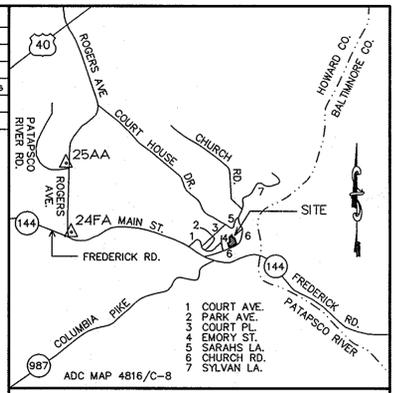


NO.	TITLE
1	Supplemental, Landscape, Grading & Stormwater Management Plan
2	Rain Garden Construction Notes, Details & Landscape Schedules
3	Rain Barrel Notes, Details, Retaining Wall Profiles & Landscape Planting Details
4	Soils Map
5	Supplemental Plan & Scenic Road Plan Exhibit

MINIMUM LOT SIZE TABULATION			
Lot No.	Gross Area	Pipestem	Minimum Lot Size
1	0.280 Ac.±	0.019 Ac.±	0.261 Ac.±

- GENERAL NOTES**
- The subject property is zoned R-VH per the February 2, 2004 Comprehensive Zoning Plan, and per the Comp Lite Zoning Amendments, effective 7/28/06.
 - Property Information: Tax map 25-A, Parcel 318, Tax Account Number: #02-201038
 - Deed Reference: Lot 1 - Liber 7616, Folio 609
 - Plot Reference: Lot 1 - Plat No. 4137
 - Total Site Area: 0.5580 Acres
 - Number of Existing Lots: 1 (Parcel 318, Plat No. 4137)
 - In accordance with Section 16.12(a)2 of the Subdivision and Land Development Regulations, Open Space is not required for subdivisions in the R-VH zone.
 - Proposed residential lots: 3 lots, (1) with existing dwelling to remain (Lot 1) (2) New buildable lots (Lots 2 & 3)
 - The subject property is located within the Ellicott City Historic District and is subject to the approval of the Howard County Planning & Zoning Commission. The subdivision plan was presented to the Historic District Commission on March 6, 2008 for Advisory Comments as HDC-08-10.
 - The boundary shown herein is based on a field run monumented boundary survey performed in October, 2007 by LDE, Inc.
 - The topography shown herein was field run by LDE, Inc. in October, 2007. The topography shown outside of the vicinity of the site was taken from the latest County Aerial Orthophotography.
 - The coordinates shown herein are based on NAD83, Maryland State Plane Coordinate System, as projected from Howard County Control Stations 25AA and 24FA.
 - There is an existing dwelling to remain located on lot 1. No new buildings, extensions or additions to the existing dwelling and structure are to be constructed at a distance less than the Zoning Regulations require.
 - This site was investigated for environmental features in May, 2008 by LDE, Inc. No streams, forest or wetlands were found. The only environmentally sensitive feature found onsite were steep slopes. The environmental features will not be disturbed except in accordance with approved HP-10-074.
 - Lots 2 & 3 have direct frontage on Church Road. Vehicular access for Lots 2 & 3 will be directly off Church Road. A 6.5 foot wide fee simple pipestem is provided for legal public road frontage to Church Road for Lot 1. Vehicular access for Lot 1 is via an existing private 15' R/W Access easement across the Clark Property, Lot 2, Plat No. 4137.
 - Forest Conservation for this subdivision is exempt per Section 16.1202(b)(1)(1) for a subdivision, site development or grading permit for development on land which is less than 40,000 square feet.
 - This project is located in the public water and sewer Metropolitan District. Public water is available to Lots 2 & 3 from Contract No. 640-W. Public sewer is available for Lots 2 & 3 from Contract No. 355-S. The connections to the existing house will remain.
 - Public water and sewage allocation will be granted at the time of issuance of the building permits for lots 2 & 3, if capacity is available at that time.
 - Water and sewer service to Lots 2 & 3 will be granted under the provisions of Section 16.122.B of the Howard County Code.
 - All areas shown herein are + or -, more or less.
 - A certified Supplemental/Landscape plan is on file with this resubdivision plan in accordance with Section 16.124 of the Howard County Code and the Landscape Manual.
 - Fencing of any in the amount of \$2,700.00 for (9) shade trees is deferred until site development plan approval for the initial lot to be developed, Lot 2 or Lot 3.
 - Landscape for this project is provided in accordance with the latest edition of the Howard County Landscape Manual and Section 16.124 of the Howard County Code.
 - The Owner/Developer is responsible for the planting of all plant material required to meet the standards established by the Howard County Landscape Manual with the site development plan application for Lot 2 or 3.
 - An approved site development plan will be required for lots 2 & 3 prior to the issuance of any building permits. The site development plan is subject to approval by the Howard County Historic District Commission.
