105, F-06-001, F-06-019, NP 06-045, ZRA-65, F-06-004, F-07-001, F 07-43, F 07-54, F-08-001 and F-08-006, F-10-100 and F-10-102.
 - This project is in conformance with the latest Howard County standards unless waivers have been approved (NP-04-105 & NP-06-045 see Note 28 below).
 - Boundary information is from a boundary survey by Gutschick, Little, and Weber, P.A., dated May, 2005.
 - Horizontal and vertical datum is based on Howard County Control Stations: 316A, 314A.
 - Aerial topography by McKenzie Snyder, Inc. on 3/23/03.
 - Wetland and stream delineation by Exploration Research, Inc. submitted and approved under Sketch Plan S 04-04 dated 2/15/05. Jurisdictional determination and verification of delineation of waters of the U.S. by U.S. Army Corps of Engineers on 5/22/05. No clearing, grading or construction is permitted within wetlands, streams or their required buffers, unless approved by DPZ as necessary disturbances or waivers have been approved. The Department of Planning and Zoning has determined that the proposed road crossing located within the environmental features and buffers are considered necessary road disturbances in accordance with Section 16.116(c) of the Howard County Subdivision and Land Development Regulations.
 - The Cemetery Inventory Maps do not show any cemeteries within the project limits. However, a cemetery does exist on the northern corner of the adjacent Curtis Property.
 - The Scenic Roads Map does not indicate any scenic roads within or adjacent to the project limits.
 - Existing utilities were taken from available Howard County records.
 - This property is within the Metropolitan District.
 - Water and Sewer are Public per Contract No. 14-4913-D and are with the Little Patuxent Sewerage Area.
 - 100-Year Flood plain prepared by Gutschick, Little, and Weber, P.A. was submitted and approved as a part of F-06-019 dated September 2006.
 - All public streets within this development shall have sidewalks on both sides of the roadway. SFA lots may not be encumbered with sidewalks and/or sidewalk easements.
 - Noise study by Nyle Laboratories, dated May 12, 2005 and updated July 12, 2005.
 - A Forest Stand Delineation Plan was submitted and approved for the area covered by this plan under S 04-04 February 15, 2005. A Forest Conservation Plan was submitted and approved for the area covered by this plan under F-06-019.
 - To fulfill the Forest Conservation requirements of this site, at least 1.48 acres of retention and 1.04 acres of afforestation are required. This requirement was addressed by providing 1.48 acres of on-site net tract forest retention, 5.14 acres of on-site afforestation, and 1.30 acres of off-site afforestation or 2.60 acres of off-site retention to be provided with the last phase of this project.

The 5.74 acres of on-site afforestation is hereby reduced to 5.68 acres as a result of a revision to reduce the area of Forest Conservation Easement No. 2a (currently Easement 2a), reduce the area of Forest Conservation Easement No. 4 (currently Easement 4a, 4b, 4c, and 4d) and correct the afforestation area within Forest Conservation Easement No. 3. An abandonment fee was required for the 0.06 acre of abandoned afforestation in the existing Forest Conservation Easement. No abandonment fee was required for the 0.01 acre of non-credited retention removed from Easement No. 4. The abandonment fee of \$5,261.00 was paid to the Howard County Forest Conservation Fund.

The 1.30 acres of the off-site afforestation is provided by an Approved Forest Conservation Plan and 1.30 acres of Forest Conservation Easement (F-11-000 F2) entitled Hobart Mullineaux and reserved and recorded as a part of the F-11-000 F2. The 1.30 acres of off-site afforestation is provided by an Approved Forest Conservation Plan and 1.30 acres of Forest Conservation Easement (F-11-000 F2) entitled Hobart Mullineaux and reserved and recorded as a part of the F-11-000 F2. The 1.30 acres of off-site afforestation is provided by an Approved Forest Conservation Plan and 1.30 acres of Forest Conservation Easement (F-11-000 F2) entitled Hobart Mullineaux and reserved and recorded as a part of the F-11-000 F2.

Where referred to herein, "Lot(s)" includes lot(s) as defined in Subdivision Sections 108(b)(30) and 108(b)(60).

All Open Space Lots are to be conveyed to the Shipley's Grant Homeowner's Association.

During the 2006 legislative session, the County Council of Howard County introduced Bill ZRA-65 to amend the Howard County Zoning Regulations pertaining to Traditional Residential Neighborhoods by expanding the applicability of the regulations to 15' and 20' front setbacks, changing the minimum lot area, and changing the maximum coverage, under certain circumstances. The effective date of the amended Zoning Regulations is April 10, 2006.

On July 14, 2004, NP 04-105, a waiver of Section 16.120(c)(4) was granted which requires single family attached lots to have at least 15' of frontage onto a public road right-of-way. Section 16.114(e), which requires truncation of public road right-of-way boundaries where public roads intersect at corner lots, and Section 16.116(a)(2) which prohibits disturbance to streams and stream buffers, to allow construction of two pedestrian bridges to cross the streams, subject to the following 2 conditions in the approval letter:

- The disturbance to the stream and stream buffer related to the pedestrian bridges shall be minimized. The Preliminary Plan shall show the limit of disturbance and proposed grading associated with the bridges, and shall be subject to review and approval by the Subdivision Review Committee.
- If it is determined by the DED that sight distance is inadequate at the intersections for which truncation as waived, then the appropriate easements must be added to the plan/plot.

On March 23, 2006, NP-06-45, approved the waivers for the following: Section 16.116(a)(1) request to be permitted to grade within 25 feet of a wetland, Section 16.116(a)(2)(ii), request to be permitted to grade within 75 feet of a perennial stream, Section 16.116(a)(2)(iii), request to be permitted to obtain vehicular access from minor and principle arterial roads and local roads, Section 16.120(c)(1), request to be permitted to create commercial and apartment/multifamily parcels without a minimum of 60 feet of frontage on an approved public road, and Section 16.114(f) request to be permitted to not submit and obtain approval of the required preliminary plan for a major subdivision before submitting the required final plan/plot. Subject to the following 4 conditions in the approval letter:

- Compliance with the DED comments of 2/14/06
- The stream and wetland buffers shall be afforested in accordance with the forest conservation plan for final plan/plot, F-06-19.
- The applicant must obtain all required State/COE permits.
- The stream and wetland buffer disturbances shall not exceed the one shown on the NP-06-45 exhibit of 2/2/06.

Landscape surety in the amount of \$3,450.00 shall be posted as a part of the Developer's Agreement.

Stormwater Management Pond 'B' is provided under F-06-19 and is a wet extended detention pond (Type P-2). Pond 'B' has been designed to provide 100% of the stormwater retention for the 100-year storm. Pond 'B' is a NP-519 hazard Class A facility. Facility 'B' will be a public facility on Homeowners Association owned property (Open Space Lot C-212), jointly maintained by Howard County Department of Public Works and the Homeowner's Association.

Stormwater Management Pond 'C' is provided under F-06-19 and is a wet extended detention pond (Type P-2). Pond 'C' has been designed to provide 100% of the stormwater retention for the 100-year storm. Pond 'C' is a NP-519 hazard Class A facility. Facility 'C' will be a public facility on Homeowners Association owned property (Open Space Lots C-211 & C-212), jointly maintained by Howard County Department of Public Works and the Homeowner's Association.

Stormwater Management Pond 'D' is provided under F-04-088 and is a wet extended detention pond (Type P-2). Pond 'D' has been designed to provide 100% of the stormwater retention for the 100-year storm. Pond 'D' is a NP-519 hazard Class A facility. Facility 'D' will be a public facility on Homeowners Association owned property (Open Space Lot D-1), jointly maintained by Howard County Department of Public Works and the Homeowner's Association.

The remaining recharge (REV) requirements for Parcel C are provided under F-08-006 (Phase 5) by an infiltration system (rev5 and rev6), located on Homeowners Association property (open space lot C-211) to be privately owned and maintained by the Homeowners Association. To fulfill the remaining recharge requirements for F-06-19, the SDF for Parcel E will provide the final 1200 cubic feet of recharge storage. Recharge requirements for Parcel D will be provided by recharge trenches designed in phases 5, 6 and the SDF for parcel D-2.

PHASE No.	CO. FILE No.	GROSS	100 YR. FLOOD PLAIN	NET	SFA LOTS	MIN. REG'D. 0/5 ¹	CREDITED 0/5 PROV. ²	NON-CREDITED 0/5 PROVIDED	TOTAL 0/5	MIN. REG'D. REC. 0/5 ³	REG. 0/5 PROVIDED	MIN. REG'D. TND 0/5 ⁴	TND 0/5 PROVIDED	APT. PARCELS	PUBLIC ROADS	PRIVATE ROADS	GROSS ACREAGE	FOR ZONE
PHASE I	F-07-043	13.63 AC.	1.36 AC.	12.27 AC.	2.15 AC.	3.4 AC.	8.2 AC. (60%)	0.4 AC.	8.6 AC.	24,800 SF.	56,471 SF.	0.7 AC./24,612 SF.	0.9 AC./24,810 SF.	0 AC.	2.0 AC.	0.9 AC.	4.2 AC.*	0 AC.
PHASE II	F-07-094	5.81 AC.	0 AC.	5.81 AC.	2.35 AC.	1.5 AC.	0.6 AC. (10%)	0.1 AC.	0.7 AC.	24,800 SF.	28,248 SF.	0.3 AC./13,068 SF.	0.9 AC./10,144 SF.	0 AC.	2.1 AC.	0.7 AC.	0 AC.	0 AC.
PHASE III	F-08-006	12.44 AC.	0.50 AC.	11.94 AC.	2.64 AC.	3.2 AC.	5.9 AC. (46%)	0.4 AC.	6.3 AC.	26,000 SF.	21,618 SF.	0.7 AC./30,942 SF.	0 AC./0 SF.	0 AC.	2.4 AC.	0.8 AC.	0 AC.	0 AC.
PHASE IV	F-09-088	5.77 AC.	0 AC.	5.77 AC.	0.84 AC.	1.4 AC.	1.9 AC. (33%)	0.1 AC.	2.0 AC.	26,000 SF.	15,852 SF.	0.3 AC./12,561 SF.	0.2 AC./6,582 SF.	1.8 AC.	1.4 AC.	0 AC.	0 AC.	6.6 AC.
CUMULATIVE TOTAL		38.15 AC.	1.86 AC.	36.29 AC.	7.78 AC.	9.5 AC.	16.6 AC. (44%)	1.0 AC.	17.6 AC.	101,600 SF.	128,145 SF.	1.4 AC./13,091 SF.	2.0 AC./86,536 SF.	1.8 AC.	8.4 AC.	2.4 AC.	4.2 AC.	6.6 AC.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
 Chief, Bureau of Highways
 Date: 10-23-09

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
 Chief, Division of Land Development
 Date: 10-27-09

Chief, Development Engineering Division
 Date: 10-27-09

GLWGUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE - SUITE 250 - BURTOWNSVILLE OFFICE PARK
 BURTOWNSVILLE, MARYLAND 20866
 TEL: 301-421-4024 FAX: 301-421-4188

OWNER-PAR C-216 thru C-218:
 BA WATERLOO TOWNHOMES, LLC.
 c/o BOZZUTO HOMES, INC.
 7850 WALKER DRIVE, SUITE 400
 GREENBELT, MARYLAND 20770
 ATTN: DUNCAN SLIDELL
 301-623-1525

PROFESSIONAL CERTIFICATION
 I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 14631
 EXPIRATION DATE: MAY 21, 2010

FINAL PLAN

SHIPLEY'S GRANT

PHASE IV

LOTS C-219 thru C-222, C-295 thru C-307, PARCELS D-2 & E-1

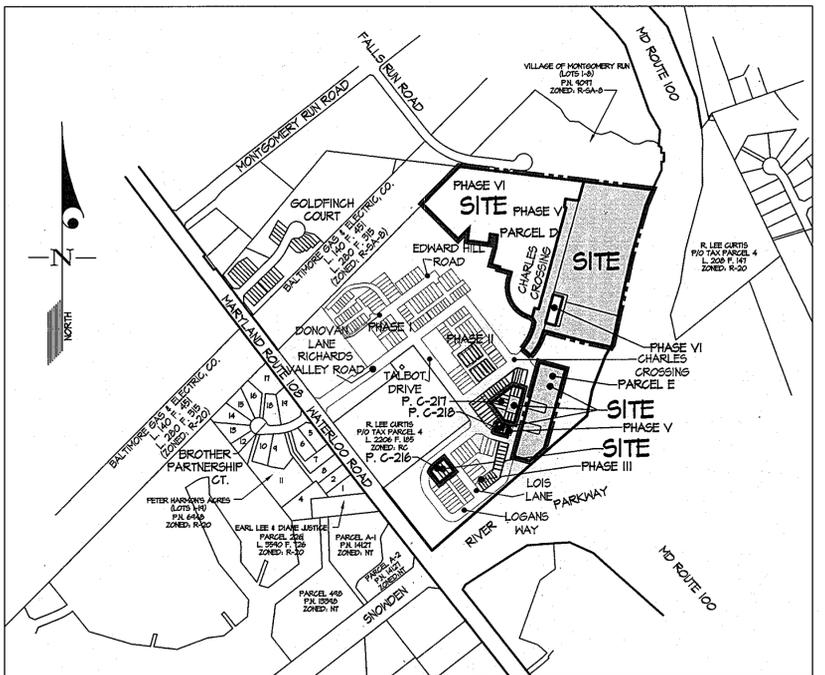
OPEN SPACE LOTS C-309, D-1, E-2 and E-3

and NON-BUILDABLE PARCELS D-3, D-4 and NON-BUILDABLE LOT C-308

A RESUBDIVISION OF NON-BUILDABLE PARCEL D
 SHIPLEY'S GRANT, PLAT No 18431 and
 A RESUBDIVISION OF NON-BUILDABLE PARCEL E
 SHIPLEY'S GRANT, PHASE II, PLAT No 19664 and
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218
 SHIPLEY'S GRANT, PHASE III, PLAT Nos 20345 & 20346

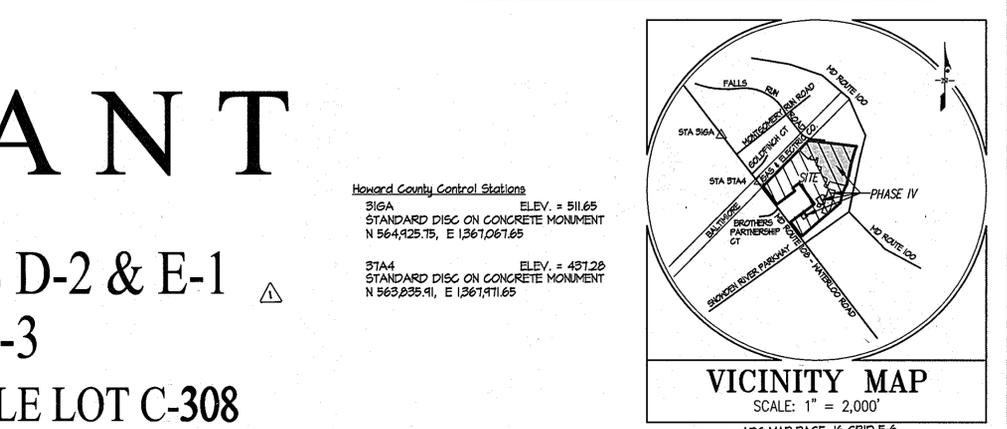
NOTE 24 CONT'D
 The 5.68 acres of on-site afforestation is hereby reduced to 5.68 acres as a result of a revision to reduce the area of Forest Conservation Easement No. 2a. An abandonment fee was required for the 0.06 acre of abandoned afforestation in the existing Forest Conservation Easement. The abandonment fee of \$5,261.00 was paid with a resubdivision F-14-00x to the Howard County Forest Conservation Fund.

OWNERS:
 BA WATERLOO TOWNHOMES, LLC
 7850 WALKER DRIVE, SUITE 400
 GREENBELT, MD 20770
 PHONE: 301-220-0100
 (OLD PARCELS "C-216" THRU "C-218")
 BA WATERLOO, LLC
 7850 WALKER DRIVE, SUITE 400
 GREENBELT, MD 20770
 PHONE: 301-220-0100
 (OLD PARCEL "D")
 BA WATERLOO CONDOMINIUM, LLC
 7850 WALKER DRIVE, SUITE 400
 GREENBELT, MD 20770
 PHONE: 301-220-0100
 (OLD PARCEL "E")



KEY MAP
 SCALE: 1" = 500'

DEVELOPMENT TRACKING CHART AND SITE ANALYSIS * PARCELS 'A' AND 'B' PREVIOUSLY RECORDED UNDER F-06-019



LEGEND

- ==== EXIST. CURB & GUTTER/PAVEMENT
- ==== STANDARD CURB & GUTTER
- EX. 8" S. EXISTING SEWER MAIN
- EX. 8" W. EXISTING WATER MAIN
- PROPOSED SEWER MAIN
- PROPOSED WATER MAIN
- EX. 18" SD EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- PROPOSED SIDEWALK
- NUMBER OF PARKING SPACES
- PROP. BARRICADE
- PROP. LIMIT OF DISTURBANCE
- STRUCTURE NUMBER
- EXISTING CONTOUR
- PROP. CONTOUR
- EXISTING TREELINE
- WB 25' WETLAND BUFFER
- SVB STREAM BANK BUFFER
- 100 YEAR FLOODPLAIN
- STREAM BANK
- WETLAND
- LIMIT OF SUBMISSION
- PROPOSED / EXISTING EASEMENT
- PROPOSED PAVEMENT
- STREET TREE
- ON-SITE AFFORESTATION AREA PER F-06-019
- FLOODPLAIN FOREST RETENTION PER F-06-019 (NO CREDIT FOR RETENTION)
- NET TRACT FOREST RETENTION PER F-06-019
- AFFORESTATION AREA IN THE FLOODPLAIN PER F-06-019
- NATURAL FOREST REGENERATION AREA AND FOREST REMOVAL AREA IN THE FLOODPLAIN PER F-06-019
- STREET LIGHT LOCATION

EXISTING FOREST CONSERVATION EASEMENT AREA TABULATION (SEE F-06-19, F-08-117 & F-10-102)

FOREST CONSERVATION EASEMENT (FCE) AREA	1	2(B-E)	3	4(A-D)	5	TOTAL
CREDITED FOREST RETENTION AREA ON NET TRACT (N AC.)	N/A	1.40	0.08	N/A	N/A	1.48
NON-CREDITED FOREST RETENTION AREA IN FLOODPLAIN (N AC.)	N/A	1.21	0.28	0.05	N/A	1.54
FOREST PLANTING AREA OUTSIDE THE FLOODPLAIN (N AC.)	0.27	2.24	0.34	0.47	2.05	5.37
FOREST PLANTING AREA WITHIN THE FLOODPLAIN (N AC.)	N/A	0.14	0.06	0.03	N/A	0.23
TOTAL ACREAGE OF AFFORESTATION PROVIDED (N AC.)	0.27	2.38	0.40	0.50	2.05	5.10
NATURAL REGENERATION AREA (N AC.)	N/A	N/A	N/A	N/A	N/A	N/A
MINIMUM TOTAL AREA IN CONSERVATION EASEMENT (N AC.)	0.27	4.99	0.76	0.55	2.05	8.02

SFA PARKING ANALYSIS

Total Parking Required: 17 units x 2 spaces/unit = 34 Spaces
 Garages: 34 Spaces (2 Car Garages)
 Total: 34 Spaces

Overflow/Guest Parking Requirements (per Design Manual Volume III, 2.8.2)
 Parking Required: 17 units x 0.3 spaces per unit = 5 Spaces
 Overflow/Guest Parking available: 34 Spaces (On-Street Parking)(See Phase IV Preliminary Plan)

SHEET INDEX

- COVER SHEET
- CHARLES CROSSING PLAN AND PROFILE
- SIGNING, PAVEMENT MARKING AND LIGHTING PLAN AND DETAILS
- STREET TREE AND CURB DELINEATION PLAN AND TYPICAL DETAILS
- SEDIMENT CONTROL NOTES AND DETAILS
- SEDIMENT CONTROL DETAILS
- STORM DRAIN DRAINAGE AREA MAP
- STORM DRAIN PROFILES
- EXISTING CONDITION DRAINAGE AREA MAP
- STORMWATER MANAGEMENT DETAILS
- STORMWATER MANAGEMENT DETAILS
- LANDSCAPE PLAN
- LANDSCAPE PLAN NOTES AND DETAILS
- CURB RETURN PROFILES
- STREAM STABILIZATION PLAN AND NOTES
- STREAM STABILIZATION PROFILES, CROSS-SECTIONS, AND DETAILS
- STREAM CROSSING DETAILS
- STREAM CROSSING STRUCTURE BORINGS

R-A-15 UNIT TABULATION

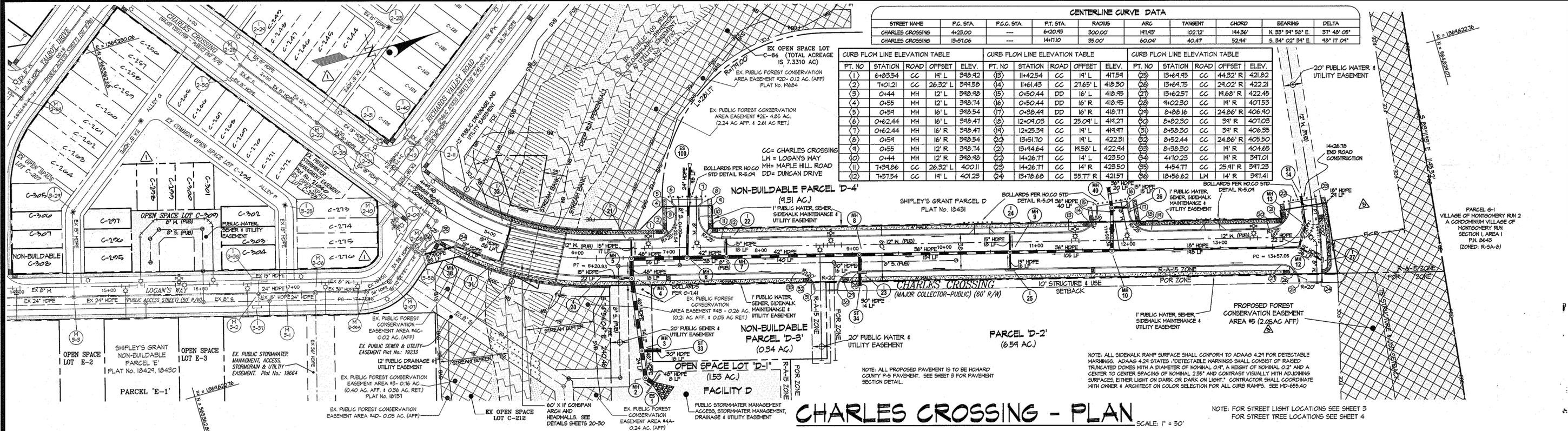
PHASE No.	MAX. NO. OF UNITS PERMITTED	PROPOSED R-A-15 UNITS				MODERATE INCOME HOUSING UNITS			
		MAX. UNIT DENSITY (15 UNITS/NET AC.)	STD. SFA UNITS	MHU SFA UNITS	APT. UNITS	TOTAL UNITS	PROPOSED UNIT DENSITY	REQUIRED MIH/s @ 10% ⁵	PROPOSED MIH/s
PHASE I	12.21 AC.	184	52	10	0	62	5 UNITS / AC.	6	10
PHASE II	5.81 AC.	87	56	6	0	62	10.6 UNITS / AC.	6	6
PHASE III	12.44 AC.	186	59	6	0	65	5.0 UNITS / AC.	7	6
PHASE IV	5.77 AC.	86	17	0	48	65	11.3 UNITS / AC.	7	4
CUMULATIVE TOTAL		544	184	22	48	254	7.0 UNITS / AC.	26	26

COVER SHEET
SHIPLEY'S GRANT
PHASE IV
 LOTS C-219 thru C-222, C-295 thru C-307, PARCELS D-2 and E-1,
 OPEN SPACE LOTS C-309, D-1, E-2 & E-3 and NON-BUILDABLE PARCELS "D-3", "D-4",
 and NON-BUILDABLE LOT C-308
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
 HOWARD COUNTY, MARYLAND

SCALE: AS SHOWN
 ZONING: R-A-15, POR
 G. L. W. FILE No.: 07002

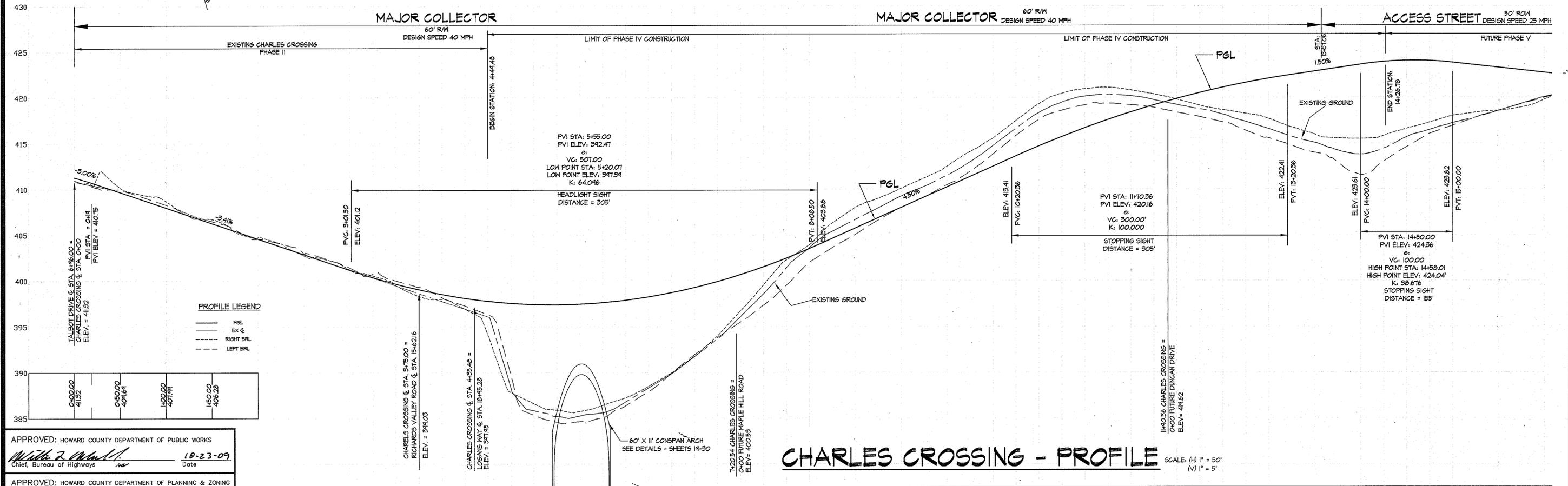
DATE: SEPT, 2009
 TAX MAP - GRID: 37-1&2
 SHEET: 1 OF 31

ELECTION DISTRICT No. 1



CHARLES CROSSING - PLAN

SCALE: 1" = 50'



CHARLES CROSSING - PROFILE

SCALE: (H) 1" = 50'
(V) 1" = 5'

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Michelle Z. ...
 Chief, Bureau of Highways
 Date: 10-23-09

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
Kurt ...
 Chief, Division of Land Development
 Date: 10-27-09

...
 Chief, Development Engineering Division
 Date: 10/27/09

GLWGUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK
 BURTONSVILLE, MARYLAND 20866
 TEL: 301-421-4024 FAX: 301-421-4186

DATE	REVISION
10-27-09	Rev. F&E Nos. 5
10-10-10	Rev. lot numbers & lot lines

OWNER PAR C-216 thru C-218:
 BA WATERLOO TOWNHOMES, LLC.
 c/o BOZZUTO HOMES, INC.
 7850 WALKER DRIVE, SUITE 400
 GREENBELT, MARYLAND 20770
 ATTN: DUNCAN SLIDELL
 301-623-1525

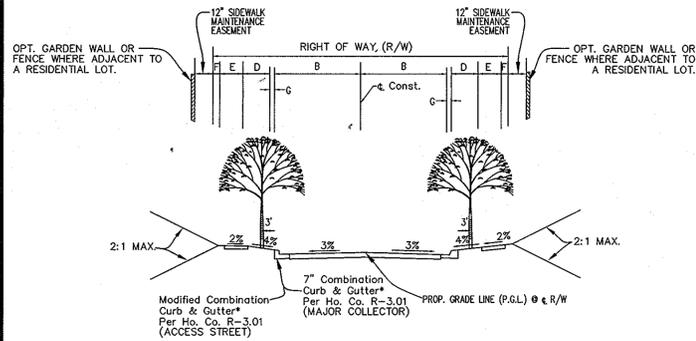
PROFESSIONAL CERTIFICATION
 I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 15331
 EXPIRATION DATE: May 21, 2010

CHARLES CROSSING PLAN AND PROFILE
SHIPLEY'S GRANT
 PHASE IV
 LOTS C-219 thru C-221, C-295 thru C-307, PARCELS D-2 and E-1, OPEN SPACE LOTS C-309, D-1, E-2 & E-3 and NON-BUILDABLE PARCELS "D-3", "D-4", and NON-BUILDABLE LOT C-308
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
 ELECTION DISTRICT No. 1
 HOWARD COUNTY, MARYLAND

SCALE	ZONING	G. L. W. FILE NO.
AS SHOWN	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT, 2009	37-1&2	2 OF 31

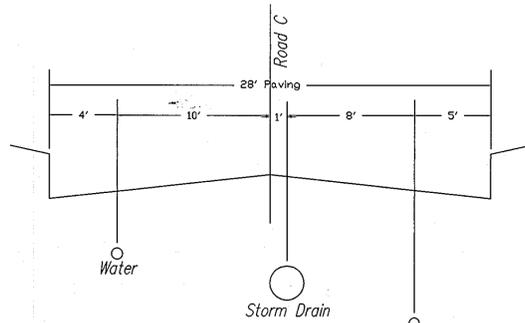
ROAD INFORMATION												
ROAD NAME	STATION	ROAD CLASSIFICATION	DESIGN SPEED	A	B	C	D	E	F	G	R/W	PAVING SECTION
CHARLES CROSSING	0+00.00 TO 13+57.06	MAJOR COLLECTOR	40 MPH	19'	6"	4"	4"	8"	60'			P-5
CHARLES CROSSING	13+57.06 TO 18+10.36	ACCESS STREET	25 MPH	14'	5'-6.75"	4"	4"	13.25"	50'			P-3

**All proposed Phase 4 pavement is P-5



TYPICAL PUBLIC ROAD SECTION

NOT TO SCALE



TYPICAL UTILITY LOCATIONS

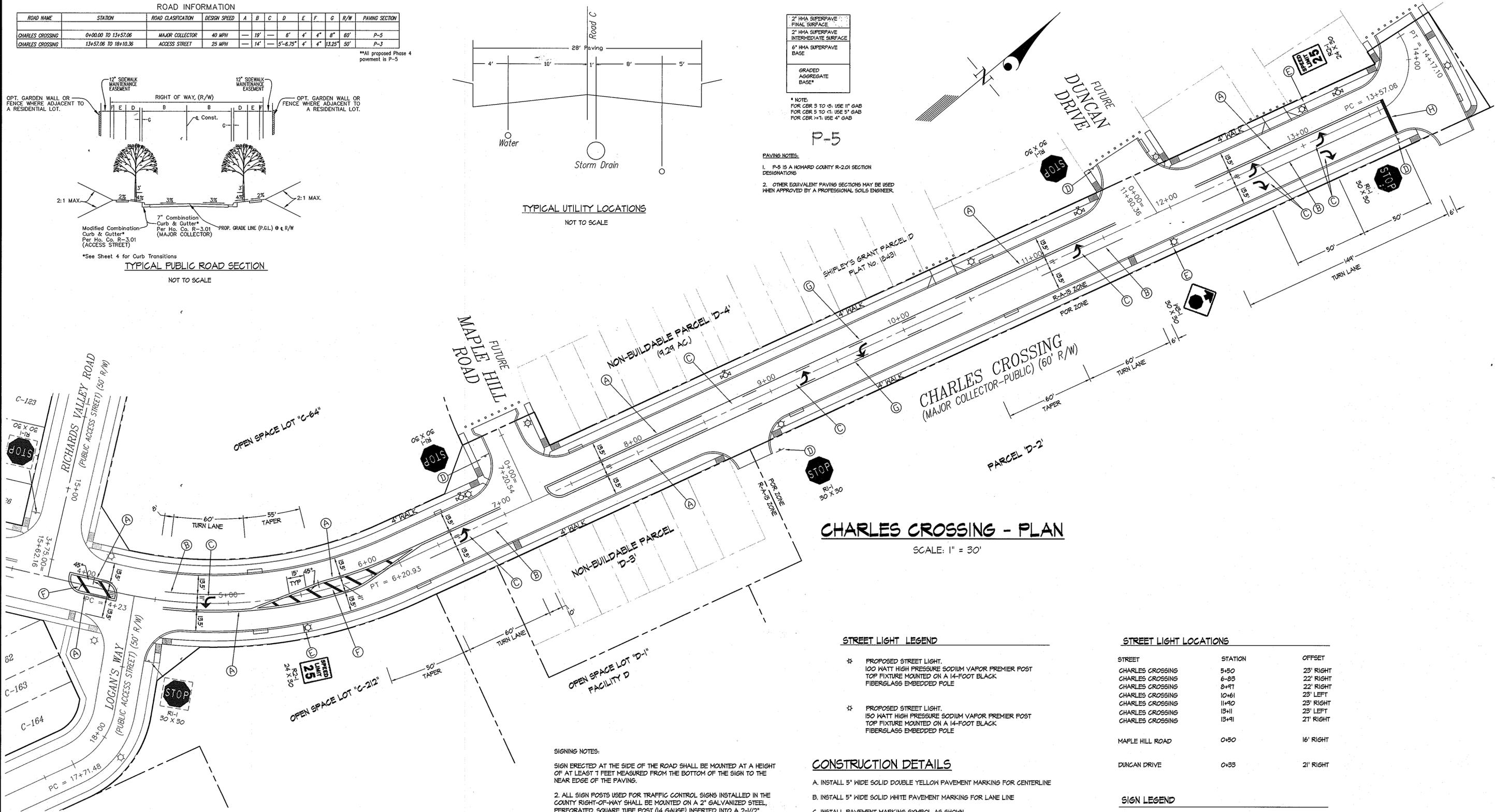
NOT TO SCALE

2" HMA SUPERPAVE FINAL SURFACE
2" HMA SUPERPAVE INTERMEDIATE SURFACE
6" HMA SUPERPAVE BASE
GRADED AGGREGATE BASE*

* NOTE: FOR CBR 3 TO 4, USE 1" GAB FOR CBR 5 TO 11, USE 5" GAB FOR CBR >= 11, USE 4" GAB

PAVING NOTES:

- P-5 IS A HOWARD COUNTY R-2.01 SECTION DESIGNATION
- OTHER EQUIVALENT PAVING SECTIONS MAY BE USED WHEN APPROVED BY A PROFESSIONAL SOILS ENGINEER.



CHARLES CROSSING - PLAN

SCALE: 1" = 30'

STREET LIGHT LEGEND

- PROPOSED STREET LIGHT. 100 WATT HIGH PRESSURE SODIUM VAPOR PREMIER POST TOP FIXTURE MOUNTED ON A 14-FOOT BLACK FIBERGLASS EMBEDDED POLE
- PROPOSED STREET LIGHT. 150 WATT HIGH PRESSURE SODIUM VAPOR PREMIER POST TOP FIXTURE MOUNTED ON A 14-FOOT BLACK FIBERGLASS EMBEDDED POLE

STREET LIGHT LOCATIONS

STREET	STATION	OFFSET
CHARLES CROSSING	5+50	23' RIGHT
CHARLES CROSSING	6+23	22' RIGHT
CHARLES CROSSING	8+47	23' LEFT
CHARLES CROSSING	10+61	23' RIGHT
CHARLES CROSSING	11+40	23' RIGHT
CHARLES CROSSING	13+11	23' LEFT
CHARLES CROSSING	13+41	21' RIGHT
MAPLE HILL ROAD	0+50	16' RIGHT
DUNCAN DRIVE	0+33	21' RIGHT

CONSTRUCTION DETAILS

- INSTALL 5" WIDE SOLID DOUBLE YELLOW PAVEMENT MARKING FOR CENTERLINE
- INSTALL 5" WIDE SOLID WHITE PAVEMENT MARKING FOR LANE LINE
- INSTALL PAVEMENT MARKING SYMBOL AS SHOWN
- INSTALL GROUND MOUNTED SIGN
- INSTALL LIGHT POLE MOUNTED SIGN
- INSTALL 16" WIDE YELLOW PAVEMENT MARKING FOR MEDIAN
- INSTALL 5" WIDE SOLID/BROKEN (10' SEGMENT - 30' GAP) YELLOW PAVEMENT MARKING FOR TWO-WAY LEFT TURN LANE
- INSTALL 24" WIDE SOLID WHITE PAVEMENT MARKING FOR STOP BAR

SIGN LEGEND

- PROPOSED STREET SIGN
- EXISTING SIGN DETAIL

SIGNING NOTES:

- SIGN ERECTED AT THE SIDE OF THE ROAD SHALL BE MOUNTED AT A HEIGHT OF AT LEAST 7 FEET MEASURED FROM THE BOTTOM OF THE SIGN TO THE NEAR EDGE OF THE PAVING.
- ALL SIGN POSTS USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE POST (1/4 GAUGE) INSERTED INTO A 2-1/2" GALVANIZED STEEL, PERFORATED, SQUARE TUBE SLEEVE (1/2 GAUGE) - 3' LONG. A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON TOP OF EACH POST.
- SIGNS SHALL BE 12" TO 18" FROM EDGE OF SIGN TO CURBLINE. STOP SIGNS SHALL BE LOCATED 15' BACK FROM INTERSECTING STREET CURB LINE OR AS DIRECTED BY HOWARD COUNTY TRAFFIC DIVISION.
- ALL SIGN LOCATIONS WITHIN THE PUBLIC RIGHT OF WAY SHALL BE APPROVED BY THE HOWARD COUNTY TRAFFIC DIVISION PRIOR TO ANY INSTALLATIONS.

PAVEMENT MARKING NOTES

- ALL PAVEMENT MARKINGS TO BE APPLIED USING "SETFAST PREMIUM ALKYD TRAFFIC PAINT" BY SHERWIN WILLIAMS OR APPROVED EQUAL.
- ALL PAVEMENT MARKINGS ARE TO BE EITHER LOCATED OR APPROVED BY THE TRAFFIC DIVISION PRIOR TO THE PLACEMENT OF ANY MARKINGS

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William J. ... 10-23-09
 Chief, Bureau of Highways

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
W. J. ... 10-27-09
 Chief, Division of Land Development

W. J. ... 10/27/09
 Chief, Development Engineering Division

GLWGUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK
 BURTONSVILLE, MARYLAND 20866
 TEL: 301-421-4024 BALT: 410-880-1820 DC/VA: 301-989-2524 FAX: 301-421-4186

OWNER PAR C-216 thru C-218:
 BA WATERLOO TOWNHOMES, LLC.
 c/o BOZZUTO HOMES, INC.
 7850 WALKER DRIVE, SUITE 400
 GREENBELT, MARYLAND 20770
 ATTN: DUNCAN SLIDELL
 301-623-1525

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 14931
 EXPIRATION DATE: MAY 21, 2010

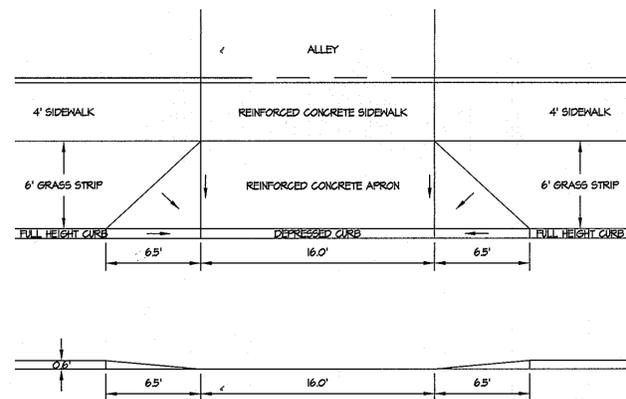


SIGNING, PAVEMENT MARKING, AND LIGHTING PLAN AND DETAILS

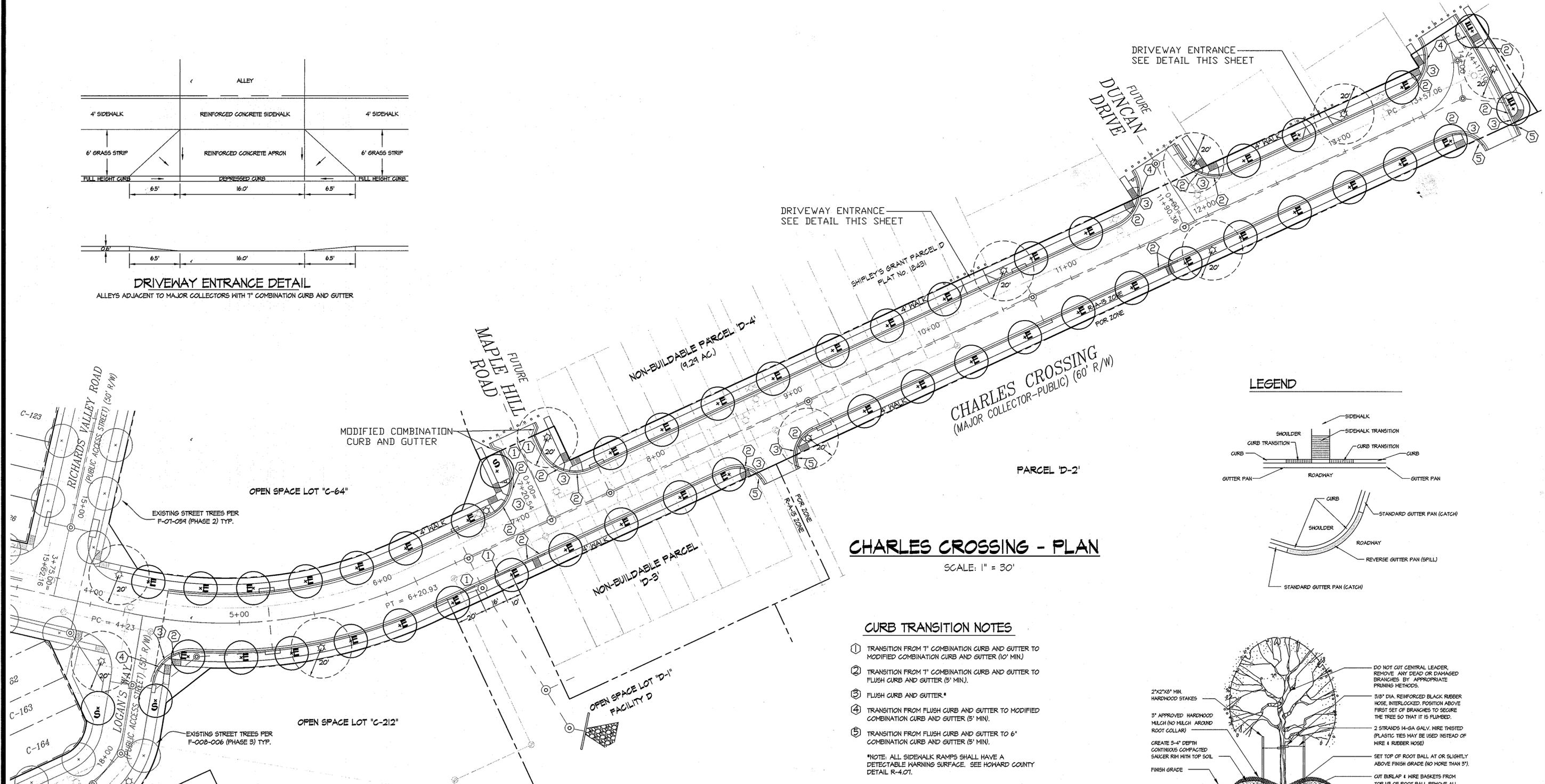
SHIPLEY'S GRANT

PHASE IV
 LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1,
 OPEN SPACE LOTS C-237, D-1, E-2 & E-3 and NON-BUILDABLE PARCELS "D-3", "D-4",
 and NON-BUILDABLE LOT C-226
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"

SCALE	ZONING	G. L. W. FILE No.
AS SHOWN	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT., 2009	37-1&2	3 OF 31



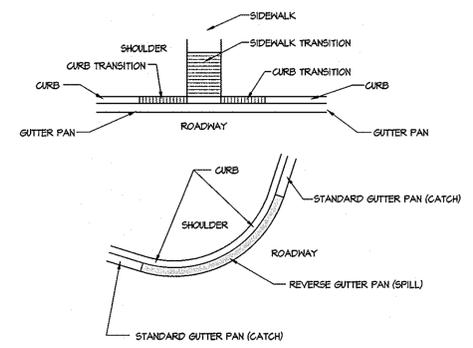
DRIVEWAY ENTRANCE DETAIL
ALLEYS ADJACENT TO MAJOR COLLECTORS WITH T' COMBINATION CURB AND GUTTER



CHARLES CROSSING - PLAN

SCALE: 1" = 30'

LEGEND



CURB TRANSITION NOTES

- ① TRANSITION FROM T' COMBINATION CURB AND GUTTER TO MODIFIED COMBINATION CURB AND GUTTER (10' MIN.)
- ② TRANSITION FROM T' COMBINATION CURB AND GUTTER TO FLUSH CURB AND GUTTER (5' MIN.)
- ③ FLUSH CURB AND GUTTER*
- ④ TRANSITION FROM FLUSH CURB AND GUTTER TO MODIFIED COMBINATION CURB AND GUTTER (5' MIN.)
- ⑤ TRANSITION FROM FLUSH CURB AND GUTTER TO 6" COMBINATION CURB AND GUTTER (5' MIN.)

*NOTE: ALL SIDEWALK RAMP SHALL HAVE A DETECTABLE WARNING SURFACE. SEE HOWARD COUNTY DETAIL R-4.01.

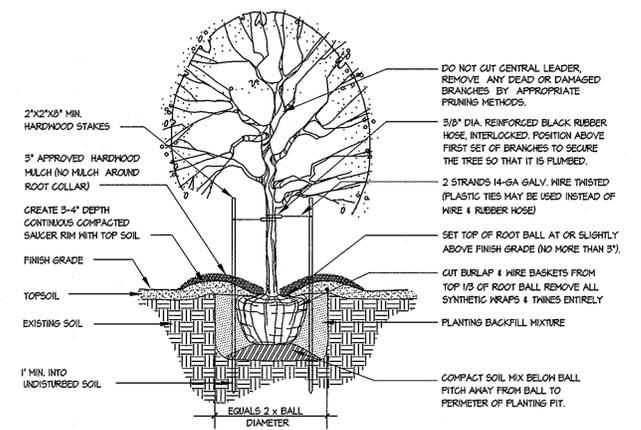
PLANT LIST

SYMBOL	QUANT.	SIZE	NAME (BOTANICAL/COMMON) OF PLANTS FOR SELECTION BY OWNER/BUYER	COMMENTS
TREES - STREET				
E	44	25" GAL. 12-14" HT. MIN.	ULMUS AMERICANA PRINCEITON / PRINCEITON ELM	B4B, FULL
S	3	25" GAL. 12-14" HT. MIN.	PLATANUS OCCIDENTALIS / SYCAMORE	B4B, FULL

STREET TREE SCHEDULE	
LINEAR FEET OF CURBLINE	1645 LF.
NUMBER OF STREET TREES REQUIRED: STREET TREES (1:40)	48
NUMBER OF STREET TREES PROVIDED: STREET TREES (2:1 SUBSTITUTION) OTHER TREES (2:1 SUBSTITUTION)	44 0

GENERAL NOTES:

1. A 20' MINIMUM DISTANCE SHALL BE MAINTAINED BETWEEN ANY TREES LOCATED ALONG THE CURB LINE AND ANY STREET LIGHT.
2. A 5' MINIMUM DISTANCE SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND A FIRE HYDRANT.



NOTE: ALL SUPPORTING DEVICES (STAKES, WIRES, ETC.) SHALL BE REMOVED AFTER 2 GROWING SEASONS.

DECIDUOUS TREE PLANTING DETAIL
FOR PLANTING MATERIAL UP TO 3 1/2" CALIPER

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
W. R. ... 10-23-09
Chief, Bureau of Highways

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
V. ... 10-27-09
Chief, Division of Land Development

M. ... 10/27/09
Chief, Development Engineering Division

GLW GUTSCHICK LITTLE & WEBER, P.A.
CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
3909 NATIONAL DRIVE - SUITE 250 - BURTONVILLE OFFICE PARK
BURTONVILLE, MARYLAND 20866
TEL: 301-421-4024 FAX: 301-989-2524 FAX: 301-421-4186

DATE	REVISION	BY	APPR.

OWNER PAR C-216 thru C-218:
BA WATERLOO TOWNHOMES, LLC.
c/o BOZZUTO HOMES, INC.
7850 WALKER DRIVE, SUITE 400
GREENBELT, MARYLAND 20770
ATTN: DUNCAN SLIDELL
301-623-1525

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 14931
EXPIRATION DATE: MAY 21, 2010



STREET TREE AND CURB DELINEATION PLAN
SHIPLEY'S GRANT
PHASE IV
LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1,
OPEN SPACE LOTS C-237, D-1, E-2 & E-3 and NON-BUILDABLE PARCELS "D-3", "D-4",
and NON-BUILDABLE LOT C-226
A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
ELECTION DISTRICT No. 1 HOWARD COUNTY, MARYLAND

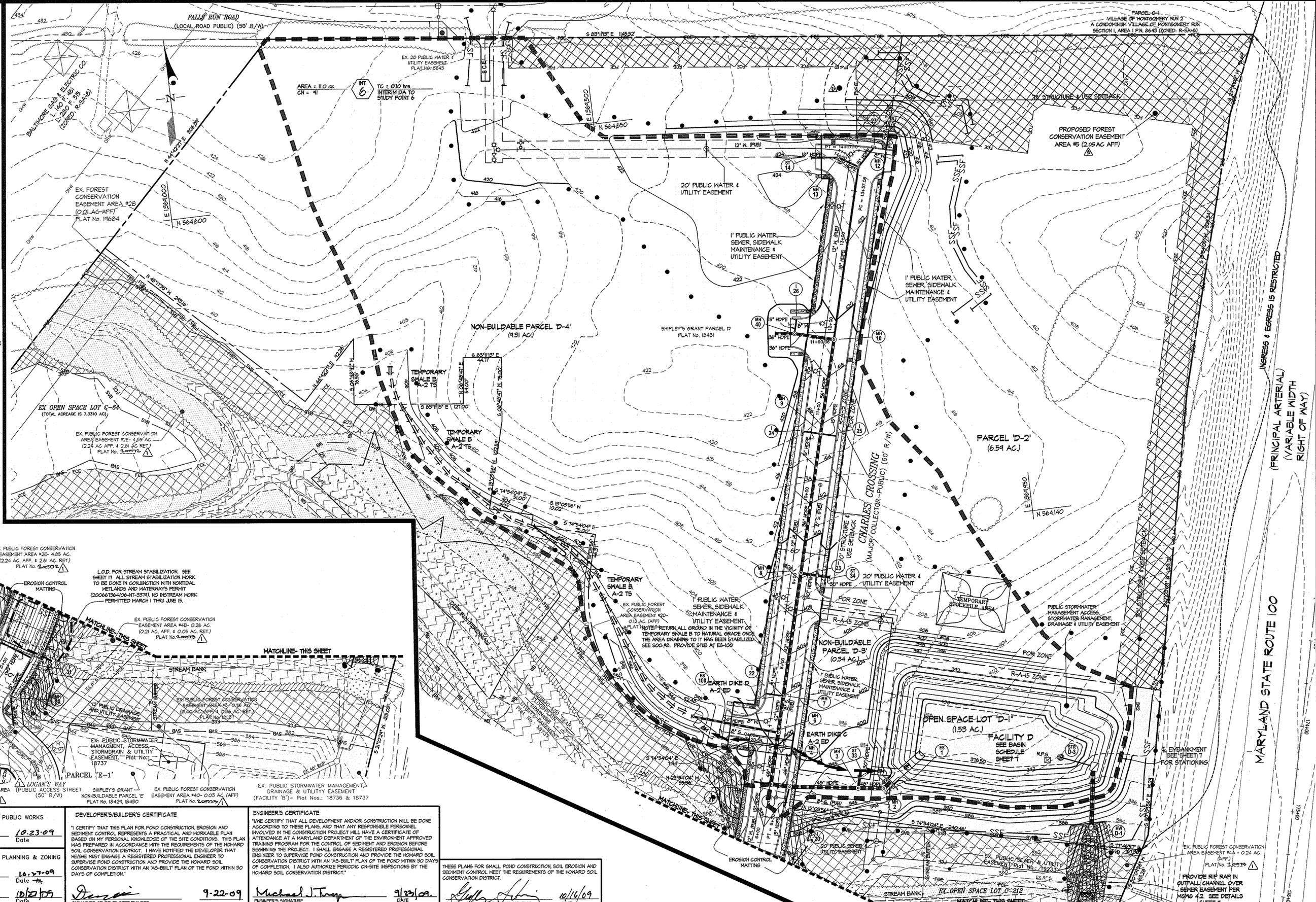
SCALE	ZONING	G. L. W. FILE No.
AS SHOWN	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT., 2009	37-1&2	4 OF 31

LEGEND

- 600 --- EXISTING CONTOUR
- 800 --- PROPOSED CONTOUR
- SSF --- PROPOSED SUPER SILT FENCE
- --- LIMIT OF DISTURBANCE
- --- TEMPORARY SWALE
- --- EARTH DIKE
- --- TEMPORARY DRAINAGE DIVIDE
- SCE STABILIZED CONSTRUCTION ENTRANCE
- PROPOSED TEMPORARY STOCKPILE AREA
- --- TIME OF CONCENTRATION PATH
- --- TYPE A MOUNTABLE BERM SEE DETAIL SHEET 6
- EROSION CONTROL MATING PER G-22-2

SEDIMENT AND EROSION CONTROL SEQUENCE OF CONSTRUCTION

- OBTAIN GRADING PERMIT AND ARRANGE PRE-CONSTRUCTION MEETING WITH SEDIMENT CONTROL INSPECTOR (1 DAY). ALL STREAM STABILIZATION WORK TO BE DONE IN CONJUNCTION WITH HORIZONTAL HETLANDS AND WATERWAYS PERMIT (200667364/06-NT-5974). NO INSTREAM WORK PERMITTED MARCH 1 THRU JUNE 15.
- INSTALL THE STABILIZED CONSTRUCTION ENTRANCES AND SILT FENCE/SUPER SILT FENCE (3 DAYS).
- CONSTRUCT SEDIMENT BASIN 'D' AND BASIN OUTFALL. REMOVE EXISTING STREAM CROSSING AND INSTALL STREAM STABILIZATION (SEE SHEETS 11 & 12 FOR DETAILS AND SEQUENCE FOR STREAM STABILIZATION). CONSTRUCT AND STABILIZE BRIDGE CROSSING (30 DAYS).
- INSTALL STORM DRAIN FROM ES-1 TO ES-100 (10 DAYS).
- INSTALL EARTH TEMPORARY SWALE B (5 DAYS).
- ONCE PERMISSION HAS BEEN GRANTED FROM THE SEDIMENT CONTROL INSPECTOR, INSTALL EARTH DIKES C & D, AND MASS GRADE SITE. PROVIDE DUST CONTROL PER SPECIFICATIONS ON SHEET 6 (10 DAYS).
- INSTALL REMAINDER OF UTILITIES, PAVEMENT, AND CURB & GUTTER. REMOVE EARTH DIKES C & D AS NECESSARY (25 DAYS).
- ONCE AREAS DRAINING TO SEDIMENT CONTROLS HAS BEEN STABILIZED AND PERMISSION HAS BEEN OBTAINED FROM THE SEDIMENT CONTROL INSPECTOR, REMOVE BACKFILL AND STABILIZE TEMPORARY EARTH DIKES AND SILT FENCE/SUPER SILT FENCE. RETURN GROUND IN THE VICINITY OF TEMPORARY SWALE B TO NATURAL GRADE. PROVIDE STUB AT ES-100 (15 DAYS).
- After completion of the Erosion Control & once permission has been granted from the sediment control inspector, convert basin 'D' to the final stormwater management configuration. (15 DAYS)
- REMOVE ANY REMAINING SEDIMENT CONTROLS AND STABILIZE ANY REMAINING DISTURBED AREAS.
- THE OWNER MUST PREPARE AN AS-BUILT OF STORMWATER MANAGEMENT FACILITY 'D' AND SUBMIT IT TO THE HOWARD SOIL CONSERVATION DISTRICT FOR REVIEW AND APPROVAL.



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
 Chief, Bureau of Highways
 10-23-09
 Date

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
 Chief, Division of Land Development
 Chief, Development Engineering Division
 10-27-09
 10/27/09
 Date

DEVELOPER'S/BUILDER'S CERTIFICATE
 I CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN AS-BUILT PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 Signature: [Signature]
 Date: 9-22-09

ENGINEER'S CERTIFICATE
 I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND 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: [Signature]
 Date: 9/23/09

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.
 Signature: [Signature]
 Date: 10/16/09
 HOWARD SOIL CONSERVATION DISTRICT

GLWGUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE - SUITE 250 - BURTNSVILLE OFFICE PARK
 BURTNSVILLE, MARYLAND 20886
 TEL: 301-421-4024 FAX: 301-421-4188
 L:\CAD\DRAWINGS\03006\PHASE IV\Finals\04-SNE.dwg DES. dds DRN. dds CHK.

DATE	REVISION	BY	APPR.
9-23-09	Rev. FEE No. 5	[Signature]	[Signature]
10-16-09	Rev. FEE No. 6	[Signature]	[Signature]

OWNER PAR C-216 thru C-218:
 BA WATERLOO TOWNHOMES, LLC.
 c/o BOZZUTO HOMES, INC.
 7850 WALKER DRIVE, SUITE 400
 GREENBELT, MARYLAND 20770
 ATTN: DUNCAN SLIDELL
 301-623-1525

PROFESSIONAL CERTIFICATION
 I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 14331
 EXPIRATION DATE: May 21, 2010



SEDIMENT AND EROSION CONTROL PLAN
SHIPLEY'S GRANT
 PHASE IV
 LOTS C-219 thru C-221, C-225 thru C-207, PARCELS D-2 and E-1, OPEN SPACE LOTS C-207 D-1, E-2 & E-3 and NON-BUILDABLE PARCELS "D-3", "D-4", and NON-BUILDABLE LOT C-202
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
 ELECTION DISTRICT No. 1
 HOWARD COUNTY, MARYLAND

SCALE	ZONING	G. L. W. FILE No.
1"=50'	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT, 2009	37-1&2	5 OF 31

STANDARD AND SPECIFICATIONS FOR TOPSOIL

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

PURPOSE
TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETATIVE GROWTH. SOILS OF CONCERN HAVE LOW MOISTURE CONTENT, LOW NITRITEN LEVELS, LOW PH, MATERIALS TOXIC TO PLANTS, AND/OR UNACCEPTABLE SOIL GRADATION.

CONDITIONS WHERE PRACTICE APPLIES
I. THIS PRACTICE IS LIMITED TO AREAS HAVING 2:1 OR FLATTER SLOPE WHERE:
A. THE TEXTURE OF THE EXPOSED SUBSOIL/PARENT MATERIAL IS NOT ADEQUATE TO PRODUCE VEGETATIVE GROWTH.
B. THE SOIL MATERIAL IS 50" OR SHALLOWER THAT THE ROOTING ZONE IS NOT DEEP ENOUGH TO SUPPORT PLANTS OR FURNISH CONTINUING SUPPLIED OF MOISTURE AND PLANT NUTRIENTS.
C. THE ORIGINAL SOIL TO BE VEGETATED CONTAINS MATERIAL TOXIC TO PLANT GROWTH.
D. THE SOIL IS SO ACIDIC THAT TREATMENT WITH LIMESTONE IS NOT FEASIBLE.

II. FOR THE PURPOSE OF THESE STANDARDS AND SPECIFICATIONS, AREAS HAVING SLOPES STEEPER THAN 2:1 REQUIRE SPECIAL CONSIDERATION AND DESIGN FOR ADEQUATE STABILIZATION. AREAS HAVING SLOPES STEEPER THAN 2:1 SHALL HAVE AN APPROPRIATE STABILIZATION SHOWN ON THE PLANS.

CONSTRUCTION AND MATERIAL SPECIFICATIONS

I. TOPSOIL SALVAGED FROM THE EXISTING SITE MAY BE USED PROVIDED THAT IT MEETS THE STANDARDS AS SET FORTH IN THESE SPECIFICATIONS. TYPICALLY THE DEPTH OF TOPSOIL TO BE SALVAGED FOR A GIVEN SOIL TYPE CAN BE FOUND IN THE RESPECTIVE 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:
A. TOPSOIL SHALL BE A LOAM, SANDY LOAM, CLAY LOAM, SILT LOAM, SANDY CLAY LOAM, LOAMY SAND, OTHER SOILS MAY BE USED IF RECOMMENDED BY A AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY. REGARDLESS, TOPSOIL SHALL NOT BE A MIXTURE OF CONTRASTING TEXTURED SUBSOILS AND SHALL CONTAIN LESS THAN 5% BY VOLUME OF CINDERS, STONES, SLAG, COARSE FRAGMENTS, GRAVEL, STICKS, ROOTS, TRASH OR OTHER MATERIALS LARGER THAN 1 1/2" IN DIAMETER.

B. TOPSOIL MUST BE FREE OF PLANT PARTS SUCH AS BERMUDA GRASS, QUACKGRASS, JOHNSONGRASS, NUTMEG, POISON IVY, THISTLE, OR OTHERS AS SPECIFIED.

C. WHERE THE SUBSOIL IS EITHER HIGHLY ACIDIC OR COMPOSED OF HEAVY CLAYS, GRAVEL LIMESTONE SHALL BE SPREAD AT THE RATE OF 4-8 TONS/ACRE (200-400 POUNDS PER 1000 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:
A. PLACE TOPSOIL (IF REQUIRED) AND APPLY SOIL AMENDMENTS AS SPECIFIED IN 2.0 VEGETATIVE STABILIZATION - SECTION I - VEGETATIVE STABILIZATION METHODS AND MATERIALS (OR SEE SEEDING NOTES).

IV. FOR SITES HAVING DISTURBED AREAS OVER 5 ACRES:
A. ON SOIL MEETING TOPSOIL SPECIFICATIONS, OBTAIN TEST RESULTS DICTATING FERTILIZER & LIME AMENDMENTS REQUIRED TO BRING THE SOIL INTO COMPLIANCE WITH THE FOLLOWING:
1. 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 APPLIED TO RAISE THE PH TO 6.5 OR HIGHER.
2. ORGANIC CONTENT OF TOPSOIL SHALL BE NOT LESS THAN 15 PERCENT BY WEIGHT.
3. TOPSOIL HAVING SOLUBLE SALT GREATER THAN 500 PARTS PER MILL SHALL NOT BE USED.
4. NO SOD OR SEED SHALL BE PLACED ON SOIL WHICH HAS BEEN WITH SOIL STERILANTS OR CHEMICALS USED FOR WEED CONTROL UNLESS SUFFICIENT TIME HAS ELAPSED (14 DAYS MIN) TO PERMIT DISAPPEARANCE OF PHOTO-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.

B. PLACE TOPSOIL (IF REQUIRED) AND APPLY SOIL AMENDMENTS AS SPECIFIED IN 2.0 VEGETATIVE STABILIZATION - SECTION I - VEGETATIVE STABILIZATION METHODS AND MATERIALS (OR SEE SEEDING NOTES).

V. TOPSOIL APPLICATION
A. WHEN TOPSOILING, MAINTAIN NEEDED EROSION AND SEDIMENT CONTROL PRACTICES SUCH AS DIVERSION, GRADE STABILIZATION STRUCTURES, EARTH DIKES, SLOPE SILT FENCE AND SEDIMENT TRAPS AND BASINS.
B. GRADES ON THE AREAS TO BE TOPSOILED, WHICH HAVE BEEN PREVIOUSLY ESTABLISHED, SHALL BE MAINTAINED, ALTHOUGH 4-8" HIGHER IN ELEVATION.
C. TOPSOIL SHALL BE UNIFORMLY DISTRIBUTED IN A 4"-8" LAYER AND LIGHTLY COMPACTED TO A MINIMUM 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 DIPS. TOPSOIL SHALL NOT BE PLACED WHILE THE TOPSOIL OR SUBSOIL IS FROZEN OR MIDDY CONDITION. WHEN THE SUBSOIL IS PROPERLY WET OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING AND SEEDING 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.
A. COMPOSTED SLUDGE MATERIAL FOR USE AS A SOIL CONDITIONER FOR SITES HAVING DISTURBED AREAS OVER 5 ACRES SHALL BE TESTED TO PRESCRIBE AMENDMENTS AND FOR SITES HAVING DISTURBED AREAS UNDER 5 ACRES SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
1. 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.
2. COMPOSTED SLUDGE SHALL CONTAIN AT LEAST 1 PERCENT NITROGEN, 15 PERCENT PHOSPHORUS, AND 0.2 PERCENT POTASSIUM AND HAVE A PH OF 1.0 TO 9.0. IF COMPOST DOES NOT MEET THESE REQUIREMENTS, THE APPROPRIATE CONSTITUENTS MUST BE ADDED TO MEET THE REQUIREMENTS PRIOR TO USE.
3. COMPOSTED SLUDGE SHALL BE APPLIED AT A RATE OF 1 TON/1000 SQUARE FEET.
B. COMPOSTED SLUDGE SHALL BE AMENDED WITH A POTASSIUM FERTILIZER APPLIED AT A RATE OF 4 LB/1000 SQUARE FEET, AND 1/2 THE NORMAL LIME APPLICATION RATE.

REFERENCES: GUIDELINE SPECIFICATIONS, SOIL PREPARATION AND SODDING, MD-VA R-14, COOPERATIVE EXTENSION SERVICE, UNIVERSITY OF MARYLAND AND VIRGINIA POLYTECHNIC INSTITUTES, REVISED 1/75.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Wade R. Mallon, Chief, Bureau of Highways, 10-23-09

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
Kurt B. Schaefer, Chief, Division of Land Development, 10-27-09
Michael J. Tray, Chief, Development Engineering Division, 10-23-09

DEVELOPER/BUILDER'S CERTIFICATE
I CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD COUNTY 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 COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

Michael J. Tray, 9-22-09, ENGINEER'S SIGNATURE, DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES
Michael J. Tray, 9-22-09, ENGINEER'S SIGNATURE, DATE

ENGINEER'S CERTIFICATE
I HEREBY 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 MARYLAND 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 COUNTY 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 COUNTY SOIL CONSERVATION DISTRICT.

Michael J. Tray, 10/10/09, ENGINEER'S SIGNATURE, DATE

OWNER PAR C-216 thru C-218:
BA WAZULU TOWNHOMES, LLC.
C/O BOZZUTO HOMES, INC.
7850 WALKER DRIVE, SUITE 400
GREENBELT, MARYLAND 20770
ATTN: DUNCAN SIDELL
301-623-1525

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SEDIMENT AND EROSION CONTROL NOTES & DETAILS
SHIPLEY'S GRANT
PHASE IV
LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1, OPEN SPACE LOTS C-237, D-1, E-2 & E-3 AND NON-BUILDABLE PARCELS "D-3", "D-4", AND NON-BUILDABLE LOT C-226
A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
HOWARD COUNTY, MARYLAND
ELECTION DISTRICT No. 1

SEDIMENT CONTROL NOTES

1. A MINIMUM OF 24 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY OFFICE OF INSPECTION AND PERMITS PRIOR TO THE START OF ANY CONSTRUCTION. (410) 313-1855

2. ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE 1974 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, AND REVISIONS THERETO.

3. FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN: A) 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DIKES AND PERIMETER SLOPES AND ALL SLOPES GREATER THAN 3:1, B) 14 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.

4. ALL SEDIMENT TRAPS/BASINS SHOWN MUST BE FENCED AND WARNING SIGNS POSTED AROUND THEIR PERIMETER IN ACCORDANCE WITH VOL. I, CHAPTER 12, OF THE HOWARD COUNTY DESIGN MANUAL, STORM DRAINAGE.

5. ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 1974 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR PERMANENT SEEDINGS, SOD, TEMPORARY SEEDINGS AND MULCHING (SEC. 6). 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.

CONSTRUCTION SPECIFICATION

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

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

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

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

5. Surface Water - all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mountable berm with 4:1 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.

ADDITIONAL SEDIMENT CONTROL MUST BE PROVIDED, IF DEEMED NECESSARY BY THE HOWARD COUNTY DPM 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 CONTROL STRUCTURES, 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 5 PIPE LENGTHS OR THAT WHICH SHALL BE BACKFILLED AND STABILIZED WITHIN 1 WORKING DAY, WHICHEVER IS SHORTER.

PERMANENT SEEDING NOTES

APPLY TO GRADED OR CLEARED AREA NOT SUBJECT TO IMMEDIATE FURTHER DISTURBANCE WHERE A PERMANENT LONG-LIVED VEGETATIVE COVER IS NEEDED.

SEEDING PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING (UNLESS PREVIOUSLY LOOSENED).

SOIL AMENDMENTS: IN LIEU OF SOIL TEST RECOMMENDATIONS, USE ONE OF THE FOLLOWING SCHEDULES:

1) PREFERRED - APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (42 LBS/1000 SQUARE FEET) AND 600 LBS PER ACRE 10-10-10 FERTILIZER (4 LBS/1000 SQ FT) BEFORE SEEDING. HARRON OR DISC INTO UPPER THREE INCHES OF SOIL AT THE TIME OF SEEDING. APPLY 400 LBS PER ACRE 30-0-0 UREA-FORM FERTILIZER (4 LBS/1000 SQ FT).

2) ACCEPTABLE - APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (42 LBS/1000 SQ FT) AND 1000 LBS PER ACRE OF 10-10-10 FERTILIZER (23 LBS/1000 SQ FT) BEFORE SEEDING. HARRON OR DISC INTO UPPER THREE INCHES OF SOIL.

SEEDING: FOR PERIODS MARCH 1 THRU APRIL 30, AND AUGUST 1 THRU OCTOBER 15, SEED WITH 1/2 BUSHEL PER ACRE OF KENTUCKY 31 TALL FESCUE. FOR THE PERIOD MAY 1 THRU JULY 31, SEED WITH 60 LBS KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS PER ACRE (05 LBS/1000 SQ FT) OF KEEPING LOVEGRASS. DURING THE PERIOD OF OCTOBER 16 THRU FEBRUARY 29, 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/ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING. OPTION (4) SEED WITH 2 TONS/ACRE WELL ANCHORED STRAW.

MULCHING: APPLY 1/2 TO 2 TONS PER ACRE (10 TO 40 LBS/1000 SQ FT) OF UNROTTED, NEED-FREE SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 210 GALLONS PER ACRE (8 GALLON/50 SQ FT) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES 3 FEET OR HIGHER, USE 340 GALLONS PER ACRE (8 GALLON/50 SQ FT) FOR ANCHORING.

TEMPORARY SEEDING NOTES

APPLY TO GRADED OR CLEARED AREAS LIKELY TO BE REDISTURBED WHERE A SHORT-TERM VEGETATIVE COVER IS NEEDED.

SEEDING PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING (UNLESS PREVIOUSLY LOOSENED).

SOIL AMENDMENTS: APPLY 600 LBS PER ACRE 10-10-10 FERTILIZER (4 LBS/1000 SQ FT).

SEEDING: FOR PERIODS MARCH 1 THRU APRIL 30 AND FROM AUGUST 1 THRU OCTOBER 15, SEED WITH 1/2 BUSHEL PER ACRE OF ANNUAL RYE (2 LBS/1000 SQ FT). FOR THE PERIOD MAY 1 THRU AUGUST 14, SEED WITH 5 LBS PER ACRE OF KEEPING LOVEGRASS (07 LBS/1000 SQ FT) FOR THE PERIOD NOVEMBER 16 THRU FEBRUARY 29, 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 1/2 TO 2 TONS PER ACRE (10 TO 40 LBS/1000 SQ FT) OF UNROTTED, NEED-FREE SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 210 GALLONS PER ACRE (8 GALLON/50 SQ FT) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES 3 FEET OR HIGHER, USE 340 GAL PER ACRE (8 GAL/500 SQ FT) FOR ANCHORING.

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. When pipe approval authority may not require single family residences to use geotextile.

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

5. Surface Water - all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mountable berm with 4:1 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.

DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 7 - 17 - 3 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 22 - SILT FENCE

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 8 - 15 - 3 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 33 - SUPER SILT FENCE

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 11 - 28 - 3 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 1 - EARTH DIKE

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE A - 2 - 1 - 6 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 2 - TEMPORARY SWALE

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE A - 2 - 3 - 3 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 30 - EROSION CONTROL MATTING

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

DETAIL 6 - GABION INFLOW PROTECTION

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE B - 7 - 2 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 18 - SEDIMENT BASIN BAFFLES

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE C - 16 - 2 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 20A - REMOVABLE PUMPING STATION

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE D - 12 - 5 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 18 - SEDIMENT BASIN BAFFLES

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE C - 16 - 2 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 20A - REMOVABLE PUMPING STATION

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE D - 12 - 5 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

BASIN DRAINAGE SCHEMATIC VERTICAL DRAW-DOWN DEVICE

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE C - 10 - 3 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 27 - ROCK OUTLET PROTECTION III

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

ROCK OUTLET PROTECTION III

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

MOUNTABLE BERM

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 7 - 18 - 10 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 27 - ROCK OUTLET PROTECTION III

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

ROCK OUTLET PROTECTION III

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

DETAIL 27 - ROCK OUTLET PROTECTION III

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

ROCK OUTLET PROTECTION III

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

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U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 7 - 18 - 10 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 27 - ROCK OUTLET PROTECTION III

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

ROCK OUTLET PROTECTION III

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

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U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 7 - 18 - 10 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 27 - ROCK OUTLET PROTECTION III

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

ROCK OUTLET PROTECTION III

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

DETAIL 27 - ROCK OUTLET PROTECTION III

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

ROCK OUTLET PROTECTION III

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

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U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 7 - 18 - 10 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 27 - ROCK OUTLET PROTECTION III

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

ROCK OUTLET PROTECTION III

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

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U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 7 - 18 - 10 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 27 - ROCK OUTLET PROTECTION III

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

ROCK OUTLET PROTECTION III

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

DETAIL 27 - ROCK OUTLET PROTECTION III

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

ROCK OUTLET PROTECTION III

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

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U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 7 - 18 - 10 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 27 - ROCK OUTLET PROTECTION III

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

ROCK OUTLET PROTECTION III

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

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U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 7 - 18 - 10 MARYLAND DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES WATER MANAGEMENT ADMINISTRATION

DETAIL 27 - ROCK OUTLET PROTECTION III

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

ROCK OUTLET PROTECTION III

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

MGWC 4.2: UTILITY CROSSING

Temporary in-stream construction

DESCRIPTION

The work should consist of installing erosion control devices in and adjacent to the construction of utility crossings.