 - Stormwater management for the development of proposed new lots 2 & 3 will be provided via private individual lot rain barrels and rain gardens.
 - Driveway to be provided to the issuance of a residential occupancy permit to insure safe access for fire and emergency vehicles, per the following minimum requirements:
 - Width - 12 feet (16 feet serving more than one residence)
 - Surface - 6" of compact crushed run base w/1.5% chip coating (1.5" min.)
 - Geometry - Max. 15% grade, max. 10% grade change and min. 45' turning radius
 - Structures (culverts/bridges) - Capable of supporting 25 gross tons (H25 loading)
 - Drainage elements - capable of safely passing 100 year flood with no more than 1" depth over driveway surface.
 - Structure clearances - Minimum 12 feet
 - Maintenance - sufficient to insure all weather use.
 - As the time of installation, all shade trees listed and approved for this site, shall be of the proper height requirements in accordance with the Howard County Landscape Manual. In addition, no substitutions or relocation of required plantings may be made without prior review and approval from the Department of Planning and Zoning. Any deviation from this approved landscaping plan may result in denial or delay in the release of Landscape Surety until such time as all required materials are planted and/or revisions are made to applicable plans and certificates.
 - This subdivision is subject to Section 128(A)(5) of the Supplemental Zoning District Regulations of the latest version of the Howard County Zoning Regulations.
 - For flag or pipestem lots, refuse collection, snow removal and road maintenance are provided to the junction of the flag or pipestem and road right-of-way line and not onto the pipestem lot driveway.
 - No grading, removal of vegetative covers or trees, paving and new structures shall be permitted within the limits of wetlands, stream(s), or their required buffers, floodplain and forest conservation easement areas.
 - Building Restriction Lines are not required for the "R-VH" Zoning District per Section 16.12 of the Zoning Regulations.
 - On March 15, 2010 the Planning Director approved HP-10-074, with conditions, to Section 16.120(c)(2)(i) to allow a reduction in the minimum public road frontage for the Lot 1 pipestem from 20' to 6.5' and to allow the vehicular access to Lot 1 through an existing recorded private 15' wide access easement to Church Road. Additionally, Section 16.116(b)(1)(i) was waived to allow grading removal of vegetative cover, trees, new structures and paving on steep slopes 25% or greater over 10 vertical feet. Conditions of approval:
 - Compliance with SRC comments dated March 11, 2010 for F-10-077.
 - Compliance with the Historic Preservation, Resource Conservation Division comments for the final plans (F-10-077) dated 1/12/2010.
 - The applicant shall further evaluate proposed house locations and grading for Lots 2 & 3 at the SDP stage to attempt to lessen the impact to the steep slopes. The applicant shall also examine ways to provide landscape buffering along Church Road to comply with the Scenic Road requirements at the SDP stage.
 - This waiver approval pertains only to the limit of disturbance within the 25% or greater slopes area as shown on the revised waiver exhibit and on this supplemental plan.
 - No disturbance to Lot 2, Mary Clark property is proposed. If offsite disturbance is necessary at the SDP stage, a letter of permission will be required.
 - No offsite grading or disturbance is proposed for this re-subdivision. All proposed grading/disturbances are within Ann's Delight Lots 1, 2 & 3 and the Church Road public right-of-way.
 - Trash and recycling collections will be at Church Road within 5' of the county roadway.
 - This development is designed to be in accordance with Section 16.127 - Residential Infill. Existing - of Subdivision compatibility with the existing neighborhood through the use of enhanced perimeter landscaping, berms, fences, similar housing unit types and the directional orientation of the proposed houses.
 - The details and notes shown herein are for informational purposes and do not represent a design for construction purposes. The Construction Plans and details shall be shown on the Site Development plans as required by Howard County.
 - All retaining walls 30" in height or greater shall require a fence of at least 36" in height with openings less than 4" in width along the walls entire top length. The specified fence shall be able to withstand 200 lbs of loading (applied horizontally) minimally at any point.