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. (See the 1994 Maryland Standards and Specifications for Soil Erosion and Sediment Control.) The proposed construction sequence is as follows (refer to Detail 4.2):

- The contractor should insure that a continuous perimeter control barrier is in place to minimize the amount of pollutants entering the flow. A diversion pipe as shown in MGWC 1.4: Diversion Pipe or other measure should be installed and sandbagged or shore barriers as shown in MGWC 1.5: Sandbag/Shore Diversion should be constructed according to specifications to divert the streamflow.
- Excavated topsoil and subsoil should be kept separate, placed on the upland side of the excavation, and replaced in their natural order.
- All construction should take place during stream low flows. The length of construction time should be limited to a maximum of 5 consecutive days for each crossing.
- All utility crossings should be placed a minimum of 3 feet (1 meter) beneath the stream bed unless an alternative section is specifically approved by the WMA. For instances where a 3-foot cover is not viable, two alternate stabilization options are given in the Detail 4.2. A low flow channel shall be constructed through all riprap placements across the stream bed.
- The stream should be diverted by an approved temporary stream diversion, the construction area should be dewatered, and any disturbed banks should be stabilized. The contractor may elect to construct the utility crossing in two stages. In this case, a WMA approved flow barrier may be constructed to keep the construction area dry.
- Once the crossing 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.

STREAM CROSSING

MARYLAND DEPARTMENT OF THE ENVIRONMENT
WATERWAY CONSTRUCTION GUIDELINES
REVISED NOVEMBER 2006

PAGE 4.2 - 1

**Maryland's Guidelines To Waterway Construction
DETAIL 4.2(a): UTILITY CROSSING**

PLAN VIEW

SECTION A-A

SECTION B-B

STREAM CROSSING

MARYLAND DEPARTMENT OF THE ENVIRONMENT
WATERWAY CONSTRUCTION GUIDELINES
REVISED NOVEMBER 2006

PAGE 4.2 - 1

**Maryland's Guidelines To Waterway Construction
DETAIL 4.2(b): UTILITY CROSSING**

SECTION VIEW: ALTERNATE OPTION 1

SECTION VIEW: ALTERNATE OPTION 2

STREAM CROSSING

REVISED NOVEMBER 2006
PAGE 4.2 - 1

MARYLAND DEPARTMENT OF THE ENVIRONMENT
WATERWAY CONSTRUCTION GUIDELINES
REVISED NOVEMBER 2006

BAFFLE COMPUTATION

D = 224 FT
A MET POOL = 17607 SQFT
M₀ = A/D = 79 FT
L₀ = 2M₀ = 158 FT
L₀ PROVIDED = 224 FT
No Baffles Required

SEDIMENT BASIN D DATA TABLE

PREGAST RISER OUTLET SEDIMENT BASIN

EXISTING DRAINAGE AREA TO STUDY POINT S: 11.46 AC (EX-6)
WORST CASE DRAINAGE AREA TO BASIN: 11.0 AC
INTERIM DRAINAGE AREA: 11.0 AC (INT-6)

NET STORAGE VOL. REQUIRED: 0.45 AC-FT
NET STORAGE VOL. PROVIDED: 1.16 AC-FT
NET STORAGE ELEV.: 382.50
DRY STORAGE REQUIRED: 0.45 AC-FT
DRY STORAGE PROVIDED: 3.14 AC-FT
DRY STORAGE ELEV.: 388.75
EXISTING Q-HYR = 2.41 cfs (STUDY POINT 6)
INTERIM Q-HYR = 1.68 cfs (STUDY POINT 6)
SAFETY FACTOR OF Q-HYR STORM PROVIDED: Q10 = 2.74 cfs
Q10-YR SEEL = 381.58 FT
BOTTOM ELEVATION: 378.50
TOP OF EMBANKMENT: 392.00
OUTFALL: 62 LF 54" RCP @ 2.90%
RISER WEIR CREST ELEVATION: 388.75
RISER WEIR LENGTH: 26.0'
RISER TRASH RACK/ANTIVORTEX: N/A

DEWATERING DEVICE = 8" PERFORATED PVC WITH 8" PVC BARREL AT 0.0%
DEWATERING INVERT AT 8" RISER = 378.50
INVERT FIRST PERFORATION: 382.50
INVERT LAST PERFORATION: 388.50
DEWATERING PERFORATION CONFIGURATION:
WITH 1" HOLES @ 2' C-C.
12 HOLES PER CIRCUMFERENTIAL ROW.
31 HOLES RUNNING VERTICALLY.
444 HOLES TOTAL.

EMERGENCY SPILLWAY ELEV.: NONE
CLEANOUT ELEVATION: 382.10
EMBANKMENT TOP WIDTH: 12'
SIDE SLOPES: 5:1 INTERIOR - 5:1 EXTERIOR

12" DIAMETER SCH. 40
THREADED PVC ENDCAP
W/ 7" DIAMETER HOLE

12" PVC TO PROTRUDE THROUGH RISER
TO ENABLE CAP TO BE SCREWED ON

NOTE: ORIFICE CONFIGURATION DIFFERENT
DURING ULTIMATE CONDITION. SEE STORM
WATER MANAGEMENT DETAILS.

SEDIMENT BASIN 'D' ENLARGEMENT SCALE: 1" = 30'

PARCEL D-2 (6.54 AC)
PARCEL D-1 (15.9 AC)
OPEN SPACE LOT C-64 (1350 AC)
EX. PUBLIC SEWER & UTILITY EASEMENT Plat No.: 19233
EX. PUBLIC 100-YEAR FLOODPLAIN DRAINAGE & UTILITY EASEMENT Plat No.: 18781

12" LF CLI RIP RAP @ 0%
14" LF CLI RIP RAP @ 0%
10" LF CLI RIP RAP @ 0%
7" LF CLI RIP RAP @ 10%
11" LF CLI RIP RAP @ 10%

EROSION CONTROL MATTING
EROSION CONTROL MATTING

PROVIDE RIP RAP IN OUTFALL CHANNEL OVER SEWER EASEMENT PER MGWC 4.2. SEE DETAILS THIS SHEET.

12" DIAMETER SCH. 40 THREADED PVC ENDCAP W/ 7" DIAMETER HOLE

12" PVC TO PROTRUDE THROUGH RISER TO ENABLE CAP TO BE SCREWED ON

NOTE: ORIFICE CONFIGURATION DIFFERENT DURING ULTIMATE CONDITION. SEE STORM WATER MANAGEMENT DETAILS.

BASIN D PROFILE ALONG 12" LOW FLOW DEWATERING DEVICE (H) 1" = 5' (V) 1" = 5'

EX GRADE

26' HIGH FLOW WEIR INV. = 388.75

12" PVC ENDCAP WITH 7" LOW FLOW ORIFICE. SEE DETAIL THIS SHEET

DRY SEEL = 388.75

1 yr SEEL = 381.58

1 yr SEEL = 384.61

NET SEEL = 382.50

CLEANOUT ELEV. = 382.10

POND BOTTOM = 378.50

DEWATER DEVICE ANCHORED IN 8" DIAMETER CYLINDER OF CONCRETE TO A MINIMUM DEPTH OF 24" TOP OF CONCRETE CYLINDER ELEV. = 378.50

54" RCP OUT @ 2.90% (SEE SHEET 12 FOR OUTFALL DETAILS INV. = 378.50)

12" SCH. 40 PVC @ 0.00%

Provide a 8 inch diameter PVC riser with 1" perforations at 2' C-C. Invert of first perforations to start at 382.50 and invert of last-top perforations at 388.50. 12 perforations in circumference and 31 perforations in height. A total of 444 perforations in riser. Top of riser to be capped with water tight PVC end cap. Device per Standard C-10-30.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

William R. Marshall 10-23-09
Chief, Bureau of Highways Date

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING

Victor Schuchman 10-27-09
Chief, Division of Land Development Date

John Scussone 10/27/09
Chief, Development Engineering Division Date

DEVELOPER'S/BUILDER'S CERTIFICATE

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

David 9-22-09
SIGNATURE OF DEVELOPER/BUILDER DATE

ENGINEER'S CERTIFICATE

I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND 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.

Michael J. Tracy 9/23/09
ENGINEER'S SIGNATURE DATE

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

William R. Marshall 10/14/09
HOWARD SOIL CONSERVATION DISTRICT DATE

GLW GUTSCHICK LITTLE & WEBER, P.A.

CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK
BURTONSVILLE, MARYLAND 20866
TEL: 301-421-4024 FAX: 410-880-1820 DC/VA: 301-989-2524 FAX: 301-421-4186

L:\CADD\DRAWINGS\03006\PHASE IV\Finals\04-SNE.dwg DES. dds DRN. dds CHK.

DATE	REVISION	BY	APPR.

OWNER PAR C-216 thru C-218:

BA WATERLOO TOWNHOMES, LLC.
c/o BOZZUTO HOMES, INC.
7850 WALKER DRIVE, SUITE 400
GREENBELT, MARYLAND 20770
ATTN: DUNCAN SLIDELL
301-623-1525

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 14833

EXPIRATION DATE: May 21, 2010

SEDIMENT AND EROSION CONTROL DETAILS

SHIPLEY'S GRANT

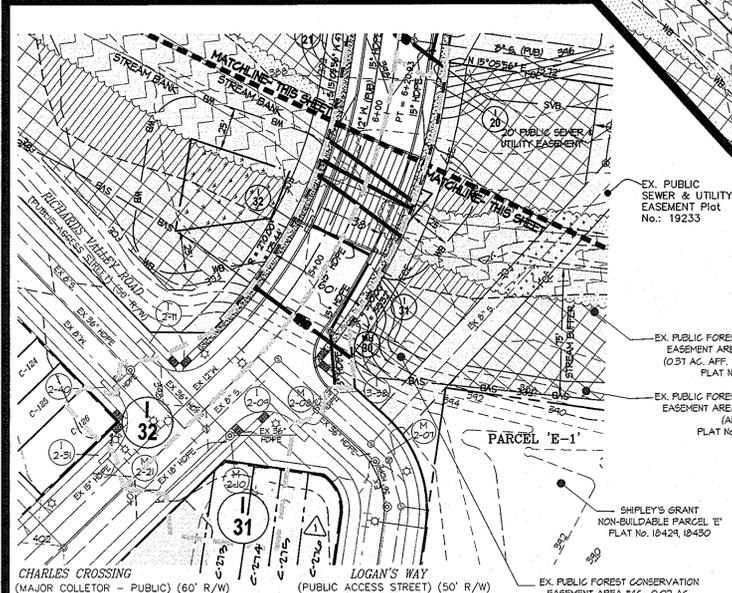
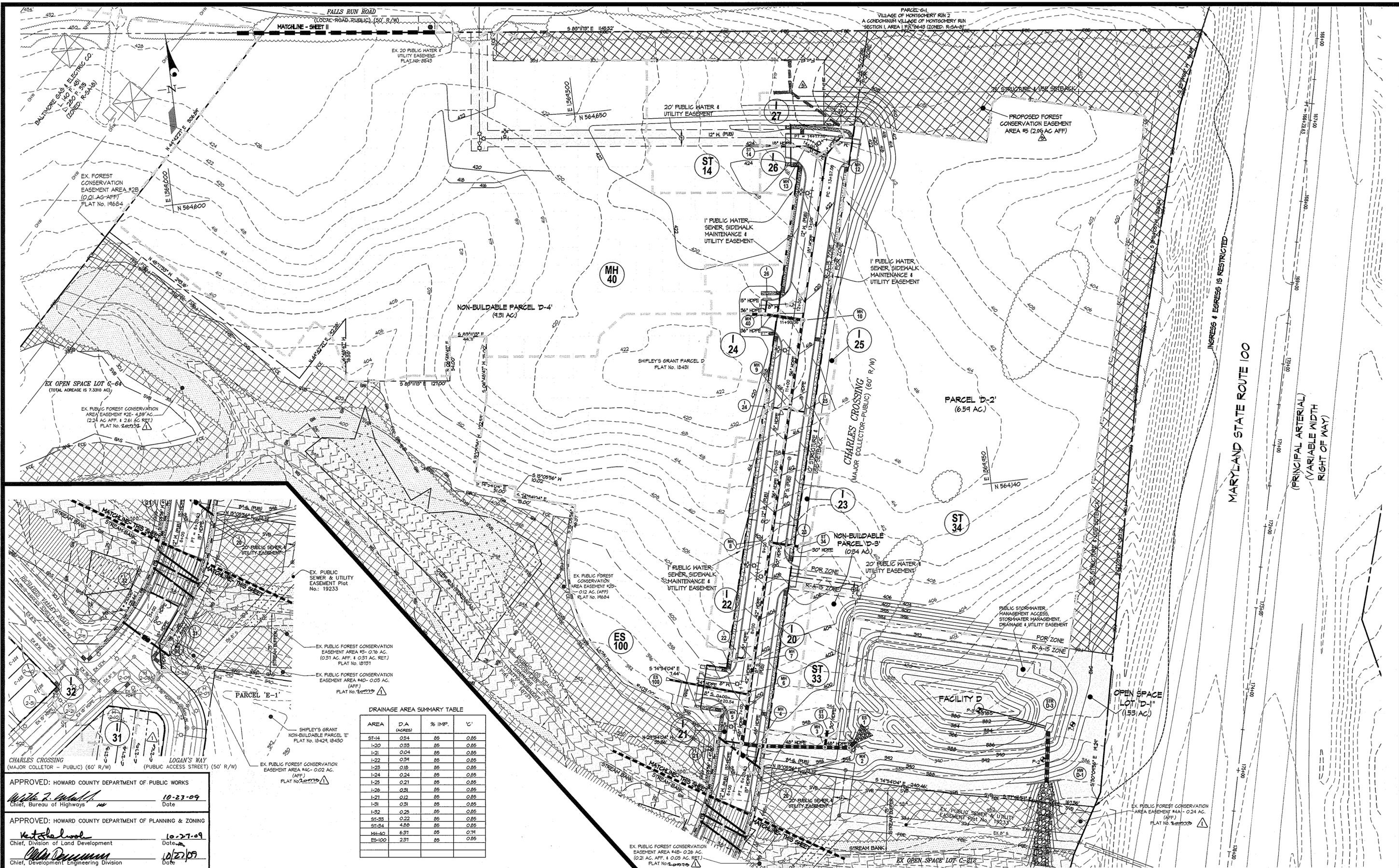
PHASE IV

LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1, OPEN SPACE LOTS C-237, D-1, E-2 & E-3 and NON-BUILDABLE PARCELS 'D-3', 'D-4', and NON-BUILDABLE LOT C-226

A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, 'D' and 'E'

ELECTION DISTRICT No. 1 HOWARD COUNTY, MARYLAND

SCALE	ZONING	G. L. W. FILE NO.
AS SHOWN	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT., 2009	37-1&2	7 OF 31



DRAINAGE AREA SUMMARY TABLE

AREA	D.A. (ACRES)	% IMP.	C
ST-14	0.54	85	0.85
I-20	0.33	85	0.85
I-21	0.04	85	0.85
I-22	0.34	85	0.85
I-23	0.19	85	0.85
I-24	0.24	85	0.85
I-25	0.21	85	0.85
I-26	0.31	85	0.85
I-27	0.12	85	0.85
I-31	0.31	85	0.85
I-32	0.25	85	0.85
ST-33	0.22	85	0.85
ST-34	4.89	85	0.85
MH-40	6.31	85	0.74
ES-100	2.31	85	0.85

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
 [Signature] 10-23-09
 Chief, Bureau of Highways

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
 [Signature] 10-27-09
 Chief, Division of Land Development

[Signature] 10/27/09
 Chief, Development Engineering Division

GLW GUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE - SUITE 250 - BURTNSVILLE OFFICE PARK
 BURTNSVILLE, MARYLAND 20886
 TEL: 301-421-4024 FAX: 410-880-1820 DC/WA: 301-989-2524 FAX: 301-421-4186

DATE	REVISION	BY	APPR.
7-5-17	REV. FEE No. 5		
7-10-10	Rev. Lot Numbers, Lot Lines, All Plat Numbers, Title Block For F-10000		

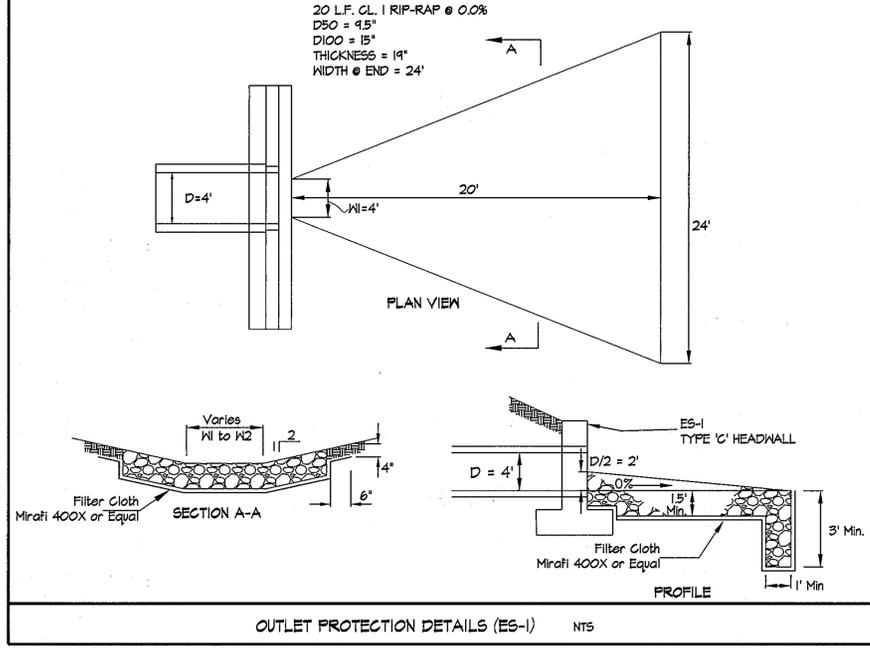
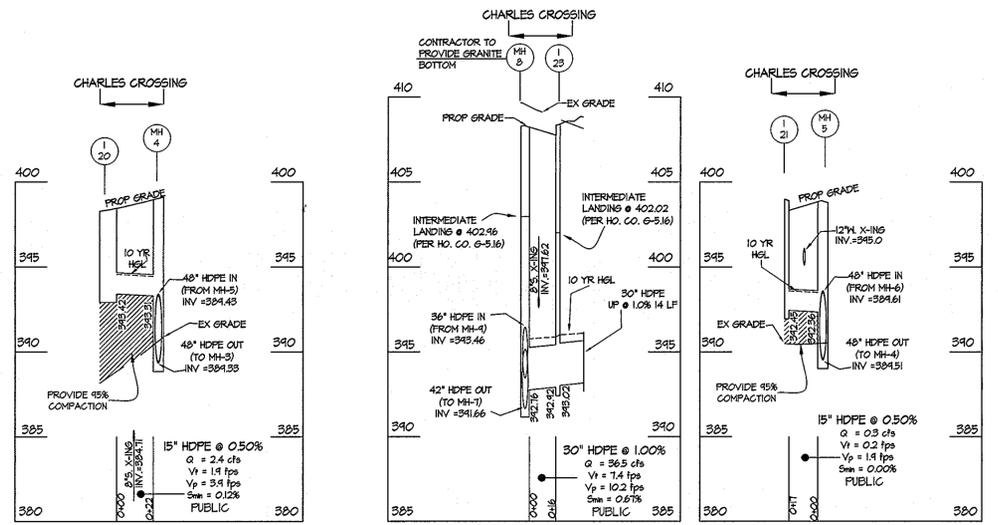
OWNER PAR C-216 thru C-218:
 BA WATERLOO TOWNHOMES, LLC.
 c/o BOZZUTO HOMES, INC.
 7850 WALKER DRIVE, SUITE 400
 GREENBELT, MARYLAND 20770
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 EXPIRATION DATE: May 21, 2010

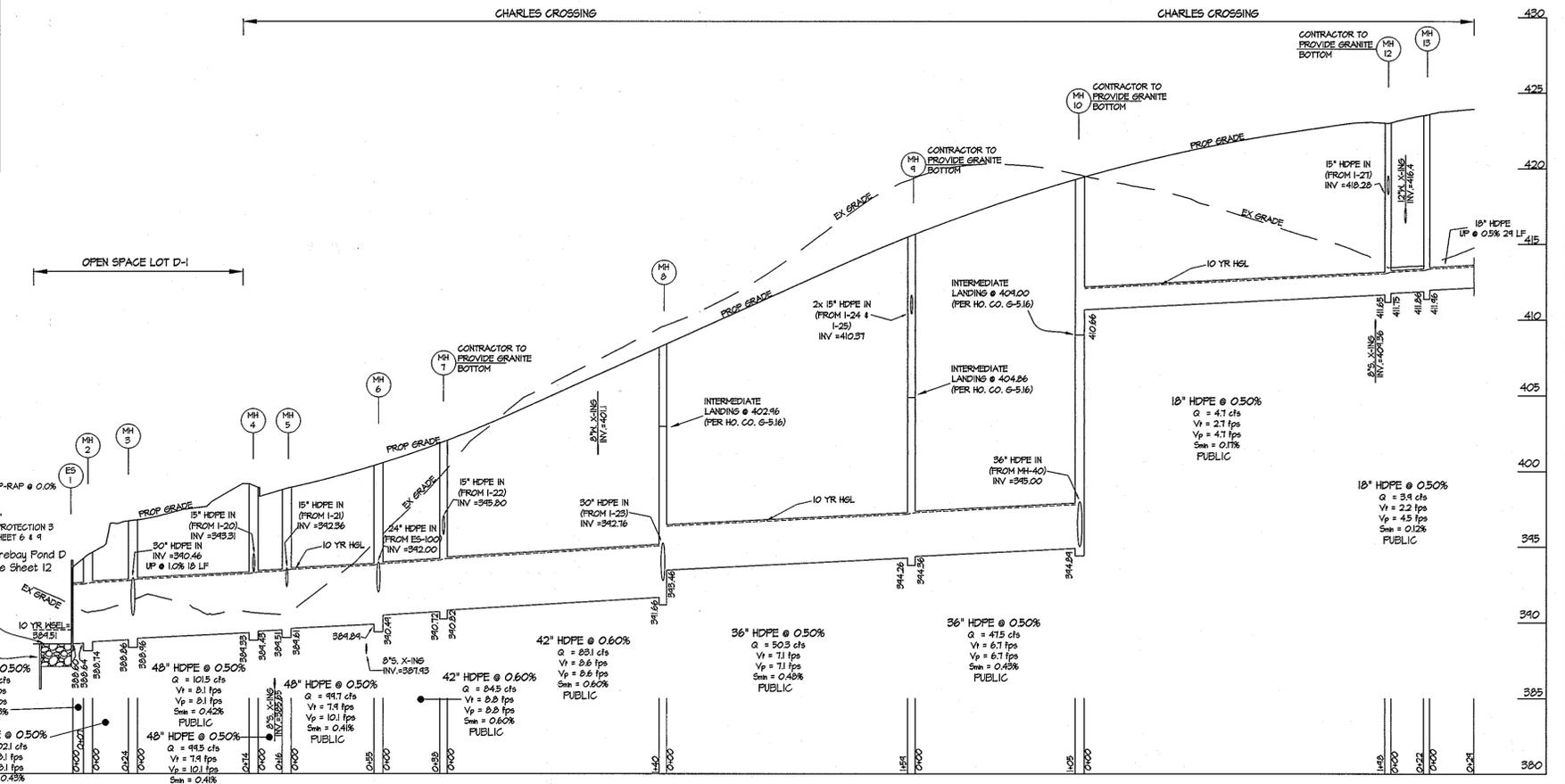
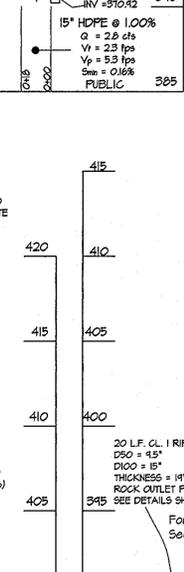
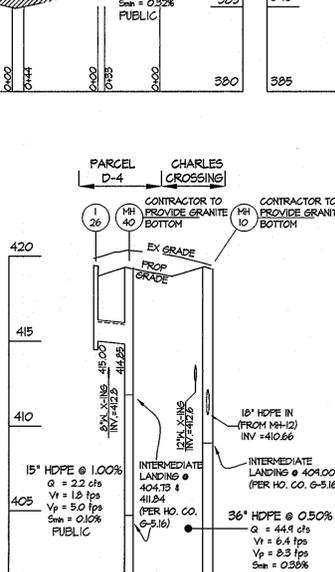
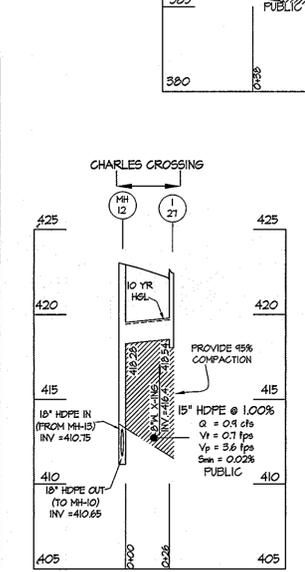
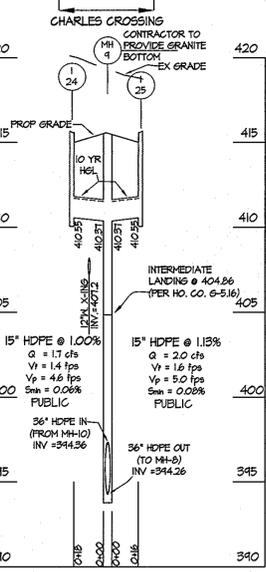
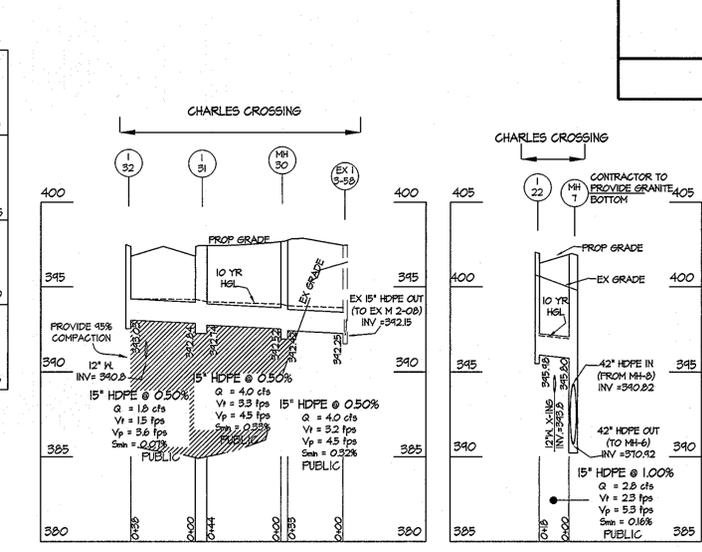
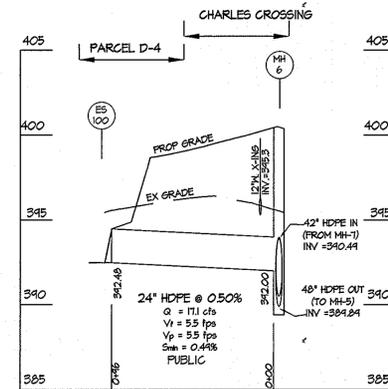


STORM DRAIN DRAINAGE AREA MAP
SHIPLEY'S GRANT
 PHASE IV
 LOTS C-219 thru C-222, C-225 thru C-207, PARCELS D-2 and E-1,
 OPEN SPACE LOTS C-207, D-1, E-2 & E-3 and NON-BUILDABLE PARCELS "D-3", "D-4",
 and NON-BUILDABLE LOT C-208
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
 HOWARD COUNTY, MARYLAND

SCALE	ZONING	G. L. W. FILE NO.
1"=50'	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT., 2009	37-1&2	8 OF 31



S.D. STRUCTURE SCHEDULE										
NO.	TYPE	WIDTH (INSIDE)	TOP ELEVATION		INVERT ELEVATION		STANDARD DETAIL	NOTES	LOCATION	OWNERSHIP & MAINTENANCE
			UPPER	LOWER	UPPER	LOWER				
ES-1	'C' HEADWALL	---	344.10	---	308.60	---	HO. CO. D 5.21		N. 563.947 E. 1364.148	PUBLIC
MH-2	MANHOLE	6'-0"	344.65	---	308.74	308.64	HO. CO. G. 5.13		N. 563.940 E. 1364.125	PUBLIC
MH-3	MANHOLE	6'-0"	346.74	---	340.46	308.86	HO. CO. G. 5.13		N. 563.944 E. 1364.110	PUBLIC
MH-4	MANHOLE	6'-0"	349.00	---	343.51	309.35	HO. CO. G. 5.13		6494.04 CG 1' R	PUBLIC
MH-5	MANHOLE	6'-0"	348.87	---	342.36	309.51	HO. CO. G. 5.13		6494.04 CG 1' R	PUBLIC
MH-6	MANHOLE	6'-0"	400.46	---	342.00	309.89	HO. CO. G. 5.13		7494.4 CG 1' R	PUBLIC
MH-7	MANHOLE	6'-0"	401.95	---	345.80	340.72	HO. CO. G. 5.13		7462.54 CG 1' R	PUBLIC
MH-8	MANHOLE	6'-0"	408.30	---	345.46	341.66	HO. CO. G. 5.13		4073.0 CG 1' R	PUBLIC
MH-9	MANHOLE	5'-0"	415.54	---	410.37	344.26	HO. CO. G. 5.13		10711.36 CG 1' R	PUBLIC
MH-10	MANHOLE	6'-0"	419.36	---	410.66	344.84	HO. CO. G. 5.13		11821.9 CG 1' R	PUBLIC
MH-12	MANHOLE	4'-0"	422.48	---	418.28	411.65	HO. CO. G. 5.12		13803.54 CG 10'46' R	PUBLIC
MH-13	MANHOLE	4'-0"	423.54	---	411.46	411.86	HO. CO. G. 5.12		14012.34 CG 2'81' R	PUBLIC
I-20	A-10	2'-6"	348.42	348.25	343.42	terminal	HO. CO. D 4.05		6429.65 CG 1' R	PUBLIC
I-21	A-5	2'-6"	348.96	348.85	342.45	terminal	HO. CO. D 4.01		6494.04 CG 1' R	PUBLIC
I-22	A-10	2'-6"	402.18	401.80	345.98	terminal	HO. CO. D 4.05		7462.54 CG 1' R	PUBLIC
I-23	COB-10	5'-0"	408.61	408.22	343.02	342.42	MD 314.62		4073.0 CG 1' R	PUBLIC
I-24	A-10	2'-6"	415.18	415.38	410.55	terminal	HO. CO. D 4.05		10711.36 CG 1' R	PUBLIC
I-25	A-10	2'-6"	415.18	415.38	410.55	terminal	HO. CO. D 4.05		10711.36 CG 1' R	PUBLIC
I-26	A-10	2'-6"	419.50	419.35	415.00	terminal	HO. CO. D 4.05		11494.8 CG 45.34' L	PUBLIC
I-27	A-5	2'-6"	422.90	422.74	418.54	terminal	HO. CO. D 4.01		13803.54 CG 31.65' R	PUBLIC
MH-30	MANHOLE	4'-0"	341.70	---	342.52	342.42	HO. CO. G. 5.12		4172.96 CG 22.80' R	PUBLIC
I-31	A-10	5'-0"	341.40	---	342.84	342.74	HO. CO. D 4.05		5207.01 CG 1' R	PUBLIC
I-32	A-10	2'-6"	341.40	---	343.03	terminal	HO. CO. D 4.05		5207.01 CG 1' R	PUBLIC
MH-40	MANHOLE	5'-0"	414.33	---	414.85	345.21	HO. CO. G. 5.13		11821.9 CG 45.34' L	PUBLIC
ES-100	HDPE END SECTION	---	344.48	---	342.48	---	HO. CO. D 5.51		7424.02 CG 91.44' L	PUBLIC



S.D. Pipe Summary Table PUBLICLY OWNED AND MAINTAINED			
Size (in.)	Type	Quantity (L.F.)	Remarks
15	HDPE	248	ADS N12 or equiv.
18	HDPE	241	ADS N12 or equiv.
24	HDPE	96	ADS N12 or equiv.
30	HDPE	30	ADS N12 or equiv.
36	HDPE	305	ADS N12 or equiv.
42	HDPE	178	ADS N12 or equiv.
48	HDPE	176	ADS N12 or equiv.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William J. Smith 10-23-09
 Chief, Bureau of Highways Date

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
Mark Stalder 10-27-09
 Chief, Division of Land Development Date
John DeMunn 10/27/09
 Chief, Development Engineering Division Date

GLW GUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE - SUITE 250 - BURTNSVILLE OFFICE PARK
 BURTNSVILLE, MARYLAND 20866
 TEL: 301-421-4024 BALT: 410-880-1820 DC/VA: 301-989-2524 FAX: 301-421-4186

OWNER PAR C-216 thru C-218:
 BA WATERLOO TOWNHOMES, LLC.
 c/o BOZZUTO HOMES, INC.
 7850 WALKER DRIVE, SUITE 400
 GREENBELT, MARYLAND 20770
 ATTN: DUNCAN SLIDELL
 301-623-1525

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 PROFESSIONAL ENGINEER UNDER THE
 LAWS OF THE STATE OF MARYLAND,
 LICENSE NO. 14831
 EXPIRATION DATE: May 21, 2010



STORM DRAIN PROFILES
SHIPLEY'S GRANT
 PHASE IV
 LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1,
 OPEN SPACE LOTS C-237, D-1, E-2 & E-3 AND NON-BUILDABLE PARCELS "D-3", "D-4",
 and NON-BUILDABLE LOT C-226
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
 ELECTION DISTRICT No. 1
 HOWARD COUNTY, MARYLAND

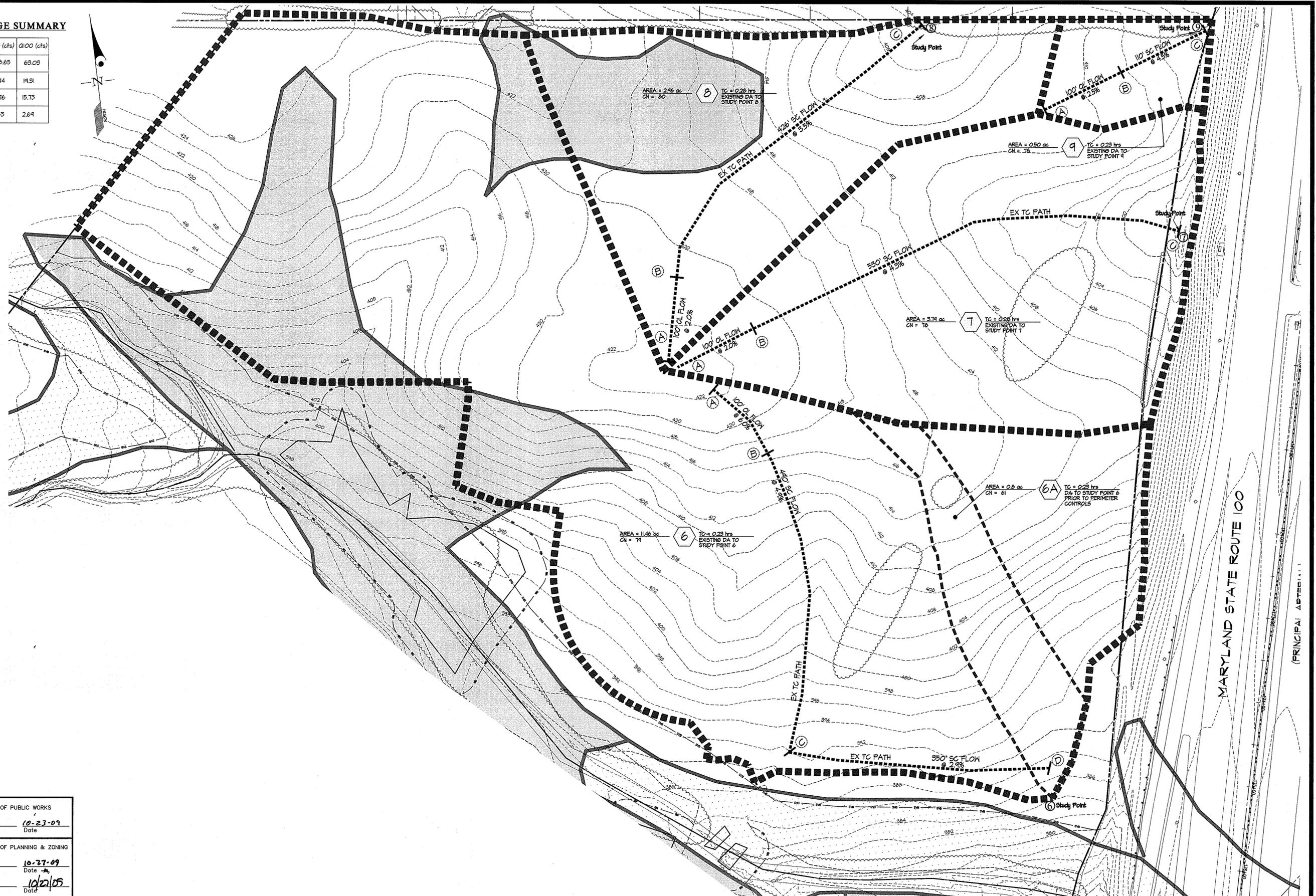
SCALE
 1"=50' (H)
 1"=5' (V)
 ZONING R-A-15, POR
 G. L. W. FILE NO. 07002
 DATE SEPT., 2009
 TAX MAP - GRID 37-1&2
 SHEET 9 OF 31

EXISTING DISCHARGE SUMMARY

	Q1 (cfs)	Q10 (cfs)	Q100 (cfs)
STUDY POINT 6	11.99	38.65	63.05
STUDY POINT 7	3.49	11.74	19.31
STUDY POINT 8	3.11	9.76	15.73
STUDY POINT 9	0.47	1.63	2.64

LEGEND

- SOILS DELINEATION LINE
- B' SOIL
- C' SOIL
- D' SOIL
- EXISTING DRAINAGE DIVIDE
- TC PATH
- DRAINAGE AREA LABEL



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Walter R. Smith
 Chief, Bureau of Highways
 10-23-09
 Date

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
Kurt Schumacher
 Chief, Division of Land Development
 10-27-09
 Date

Chris Demasius
 Chief, Development Engineering Division
 10/27/09
 Date

GLW GUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE - SUITE 250 - BURTONVILLE OFFICE PARK
 BURTONVILLE, MARYLAND 20886
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DATE	REVISION	BY	APPR.

OWNER PAR C-216 thru C-218:
 BA WATERLOO TOWNHOMES, LLC.
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 LAWS OF THE STATE OF MARYLAND,
 LICENSE NO. 14831
 EXPIRATION DATE: May 21, 2010

EXISTING CONDITION SWM DRAINAGE AREA MAP
SHIPLEY'S GRANT
 PHASE IV
 LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1,
 OPEN SPACE LOTS C-237, D-1, E-2 & E-3 and NON-BUILDABLE PARCELS "D-3", "D-4",
 and NON-BUILDABLE LOT C-226
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
 HOWARD COUNTY, MARYLAND

SCALE	ZONING	G. L. W. FILE No.
1"=50'	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT., 2009	37-1&2	10 OF 31

MARYLAND STATE ROUTE 100

(PRINCIPAL) AUSTRI, A. I.

PEAK DISCHARGE SUMMARY

STUDY POINT	EX.	Q1 (cfs)	Q10 (cfs)	Q100 (cfs)
STUDY POINT 6	EX.	11.91	38.65	63.03
	PROP.	0.80	64.86	113.42
STUDY POINT 7	EX.	3.41	11.74	19.31
	PROP.	0.30	0.97	1.63
STUDY POINT 8	EX.	3.11	9.76	15.73
	PROP.	0.00	0.00	0.00
STUDY POINT 9	EX.	0.47	1.63	2.64
	PROP.	0.00	0.00	0.00

LEGEND

- SOILS DELINEATION LINE
- B' SOIL
- C' SOIL
- D' SOIL
- PROPOSED DRAINAGE DIVIDE
- TC PATH
- DRAINAGE AREA LABEL

STORMWATER MANAGEMENT POND D

Stormwater Management Pond D provides Quality Control (WQV) and quantity control for 18.65 acres of the proposed development. WQV is provided via a permanent pool. CFV is provided via Extended Detention. Safe passage of the 100-year design storm has been analyzed for the blocked condition and a minimum 2-feet of freeboard has been provided.

Type (per MDE) : Wet Pond (P2)
 MD-318 Hazard Class A Facility
 Total Drainage Area To Facility = 19.68 acres (Area 6)
 CN = 88
 Zoning: Townhouse, 25% Impervious
 Tc = 0.250 hrs.
 WQV Required = 0.82 ac-ft
 WQV Provided = 0.82 ac-ft
 WQV/Permanent Pool WSEL = 385.0
 CFV Required = 1.56
 CFV Provided = 1.71
 CFV WSEL = 388.75
 Rev Requirement = 0.29 ac-ft
 Rev To Be Provided By Infiltration Trenches (See Below)*
 1-YR (Qp = 0.80 cfs) (WSEL = 388.74)
 10-YR (Qp = 64.86 cfs) (WSEL = 389.51)
 10-YR Blocked Flow (WSEL = 389.61)
 100-YR (Qp = 113.42 cfs) (WSEL = 390.00)
 100-YR Blocked Flow (WSEL = 390.01)
 Lag: 18.6 hours
 5 ft. Aquatic Bench = 384.00
 12 ft. Safety/Maintenance Bench = 386.00
 Outfall: Precast Riser Structure to 54" RCP to Stream Buffer
 T.O.D. = 392.00

* The recharge requirement for this drainage area (6) will be provided by infiltration trenches. These infiltration trenches will be designed under a future phase.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

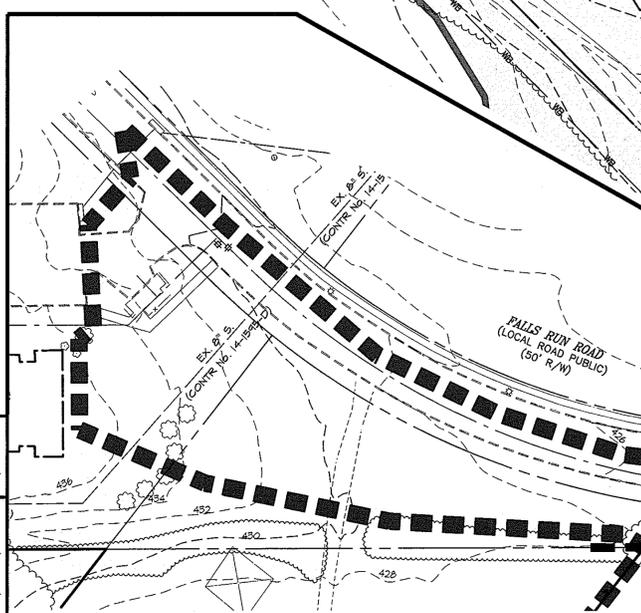
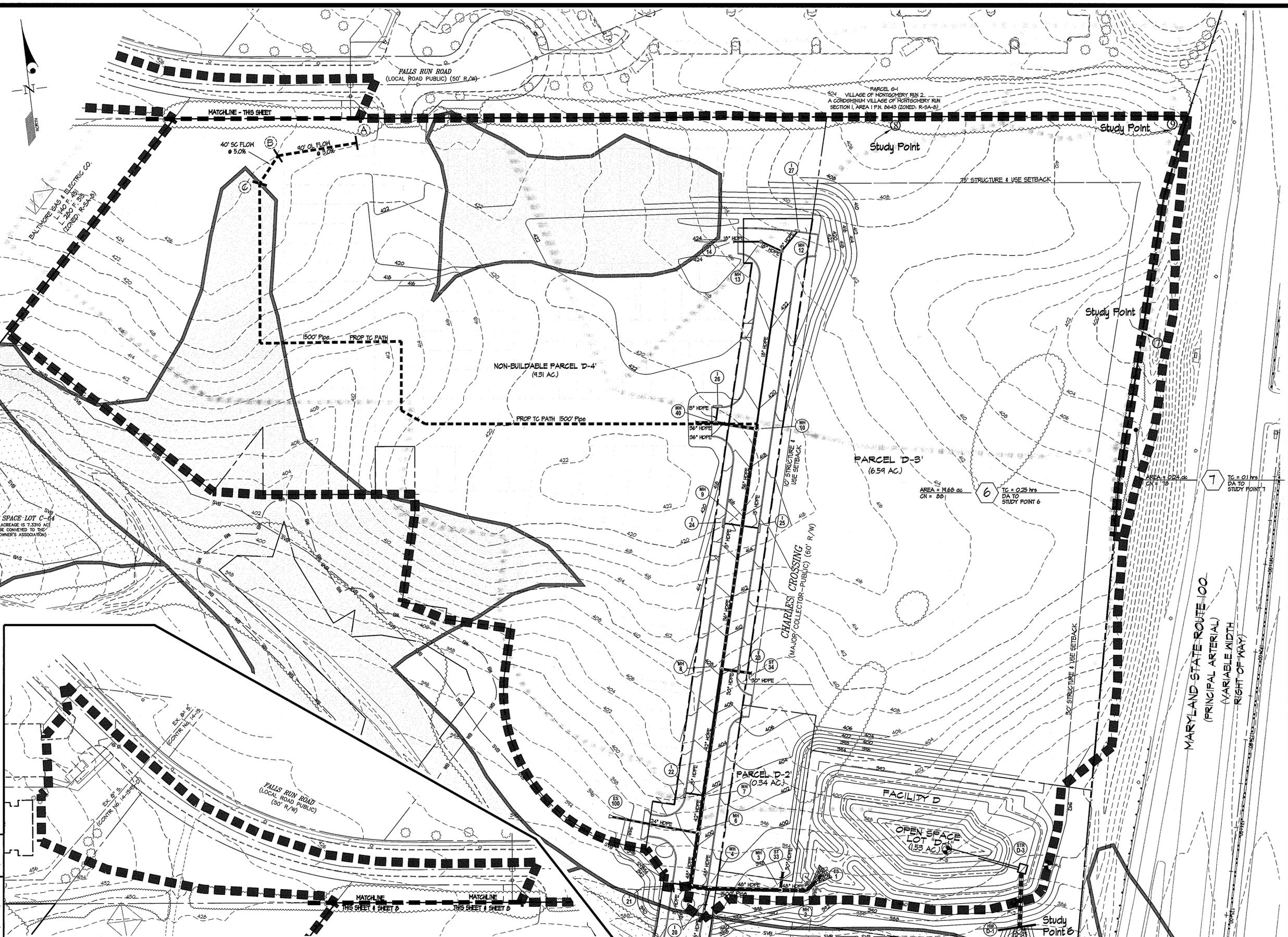
Matthew R. Goshall
 Chief, Bureau of Highways
 Date: 10-23-09

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING

Kent Stalwood
 Chief, Division of Land Development
 Date: 10-27-09
William J. Williams
 Chief, Development Engineering Division
 Date: 10/27/09

GLW GUTSCHICK LITTLE & WEBER, P.A.
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L:\CAD\DRAWINGS\0306\PHASE IV\Finals\04-PS\MDM.dwg DES. mjt DRN. mjt CHK. mjt



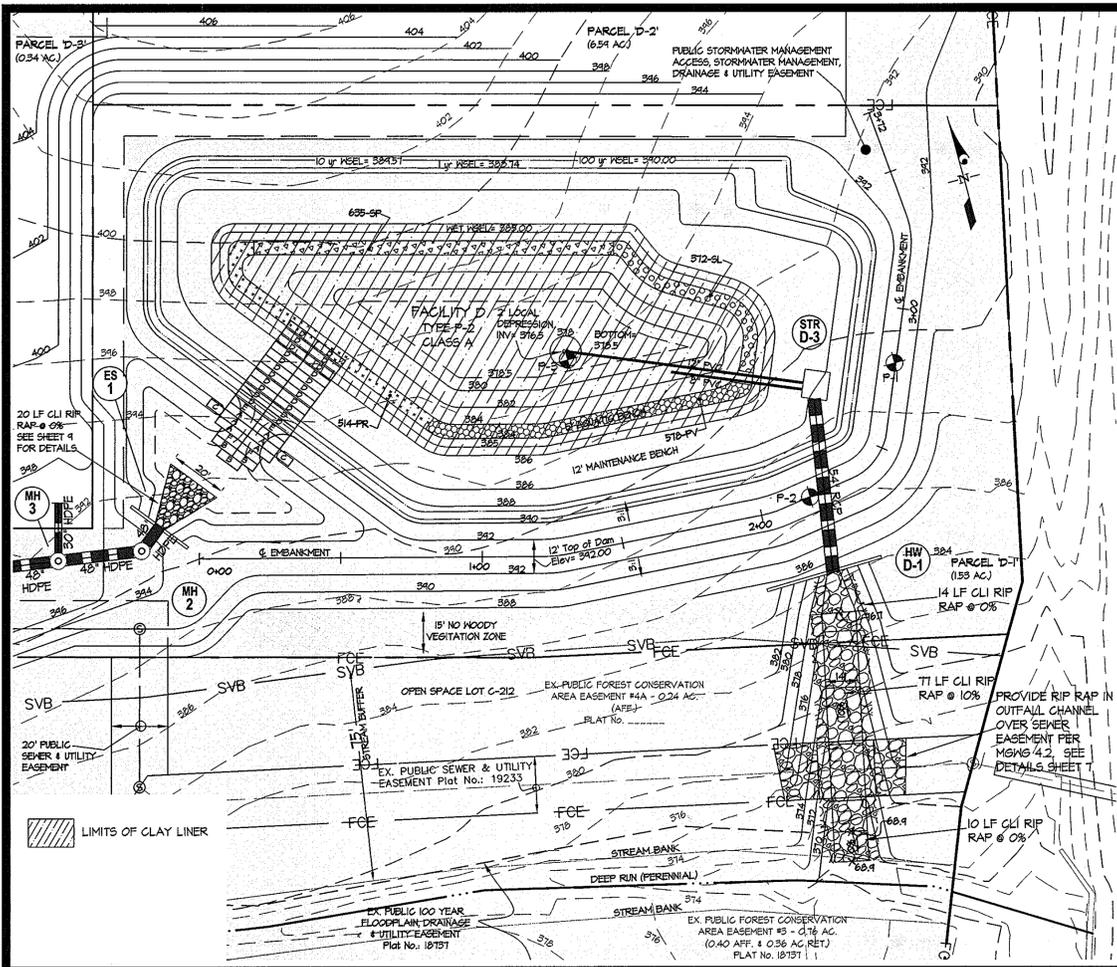
DATE	REVISION	BY	APPR.

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 EXPIRATION DATE: MAY 21, 2008

PROPOSED CONDITION SWM DRAINAGE AREA MAP
SHIPLEY'S GRANT
 PHASE IV
 LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1, OPEN SPACE LOTS C-237, D-1, E-2 & E-3 and NON-BUILDABLE PARCELS "D-3", "D-4", and NON-BUILDABLE LOT C-226
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
 HOWARD COUNTY, MARYLAND

SCALE	ZONING	G. L. W. FILE NO.
1"=50'	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT., 2009	37-1&2	11 OF 31



STORMWATER MANAGEMENT POND 'D' ENLARGEMENT / PLANTING PLAN

SCALE: 1" = 30'

STORMWATER MANAGEMENT POND D
 Stormwater Management Pond D provides Quality Control (WQ) and quantity control for 18.85 acres of the proposed development. WQ is provided via a permanent pool. CPV is provided via Extended Detention. Safe passage of the 100-year design storm has been analyzed for the blocked condition and a minimum 2-foot of freeboard has been provided.

Type (per MDE) : Wet Pond (P2)
 MD-318 Hazard Class A Facility
 Total Drainage Area To Facility = 14.68 acres (Area 6)
 CN = 88
 Zoning: Townhome, 85% impervious
 Tc = 0.250 hrs.
 WQ Required = 0.82 ac-ft
 WQ Provided = 0.82 ac-ft
 WQ/Permanent Pool WEEL = 385.0
 CPV Required = 1.56
 CPV Provided = 1.71
 CPV WEEL = 388.75
 Rev Requirement = 0.24 ac-ft
 Rev To Be Provided By Infiltration Trenches (See Below)*
 10-YR (Op = 64.86 cfs) (WEEL = 384.57)
 10-YR Blocked Flow (WEEL = 384.61)
 100-YR (Op = 115.42 cfs) (WEEL = 390.00)
 100-YR Blocked Flow (WEEL = 390.00)
 Lag: 18.6 hours
 5 ft Aquatic Bench = 384.00
 12 ft Safety/Maintenance Bench = 386.00
 Outfall: Precast Riser Structure to 54" RCP to Stream Buffer T.O.D. = 342.00

* The recharge requirement for this drainage area (6) will be provided by infiltration trenches. These infiltration trenches will be designed under a future phase.

SWM FACILITY 'D' IS TO BE MAINTAINED JOINTLY BY HO. CO. & HOA

OPERATION AND MAINTENANCE SCHEDULE OF JOINTLY MAINTAINED STORMWATER MANAGEMENT FACILITY

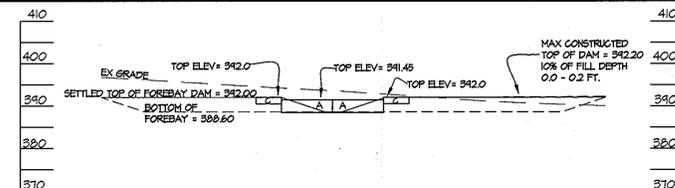
ROUTINE MAINTENANCE (BY HOA)

1. THE FACILITY SHALL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHOULD 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 A YEAR, ONCE IN JUNE AND ONCE IN SEPTEMBER. OTHER SIDE SLOPES, THE BOTTOM OF THE POND, AND MAINTENANCE ACCESS SHOULD BE MOWED AS NEEDED.
3. DEBRIS AND LITTER NEXT TO THE OUTLET STRUCTURE SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
4. VISIBLE SIGNS OF EROSION IN THE POND AS WELL AS RIPRAP OUTLET AREA SHALL BE REPAIRED AS SOON AS IT IS NOTICED.

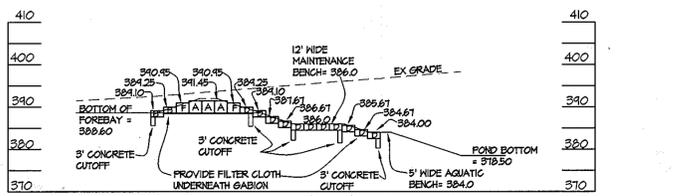
NON-ROUTINE MAINTENANCE (BY HOWARD COUNTY)

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

HOWARD SOIL CONSERVATION DISTRICT OPERATION, MAINTENANCE AND INSPECTION NOTE
 INSPECTION OF THE POND(S) SHOWN HEREON SHALL BE PERFORMED AT LEAST ANNUALLY IN ACCORDANCE WITH THE CHECKLIST AND REQUIREMENTS CONTAINED WITHIN THE USDA SCS STANDARDS AND SPECIFICATIONS FOR PONDS (MD-318). THE POND OWNER(S) AND ANY HEIRS, SUCCESSORS OR ASSIGNS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE POND AND THE CONTINUED OPERATION, SURVEILLANCE, INSPECTION, AND MAINTENANCE THEREOF. THE POND OWNER(S) SHALL PROMPTLY NOTIFY THE SOIL CONSERVATION DISTRICT OF ANY UNUSUAL OBSERVATIONS THAT MAY BE INDICATORS OF DISTRESS SUCH AS EXCESSIVE SEEPAGE, TURBID SEEPAGE, SLIDING OR SLUMPING.



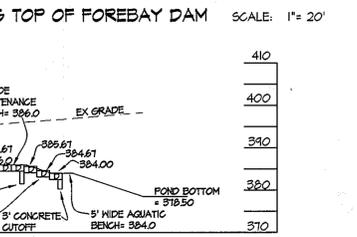
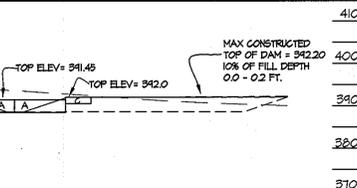
PROFILE ALONG TOP OF FOREBAY DAM SCALE: 1" = 20'



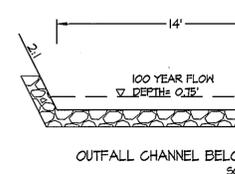
PROFILE THROUGH FOREBAY SCALE: 1" = 20'

SYMBOL	QTY.	NAMES (BOTANICAL / SCIENTIFIC)	SIZE	NOTES
SL	372	Sagittaria latifolia Duck Potato	1 pint cont. or bare root	12" o.c.
SP	635	Scirpus pungens Three-Square Bulrush	1 pint cont. or bare root	12" o.c.
FR	514	Polemonium reptans Jacob's Ladder	1 pint cont. or bare root	12" o.c.
PV	578	Peltandra virginica Arrow Arum	1 pint cont. or bare root	12" o.c.

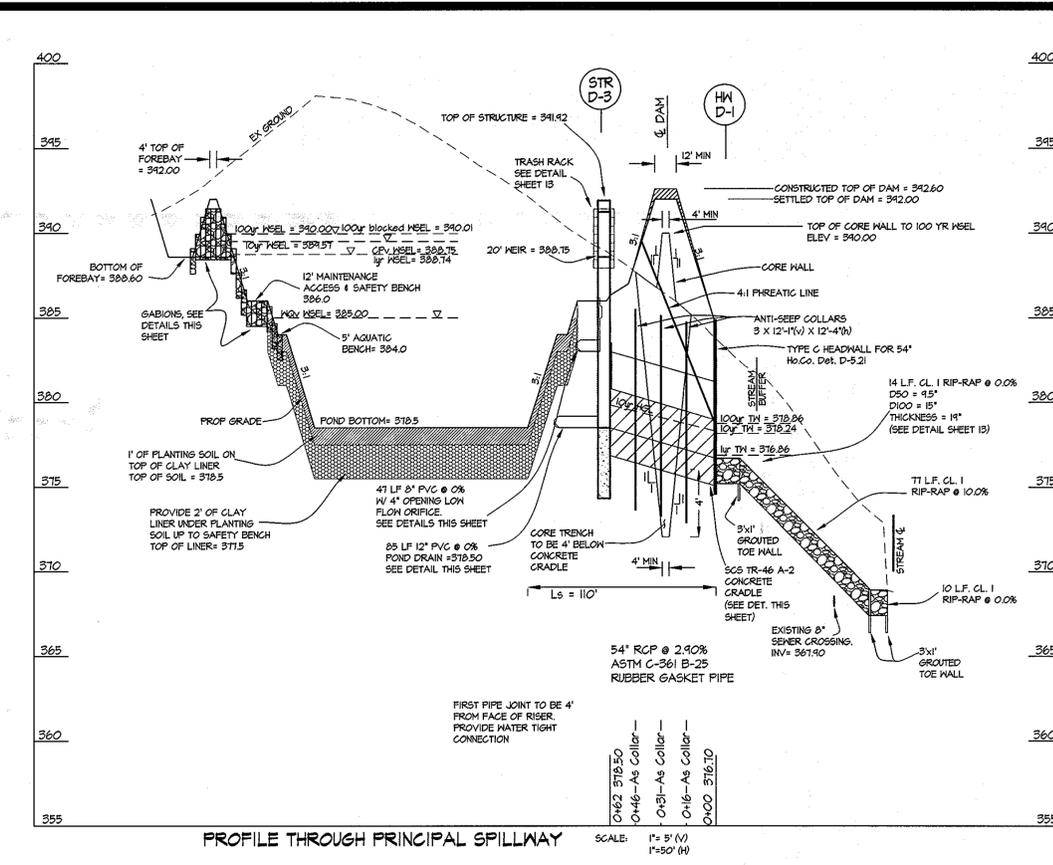
NOTE: STORMWATER MANAGEMENT POND PLANTINGS ARE PER MDE 2000 REQUIREMENTS. SEE SHEET IS FOR PLANTING NOTES AND DETAILS.



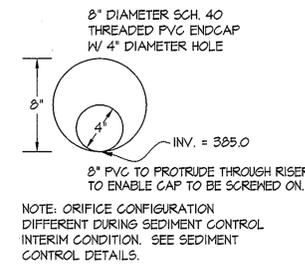
PROFILE THROUGH POND DRAIN AND LOW FLOW RELEASE SCALE: 1" = 5' (V) 1" = 50' (H)



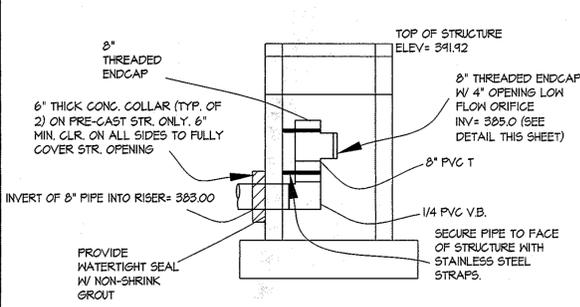
OUTFALL CHANNEL BELOW HW D-1 SCALE: 1" = 5'



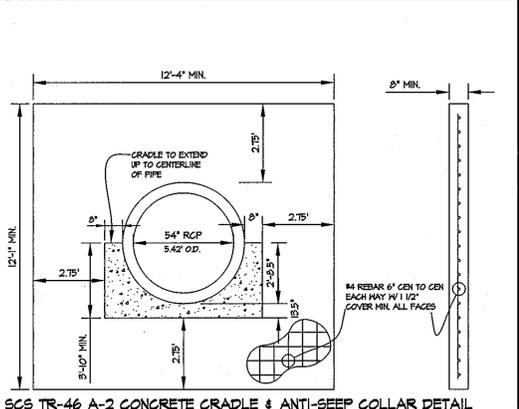
PROFILE THROUGH PRINCIPAL SPILLWAY SCALE: 1" = 5' (V) 1" = 50' (H)



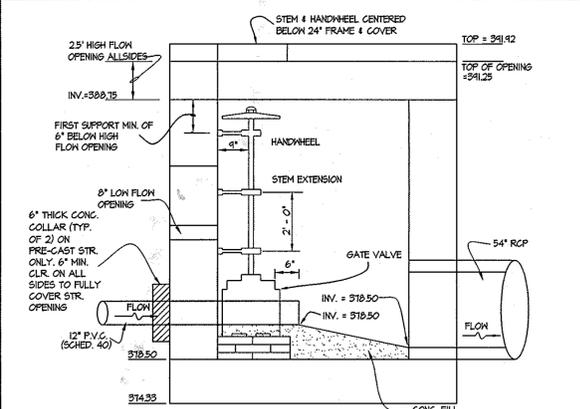
SWM LOW-FLOW ORIFICE DETAIL NTS



DEWATERING DEVICE DETAIL NTS



SCS TR-46 A-2 CONCRETE CRADLE & ANTI-SLEEP COLLAR DETAIL



GATE VALVE DETAIL NTS

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
 [Signature] 10-23-09
 Chief, Bureau of Highways

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
 [Signature] 10-27-09
 Chief, Division of Land Development

[Signature] 10/27/09
 Chief, Development Engineering Division

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

[Signature] 9-22-09
 SIGNATURE OF DEVELOPER/BUILDER DATE

[Signature] 9/23/09
 SIGNATURE OF DEVELOPER/BUILDER DATE

ENGINEER'S CERTIFICATE
 I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND 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] 9/23/09
 ENGINEER'S SIGNATURE DATE

[Signature] 10/14/09
 HOWARD SOIL CONSERVATION DISTRICT DATE

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

[Signature] 10/14/09
 HOWARD SOIL CONSERVATION DISTRICT DATE

[Signature] 10/14/09
 HOWARD SOIL CONSERVATION DISTRICT DATE

GLWGUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE SUITE 250 - BURTNSVILLE OFFICE PARK
 BURTNSVILLE, MARYLAND 20896
 TEL: 301-421-4024 FAX: 410-880-1820 DC/VA: 301-989-2524 FAX: 301-421-4186

DATE	REVISION	BY	APPR.

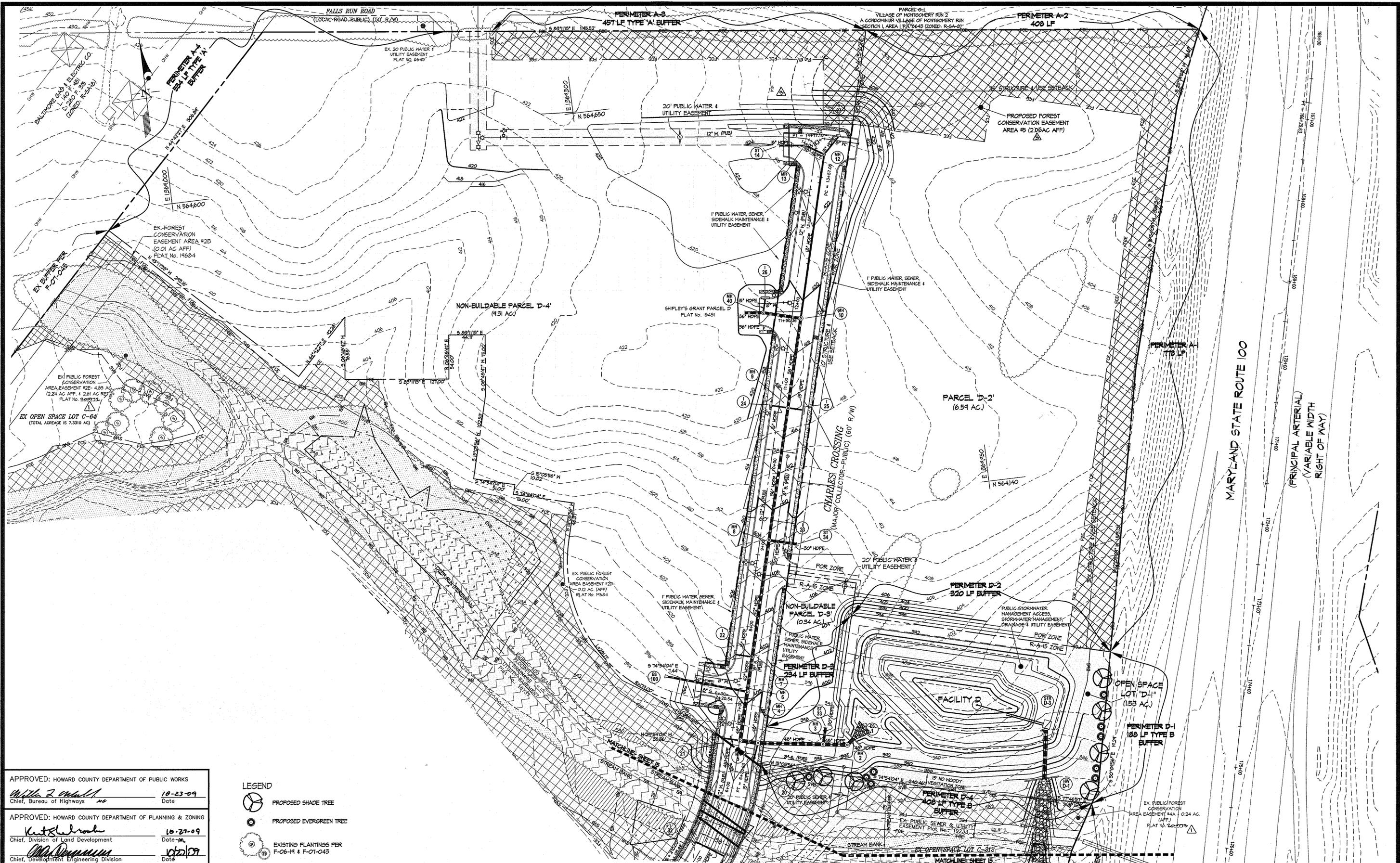
OWNER PAR C-216 thru C-218:
 BA WATERLOO TOWNHOMES, LLC.
 c/o BOZZUTO HOMES, INC.
 7850 WALKER DRIVE, SUITE 400
 GREENBELT, MARYLAND 20770
 ATTN: DUNCAN SLIDELL
 301-623-1525

PROFESSIONAL CERTIFICATION
 I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 14683
 EXPIRATION DATE: Nov 21, 2010



STORMWATER MANAGEMENT POND D DETAILS
SHIPLEY'S GRANT
 PHASE IV
 LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1, OPEN SPACE LOTS C-237, D-1, E-2 & E-3 AND NON-BUILDABLE PARCELS 'D-3', 'D-4', AND NON-BUILDABLE LOT C-226
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, 'D' and 'E'
 HOWARD COUNTY, MARYLAND

SCALE	ZONING	G. L. W. FILE NO.
AS SHOWN	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT., 2009	37-1&2	12 OF 31



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Michelle Z. Small 10-23-09
 Chief, Bureau of Highways Date

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
Kathleen 10-27-09
 Chief, Division of Land Development Date

John 10/21/09
 Chief, Development Engineering Division Date

- LEGEND**
- PROPOSED SHADE TREE
 - PROPOSED EVERGREEN TREE
 - EXISTING PLANTINGS PER F-06-19 & F-01-043

GLW GUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3009 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK
 BURTONSVILLE, MARYLAND 20886
 TEL: 301-421-4024 FAX: 301-421-4186

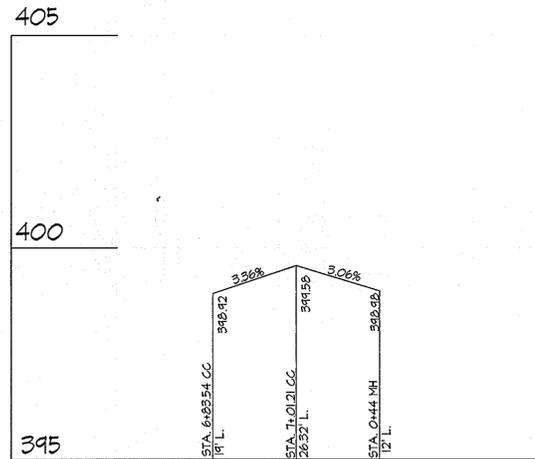
DATE	REVISION	BY	APPR.
9-9-19	REV. FOR N.P.S.	JT	
10-10-19	REV. TITLE BLOCK FOR F-10-000 & ADD PLAT NO'S	WGL	

OWNER PAR C-216 thru C-218:
 BA WATERLOO TOWNHOMES, LLC.
 c/o BOZZUTO HOMES, INC.
 7850 WALKER DRIVE, SUITE 400
 GREENBELT, MARYLAND 20770
 ATTN: DUNCAN SLIDELL
 301-623-1525

PROFESSIONAL CERTIFICATION
 I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16931
 EXPIRATION DATE: May 21, 2016

LANDSCAPE PLAN
SHIPLEY'S GRANT
 PHASE IV
 OPEN SPACE LOTS C-207, D-1, E-2 & E-3 and NON-BUILDABLE PARCELS "D-3", "D-4", and NON-BUILDABLE LOT C-208
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "B"
 ELECTION DISTRICT No. 1 HOWARD COUNTY, MARYLAND

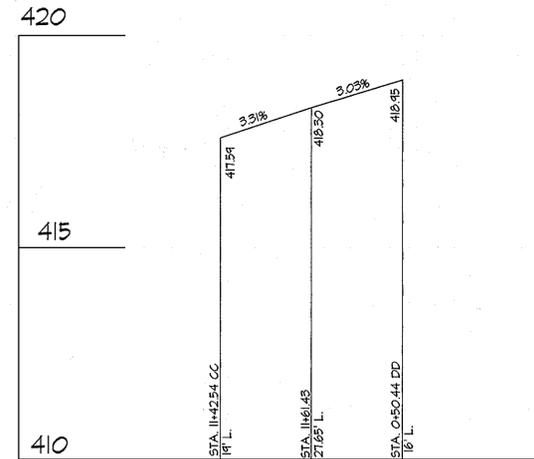
SCALE	ZONING	G. L. W. FILE NO.
1"=50'	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT., 2009	37-1&2	14 OF 31



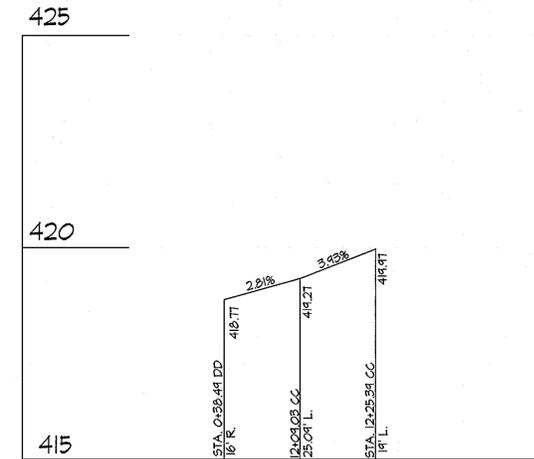
E.O.P. RETURN PROFILE FOR CHARLES CROSSING AND MAPLE HILL ROAD



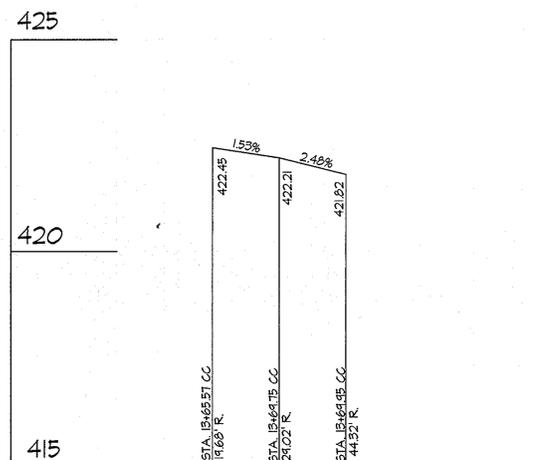
E.O.P. RETURN PROFILE FOR CHARLES CROSSING AND MAPLE HILL ROAD



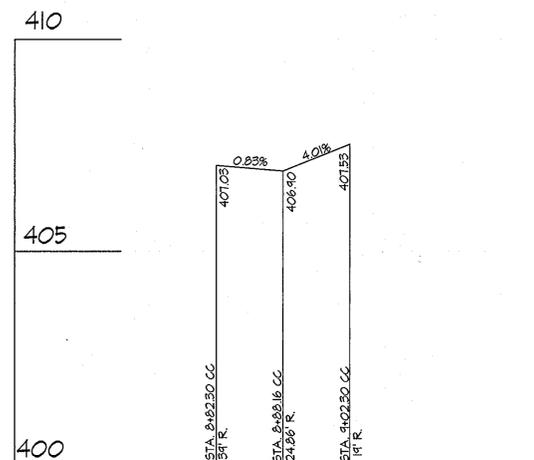
E.O.P. RETURN PROFILE FOR CHARLES CROSSING AND DUNCAN DRIVE



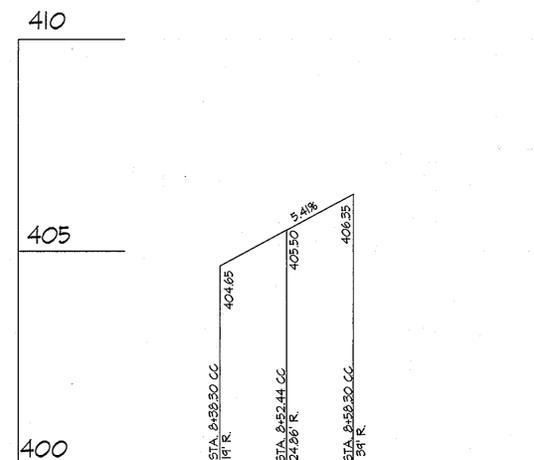
E.O.P. RETURN PROFILE FOR CHARLES CROSSING AND DUNCAN DRIVE



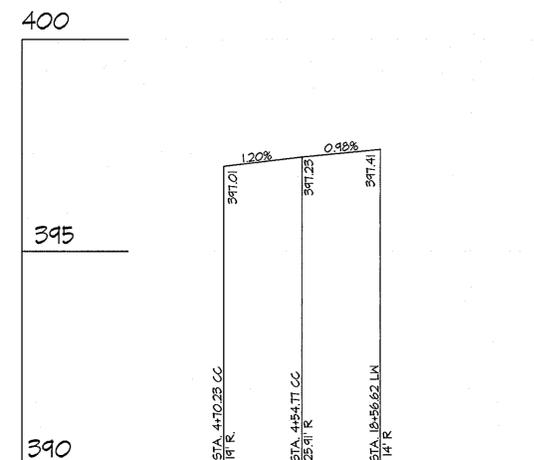
E.O.P. RETURN PROFILE FOR CHARLES CROSSING AND OFFICE DRIVEWAY



E.O.P. RETURN PROFILE FOR CHARLES CROSSING AND OFFICE DRIVEWAY



E.O.P. RETURN PROFILE FOR CHARLES CROSSING AND OFFICE DRIVEWAY



E.O.P. RETURN PROFILE FOR CHARLES CROSSING AND LOGAN'S WAY

CC= CHARLES CROSSING
LN = LOGAN'S WAY
MH= MAPLE HILL ROAD
DD= DUNCAN DRIVE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Walter R. Marshall
Chief, Bureau of Highways
Date: 10-23-09

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
Walter R. Marshall
Chief, Division of Land Development
Date: 10-27-09
John Demas
Chief, Development Engineering Division
Date: 10/27/09

GLW GUTSCHICK LITTLE & WEBER, P.A.
CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK
BURTONSVILLE, MARYLAND 20886
TEL: 301-421-4024 BALT: 410-880-1820 DC/VA: 301-989-2524 FAX: 301-421-4188

L:\CAD\DRAWINGS\33006\PHASE IV\Roads\04-Charles Crossing.dwg DES. dds DRN. dds CHK.

DATE	REVISION	BY	APPR.

OWNER PAR C-216 thru C-218:
BA WATERLOO TOWNHOMES, LLC.
c/o BOZZUTO HOMES, INC.
7850 WALKER DRIVE, SUITE 400
GREENBELT, MARYLAND 20770
ATTN: DUNCAN SLIDELL
301-623-1525

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 14631 EXPIRATION DATE: May 21, 2010

CURB RETURN PROFILES
SHIPLEY'S GRANT
PHASE IV
LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1,
OPEN SPACE LOTS C-237, D-1, E-2 & E-3 and NON-BUILDABLE PARCELS "D-3", "D-4",
and NON-BUILDABLE LOT C-226
A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
HOWARD COUNTY, MARYLAND

SCALE	ZONING	G. L. W. FILE No.
1" = 20' (H) 1" = 2' (V)	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT., 2009	37-1&2	16 OF 31

MGNC 2: Pump-Around Practice

Description:
The work shall consist of installing a temporary pump around and supporting measures to divert flow around in-stream construction sites.

Implementation Sequence:
Sediment control measures, pump arounds, and associated channel and bank construction shall be completed in the following sequence:

- Construction activities including the installation of erosion and sediment control measures shall not begin until all necessary easements and/or right-of-ways have been acquired. All existing utilities shall be marked in the field prior to construction. The contractor is responsible for any damage to existing utilities that may result from construction and shall repair the damage at his/her own expense to the county's satisfaction.
- The contractor shall notify the Maryland Department of the Environment or HMA sediment control inspector at least 5 days before beginning construction. Additionally, the contractor shall inform the local environmental protection and resource management inspection and enforcement division and the provider of local utilities a minimum of 48 hours before starting construction.
- The contractor shall conduct a pre-construction meeting on site with the HMA sediment control inspector, the county project manager, and the engineer to review limits of disturbance, erosion and sediment control requirements, and the sequence of construction. (The contractor shall stake out all limits of disturbance prior to the pre-construction meeting.) The participants will also designate the contractor's staging areas and flag all trees within the limit of disturbance which will be removed for construction access. Trees shall not be removed within the limit of disturbance without approval from the HMA or local authority.
- Construction shall not begin until all sediment and erosion control measures have been installed and approved by the engineer and the sediment control inspector. The contractor shall stay within the limits of the disturbance as shown on the plans and minimize disturbance within the work area whenever possible.
- Upon installation of all sediment control measures and approval by the sediment control inspector and the local environmental protection and resource management inspection and enforcement division, the contractor shall begin work at the upstream section and proceed downstream beginning with the establishment of stabilized construction entrances. The sequence of construction must be followed unless the contractor gets written approval for deviations from the HMA or local authority. The contractor shall only begin work in an area which can be completed by the end of the day (including grading adjacent to the channel). At the end of each work day, the work area must be stabilized and the pump around removed from the channel. Work shall not be conducted in the channel during rain events.
- Sandbag dikes shall be situated at the upstream and downstream ends of the work area as shown on the plans, and stream flow shall be pumped around the work area. The pump shall discharge onto a stable velocity dissipater made of riprap or sandbags.
- Water from the work area shall be pumped to sediment filtering measure such as a sediment bag. The measuring shall be located such that the water drains back into the channel below the downstream sandbag dike.
- Traversing a channel reach with equipment where no work is proposed should be avoided. If equipment has to traverse a reach for access to another area, then timber mats or similar measures shall be used to minimize disturbance to the channel. Temporary stream crossings shall be used only when necessary and only where noted on the plans or specified by the engineer.
- All stream restoration measures shall be installed as indicated by the plans and all banks graded in accordance with the grading plans and typical cross-sections. All grading must be permanently stabilized at the end of each day with seed and mulch or seed and matting as specified on the plans.
- After an area is completed and stabilized, sandbag diversions, the water pump, and sediment filtering measure shall be moved to the next work area. This shall be accomplished by first moving the downstream sandbag dike to the new upstream pump around location and then by relocating the upstream sandbag dike, velocity dissipater, and sediment filter to the new downstream location.
- A pump around must be installed on any tributary or storm drain outfall which contributes base-flow to the work area. This should be accomplished by locating a sandbag dike at the downstream end of the tributary or storm drain outfall and pumping the stream flow around the work area. This water should discharge onto the same velocity dissipater used for the main stem pump around.
- If a tributary is to be restored, construction should take place on the tributary before work on the main stem reaches the tributary confluence. Construction in the tributary, including pump around practices, shall follow the same sequence as for the main stem of the river or stream. When construction on the tributary is completed, work on the main stem shall resume. Water from the tributary shall continue to be pumped around the work area in the main stem.
- The contractor is responsible for providing access to and maintaining all erosion and sediment control devices until the sediment control inspector approved their removal.
- After construction, all disturbed areas shall be regraded and revegetated as per the planting plan.
- The base flow of the stream as measured on 6/17/09 was flowing at a rate of 30 gal./minute. Contractor to supply pump-around capable of handling this flow rate.

SCHEDULE OF SEED MIX

BOTANICAL NAME	COMMON NAME	APPLICATION RATE (#/Ac.)	PERCENT OF MIX	REMARKS
LOLIUM MULTIFLORA	ANNUAL RYE GRASS	20	25	
AGROSTIS ALBA	RED TOP	4	40	
PANICUM CLANDESTINUM	DEER TONGUE GRASS	10	25	
BROMUS ARVENSIS	FIELD BROMEGRASS	9	10	WINTER SEED
OR	OR	OR	OR	OR
CANICUM RAMOSUM	BROWN TOP MILLET	4	10	SUMMER SEED

1. Apply fertilizer in accordance with rates and methods described for permanent seeding.

MGNC 3.9: STEP POOLS

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 MGNC 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 HMA or local authority. The proposed construction sequence for step pools is as follows (refer to Detail 3.9):

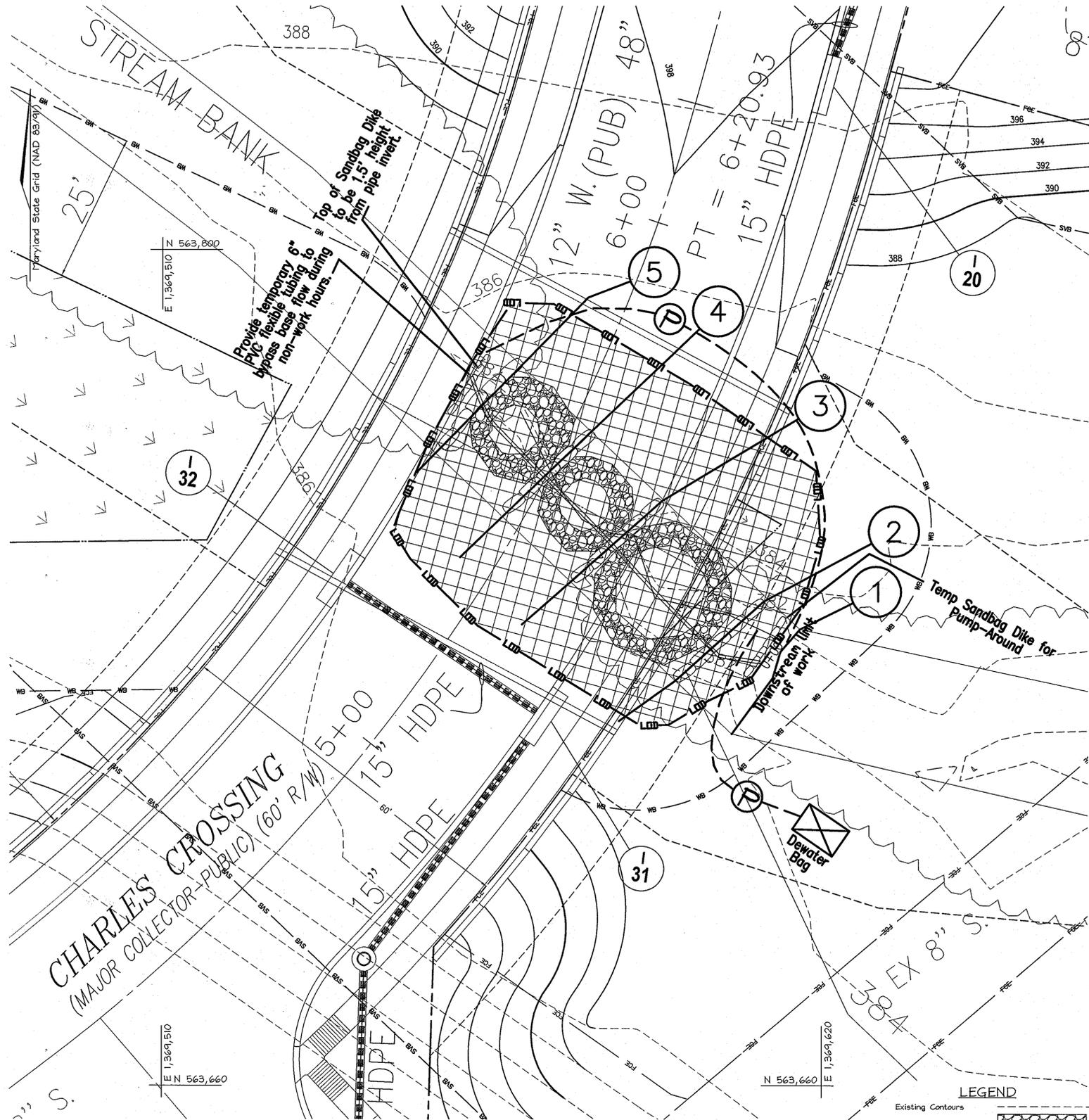
- The stream should be redirected by an approved temporary stream diversion (See Section 1: Temporary Instream Construction Measures, Maryland's Guidelines to Waterway Construction), the construction area should be dewatered, and any disturbed banks should be stabilized.
- Step-pool units should be designed 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.
- 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.
- 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 ($1 < (H/L)_{avg} / S < 2$). Typical spacings for step pools and cascades are provided in Detail 3.9(b) relating to alluvial channel morphologies.
- 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.
- 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.

CONSTRUCTION NOTES/SPECIFICATIONS

- The contractor shall install appropriate sediment and erosion control devices before project. All work to be performed at the direction of the stream restoration specialist.
- The foundation area shall be cleared of trees, stumps, roots, sod, loose rock, or other objectionable material.
- The cross-section shall be excavated to the next lines and grades as shown on the plans. Over-excavated areas shall be backfilled with moist soil compacted to the density of the surrounding material.
- No abrupt deviations from the design grade or horizontal alignment shall be permitted unless authorized by the ERI Stream Restoration Specialist.
- Filter, bedding, and rock rip-rap shall be placed to line and grade in the manner specified.
- Construction operations shall be done in such a manner that erosion, air, and water pollution will be minimized and held within legal limits. The completed job shall present a workmanlike appearance. All disturbed areas shall be vegetated or otherwise protected against soil erosion.
- Filter cloth shall be placed beneath rip-rap where indicated. The filter cloth shall consist of either woven or non-woven monofilament fiber and shall conform to the ASTM D 1777, ASTM D 1682, Having a thickness of 20-60 MILs, and a grab strength of 90-120 LBS.
- All boulders shall be selected Class III Rip-rap boulders, natural in color and pre-approved by the Stream Restoration Specialist at Exploration Research, Inc. (ERI)
- 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.
- The rock or gravel shall conform to the specified grading limits when installed.
- Geotextile shall be protected from punching, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of geotextile over the damaged part or by completely replacing the geotextile. All overlaps whether for repairs or for joining two pieces of geotextile shall be a minimum of one foot.
- Stone and boulders for the rip-rap may be placed by equipment. It shall be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The stone for rip-rap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogeneous with the small stones and spalls filling the voids between the larger stones. Rip-rap shall be placed in a manner to prevent damage to the filter blanket or geotextile. Hand placement will be required to the extent necessary to prevent damage to the permanent works. Exact placement will be required as directed by the ERI Stream Specialist in the field.
- The stone shall be placed so that it blends in with the existing grade. 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.

SEQUENCE OF CONSTRUCTION

- Contact the MDE Compliance Inspector at 410-534-3510 48 hours prior to start of work.
- All stream stabilization work to be done in conjunction with Nontidal Wetlands and Waterways Permit (200667364/06-NT-3379). No instream work permitted March 1 thru June 15.
- With permission of the Howard County and MDE Inspector, install sandbag dikes and establish pump-around device. (1 Day)
- Clear and begin construction of step pools while maintaining pump-around and 6" PVC bypass. (1 Week)
- Stabilize all disturbed areas with seed, erosion control matting and fertilizer. (1 Day)



PLAN VIEW
SCALE: 1"=10'

LEGEND

Existing Contours	
Class I Rip Rap	
Class III Rip Rap	
Tree Line	
Erosion Control Matting	
Limits of Disturbance	
Sandbag Dike	

ENGINEERS CERTIFICATE
I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT MEETS THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.
Zacharia T. Fisch
SIGNATURE OF ENGINEER
ZACHARIA T. FISCH
9/15/09
DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Walter R. Mahall
Chief, Bureau of Highways
10-23-09
Date

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
Walt Stulwood
Chief, Division of Planning and Development
10-27-09
Date
Walt Stulwood
Chief, Development Engineering Division
10/23/09
Date

DEVELOPER'S CERTIFICATE
I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.
[Signature]
SIGNATURE OF DEVELOPER
9-22-09
DATE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
[Signature]
HOWARD SOIL CONSERVATION DISTRICT
10/16/09
DATE

EXPLORATION RESEARCH, INC.
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS
6330 HOWARD LANE
ELLENROSE, MARYLAND 21035
TEL: (410) 567-5211 FAX: (410) 798-1582
EMAIL: info@ehar.com

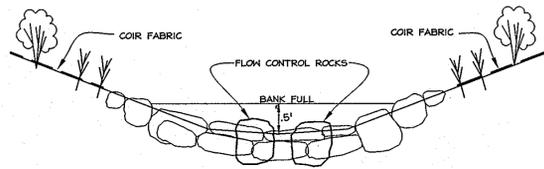
NO.	REVISION	DATE	BY	APPR.

OWNER PAR C-216 thru C-218:
BA WATERLOO TOWNHOMES, LLC.
c/o BOZZUTO HOMES, INC.
7850 WALKER DRIVE, SUITE 400
GREENBELT, MARYLAND 20770
ATTN: DUNCAN SLIDELL
301-623-1525

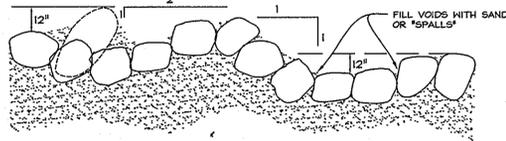
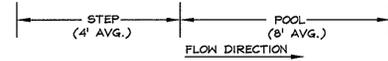
PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 22418
EXPIRATION DATE: JULY 29, 2011
[Signature]
STATE OF MARYLAND
PROFESSIONAL ENGINEER

Stream Stabilization Plan and Notes
SHIPLEY'S GRANT
PHASE IV
LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1, OPEN SPACE LOTS C-237, D-1, E-2 and E-3 and NON-BUILDABLE PARCELS "D-3", "D-4", and LOT C-226
A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
HOWARD COUNTY, MARYLAND
ELECTION DISTRICT No. 1

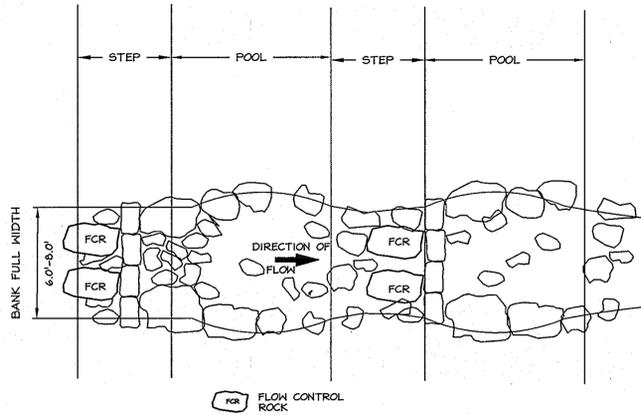
SCALE	ZONING	G. L. W. FILE NO.
As Shown	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT. 14, 2009	37-1&2	17 OF 31



TYPICAL STEP GRADING AND STONE PLACEMENT CROSS SECTION (N.T.S.)



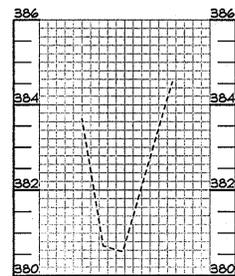
TYPICAL STEP GRADING AND STONE PLACEMENT PROFILE VIEW (N.T.S.)



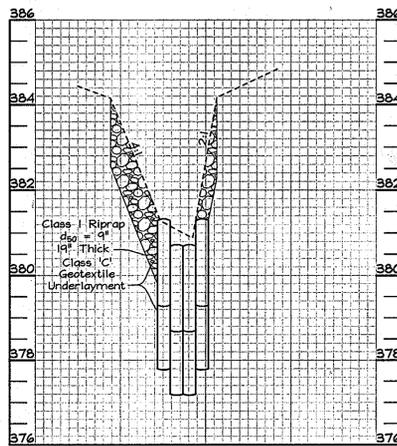
TYP. STEP-POOL GRADING AND STONE PLACEMENT (N.T.S.)

STEP POOL CONSTRUCTION AND STONE PLACEMENT

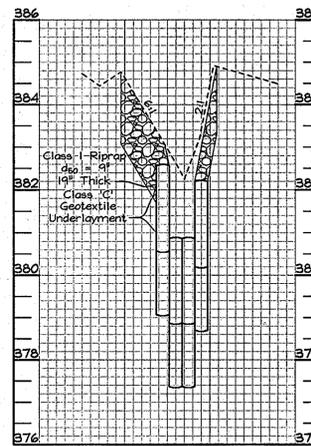
STEP-POOL STRUCTURE TO BE CONSTRUCTED WITH CLASS I & II RIPRAP SIZE STONE, GREY IN COLOR, FROM A FREDERICK COUNTY SOURCE. CONTRACTOR TO INSURE THAT BOULDERS/STONES ARE PROPERLY KEED-IN WITH EACH UPSTREAM STONE PARTIALLY PLACED OVER TOP THE ADJACENT DOWNSTREAM STONE. VOIDS IN STONE TO BE FILLED WITH FLAGSTONE TAILINGS OR "SPALLS", AS APPROVED BY THE ERI STREAM RESTORATION SPECIALIST.



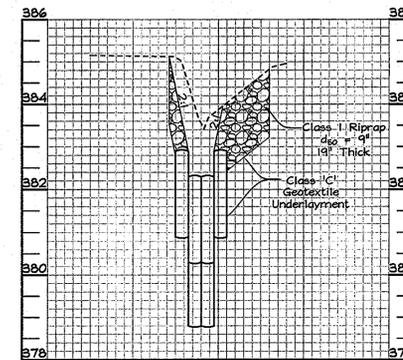
CROSS-SECTION #1 SCALE: Horizontal 1"=20', Vertical 1"=2'



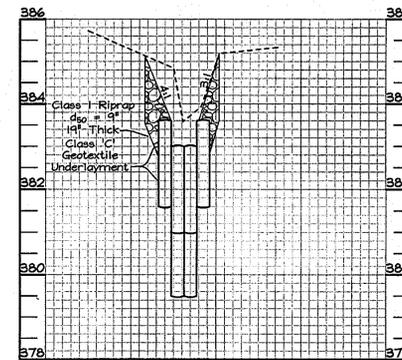
CROSS-SECTION #2 SCALE: Horizontal 1"=20', Vertical 1"=2'



CROSS-SECTION #3 SCALE: Horizontal 1"=20', Vertical 1"=2'

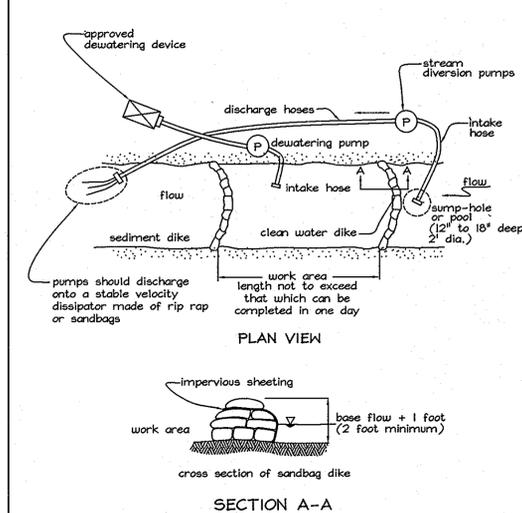


CROSS-SECTION #4 SCALE: Horizontal 1"=20', Vertical 1"=2'



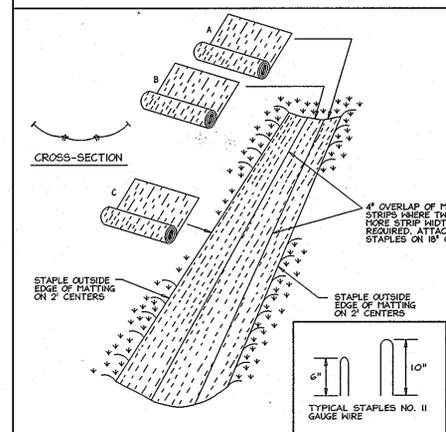
CROSS-SECTION #5 SCALE: Horizontal 1"=20', Vertical 1"=2'

DETAIL I.2: PUMP-AROUND PRACTICE



Temporary Instream Construction Measures REVISED NOVEMBER 2000 PAGE 12 - 3 Maryland Department of the Environment Water Management Administration

DETAIL 30 - EROSION CONTROL MATTING

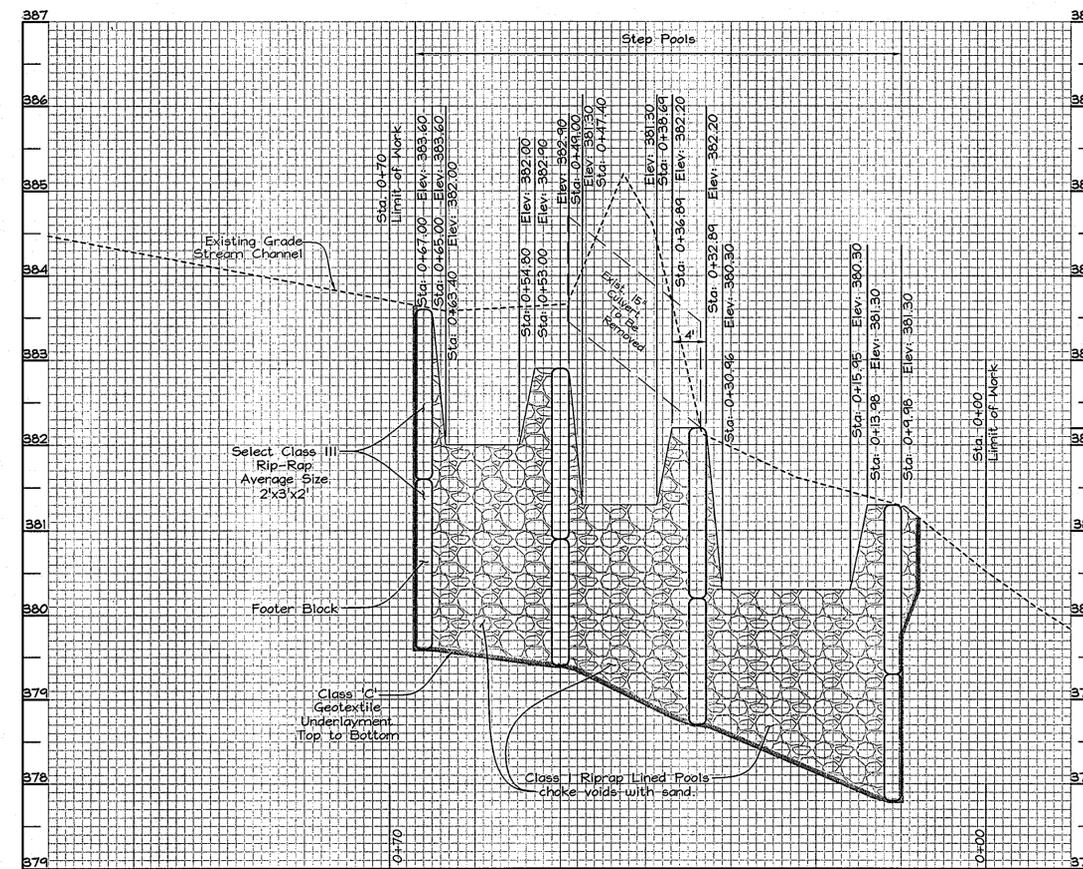


Construction Specifications

1. Key-in the matting by placing the top ends of the matting in a narrow trench, 6" in depth. Backfill the trench and tamp firmly to conform to the channel cross-section. Secure with a row of staples about 4" down slope from the trench. Spacing between staples is 6".
2. Staple the 4" overlap in the channel center using an 18" spacing between staples.
3. Before stapling the outer edges of the matting, make sure the matting is smooth and in firm contact with the soil.
4. Staples shall be placed 2' apart with 4 rows for each strip, 2 outer rows, and 2 alternating rows down the center.
5. Where one roll of matting ends and another begins, the end of the top strip shall overlap the upper end of the lower strip by 4", shiplap fashion. Reinforce the overlap with a double row of staples spaced 6" apart in a staggered pattern on either side.
6. The discharge end of the matting liner should be similarly secured with 2 double rows of staples.

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

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



STREAM CHANNEL PROFILE THROUGH STEP-POOLS SCALE: Horizontal 1"=10', Vertical 1"=1'

ENGINEERS CERTIFICATE

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

Zacharia Y. Fisch 9/15/09
SIGNATURE OF ENGINEER DATE
ZACHARIA Y. FISCH

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

Will Z. Umall 10-23-09
Chief, Bureau of Highways DATE

DEVELOPER'S CERTIFICATE

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

Director Date
Chief, Division of Land Development 10/23/09
Chief, Development Engineering Division 10/23/09

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT
Signature of Developer DATE 9-22-09
HOWARD SOIL CONSERVATION DISTRICT DATE 10/14/09

EXPLORATION RESEARCH, INC.
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS
6339 HOWARD LANE
ELKSPRO, MARYLAND 21075
TEL: (410) 567-5210 FAX: (410) 798-1562
EMAIL: info@erinc.com

OWNER PAR C-216 thru C-218:
BA WATERLOO TOWNHOMES, LLC.
c/o BOZZUTO HOMES, INC.
7850 WALKER DRIVE, SUITE 400
GREENBELT, MARYLAND 20770
ATTN: DUNCAN SLIDELL
301-623-1525

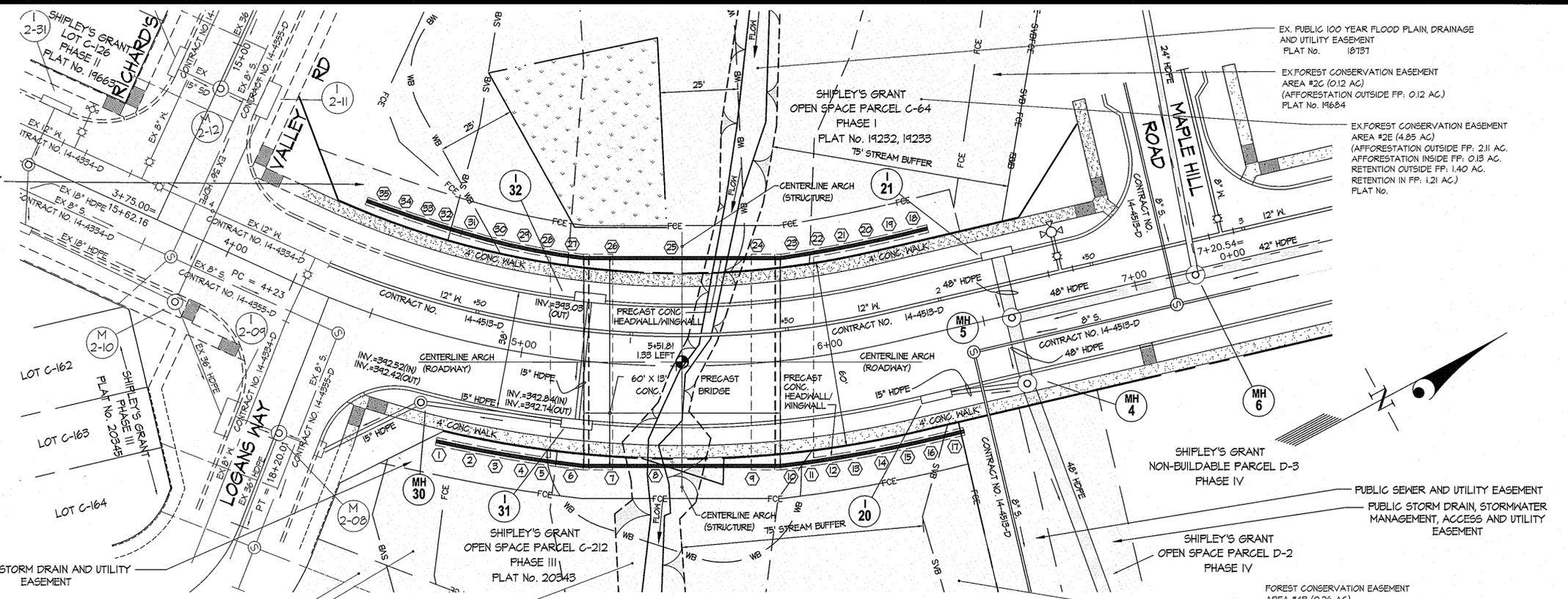
PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 22418
EXPIRATION DATE: 8/23/2011

Stream Stabilization Profiles, Cross-Sections, and Details
SHIPLEY'S GRANT
PHASE IV
LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1, OPEN SPACE LOTS C-237, D-1, E-2 and E-3 and NON-BUILDABLE PARCELS "D-3", "D-4", and LOT C-226
A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
ELECTION DISTRICT: No. 1
HOWARD COUNTY, MARYLAND

SCALE	ZONING	G. L. W. FILE No.
As Shown	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
AUG. 5, 2009	37-1&2	18 OF 31

NO	DATE	REVISION	BY	APPR.

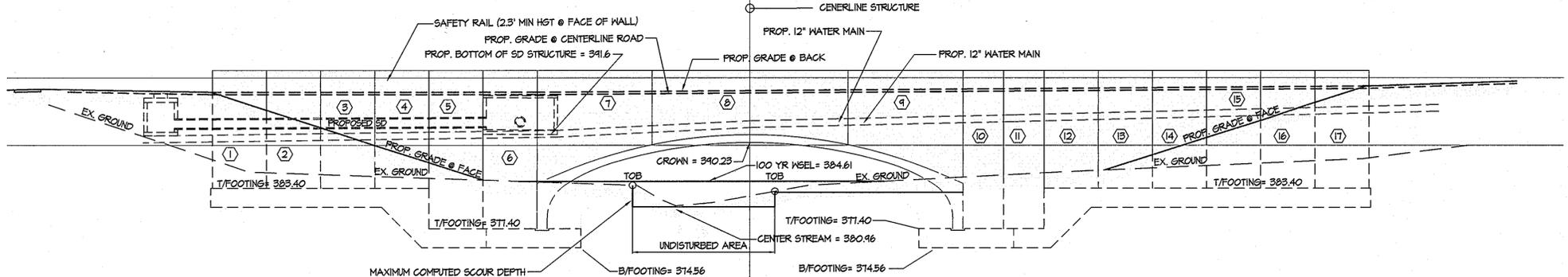
DES. SH DRN. CED CHK. SH



PARTIAL PLAN - CHARLES CROSSING
SCALE: 1" = 20'

DOWNSTREAM HEADWALL/MINGWALL SUMMARY

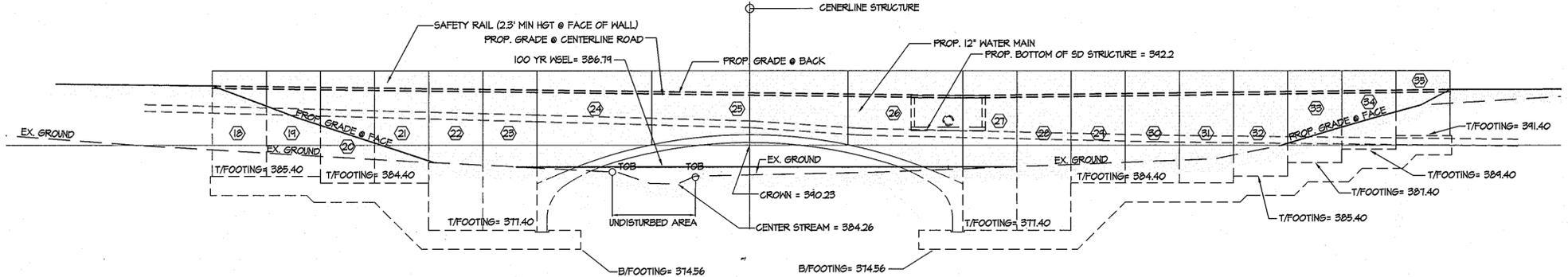
PANEL NO.	TOP OF PANEL	BOTTOM OF PANEL	MAX GRADE AT TOP OF PANEL	MIN GRADE AT BOTTOM OF PANEL
1	401.0	382.56	341.4	345.2
2	401.0	382.56	341.4	342.1
3	401.0	381.56	341.4	340.0
4	401.0	381.56	341.4	337.4
5	401.0	371.56	341.4	334.4
6	401.0	371.56	341.4	334.5
7	401.0	ARCH	348.0	340.1
8	401.0	ARCH	348.2	340.1
9	401.0	ARCH	348.3	340.1
10	401.0	371.56	348.4	335.2
11	401.0	371.56	348.4	335.6
12	401.0	382.56	348.5	335.1
13	401.0	382.56	348.6	336.3
14	401.0	383.56	348.6	336.6
15	401.0	383.56	348.7	341.2
16	401.0	383.56	348.7	343.1
17	401.0	383.56	348.8	346.4



DOWNSTREAM HEADWALL/MINGWALL ELEVATION
SCALE: 1" = 10'

DOWNSTREAM HEADWALL/MINGWALL SUMMARY

PANEL NO.	TOP OF PANEL	BOTTOM OF PANEL	MAX GRADE AT TOP OF PANEL	MIN GRADE AT BOTTOM OF PANEL
18	401.0	385.56	348.9	345.9
19	401.0	385.56	348.8	343.0
20	401.0	384.56	348.6	340.3
21	401.0	384.56	348.5	337.1
22	401.0	371.56	348.4	337.1
23	401.0	371.56	348.3	336.4
24	401.0	ARCH	348.2	340.1
25	401.0	ARCH	348.0	340.1
26	401.0	ARCH	347.6	336.3
27	401.0	371.56	347.5	336.5
28	401.0	371.56	347.6	336.8
29	401.0	384.56	347.7	337.1
30	401.0	384.56	347.8	337.5
31	401.0	384.56	347.9	337.8
32	401.0	385.56	348.1	338.5
33	401.0	387.56	348.1	340.3
34	401.0	384.56	348.1	342.1
35	401.0	341.56	348.3	345.0



UPSTREAM HEADWALL/MINGWALL ELEVATION
SCALE: 1" = 10'

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Walter Z. Deibel
 Chief, Bureau of Highways
 Date: 10-23-09

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
Ken Sheehy
 Chief, Division of Land Development
 Date: 10-27-09

Mike Deamus
 Chief, Development Engineering Division
 Date: 10/21/09

GLWGUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK
 BURTONSVILLE, MARYLAND 20886
 TEL: 301-421-4024 FAX: 301-421-4186

DES. M.J.T.	DRN. M.J.T.	CHK.
DATE	REVISION	BY APPR.

OWNER PAR C-216 thru C-218: BA WATERLOO TOWNHOMES, LLC. c/o BOZZUTO HOMES, INC. 7850 WALKER DRIVE, SUITE 400 GREENBELT, MARYLAND 20770 ATTN: DUNCAN SLIDELL 301-623-1525	PROFESSIONAL CERTIFICATION I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 14681 EXPIRATION DATE: MAY 21, 2010
--	---

STREAM CROSSING DETAILS
SHIPLEY'S GRANT
 PHASE IV
 LOTS C-219 thru C-225, C-227 thru C-236, PARCELS D-2 and E-1, OPEN SPACE LOTS C-237, D-1, E-2 & E-3 and NON-BUILDABLE PARCELS "D-3", "D-4", and NON-BUILDABLE LOT C-226
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 thru C-218, "D" and "E"
 HOWARD COUNTY, MARYLAND

ELECTION DISTRICT No. 1

SCALE	ZONING	G. L. W. FILE NO.
AS SHOWN	R-A-15, POR	07002
DATE	TAX MAP - GRID	SHEET
SEPT., 2009	37-1&2	19 OF 31

NOTES

GENERAL NOTES:

1. THIS BRIDGE HAS BEEN DESIGNED FOR GENERAL SITE CONDITIONS. THE PROJECT ENGINEER SHALL BE RESPONSIBLE FOR THE STRUCTURE'S SUITABILITY TO THE EXISTING SITE CONDITIONS AND FOR THE HYDRAULIC EVALUATION -- INCLUDING SCOUR AND CONFIRMATION OF SOIL CONDITIONS.
2. PRIOR TO CONSTRUCTION, CONTRACTOR MUST VERIFY ALL ELEVATIONS SHOWN THROUGH THE ENGINEER.
3. ONLY CONTECH BRIDGE SOLUTIONS INC. THE CON/SPAN® APPROVED PRECASTER IN MARYLAND MAY PROVIDE THE STRUCTURE DESIGNED IN ACCORDANCE WITH THESE PLANS.
4. THE USE OF ANOTHER PRECAST STRUCTURE WITH THE DESIGN ASSUMPTIONS USED FOR THE CON/SPAN® STRUCTURE MAY LEAD TO SERIOUS DESIGN ERRORS. USE OF ANY OTHER PRECAST STRUCTURE WITH THIS DESIGN AND DRAWINGS VOIDS ANY CERTIFICATION OF THIS DESIGN AND WARRANTY. CONTECH BRIDGE SOLUTIONS INC. ASSUMES NO LIABILITY FOR DESIGN OF ANY ALTERNATE OR SIMILAR TYPE STRUCTURES.
5. ALTERNATE STRUCTURES MAY BE CONSIDERED, PROVIDED THAT SIGNED AND SEALED DESIGN DRAWINGS (AND CALCULATIONS) ARE SUBMITTED TO THE ENGINEER 2 WEEKS PRIOR TO THE BID DATE FOR REVIEW AND APPROVAL.
6. PROPOSED ALTERNATES TO A CON/SPAN® BRIDGE SYSTEM MUST SUBMIT AT LEAST TWO (2) INDEPENDENTLY VERIFIED FULL SCALE LOAD TESTS THAT CONFIRM THE PROPOSED DESIGN METHODOLOGY OF THE THREE SIDED/ARCH STRUCTURE(S). THE PROPOSED ALTERNATE, UPON SATISFACTORY CONFIRMATION OF DESIGN METHODOLOGY, MAY BE CONSIDERED AN ACCEPTABLE ALTERNATE.

DESIGN DATA

DESIGN LOADING:
 BRIDGE UNITS: HS20-44
 HEADWALLS: EARTH PRESSURE ONLY
 WINGWALLS: EARTH PRESSURE ONLY
 DESIGN FILL HEIGHT: 2'-0" MIN. TO 7'-0" MAX.
 FROM TOP OF CROWN TO TOP OF PAVEMENT.
 DESIGN METHOD: LOAD FACTOR PER AASHTO SPECIFICATION
 NET ALLOWABLE SOIL BEARING PRESSURE: 4000 PSF *
 (FOR ALL B/ C.I.P. CONCRETE FOOTINGS WITH ELEV. EQUAL TO 374.56)
 NET ALLOWABLE SOIL BEARING PRESSURE: 2500 PSF *
 (FOR ALL B/ C.I.P. CONCRETE FOOTINGS WITH ELEV. GREATER THAN 374.56)

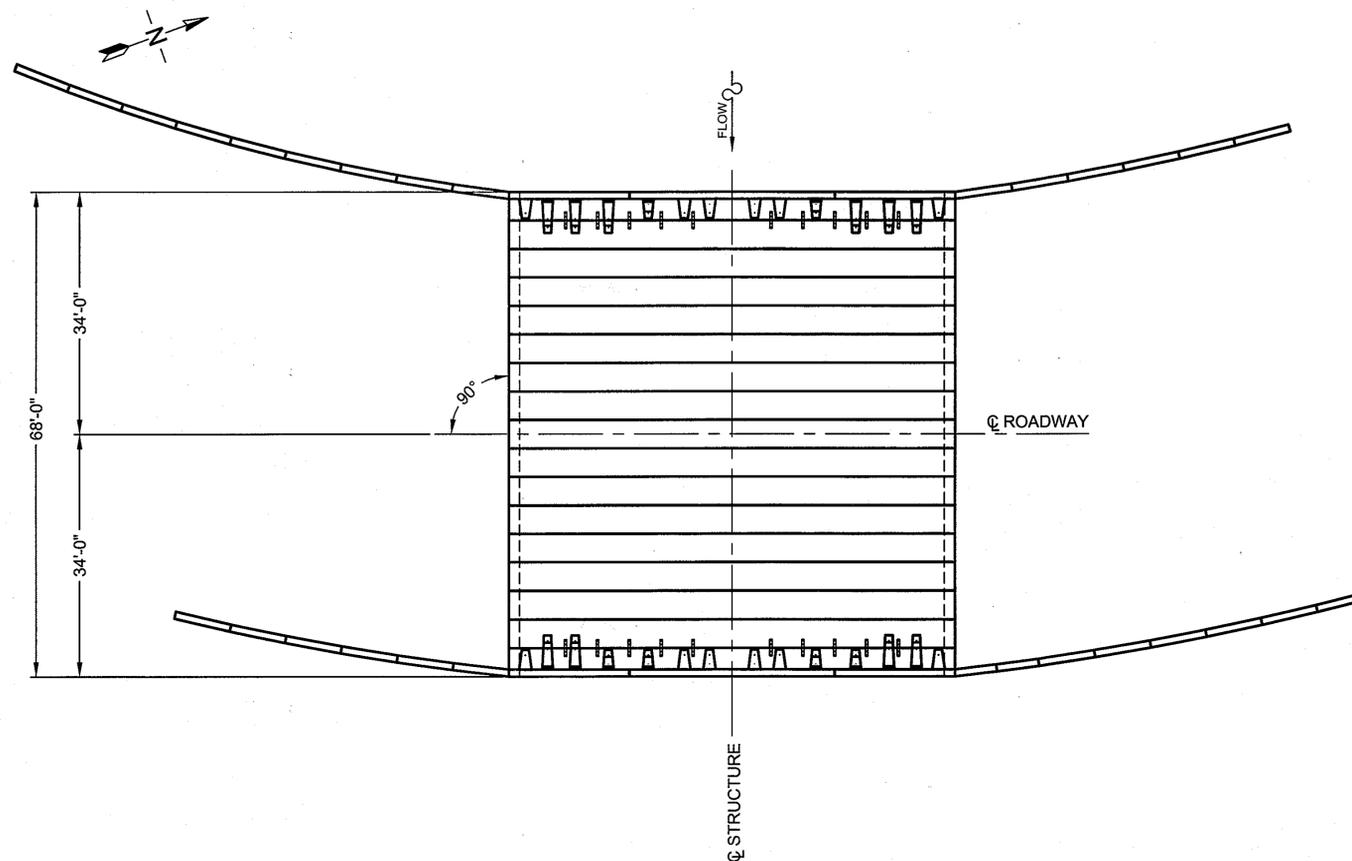
*FOUNDATION EXCAVATION AND SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL REPORT FOR THIS PROJECT PREPARED BY SPECIALIZED ENGINEERING DATED 1/9/2009 AND THE ADDENDUM REPORT DATED 7/30/2009.

MATERIALS

PRECAST UNITS SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH CON/SPAN® SPECIFICATIONS. CONCRETE FOR FOOTINGS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI. REINFORCING STEEL FOR FOOTINGS SHALL CONFORM TO ASTM A615 OR A996-GRADE 60.

SHIPLEY'S GRANT

ELLICOTT CITY, MARYLAND



LOCATION PLAN

NOT TO SCALE

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 36225, Expiration Date: 8/19/2010.



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

Walter Z. M... 10-23-09
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

K... 10-27-09
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

... 10/27/09
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

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If discrepancies between the supplied information upon which the drawing is based and actual field conditions are encountered as site work progresses, these discrepancies must be reported to CONTECH immediately for re-evaluation of the design. CONTECH accepts no liability for designs based on missing, incomplete or inaccurate information supplied by others.

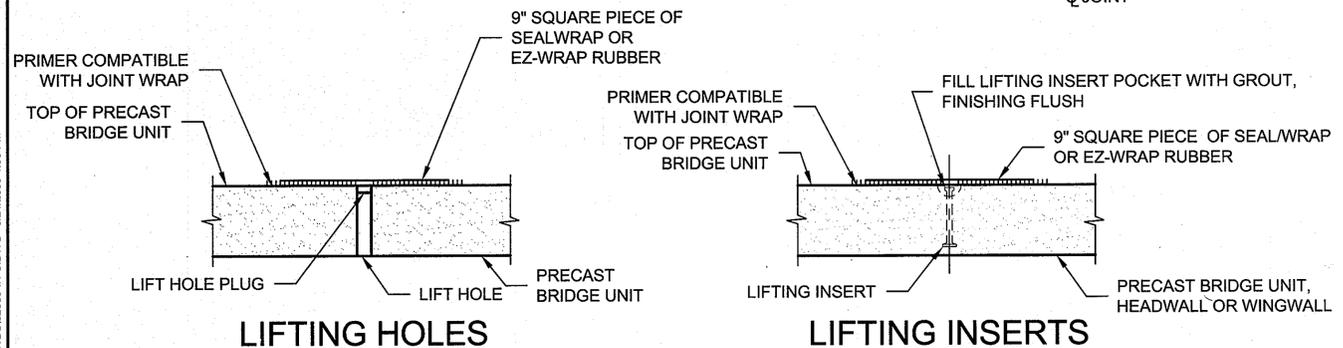
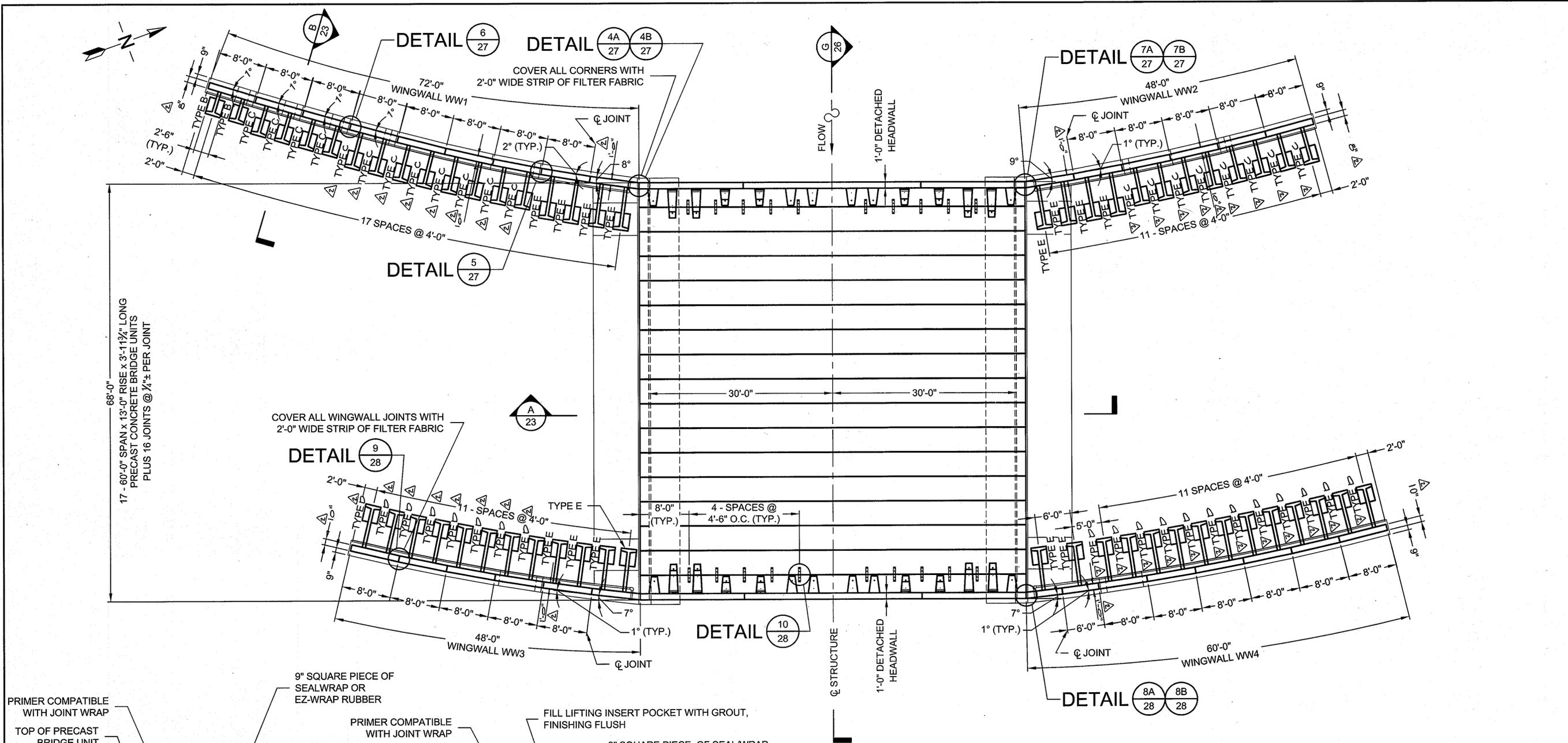
MARK	DATE	REVISION DESCRIPTION	BY

CONTECH®
 CONSTRUCTION PRODUCTS INC.
 www.contech-cpi.com
 9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
 800-338-1122 513-645-7000 513-645-7993 FAX

CON/SPAN®
 BRIDGE SYSTEMS
 CONTECH CONTRACT DRAWING

SHIPLEY'S GRANT
 PHASE IV
 LOTS C-219 THRU C-225, C-227 THRU C-236, PARCELS D-2 AND E-1,
 OPEN SPACE LOTS C-237, D-1, E-2 AND E-3 AND NON-BUILDABLE PARCELS "D-3", "D-4",
 AND NON-BUILDABLE LOT C-226
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 THRU C-218, "D" AND "E"
 ELECTION DISTRICT NO. 1 HOWARD COUNTY, MARYLAND

PROJECT NUMBER: 52059	DATE: 8/7/2009
DESIGNED: JAL	DRAWN: RJB
CHECKED: BAP	APPROVED: PAC
SHEET NO.: 20 OF 31	



TYPICAL LIFT POINT SEALING DETAIL
NOT TO SCALE



Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 36225, Expiration Date: 8/19/2012.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS	
<i>Walter Z. Marshall</i>	10-23-09
CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	
<i>Kevin Stalinski</i>	10-27-09
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
<i>John P. ...</i>	10/27/09
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE



MARK	DATE	REVISION DESCRIPTION	BY
2/10/11		Rev To Wingwalls & Anchors	WJ
7/10/10		Rev Title Block For F10-000	WJ

CONTECH
CONSTRUCTION PRODUCTS INC.
www.contech-cpi.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

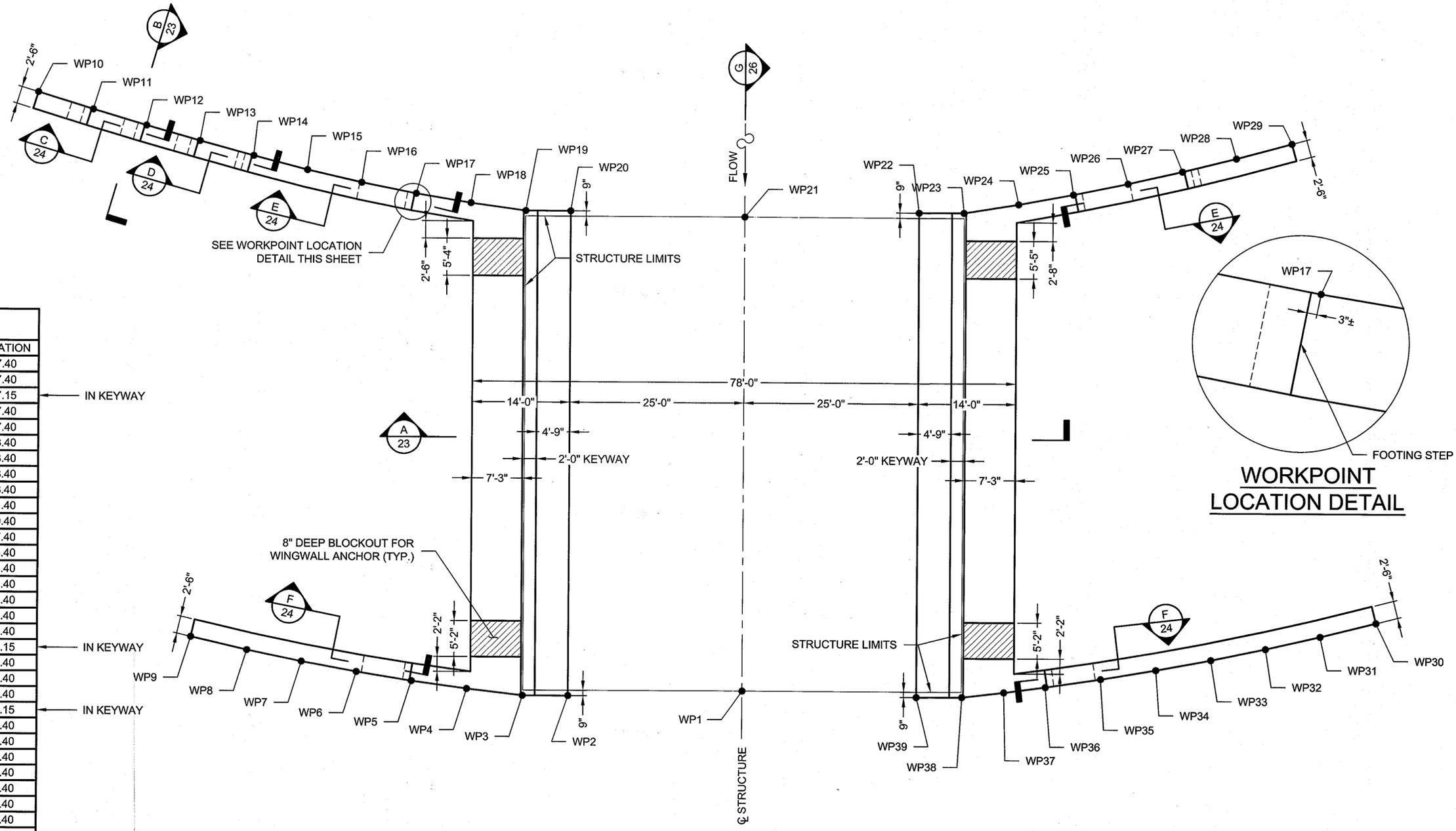
CONSPAN
BRIDGE SYSTEMS
CONTECH CONTRACT DRAWING

SHIPLEY'S GRANT
PHASE IV
LOTS C-219 THRU C-222, C-295 THRU C-307, PARCELS D-2 AND E-1,
OPEN SPACE LOTS C-309, D-1, E-2 AND E-3 AND NON-BUILDABLE PARCELS "D-3", "D-4",
AND NON-BUILDABLE LOT C-308
A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 THRU C-218, "D" AND "E"
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

PROJECT NUMBER:	52059	DATE:	8/7/2009
DESIGNED:	JAL	DRAWN:	RJB
CHECKED:	BAP	APPROVED:	PAC
SHEET NO.:	21 OF 31		

F 07-088

I:\BRIDGE\PROJECTS\ACTIVE\52059\DRAWINGS\52059-IN-C.DWG 9/21/2009 4:36 PM



WORKPOINT TABLE			
WORKPOINT	DISTANCE (X)	DISTANCE (Y)	ELEVATION
WP1	0.00	0.00	377.40
WP2	-25.00	-0.75	377.40
WP3	-31.54	-0.75	377.15
WP4	-39.54	0.17	377.40
WP5	-47.48	1.26	377.40
WP6	-55.40	2.53	383.40
WP7	-63.28	3.95	383.40
WP8	-71.14	5.60	383.40
WP9	-79.19	7.46	383.40
WP10	-101.48	85.35	391.40
WP11	-93.60	82.92	389.40
WP12	-85.93	80.65	387.40
WP13	-78.25	78.48	385.40
WP14	-70.53	76.39	384.40
WP15	-62.80	74.41	384.40
WP16	-55.02	72.65	384.40
WP17	-47.19	71.11	377.40
WP18	-39.32	69.81	377.40
WP19	-31.45	68.75	377.15
WP20	-25.00	68.75	377.40
WP21	0.00	68.00	377.40
WP22	25.00	68.75	377.40
WP23	31.44	68.75	377.15
WP24	39.27	70.02	377.40
WP25	47.12	71.47	377.40
WP26	54.94	73.08	384.40
WP27	62.72	74.86	384.40
WP28	70.46	76.81	385.40
WP29	78.42	78.97	385.40
WP30	90.88	10.19	383.40
WP31	82.87	8.19	383.40
WP32	75.06	6.39	383.40
WP33	67.21	4.75	383.40
WP34	59.34	3.26	383.40
WP35	51.44	1.92	383.40
WP36	43.51	0.74	377.40
WP37	37.55	-0.05	377.40
WP38	31.54	-0.75	377.15
WP39	25.00	-0.75	377.40

IN KEYWAY

IN KEYWAY

IN KEYWAY

IN KEYWAY

FOUNDATION PLAN



Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 86225, Expiration Date: 8/19/2010.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

Willa R. Mahall 10-23-09
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Kent Stalwood 10-27-09
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

W. Deussen 10/27/09
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE



*ALL VALUES ARE GIVEN IN DECIMAL FEET, AND REPRESENT THE TOP OF FOOTING ELEVATION.

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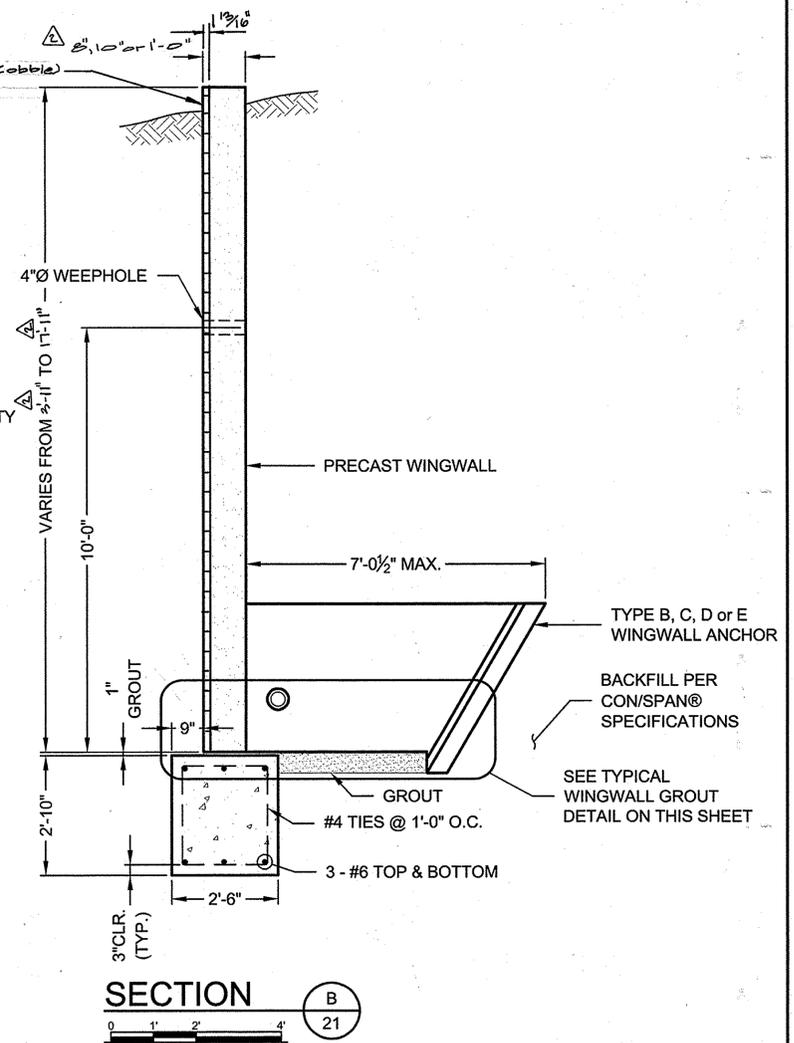
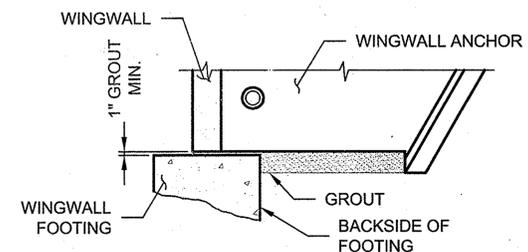
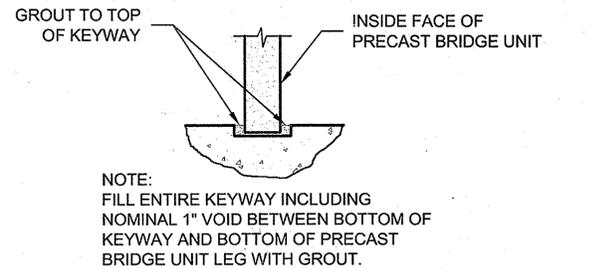
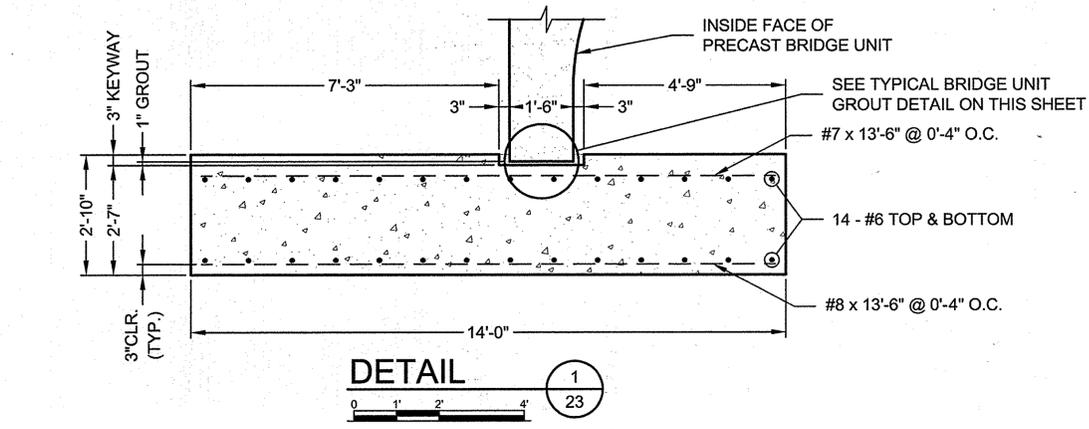
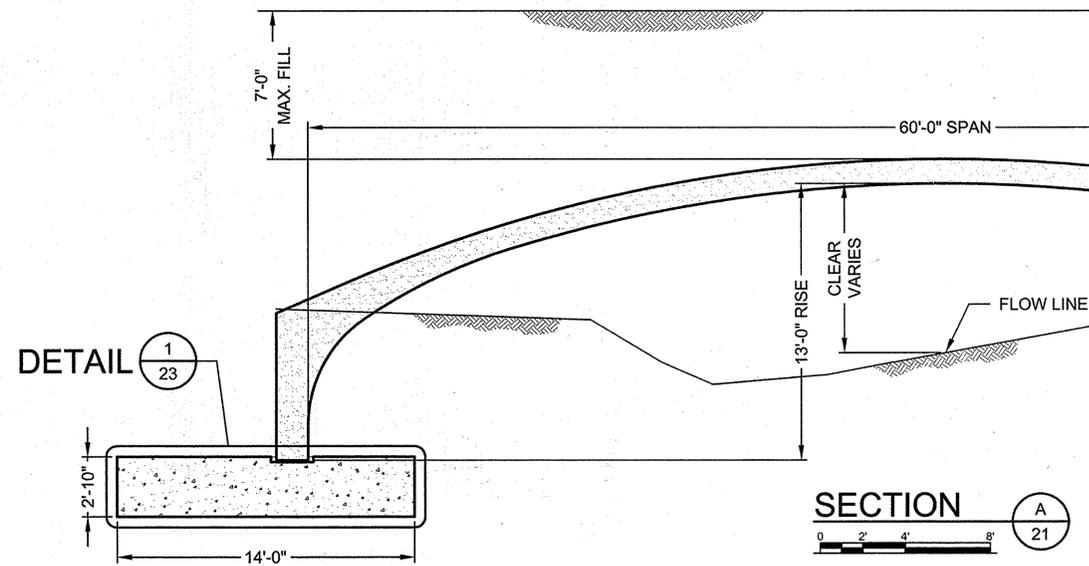
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BRIDGE SYSTEMS
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DRAWING

SHIPLEY'S GRANT
PHASE IV
LOTS C-219 THRU C-225, C-227 THRU C-236, PARCELS D-2 AND E-1,
OPEN SPACE LOTS C-237, D-1, E-2 AND E-3 AND NON-BUILDABLE PARCELS "D-3", "D-4",
AND NON-BUILDABLE LOT C-226
A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 THRU C-218, "D" AND "E"
ELECTION DISTRICT NO. 1
HOWARD COUNTY, MARYLAND

PROJECT NUMBER: 52059	DATE: 8/7/2009
DESIGNED: JAL	DRAWN: RJB
CHECKED: BAP	APPROVED: PAC
SHEET NO.: 22 OF 31	

F 07-088



- NOTES:
- MINIMUM 1" GROUT UNDER WINGWALL LEG & ANCHOR STEM.
 - AREA BETWEEN WINGWALL FOOTING AND WINGWALL ANCHOR SHALL BE GROUTED SOLID BEFORE BACKFILL.
 - FORM BACKSIDE OF FOOTING TO DIMENSIONS SHOWN ON FOUNDATION PLAN.

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 36225, Expiration Date: 8/19/2010.



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William J. ... 10-23-09
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Kent ... 10-21-09
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
John ... 10/27/09
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

MARK	DATE	REVISION DESCRIPTION	BY
△	3-19-14	Added stone Veneer	WJS
△	2/10/11	Rev To Wingwalls & Anchors	WJS
△	7-17-10	Rev Title Block Per F 10-000	WJS

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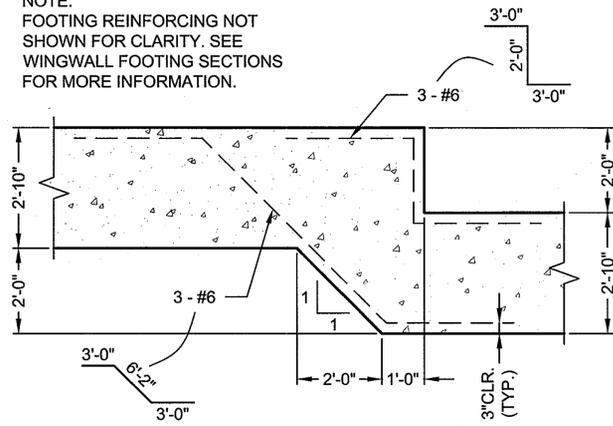
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 CONTECH CONTRACT DRAWING

SHIPLEY'S GRANT
 PHASE IV
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 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 THRU C-218, "D" AND "E"
 ELECTION DISTRICT NO. 1 HOWARD COUNTY, MARYLAND

PROJECT NUMBER: 52059	DATE: 8/7/2009
DESIGNED: JAL	DRAWN: RJB
CHECKED: BAP	APPROVED: PAC
SHEET NO.: 23	OF 31

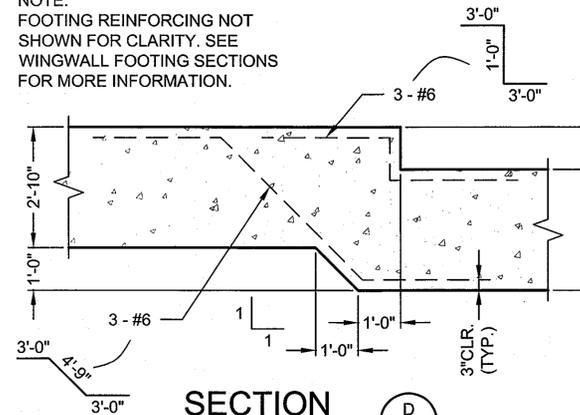
F 07-088

NOTE:
FOOTING REINFORCING NOT
SHOWN FOR CLARITY. SEE
WINGWALL FOOTING SECTIONS
FOR MORE INFORMATION.



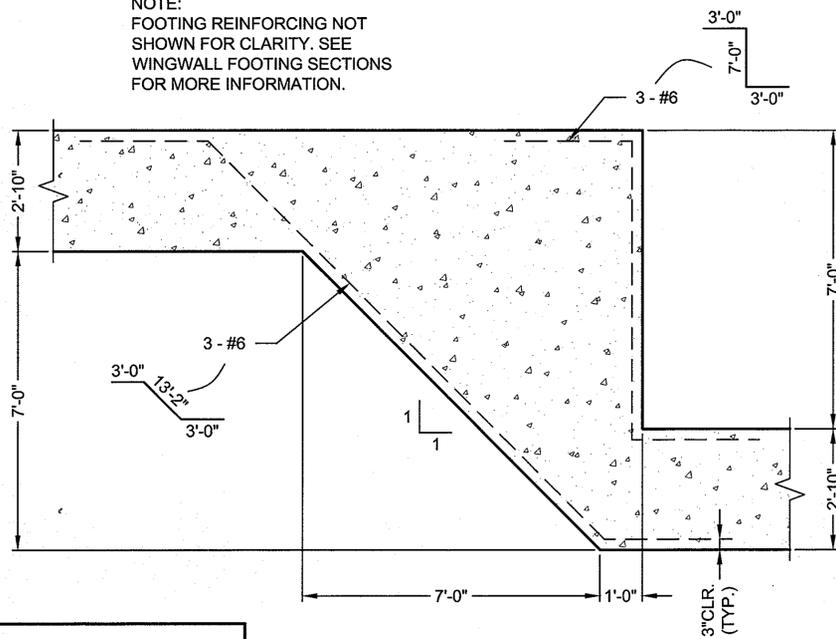
SECTION C
0 1 2 4
22

NOTE:
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FOR MORE INFORMATION.



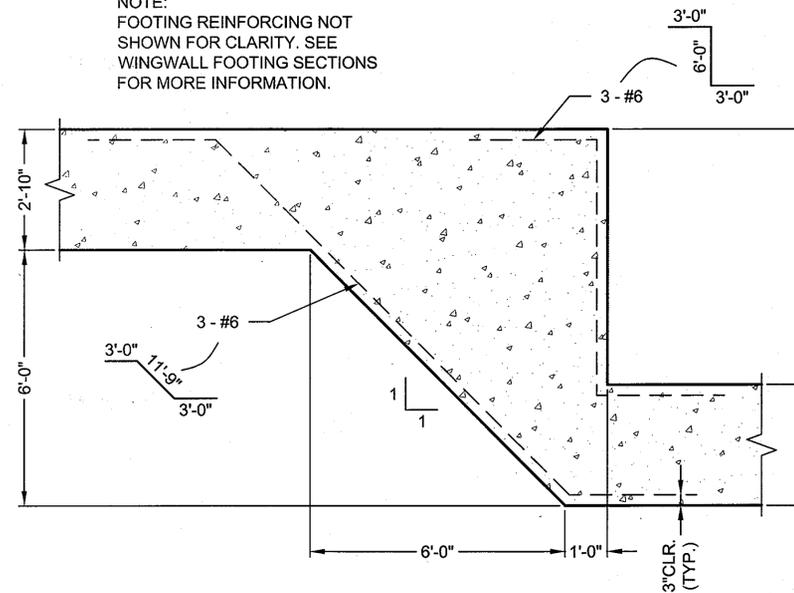
SECTION D
0 1 2 4
22

NOTE:
FOOTING REINFORCING NOT
SHOWN FOR CLARITY. SEE
WINGWALL FOOTING SECTIONS
FOR MORE INFORMATION.



SECTION E
0 1 2 4
22

NOTE:
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WINGWALL FOOTING SECTIONS
FOR MORE INFORMATION.



SECTION F
0 1 2 4
22

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

William P. ... 10-23-09
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Kent ... 10-27-09
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

... 10/22/09
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

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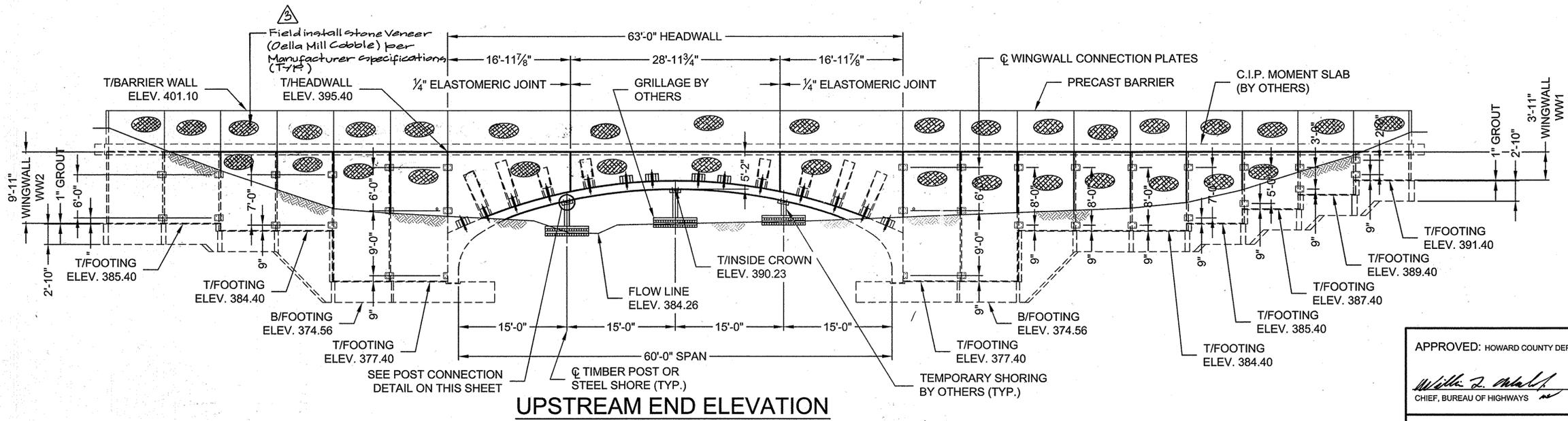
SHIPLEY'S GRANT
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OPEN SPACE LOTS C-237, D-1, E-2 AND E-3 AND NON-BUILDABLE PARCELS "D-3", "D-4",
AND NON-BUILDABLE LOT C-226
A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 THRU C-218, "D" AND "E"
ELECTION DISTRICT NO. 1 HOWARD COUNTY, MARYLAND

PROJECT NUMBER: 52059	DATE: 8/7/2009
DESIGNED: JAL	DRAWN: RJB
CHECKED: BAP	APPROVED: PAC
SHEET NO.:	24 OF 31

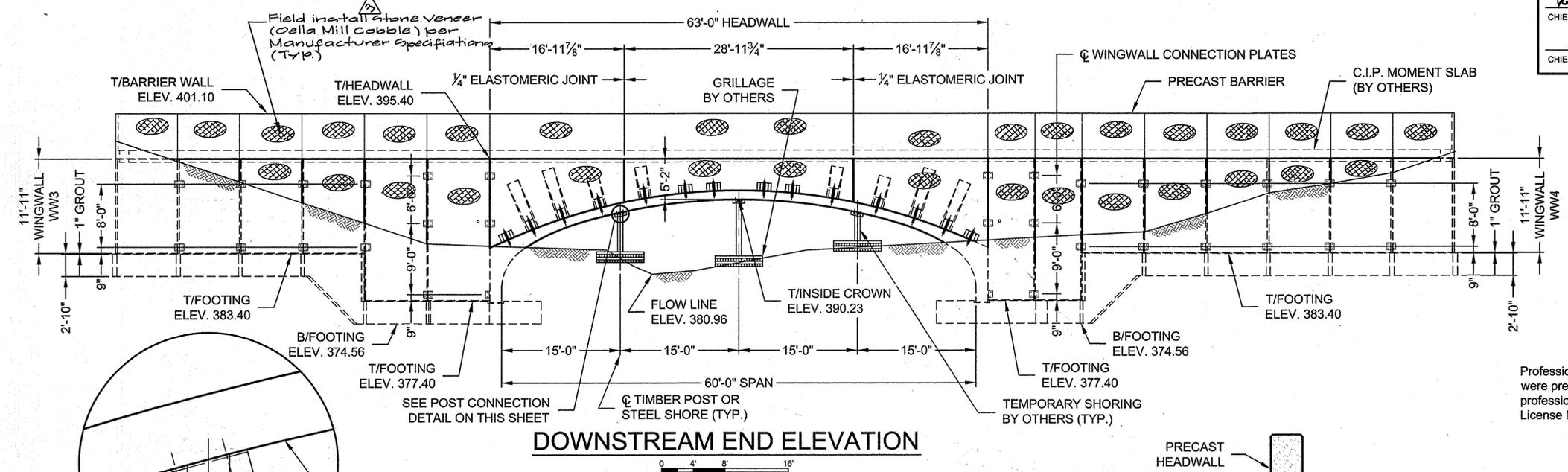
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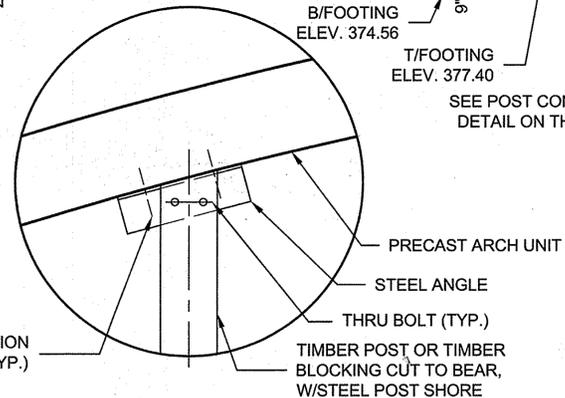
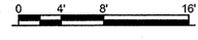
F09-088



UPSTREAM END ELEVATION

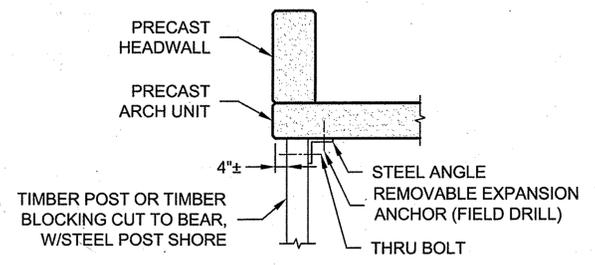


DOWNSTREAM END ELEVATION



TEMPORARY SHORING POST CONNECTION DETAIL

NOTES:
 1. INSTALL TIMBER OR STEEL POSTS TIGHT AGAINST UNDERSIDE OF PRECAST ARCH UNIT PRIOR TO SETTING PRECAST HEADWALL UNITS.
 2. POSTS SHALL REMAIN IN PLACE UNTIL BACKFILL IS AT LEAST 1'-0" FROM TOP OF THE STRUCTURE



TEMPORARY SHORING HEADWALL SECTION

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
William P. Mallon 10-23-09
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Kurt Schleicher 10-27-09
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

William P. Mallon 10/27/09
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

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△	8-13-14	Added stone Veneer	WBJ
△	7-17-10	Rev. Title Block Per E 10000	WBJ

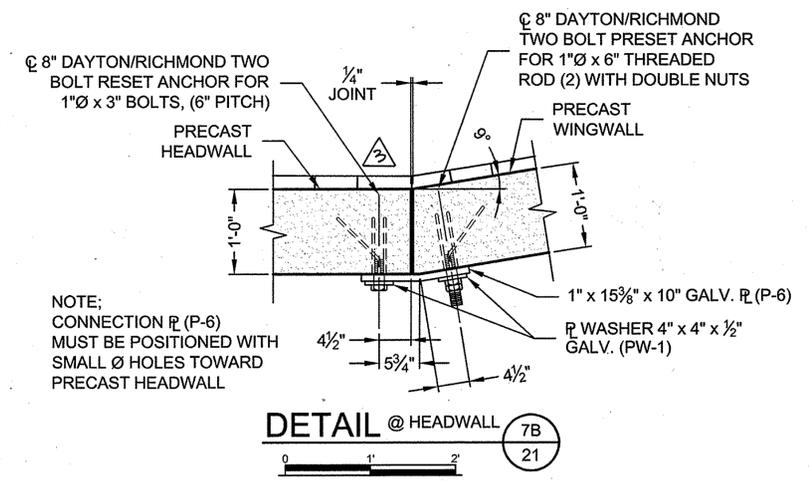
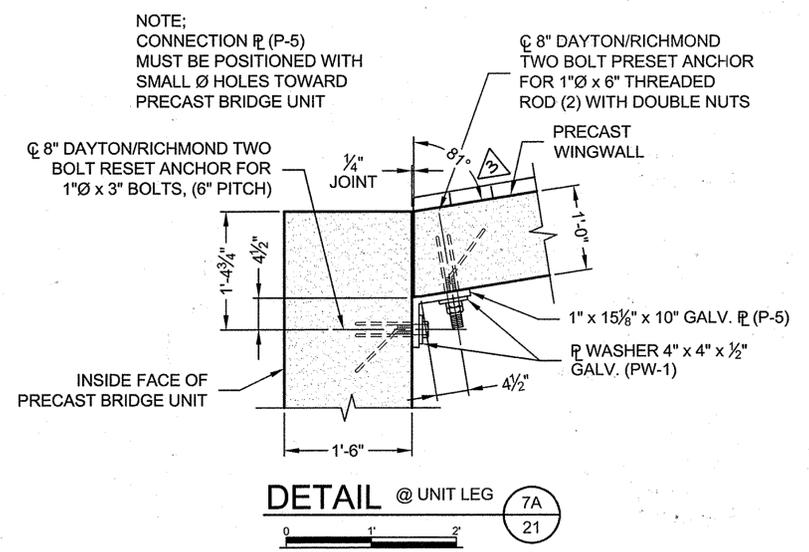
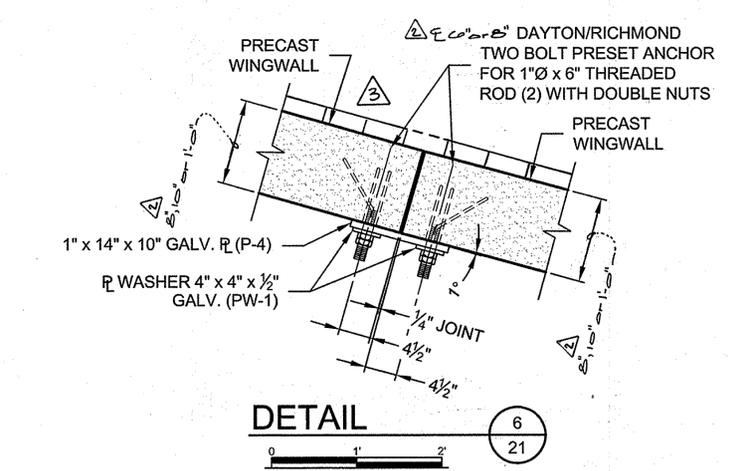
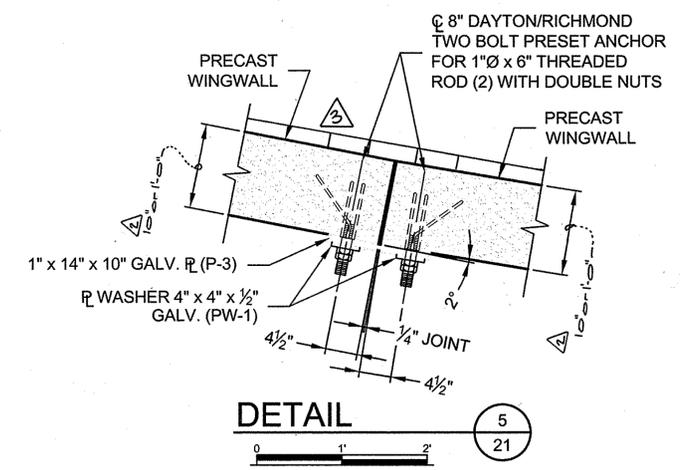
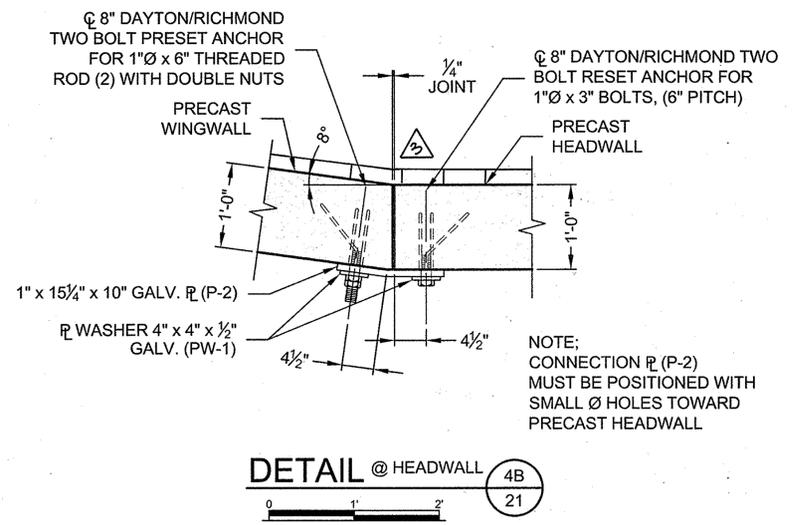
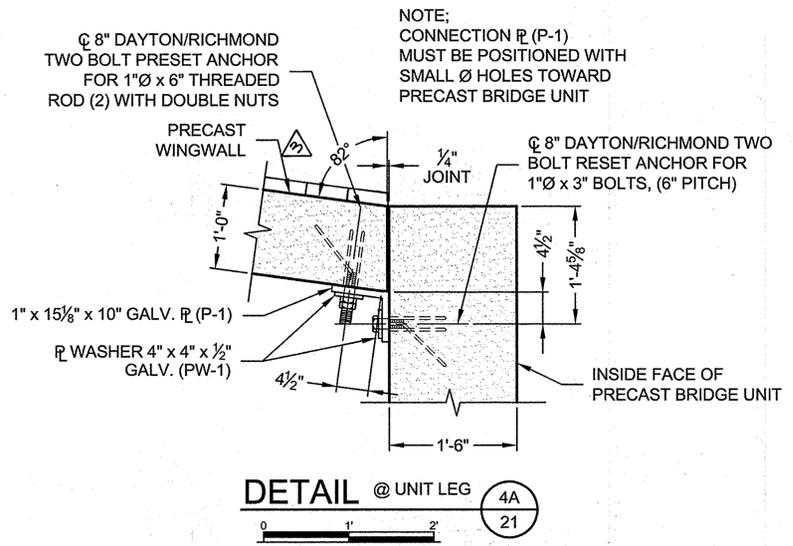
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SHIPLEY'S GRANT
 PHASE IV
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 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 THRU C-218, "D" AND "E"
 ELECTION DISTRICT NO. 1 HOWARD COUNTY, MARYLAND

PROJECT NUMBER: 52059	DATE: 8/7/2009
DESIGNED: JAL	DRAWN: RJB
CHECKED: BAP	APPROVED: PAC
SHEET NO.: 25 OF 31	

F07-088



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
Walter Z. ... 10-23-09
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Kurt ... 10-27-09
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

John ... 10/27/09
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

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MARK	DATE	REVISION DESCRIPTION	BY
Δ	8-13-14	Added stone veneer	WBJ
Δ	2/16/11	Rev To Wingwalls & Anchors	WBJ
Δ	7/17/10	Rev Title Block For F 10-0000	WBJ

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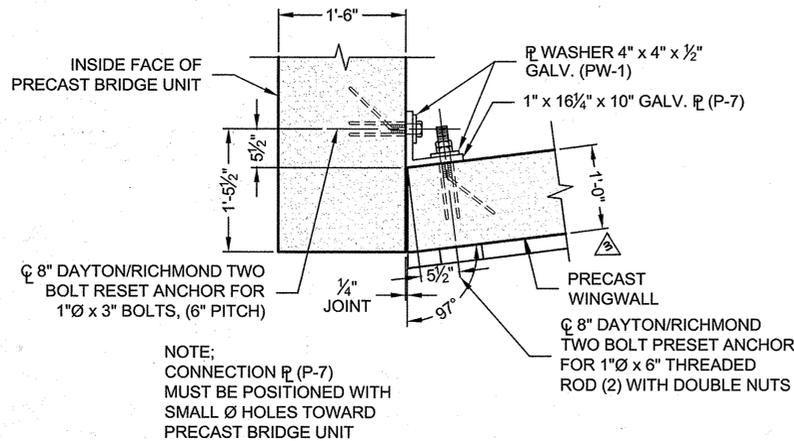
SHIPLEY'S GRANT
PHASE IV
LOTS C-219 THRU C-222, C-275 THRU C-307, PARCELS D-2 AND E-1,
OPEN SPACE LOTS C-307, D-1, E-2 AND E-3 AND NON-BUILDABLE PARCELS "D-3", "D-4",
AND NON-BUILDABLE LOT C-208
A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 THRU C-218, "D" AND "E"
HOWARD COUNTY, MARYLAND

ELECTION DISTRICT NO. 1

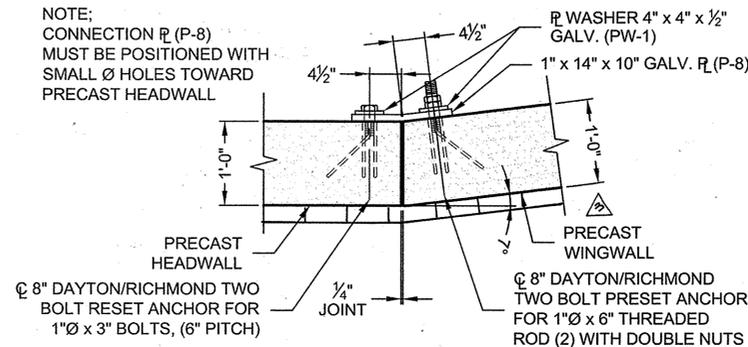
PROJECT NUMBER: 52059	DATE: 8/7/2009
DESIGNED: JAL	DRAWN: RJB
CHECKED: BAP	APPROVED: PAC
SHEET NO.: 27 OF 31	



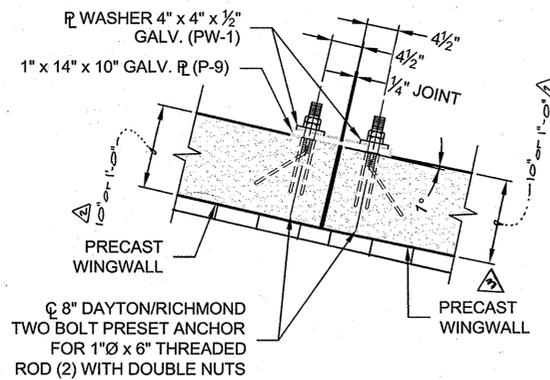
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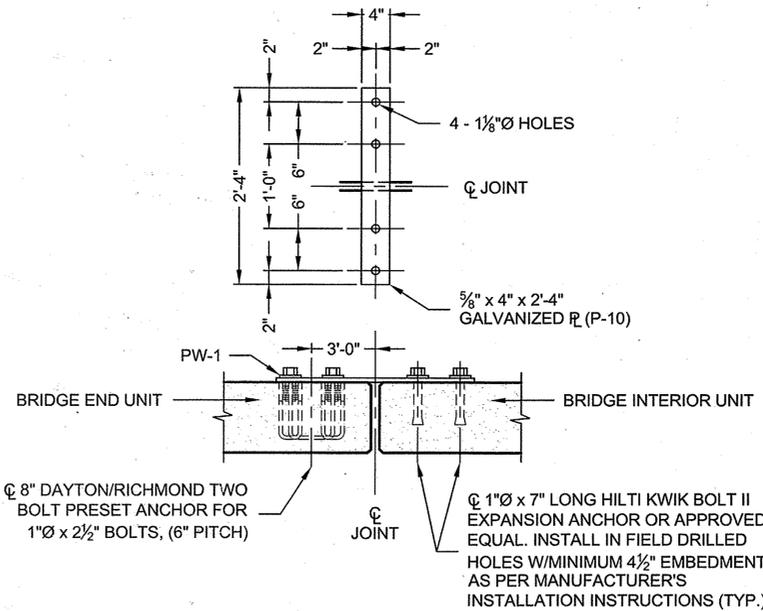
DETAIL @ UNIT LEG 8A
 0 1 2
 21



DETAIL @ HEADWALL 8B
 0 1 2
 21



DETAIL 9
 0 1 2
 21



DETAIL 10
 NOT TO SCALE
 21

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

Walter Z. Walsh 10-23-09
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Kent Shulrood 10-27-09
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

W. D. ... 10/27/09
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

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△	8-19-14	Add Stone Veneer	WJS
△	2-16-11	Rev To Wingwalls & Anchors	WJS
△	7-17-10	Rev Title Block Per 10-000	WJS

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SHIPLEY'S GRANT
 PHASE IV
 △ LOTS C-219 THRU C-222, C-225 THRU C-207, PARCELS D-2 AND E-1, OPEN SPACE LOTS C-209, D-1, E-2 AND E-3 AND NON-BUILDABLE PARCELS "D-3", "D-4", AND NON-BUILDABLE LOT C-208
 A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 THRU C-218, "D" AND "E"
 HOWARD COUNTY, MARYLAND

PROJECT NUMBER: 52059	DATE: 8/7/2009
DESIGNED: JAL	DRAWN: RJB
CHECKED: BAP	APPROVED: PAC
SHEET NO.: 28 OF 31	



Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 36225, Expiration Date: 8/17/2011.

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F 07-088

SPECIFICATIONS FOR MANUFACTURE AND INSTALLATION OF CON/SPAN® BRIDGE SYSTEMS

1. DESCRIPTION

1.1. TYPE - THIS WORK SHALL CONSIST OF FURNISHING AND CONSTRUCTING A CON/SPAN® BRIDGE SYSTEM IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN REASONABLY CLOSE CONFORMITY WITH THE LINES, GRADES, DESIGN AND DIMENSIONS SHOWN ON THE PLANS OR AS ESTABLISHED BY THE ENGINEER. IN SITUATIONS WHERE TWO OR MORE SPECIFICATIONS APPLY TO THIS WORK, THE MOST STRINGENT REQUIREMENTS SHALL GOVERN.

1.2. DESIGNATION - PRECAST REINFORCED CONCRETE CON/SPAN® BRIDGE UNITS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY SPAN AND RISE. PRECAST REINFORCED CONCRETE WINGWALLS AND HEADWALLS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY LENGTH, HEIGHT, AND DEFLECTION ANGLE.

2. DESIGN

2.1. SPECIFICATIONS - THE PRECAST ELEMENTS ARE DESIGNED IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" 17TH EDITION, ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 2002. A MINIMUM OF ONE FOOT OF COVER ABOVE THE CROWN OF THE BRIDGE UNITS IS REQUIRED IN THE INSTALLED CONDITION. (UNLESS NOTED OTHERWISE ON THE SHOP DRAWINGS AND DESIGNED ACCORDINGLY.)

3. MATERIALS

3.1. CONCRETE - THE CONCRETE FOR THE PRECAST ELEMENTS SHALL BE AIR-ENTRAINED WHEN INSTALLED IN AREAS SUBJECT TO FREEZE-THAW CONDITIONS, COMPOSED OF PORTLAND CEMENT, FINE AND COARSE AGGREGATES, ADMIXTURES AND WATER. AIR-ENTRAINED CONCRETE SHALL CONTAIN 6 ± 2 PERCENT AIR. THE AIR-ENTRAINING ADMIXTURE SHALL CONFORM TO AASHTO M154. THE MINIMUM CONCRETE COMPRESSIVE STRENGTH SHALL BE AS SHOWN ON THE SHOP DRAWINGS.

3.1.1. PORTLAND CEMENT - SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATIONS C150-TYPE I, TYPE II, OR TYPE III CEMENT.

3.1.2. COARSE AGGREGATE - SHALL CONSIST OF STONE HAVING A MAXIMUM SIZE OF 1 INCH. AGGREGATE SHALL MEET REQUIREMENTS FOR ASTM C33.

3.1.3. WATER REDUCING ADMIXTURE - THE MANUFACTURER MAY SUBMIT, FOR APPROVAL BY THE ENGINEER, A WATER-REDUCING ADMIXTURE FOR THE PURPOSE OF INCREASING WORKABILITY AND REDUCING THE WATER REQUIREMENT FOR THE CONCRETE.

3.1.4. CALCIUM CHLORIDE - THE ADDITION TO THE MIX OF CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CALCIUM CHLORIDE WILL NOT BE PERMITTED.

3.1.5. MIXTURE - THE AGGREGATES, CEMENT AND WATER SHALL BE PROPORTIONED AND MIXED IN A BATCH MIXER TO PRODUCE A HOMOGENEOUS CONCRETE MEETING THE STRENGTH REQUIREMENTS OF THIS SPECIFICATION. THE PROPORTION OF PORTLAND CEMENT IN THE MIXTURE SHALL NOT BE LESS THAN 564 POUNDS (6 SACKS) PER CUBIC YARD OF CONCRETE.

3.2. STEEL REINFORCEMENT

3.2.1. THE MINIMUM STEEL YIELD STRENGTH SHALL BE 60,000 PSI, UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS.

3.2.2. ALL REINFORCING STEEL FOR THE PRECAST ELEMENTS SHALL BE FABRICATED AND PLACED IN ACCORDANCE WITH THE DETAILED SHOP DRAWINGS SUBMITTED BY THE MANUFACTURER.

3.2.3. REINFORCEMENT SHALL CONSIST OF WELDED WIRE FABRIC CONFORMING TO ASTM SPECIFICATION A 185 OR A 497, OR DEFORMED BILLET STEEL BARS CONFORMING TO ASTM SPECIFICATION A 616. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY CONSIST OF WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS.

3.3. STEEL HARDWARE

3.3.1. BOLTS AND THREADED RODS FOR WINGWALL CONNECTIONS SHALL CONFORM TO ASTM A 307. NUTS SHALL CONFORM TO AASHTO M292 (ASTM A194) GRADE 2H. ALL BOLTS, THREADED RODS AND NUTS USED IN WINGWALL CONNECTIONS SHALL BE MECHANICALLY ZINC COATED IN ACCORDANCE WITH ASTM B695 CLASS 50.

3.3.2. STRUCTURAL STEEL FOR WINGWALL CONNECTION PLATES AND PLATE WASHERS SHALL CONFORM TO AASHTO M 270 (ASTM A 709) GRADE 36 AND SHALL BE HOT DIP GALVANIZED AS PER AASHTO M111 (ASTM A123).

3.3.3. INSERTS FOR WINGWALLS SHALL BE 1" DIAMETER TWO-BOLT PRESET WINGWALL ANCHORS AS MANUFACTURED BY DAYTON/RICHMOND CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700.

3.3.4. FERRULE LOOP INSERTS SHALL BE F-64 FERRULE LOOP INSERTS AS MANUFACTURED BY DAYTON/RICHMOND CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700.

3.3.5. HOOK BOLTS USED IN ATTACHED HEADWALL CONNECTIONS SHALL BE ASTM A307.

3.3.6. INSERTS FOR DETACHED HEADWALL CONNECTIONS SHALL BE AISI TYPE 304 STAINLESS STEEL, F-58 EXPANDED COIL INSERTS AS MANUFACTURED BY DAYTON/RICHMOND CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700. COIL RODS AND NUTS USED IN HEADWALL CONNECTIONS SHALL BE AISI TYPE 304 STAINLESS STEEL. WASHERS USED IN HEADWALL CONNECTIONS SHALL BE EITHER AISI TYPE 304 STAINLESS STEEL PLATE WASHERS

OR AASHTO M270 (ASTM A709) GRADE 36 PLATE WASHERS HOT DIP GALVANIZED AS PER AASHTO M111 (ASTM A123).

3.3.7. REINFORCING BAR SPLICES SHALL BE MADE USING THE DOWEL BAR SPLICER SYSTEM AS MANUFACTURED BY DAYTON/RICHMOND CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700, AND SHALL CONSIST OF THE DOWEL BAR SPLICER (DB-SAE) AND DOWEL-IN (DI).

4. MANUFACTURE OF PRECAST ELEMENTS - SUBJECT TO THE PROVISIONS OF SECTION 5, BELOW, THE PRECAST ELEMENT DIMENSION AND REINFORCEMENT DETAILS SHALL BE AS PRESCRIBED IN THE PLAN AND SHOP DRAWINGS PROVIDED BY THE MANUFACTURER.

4.1. FORMS - THE FORMS USED IN MANUFACTURE SHALL BE SUFFICIENTLY RIGID AND ACCURATE TO MAINTAIN THE REQUIRED PRECAST ELEMENT DIMENSIONS WITHIN THE PERMISSIBLE VARIATIONS GIVEN IN SECTION 5 OF THESE SPECIFICATIONS. ALL CASTING SURFACES SHALL BE OF A SMOOTH MATERIAL.

4.2. PLACEMENT OF REINFORCEMENT

4.2.1. PLACEMENT OF REINFORCEMENT IN PRECAST BRIDGE UNITS - THE COVER OF CONCRETE OVER THE OUTSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 2" MINIMUM. THE COVER OF CONCRETE OVER THE INSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 1 1/2" MINIMUM, UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS. THE CLEAR DISTANCE OF THE END CIRCUMFERENTIAL WIRES SHALL NOT BE LESS THAN 1" NOR MORE THAN 2" FROM THE ENDS OF EACH SECTION. REINFORCEMENT SHALL BE ASSEMBLED UTILIZING SINGLE OR MULTIPLE LAYERS OF WELDED WIRE FABRIC (NOT TO EXCEED 3 LAYERS), SUPPLEMENTED BY SINGLE LAYER OF DEFORMED BILLET-STEEL BARS, WHEN NECESSARY. WELDED WIRE FABRIC SHALL BE COMPOSED OF CIRCUMFERENTIAL AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE BRIDGE UNIT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW. THE ENDS OF THE LONGITUDINAL DISTRIBUTION REINFORCEMENT SHALL BE NOT MORE THAN 3" AND NOT LESS THAN 1 1/2" FROM THE ENDS OF THE BRIDGE UNIT.

4.2.2. BENDING OF REINFORCEMENT FOR PRECAST BRIDGE UNITS - THE OUTSIDE AND INSIDE CIRCUMFERENTIAL REINFORCING STEEL FOR THE CORNERS OF THE BRIDGE SHALL BE BENT TO SUCH AN ANGLE THAT IS APPROXIMATELY EQUAL TO THE CONFIGURATION OF THE BRIDGE'S OUTSIDE CORNER.

4.2.3. PLACEMENT OF REINFORCEMENT FOR PRECAST WINGWALLS AND HEADWALLS - THE COVER OF CONCRETE OVER THE LONGITUDINAL AND TRANSVERSE REINFORCEMENT SHALL BE 2" MINIMUM. THE CLEAR DISTANCE FROM THE END OF EACH PRECAST ELEMENT TO THE END OF REINFORCING STEEL SHALL NOT BE LESS THAN 1/2" NOR MORE THAN 3". REINFORCEMENT SHALL BE ASSEMBLED UTILIZING A SINGLE LAYER OF WELDED WIRE FABRIC, OR A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS. WELDED WIRE FABRIC SHALL BE COMPOSED OF TRANSVERSE AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE ELEMENT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW.

4.3. LAPS, WELDS, SPACING

4.3.1. LAPS, WELDS, AND SPACING FOR PRECAST BRIDGE UNITS - TENSION SPLICES IN THE CIRCUMFERENTIAL REINFORCEMENT SHALL BE MADE BY LAPPING. LAPS MAY BE TACK WELDED TOGETHER FOR ASSEMBLY PURPOSES. FOR SMOOTH WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 8.30.2 AND 8.32.6. FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 8.30.1 AND 8.32.5. THE OVERLAP OF WELDED WIRE FABRIC SHALL BE MEASURED BETWEEN THE OUTER-MOST LONGITUDINAL WIRES OF EACH FABRIC SHEET. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 8.25. FOR SPLICES OTHER THAN TENSION SPLICES, THE OVERLAP SHALL BE A MINIMUM OF 1'-0" FOR WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS. THE SPACING CENTER TO CENTER OF THE CIRCUMFERENTIAL WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2" NOR MORE THAN 4". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL WIRES SHALL NOT BE MORE THAN 8". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL DISTRIBUTION STEEL FOR EITHER LINE OF REINFORCING IN THE TOP SLAB SHALL BE NOT MORE THAN 1'-4".

4.3.2. LAPS, WELDS, AND SPACING FOR PRECAST WINGWALLS AND HEADWALLS - SPLICES IN THE REINFORCEMENT SHALL BE MADE BY LAPPING. LAPS MAY BE TACK WELDED TOGETHER FOR ASSEMBLY PURPOSES. FOR SMOOTH WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 8.30.2 AND 8.32.6. FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL

MEET THE REQUIREMENTS OF AASHTO 8.30.1 AND 8.32.5. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 8.25. THE SPACING CENTER-TO-CENTER OF THE WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2" NOR MORE THAN 8".

4.4. CURING - THE PRECAST CONCRETE ELEMENTS SHALL BE CURED FOR A SUFFICIENT LENGTH OF TIME SO THAT THE CONCRETE WILL DEVELOP THE SPECIFIED COMPRESSIVE STRENGTH IN 28 DAYS OR LESS, ANY ONE OF THE FOLLOWING METHODS OF CURING OR COMBINATIONS THERE OF SHALL BE USED:

4.4.1. STEAM CURING - THE PRECAST ELEMENTS MAY BE LOW-PRESSURE STEAM CURED BY A SYSTEM THAT WILL MAINTAIN A MOIST ATMOSPHERE.

4.4.2. WATER CURING - THE PRECAST ELEMENTS MAY BE WATER CURED BY ANY METHOD THAT WILL KEEP THE SECTIONS MOIST.

4.4.3. MEMBRANE CURING - A SEALING MEMBRANE CONFORMING TO THE REQUIREMENTS OF ASTM SPECIFICATION C309 MAY BE APPLIED AND SHALL BE LEFT INTACT UNTIL THE REQUIRED CONCRETE COMPRESSIVE STRENGTH IS ATTAINED. THE CONCRETE TEMPERATURE AT THE TIME OF STRENGTH IS ATTAINED. THE CONCRETE TEMPERATURE AT THE TIME OF APPLICATION SHALL BE WITHIN ± 10 DEGREES F OF THE ATMOSPHERIC TEMPERATURE. ALL SURFACES SHALL BE KEPT MOIST PRIOR TO THE APPLICATION OF THE COMPOUNDS AND SHALL BE DAMP WHEN THE COMPOUND IS APPLIED.

4.5. STORAGE, HANDLING & DELIVERY

4.5.1. STORAGE

PRECAST CONCRETE BRIDGE ELEMENTS SHALL BE LIFTED AND STORED IN "AS-CAST" POSITION. PRECAST CONCRETE HEADWALL AND WINGWALL UNITS ARE CAST, STORED AND SHIPPED IN A FLAT POSITION. THE PRECAST ELEMENTS SHALL BE STORED IN SUCH A MANNER TO PREVENT CRACKING OR DAMAGE. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE. THE UNITS SHALL NOT BE MOVED UNTIL THE CONCRETE COMPRESSIVE STRENGTH HAS REACHED A MINIMUM OF 2500 PSI, AND THEY SHALL NOT BE STORED IN AN UPRIGHT POSITION.

4.5.2. HANDLING

HANDLING DEVICES SHALL BE PERMITTED IN EACH PRECAST ELEMENT FOR THE PURPOSE OF HANDLING AND SETTING. SPREADER BEAMS MAY BE REQUIRED FOR THE LIFTING OF PRECAST CONCRETE BRIDGE ELEMENTS TO PRECLUDE DAMAGE FROM BENDING OR TORSION FORCES.

4.5.3. DELIVERY

PRECAST CONCRETE ELEMENTS MUST NOT BE SHIPPED UNTIL THE CONCRETE HAS ATTAINED THE SPECIFIED DESIGN COMPRESSIVE STRENGTH, OR AS DIRECTED BY THE DESIGN ENGINEER. PRECAST CONCRETE ELEMENTS MAY BE UNLOADED AND PLACED ON THE GROUND AT THE SITE UNTIL INSTALLED. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE.

4.5. QUALITY ASSURANCE - THE PRECASTER SHALL DEMONSTRATE ADHERENCE TO THE STANDARDS SET FORTH IN THE NPCA QUALITY CONTROL MANUAL. THE PRECASTER SHALL MEET EITHER SECTION 4.7.1 OR 4.7.2

4.5.1. CERTIFICATION - THE PRECASTER SHALL BE CERTIFIED BY THE PRECAST/PRESTRESSED CONCRETE INSTITUTE PLANT CERTIFICATION PROGRAM OR THE NATIONAL PRECAST CONCRETE ASSOCIATION'S PLANT CERTIFICATION PROGRAM PRIOR TO AND DURING PRODUCTION OF THE PRODUCTS COVERED BY THIS SPECIFICATION.

4.5.2. QUALIFICATIONS, TESTING AND INSPECTION

4.5.2.1. THE PRECASTER SHALL HAVE BEEN IN THE BUSINESS OF PRODUCING PRECAST CONCRETE PRODUCTS SIMILAR TO THOSE SPECIFIED FOR A MINIMUM OF THREE YEARS. HE SHALL MAINTAIN A PERMANENT QUALITY CONTROL DEPARTMENT OR RETAIN AN INDEPENDENT TESTING AGENCY ON A CONTINUING BASIS. THE AGENCY SHALL ISSUE A REPORT, CERTIFIED BY A LICENSED ENGINEER, DETAILING THE ABILITY OF THE PRECASTER TO PRODUCE QUALITY PRODUCTS CONSISTENT WITH INDUSTRY STANDARDS.

4.5.2.2. THE PRECASTER SHALL SHOW THAT THE FOLLOWING TESTS ARE PERFORMED IN ACCORDANCE WITH THE ASTM STANDARDS INDICATED. TESTS SHALL BE PERFORMED AS INDICATED IN SECTION 6 OF THESE SPECIFICATIONS.

4.5.2.2.1. AIR CONTENT: C231 OR C173

4.5.2.2.2. COMPRESSIVE STRENGTH: C31, C39, C497

4.5.2.3. THE PRECASTER SHALL PROVIDE DOCUMENTATION DEMONSTRATING COMPLIANCE WITH THIS SECTION TO CONTECH® BRIDGE SOLUTIONS AT REGULAR INTERVALS OR UPON REQUEST.

4.5.2.4. THE OWNER MAY PLACE AN INSPECTOR IN THE PLANT WHEN THE PRODUCTS COVERED BY THIS SPECIFICATION ARE BEING MANUFACTURED.

4.5.3. DOCUMENTATION - THE PRECASTER SHALL SUBMIT PRECAST PRODUCTION REPORTS TO CONTECH® BRIDGE SOLUTIONS AS REQUIRED.

5. PERMISSIBLE VARIATIONS

5.1. BRIDGE UNITS

5.1.1. INTERNAL DIMENSIONS - THE INTERNAL DIMENSION SHALL VARY NOT MORE THAN 1% FROM THE DESIGN DIMENSIONS NOR MORE THAN 1/2" WHICHEVER IS LESS.

5.1.2. SLAB AND WALL THICKNESS - THE SLAB AND WALL THICKNESS SHALL NOT BE LESS THAN THAT SHOWN IN THE DESIGN BY MORE THAN 1/2". A THICKNESS MORE THAN THAT REQUIRED IN THE DESIGN SHALL NOT BE CAUSE FOR REJECTION.

5.1.3. LENGTH OF OPPOSITE SURFACES - VARIATIONS IN LAYING LENGTHS OF TWO OPPOSITE SURFACES OF THE BRIDGE UNIT SHALL NOT BE MORE THAN 1/2" IN ANY SECTION, EXCEPT WHERE BEVELED ENDS FOR LAYING OF CURVES ARE SPECIFIED BY THE PURCHASER.

5.1.4. LENGTH OF SECTION - THE UNDERRUN IN LENGTH OF A SECTION SHALL NOT BE MORE THAN 1/2" IN ANY BRIDGE UNIT.

5.1.5. POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN POSITION OF THE REINFORCEMENT SHALL BE $\pm 1/2$ ". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1 1/2" FOR THE OUTSIDE CIRCUMFERENTIAL STEEL OR BE LESS THAN 1" FOR THE INSIDE CIRCUMFERENTIAL STEEL AS MEASURED TO THE EXTERNAL OR INTERNAL SURFACE OF THE BRIDGE. THESE TOLERANCES OR COVER REQUIREMENTS DO NOT APPLY TO MATING SURFACES OF THE JOINTS.

5.1.6. AREA OF REINFORCEMENT - THE AREAS OF STEEL REINFORCEMENT SHALL BE THE DESIGN STEEL AREAS AS SHOWN IN THE MANUFACTURER'S SHOP DRAWINGS. STEEL AREAS GREATER THAN THOSE REQUIRED SHALL NOT BE CAUSE FOR REJECTION. THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCING SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCEMENT.

5.2. WINGWALLS & HEADWALLS

5.2.1. WALL THICKNESS - THE WALL THICKNESS SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN 1/2".

5.2.2. LENGTH/HEIGHT OF WALL SECTIONS - THE LENGTH AND HEIGHT OF THE WALL SHALL NOT VARY FROM THAT SHOWN IN THE DESIGN BY MORE THAN 1/2".

5.2.3. POSITION OF REINFORCEMENT - THE MAXIMUM VARIATION IN THE POSITION OF THE REINFORCEMENT SHALL BE $\pm 1/2$ ". IN NO CASE SHALL THE COVER OVER THE REINFORCEMENT BE LESS THAN 1 1/2".

5.2.4. SIZE OF REINFORCEMENT - THE PERMISSIBLE VARIATION IN DIAMETER OF ANY REINFORCING SHALL CONFORM TO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCING. STEEL AREA GREATER THAN THAT REQUIRED SHALL NOT BE CAUSE FOR REJECTION.

6. TESTING/INSPECTION

6.1. TESTING

6.1.1. TYPE OF TEST SPECIMEN - CONCRETE COMPRESSIVE STRENGTH SHALL BE DETERMINED FROM COMPRESSION TESTS MADE ON CYLINDERS OR CORES. FOR CYLINDER TESTING, A MINIMUM OF 3 CYLINDERS SHALL BE TAKEN FOR EACH LOT OF BRIDGE ELEMENTS. (A LOT IS DEFINED AS THE PRECAST ELEMENTS MADE USING THE SAME CONCRETE MIX DURING A SINGLE DAY'S PRODUCTION.) FOR CORE TESTING, ONE CORE SHALL BE CUT FROM EACH OF 3 PRECAST ELEMENTS SELECTED AT RANDOM FROM EACH GROUP OF 15 OR FEWER ELEMENTS MADE USING A SINGLE CONCRETE MIX IN THE SAME DAY'S PRODUCTION. EACH LOT SHALL BE CONSIDERED SEPARATELY FOR THE PURPOSE OF TESTING AND ACCEPTANCE.

6.1.2. COMPRESSION TESTING - CYLINDERS SHALL BE MADE AND TESTED AS PRESCRIBED BY THE ASTM C39 SPECIFICATION. CORES SHALL BE OBTAINED AND TESTED FOR COMPRESSION STRENGTH IN ACCORDANCE WITH THE PROVISIONS OF THE ASTM C42 SPECIFICATION.

6.1.3. ACCEPTABILITY OF CYLINDER TESTS - WHEN THE AVERAGE COMPRESSIVE STRENGTH OF ALL CYLINDERS TESTED IS EQUAL TO OR GREATER THAN THE DESIGN COMPRESSIVE STRENGTH, AND NOT MORE THAN 10% OF THE CYLINDERS TESTED HAVE A COMPRESSIVE STRENGTH LESS THAN THE DESIGN CONCRETE STRENGTH, AND NO CYLINDER TESTED HAS A COMPRESSIVE STRENGTH LESS THAN 80% OF THE DESIGN COMPRESSIVE STRENGTH, THEN THE LOT SHALL BE ACCEPTED. WHEN THE COMPRESSIVE STRENGTH OF THE CYLINDERS TESTED DOES NOT CONFORM TO THESE ACCEPTANCE CRITERIA, THE ACCEPTABILITY OF THE LOT MAY BE DETERMINED AS DESCRIBED IN SECTION 6.1.4, BELOW.

6.1.4. ACCEPTABILITY OF CORE TESTS - THE COMPRESSIVE STRENGTH OF THE CONCRETE IN A LOT IS ACCEPTABLE WHEN THE AVERAGE CORE TEST STRENGTH IS EQUAL TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH. WHEN THE COMPRESSIVE STRENGTH OF A CORE TESTED IS LESS THAN THE DESIGN CONCRETE STRENGTH, THE PRECAST ELEMENT FROM WHICH THAT CORE WAS TAKEN MAY BE RE-CORED. WHEN THE COMPRESSIVE STRENGTH OF THE RE-CORE IS EQUAL TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH, THE COMPRESSIVE STRENGTH OF THE CONCRETE IN THAT LOT IS ACCEPTABLE.

6.1.4.1. WHEN THE COMPRESSIVE STRENGTH OF ANY RECORE IS LESS THAN THE DESIGN CONCRETE STRENGTH, THE PRECAST ELEMENT FROM WHICH THAT CORE WAS TAKEN SHALL BE REJECTED. TWO PRECAST ELEMENTS FROM THE REMAINDER OF THE LOT SHALL BE SELECTED AT RANDOM AND ONE CORE SHALL BE TAKEN FROM EACH. IF THE COMPRESSIVE STRENGTH OF BOTH CORES IS EQUAL TO OR GREATER THAN THE DESIGN CONCRETE STRENGTH, THE COMPRESSIVE STRENGTH OF THE REMAINDER OF THAT GROUP IS

ACCEPTABLE. IF THE COMPRESSIVE STRENGTH OF EITHER OF THE TWO CORES TESTED IS LESS THAN THE DESIGN CONCRETE STRENGTH, THE REMAINDER OF THE GROUP SHALL BE REJECTED OR, AT THE OPTION OF THE MANUFACTURER, EACH PRECAST ELEMENT OF THE REMAINDER OF THE GROUP SHALL BE CORED AND ACCEPTED INDIVIDUALLY, AND ANY OF THESE ELEMENTS THAT HAVE CORES WITH LESS THAN THE DESIGN CONCRETE STRENGTH SHALL BE REJECTED. PLUGGING CORE HOLES - THE CORE HOLES SHALL BE PLUGGED AND SEALED BY THE MANUFACTURER IN A MANNER SUCH THAT THE ELEMENTS WILL MEET ALL OF THE TEST REQUIREMENTS OF THIS SPECIFICATION. PRECAST ELEMENTS SO SEALED SHALL BE CONSIDERED SATISFACTORY FOR USE.

6.1.4.2. TEST EQUIPMENT - EVERY MANUFACTURER FURNISHING PRECAST ELEMENTS UNDER THIS SPECIFICATION SHALL FURNISH ALL FACILITIES AND PERSONNEL NECESSARY TO CARRY OUT THE TEST REQUIRED.

6.2. INSPECTION - THE QUALITY OF MATERIALS, THE PROCESS OF MANUFACTURE, AND THE FINISHED PRECAST ELEMENTS SHALL BE SUBJECT TO INSPECTION BY THE PURCHASER.

7. JOINTS

THE BRIDGE UNITS SHALL BE PRODUCED WITH FLAT BUTT ENDS. THE ENDS OF THE BRIDGE UNITS SHALL BE SUCH THAT WHEN THE SECTIONS ARE LAID TOGETHER THEY WILL MAKE A CONTINUOUS LINE WITH A SMOOTH INTERIOR FREE OF APPRECIABLE IRREGULARITIES, ALL COMPATIBLE WITH THE PERMISSIBLE VARIATIONS IN SECTION 5, ABOVE. THE JOINT WIDTH BETWEEN ADJACENT PRECAST UNITS SHALL NOT EXCEED 3/4".

8. WORKMANSHIP/FINISH

THE BRIDGE UNITS, WINGWALLS, AND HEADWALLS SHALL BE SUBSTANTIALLY FREE OF FRACTURES. THE ENDS OF THE BRIDGE UNITS SHALL BE NORMAL TO THE WALLS AND CENTERLINE OF THE BRIDGE SECTION. WITHIN THE LIMITS OF THE VARIATIONS GIVEN IN SECTION 5, ABOVE, EXCEPT WHERE BEVELED ENDS ARE SPECIFIED, THE FACES OF THE WINGWALLS AND HEADWALLS SHALL BE PARALLEL TO EACH OTHER, WITHIN THE LIMITS OF VARIATIONS GIVEN IN SECTION 5, ABOVE. THE SURFACE OF THE PRECAST ELEMENTS SHALL BE A SMOOTH STEEL FORM OR TROWELED SURFACE. TRAPPED AIR POCKETS CAUSING SURFACE DEFECTS SHALL BE CONSIDERED AS PART OF A SMOOTH, STEEL FORM FINISH.

9. REPAIRS

PRECAST ELEMENTS MAY BE REPAIRED, IF NECESSARY, BECAUSE OF IMPERFECTIONS IN MANUFACTURE OR HANDLING DAMAGE AND WILL BE ACCEPTABLE IF, IN THE OPINION OF THE PURCHASER, THE REPAIRS ARE SOUND, PROPERLY FINISHED AND CURED, AND THE REPAIRED SECTION CONFORMS TO THE REQUIREMENTS OF THIS SPECIFICATION.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

William J. Marshall 10-23-09
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Kurt Shulman 10-27-09
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

William J. Marshall 10/27/09
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 36225, Expiration Date: 8/19/2010.



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CONSPAN®
BRIDGE SYSTEMS

CONTECH
CONTRACT
DRAWING

SHIPLEY'S GRANT
PHASE IV
LOTS C-219 THRU C-225, C-227 THRU C-236, PARCELS D-2 AND E-1,
OPEN SPACE LOTS C-237, D-1, E-2 AND E-3 AND NON-BUILDABLE PARCELS "D-3", "D-4",
AND NON-BUILDABLE LOT C-226
A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 THRU C-218, "D" AND "E"
HOWARD COUNTY, MARYLAND

ELECTION DISTRICT NO. 1

PROJECT NUMBER: 52059	DATE: 8/7/2009
DESIGNED: JAL	DRAWN: RJB
CHECKED: BAP	APPROVED: PAC
SHEET NO.:	29 OF 31

F07-088

SPECIFICATIONS FOR MANUFACTURE AND INSTALLATION OF CON/SPAN® BRIDGE SYSTEMS (CONT'D)

- 10. REJECTION**
THE PRECAST ELEMENTS SHALL BE SUBJECT TO REJECTION ON ACCOUNT OF ANY OF THE SPECIFICATION REQUIREMENTS. INDIVIDUAL PRECAST ELEMENTS MAY BE REJECTED BECAUSE OF ANY OF THE FOLLOWING:
- 10.1. FRACTURES OR CRACKS PASSING THROUGH THE WALL, EXCEPT FOR A SINGLE END CRACK THAT DOES NOT EXCEED ONE HALF THE THICKNESS OF THE WALL.
 - 10.2. DEFECTS THAT INDICATE PROPORTIONING, MIXING, AND MOLDING NOT IN COMPLIANCE WITH SECTION 4 OF THESE SPECIFICATIONS.
 - 10.3. HONEYCOMBED OR OPEN TEXTURE.
 - 10.4. DAMAGED ENDS, WHERE SUCH DAMAGE WOULD PREVENT MAKING A SATISFACTORY JOINT.
- 11. MARKING**
EACH BRIDGE UNIT SHALL BE CLEARLY MARKED BY WATERPROOF PAINT. THE FOLLOWING SHALL BE SHOWN ON THE INSIDE OF THE VERTICAL LEG OF THE BRIDGE SECTION:
BRIDGE SPAN x BRIDGE RISE
DATE OF MANUFACTURE
NAME OR TRADEMARK OF THE MANUFACTURER
- 12. INSTALLATION PREPARATION**
TO ENSURE CORRECT INSTALLATION OF THE PRECAST CONCRETE BRIDGE SYSTEM, CARE AND CAUTION MUST BE EXERCISED IN FORMING THE SUPPORT AREAS FOR BRIDGE UNITS, HEADWALL, AND WINGWALL ELEMENTS. EXERCISING SPECIAL CARE WILL FACILITATE THE RAPID INSTALLATION OF THE PRECAST COMPONENTS.
- 12.1. FOOTINGS**
DO NOT OVER EXCAVATE FOUNDATIONS UNLESS DIRECTED BY SITE SOIL ENGINEER TO REMOVE UNSUITABLE SOIL.
- 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 CONTECH® BRIDGE SOLUTIONS PRIOR TO SHIPMENT OF PRECAST CONCRETE ELEMENTS.
- THE BRIDGE UNITS AND WINGWALLS SHALL BE INSTALLED ON EITHER PRECAST OR CAST-IN-PLACE CONCRETE FOOTINGS. THE SIZE AND ELEVATION OF THE FOOTINGS SHALL BE AS DESIGNED BY THE ENGINEER. A KEYWAY SHALL BE FORMED IN THE TOP SURFACE OF THE BRIDGE FOOTING AS SPECIFIED ON THE PLANS. NO KEYWAY IS REQUIRED IN THE WINGWALL FOOTINGS, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
- THE FOOTINGS SHALL BE GIVEN A SMOOTH FLOAT FINISH AND SHALL REACH A COMPRESSIVE STRENGTH OF 2,000 PSI BEFORE PLACEMENT OF THE BRIDGE AND WINGWALL ELEMENTS. BACKFILLING SHALL NOT BEGIN UNTIL THE FOOTING HAS REACHED THE FULL DESIGN COMPRESSIVE STRENGTH WITHOUT WRITTEN APPROVAL FROM CONTECH® BRIDGE SOLUTIONS.
- THE FOOTING SURFACE SHALL BE CONSTRUCTED IN ACCORDANCE WITH GRADES SHOWN ON THE PLANS. WHEN TESTED WITH A 10'-0" STRAIGHT EDGE, THE SURFACE SHALL NOT VARY MORE THAN 1/4" IN 10'-0".
- IF A PRECAST CONCRETE FOOTING IS USED, THE CONTRACTOR SHALL PREPARE A 4" THICK BASE LAYER OF COMPACTED GRANULAR MATERIAL THE FULL WIDTH OF THE FOOTING PRIOR TO PLACING THE PRECAST FOOTING.
- THE FOUNDATIONS FOR PRECAST CONCRETE BRIDGE ELEMENTS AND WINGWALLS MUST BE CONNECTED BY REINFORCEMENT TO FORM ONE MONOLITHIC BODY. EXPANSION JOINTS SHALL NOT BE USED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONSTRUCTION OF THE FOUNDATIONS PER THE PLANS AND SPECIFICATIONS.
- 13. INSTALLATION**
- 13.1. GENERAL** - THE INSTALLATION OF THE PRECAST CONCRETE ELEMENTS SHALL BE AS EXPLAINED IN THE PUBLICATION CON/SPAN BRIDGE SYSTEMS INSTALLATION HANDBOOK.
- 13.1.1. LIFTING** - 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 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 OR HOLES 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 CONTECH® BRIDGE SOLUTIONS.
- 13.1.2. CONSTRUCTION EQUIPMENT WEIGHT RESTRICTIONS** - IN NO CASE SHALL EQUIPMENT OPERATING IN EXCESS OF THE DESIGN LOAD (HS20 OR HS25) BE PERMITTED OVER THE BRIDGE UNITS UNLESS APPROVED BY CONTECH® BRIDGE SOLUTIONS.
- 13.1.2.1.** IN THE IMMEDIATE AREA OF THE BRIDGE UNITS, THE FOLLOWING RESTRICTIONS FOR THE USE OF HEAVY CONSTRUCTION MACHINERY DURING BACKFILLING OPERATIONS APPLY:
- NO CONSTRUCTION EQUIPMENT SHALL CROSS THE BARE PRECAST CONCRETE BRIDGE UNIT.
 - AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF

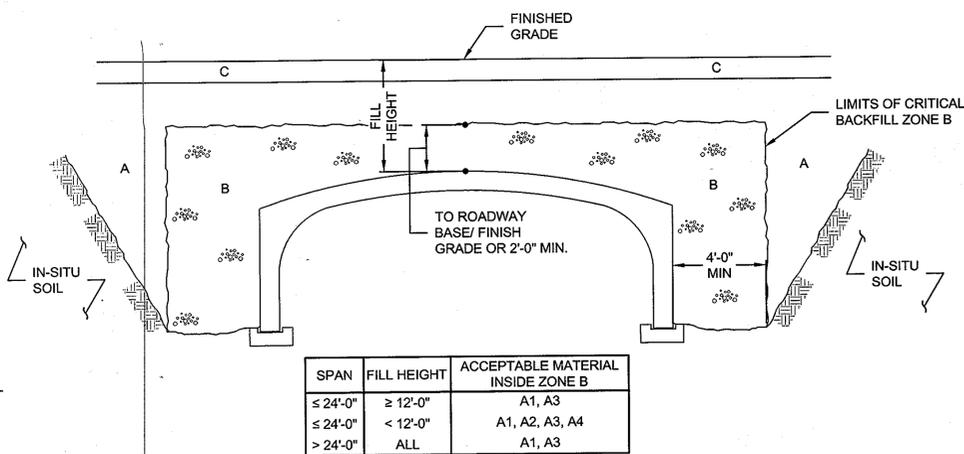
- 4" OVER THE CROWN OF THE BRIDGE, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 10 TONS MAY CROSS THE BRIDGE.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF 1'-0" OVER THE CROWN OF THE BRIDGE, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 30 TONS MAY CROSS THE BRIDGE.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED THE DESIGN COVER, OR 2'-0" MINIMUM, OVER THE CROWN OF THE PRECAST CONCRETE BRIDGE, CONSTRUCTION EQUIPMENT WITHIN THE DESIGN LOAD LIMITS FOR THE ROAD MAY CROSS THE PRECAST CONCRETE BRIDGE.
- 13.2. LEVELING PADS/SHIMS** - THE BRIDGE UNITS AND WINGWALLS SHALL BE SET ON MASONITE OR STEEL SHIMS MEASURING 6" x 6", MINIMUM, UNLESS SHOWN OTHERWISE ON THE PLANS. A MINIMUM GAP OF 1/2" SHALL BE PROVIDED BETWEEN THE FOOTING AND THE BOTTOM OF THE BRIDGE'S VERTICAL LEGS OR THE BOTTOM OF THE WINGWALL.
- 13.3. PLACEMENT OF BRIDGE UNITS** - THE BRIDGE UNITS SHALL BE PLACED AS SHOWN ON THE ENGINEER'S PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE. THE JOINT WIDTH BETWEEN ADJACENT PRECAST UNITS SHALL NOT EXCEED 1/4".
- IT IS IMPERATIVE THAT ANY LATERAL SPREADING OF THE BRIDGE ELEMENTS BE AVOIDED DURING AND AFTER THEIR PLACEMENT. GENERALLY, HORIZONTAL CABLE TIES ARE SHIPPED IN THE LARGER BRIDGE ELEMENTS TO PREVENT THIS SPREADING. IF, DUE TO SITE RESTRICTIONS, THESE TIES MUST BE REMOVED PRIOR TO PLACEMENT OF THE BRIDGE ELEMENT, THE CONTRACTOR MUST PROVIDE HARDWOOD WEDGES ON SITE. THESE HARDWOOD WEDGES ARE PLACED IN THE KEYWAY OUTSIDE THE LEGS OF THE BRIDGE ELEMENTS, AND SMALLER SHIMS AND WEDGES ARE ADDED BEFORE COMPLETE RELEASE OF THE BRIDGE ELEMENT FROM THE CRANE. ALSO, A SUPPLY OF 1/2", 3/4" & 1" THICK STEEL OR MASONITE SHIMS FOR VARIOUS SHIMMING PURPOSES SHOULD BE ON SITE, PER SECTION 13.2.
- 13.4. PLACEMENT OF WINGWALLS & HEADWALLS** - THE WINGWALLS AND HEADWALLS SHALL BE PLACED AS SHOWN ON THE PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE.
- 13.5. WATERPROOFING/JOINT PROTECTION AND SUBSURFACE DRAINAGE**
- 13.5.1. EXTERNAL PROTECTION OF JOINTS** - THE BUTT JOINT MADE BY TWO ADJOINING BRIDGE UNITS SHALL BE COVERED WITH A 1/2" x 1 1/2" PREFORMED BITUMINOUS JOINT SEALANT AND A MINIMUM OF A 9" WIDE JOINT WRAP. THE SURFACE SHALL BE FREE OF DIRT BEFORE APPLYING THE JOINT MATERIAL. A PRIMER COMPATIBLE WITH THE JOINT WRAP TO BE USED SHALL BE APPLIED FOR A MINIMUM WIDTH OF 9" ON EACH SIDE OF THE JOINT. THE EXTERNAL WRAP SHALL BE EITHER EZ-WRAP RUBBER BY PRESS-SEAL GASKET CORPORATION, SEAL WRAP BY MAR MAC MANUFACTURING CO. INC. OR APPROVED EQUAL. THE JOINT SHALL BE COVERED CONTINUOUSLY FROM THE BOTTOM OF ONE BRIDGE SECTION LEG, ACROSS THE TOP OF THE BRIDGE AND TO THE OPPOSITE BRIDGE SECTION LEG. ANY LAPS THAT RESULT IN THE JOINT WRAP SHALL BE A MINIMUM OF 6" LONG WITH THE OVERLAP RUNNING DOWNHILL.
- 13.5.2.** IN ADDITION TO THE JOINTS BETWEEN BRIDGE UNITS, THE JOINT BETWEEN THE END BRIDGE UNIT AND THE HEADWALL SHALL ALSO BE SEALED AS DESCRIBED ABOVE. IF PRECAST WINGWALLS ARE USED, THE JOINT BETWEEN THE END BRIDGE UNIT AND THE WINGWALL SHALL BE SEALED WITH A 2'-0" STRIP OF FILTER FABRIC. ALSO, IF LIFT HOLES ARE FORMED IN THE BRIDGE UNITS, THEY SHALL BE PRIMED AND COVERED WITH A 9" x 9" SQUARE OF JOINT WRAP.
- 13.5.3.** DURING THE BACKFILLING OPERATION, CARE SHALL BE TAKEN TO KEEP THE JOINT WRAP IN ITS PROPER LOCATION OVER THE JOINT.
- 13.5.4.** SUBSOIL DRAINAGE SHALL BE AS DIRECTED BY THE ENGINEER.
- 13.6. GROUTING**
- 13.6.1.** GROUTING SHALL NOT BE PERFORMED WHEN TEMPERATURES ARE EXPECTED TO GO BELOW 35° FOR A PERIOD OF 72 HOURS. FILL THE BRIDGE-FOUNDATION KEYWAY WITH CEMENT GROUT (PORTLAND CEMENT AND WATER OR CEMENT MORTAR COMPOSED OF PORTLAND CEMENT, SAND AND WATER) WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI. VIBRATE AS REQUIRED TO ENSURE THAT THE ENTIRE KEY AROUND THE BRIDGE ELEMENT IS COMPLETELY FILLED. IF BRIDGE ELEMENTS HAVE BEEN SET WITH TEMPORARY TIES (CABLES, BARS, ETC.) GROUT MUST ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI BEFORE TIES MAY BE REMOVED.
- 13.6.2.** ALL GROUT SHALL HAVE A MAXIMUM AGGREGATE SIZE OF 1/2".
- 13.6.3.** LIFTING AND ERECTION ANCHOR RECESSES SHALL BE FILLED WITH GROUT.
- 13.7. BACKFILL**
- 13.7.1.** DO NOT PERFORM BACKFILLING DURING WET OR FREEZING WEATHER.
- 13.7.2.** NO BACKFILL SHALL BE PLACED AGAINST ANY STRUCTURAL ELEMENTS UNTIL THEY HAVE BEEN APPROVED BY THE ENGINEER.
- 13.7.3.** BACKFILL SHALL BE CONSIDERED AS ALL REPLACED EXCAVATION AND NEW EMBANKMENT ADJACENT TO THE PRECAST CONCRETE ELEMENTS. THE PROJECT CONSTRUCTION AND MATERIAL SPECIFICATIONS, WHICH INCLUDE THE SPECIFICATIONS FOR EXCAVATION FOR STRUCTURES AND ROADWAY EXCAVATION AND EMBANKMENT CONSTRUCTION, SHALL APPLY EXCEPT AS MODIFIED IN THIS SECTION.
- 13.7.4. BACKFILL ZONES:**

- IN-SITU SOIL
 - ZONE A: CONSTRUCTED EMBANKMENT OR OVERFILL
 - ZONE B: FILL THAT IS DIRECTLY ASSOCIATED WITH PRECAST CONCRETE BRIDGE INSTALLATION.
 - ZONE C: ROAD STRUCTURE.
- 13.7.5. REQUIRED BACKFILL PROPERTIES**
- 13.7.5.1.** IN-SITU SOIL - NATURAL GROUND IS TO BE SUFFICIENTLY STABLE TO ALLOW EFFECTIVE SUPPORT TO THE PRECAST CONCRETE BRIDGE UNITS. AS A GUIDE, THE EXISTING NATURAL GROUND SHOULD BE OF SIMILAR QUALITY AND DENSITY TO ZONE B MATERIAL FOR MINIMUM LATERAL DIMENSION OF ONE BRIDGE SPAN OUTSIDE OF THE BRIDGE FOOTING.
- 13.7.5.2.** ZONE A - ZONE A REQUIRES FILL MATERIAL WITH SPECIFICATIONS AND COMPACTING PROCEDURES EQUAL TO THAT FOR NORMAL ROAD EMBANKMENTS.
- 13.7.5.3.** ZONE B - GENERALLY, SOILS SHALL BE REASONABLY FREE OF ORGANIC MATTER, AND, NEAR CONCRETE SURFACES, FREE OF STONES LARGER THAN 3" IN DIAMETER SEE CHARTS FOR DETAILED DESCRIPTIONS OF ACCEPTABLE SOILS.
- 13.7.5.4.** ZONE C - ZONE C IS THE ROAD SECTION OF GRAVEL, ASPHALT OR CONCRETE BUILT IN COMPLIANCE WITH LOCAL ENGINEERING PRACTICES.
- 13.7.6. PLACING AND COMPACTING BACKFILL**
DUMPING FOR BACKFILLING IS NOT ALLOWED ANY NEARER THAN 3'-0" FROM THE BRIDGE LEG.

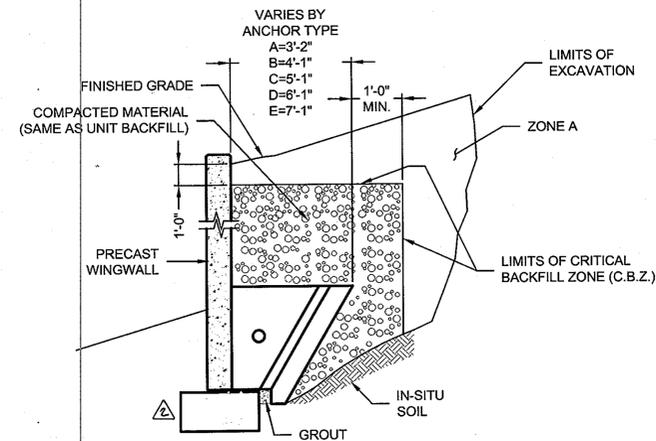
- THE FILL MUST BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8". THE MAXIMUM DIFFERENCE IN THE SURFACE LEVELS OF THE FILL ON OPPOSITE SIDES OF THE BRIDGE MUST NOT EXCEED 2'-0".
- THE FILL BEHIND WINGWALLS MUST BE PLACED AT THE SAME TIME AS THAT OF THE BRIDGE FILL. IT MUST BE PLACED IN PROGRESSIVELY PLACED HORIZONTAL LAYERS NOT EXCEEDING 8" PER LAYER.
- THE BACKFILL OF ZONE B SHALL BE COMPACTED TO A MINIMUM DENSITY OF 95% OF THE STANDARD PROCTOR, AS REQUIRED BY AASHTO T-99.
- SOIL WITHIN 1'-0" 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.
- THE BACKFILL MATERIAL AND COMPACTING BEHIND WINGWALLS SHOULD SATISFY THE CRITERIA FOR THE BRIDGE BACKFILL, ZONE B.
- BACKFILL AGAINST A WATERPROOFED SURFACE SHALL BE PLACED CAREFULLY TO AVOID DAMAGE TO THE WATERPROOFING MATERIAL.
- 13.7.7. BRIDGE UNITS**
FOR FILL HEIGHTS OVER 12'-0", NO BACKFILLING MAY BEGIN UNTIL A BACKFILL COMPACTION TESTING PLAN HAS BEEN COORDINATED WITH AND APPROVED BY CONTECH® BRIDGE SOLUTIONS. COST OF THE BACKFILL COMPACTION TESTING SHALL BE INCLUDED IN THE COST OF THE PRECAST UNITS. THIS INCLUDED COST APPLIES ONLY TO PROJECTS WITH FILL HEIGHTS OVER 12'-0" (AS MEASURED FROM TOP CROWN OF BRIDGE TO FINISHED GRADE).
- 13.7.8. WINGWALLS**
BACKFILL IN FRONT OF WINGWALLS SHALL BE CARRIED TO GROUND LINES SHOWN IN THE PLANS.
- 13.7.9. MONITORING**
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.
- THE FIRST MEASUREMENT ROW SHOULD TAKE PLACE AFTER THE ERECTION OF ALL PRECAST BRIDGE SYSTEM ELEMENTS, A SECOND AFTER COMPLETION OF BACKFILLING, AND A THIRD BEFORE OPENING OF THE BRIDGE TO TRAFFIC. FURTHER MEASUREMENTS MAY BE MADE ACCORDING TO LOCAL CONDITIONS.
- THE MAXIMUM DIFFERENCE IN VERTICAL DISPLACEMENTS 'V' SHOULD NOT EXCEED 1" ALONG THE LENGTH OF ONE FOUNDATION.

ACCEPTABLE SOILS FOR USE IN ZONE B BACKFILL

TYPICAL USCS MATERIALS	AASHTO GROUP	AASHTO SUBGROUP	PERCENT PASSING US SIEVE NO.			CHARACTER OF FRACTION PASSING NO. 40 SIEVE		SOIL DESCRIPTION
			#10	#40	#200	LIQUID LIMIT	PLASTICITY INDEX	
GW, GP, SP	A1	A-1a	50 MAX	30 MAX	15 MAX	6 MAX	LARGELY GRAVEL BUT CAN INCLUDE SAND AND FINES	
GM, SW, SP, SM		A-1b	50 MAX	25 MAX	6 MAX			
GM, SM, ML, SP, GP	A2	A-2-4			35 MAX	40 MAX	10 MAX	SANDS, GRAVELS WITH LOW-PLASTICITY SILT FINES
SC, GC, GM		A-2-5			35 MAX	41 MAX	10 MAX	SANDS, GRAVELS WITH PLASTIC SILT FINES
SP, SM, SW	A3			51 MIN	10 MAX		NON-PLASTIC	FINE SANDS
ML, SM, SC	A4			36 MIN		40 MAX	10 MAX	LOW-COMPRESSIBILITY SILTS



BACKFILL REQUIREMENTS



WALL BACKFILL REQUIREMENTS

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

William R. Hall 10-23-09
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Kit Shelton 10-27-09
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

John P. ... 10/27/09
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 36225, Expiration Date: 8/17/2012.



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MARK	DATE	REVISION DESCRIPTION	BY
2	11/11/11	Rev. To Wingwalls & Anchors	WBJ
1	7/10/10	Rev. Title Block Per F-10-050	WBJ

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ELECTION DISTRICT NO. 1

SHIPLEY'S GRANT
PHASE IV

△ LOTS C-219 THRU C-222, C-216 THRU C-207, PARCELS D-2 AND E-1, OPEN SPACE LOTS C-209, D-1, E-2 AND E-3 AND NON-BUILDABLE PARCELS "D-3", "D-4", AND NON-BUILDABLE LOT C-208
A RESUBDIVISION OF NON-BUILDABLE PARCELS C-216 THRU C-218, "D" AND "E" HOWARD COUNTY, MARYLAND

PROJECT NUMBER: 52059	DATE: 8/7/2009
DESIGNED: JAL	DRAWN: RJB
CHECKED: BAP	APPROVED: PAC
SHEET NO.: 30 OF 31	

F09-088