VICINITY MAP
Scale: 1" = 2000'

LEGEND:

	SOILS BOUNDARY
	EXISTING CONTOURS
	PROPOSED CONTOURS
	STEEP SLOPES (15% - 24.9%)
	STEEP SLOPES (25% OR GREATER)
	SUBDIVISION BOUNDARY
	INTERIOR LOT LINE
	IRON ROD FOUND
	IRON PIPE FOUND
	P. K. NAIL SET
	STONE FOUND
	EX. TREE TO BE REMOVED
	EX. TREE TO REMAIN
	EXISTING BRUSH LINE
	PROPOSED BRUSH LINE
	EXISTING PAVING
	PROPOSED PAVING
	PROP. CONC. PORCH & S/W
	EXIST. OVERHEAD ELECTRIC
	EXIST. POWER POLE
	EXIST. WATER METER
	EXIST. WATER VALVE
	EXIST. FIRE HYDRANT
	EXIST. SANITARY MANHOLE
	EXIST. SANITARY CLEAN OUT
	EXIST. GAS LINE
	EXIST. GAS VALVE
	PROPOSED GAS LINE
	PROPOSED 10' PRIVATE GAS & UTILITY EASEMENT
	PROPOSED RAIN GARDEN
	SOIL BORING
	RAIN BARREL
	LIMIT OF DISTURBANCE
	36" HIGH DECORATIVE FENCE
	RETAINING WALL

NOTE: SEE SHEET 3 FOR RETAINING WALL ELEVATION PROFILES.

NOTE: ALL ROOF DRAINS SHALL BE DIRECTED TO OUTFALL INTO THE PROPOSED PRIVATE ONSITE RAIN BARRELS FOR LOTS 2 & 3. (SEE SHEET 3 FOR DETAILS)

LANDSCAPE NOTES:

- This plan has been prepared in accordance with the provisions of Section 16.124 of the Howard County Code and Landscape Manual.
- The Owner/Developer is responsible for the planting of all plant material required to meet the standards established by the Howard County Landscape Manual.
- Financial Surety in the amount of \$2,700.00 for 9 shade trees is deferred until site development plan approval for the initial lot to be developed, Lot 2 or Lot 3.

SOILS LEGEND		
HYDROLOGIC SOIL GROUP	SOIL SYMBOL	DESCRIPTION
B	MgD	Manor - Barnetown sandy loams
B	GIC	Gladstone - Urban land complex

BENCHMARKS USED
24FA--(NAD 83) NORTHEAST QUADRANT OF ROGERS AVE AND MAIN ST. STAMPED DISK SET ON TOP OF CONCRETE COLUMN. N-583751.41/E-1366091.94 ELEV-263.701
25AA--(NAD 83) NORTHWEST QUADRANT OF INTERSECTION OF ROGERS AVE AND PATAPSCO RIVER RD. STAMPED DISK SET ON TOP OF CONCRETE COLUMN. N-583307.19/E-1366070.97 ELEV-307.71

STATE OF MARYLAND
DAVID BURTON
REGISTERED PROFESSIONAL ENGINEER
No. 1910

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. 1910, EXPIRATION DATE: 6/30/11.

SIGNED: **DAVID BURTON**
DATE: **10/6/10**

REVISIONS

No.	Date	Description

LDE Inc.
Engineers, Surveyors, Planners
9250 Ramsey Road, Suite 106 Columbia, Maryland - 21045
(410)715-1070 - (301)596-3424 - FAX (410)715-9540

DESIGNED SDH LDE	SUPPLEMENTAL, LANDSCAPE, GRADING & STORMWATER MANAGEMENT PLAN	SCALE 1" = 20'
DRAWN GDW LDE		DRAWING 1 OF 5
CHECKED BDB	ANN'S DELIGHT LOTS 1 - 3 A Resubdivision of the Mary D. Clark Property, Lot 1, Plat No. 4137	JOB NO. 06-035
DATE 9/2010		OWNER/DEVELOPER: Tax Map No. 25A - Parcel 318 2nd Election District - Howard County, Maryland Previous Submittals: F78-156, VP78-91, WP 10-074 Mr. Charles E. Hogg Jr. 3784 Church Road Ellicott City, MD 21043 Phone: 410-461-1650

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Kit Shandorff
CHIEF, DIVISION OF LAND DEVELOPMENT
10/6/10
DATE

David Burton
CHIEF, DEVELOPMENT ENGINEERING DIVISION
10/1/10
DATE

DEVELOPER'S / BUILDER'S CERTIFICATION
I certify that the landscaping shown on this plan will be done according to the plan, Section 16.124 of the Howard County Code and the Howard County Landscape Manual. I further certify that upon completion a Letter of Landscape Installation, accompanied by an executed One Year Guarantee of Plant Materials will be submitted to the Department of Planning and Zoning.

David Burton
SIGNATURE OF DEVELOPER / BUILDER
9/20/10
DATE

KEYSTONE CONCRETE RETAINING WALL

PART 1: GENERAL

- 1.01 Description**
- A. Work shall consist of designing, furnishing and construction of a KEYSTONE Compac Unit Retaining Wall System in accordance with these specifications and in reasonably close conformity with the lines, grades, design, and dimensions shown on the plans. No alternate wall systems will be considered.
- B. Work includes preparing foundation soil, furnishing and installing leveling pad, unit drainage fill and backfill to the lines and grades shown on the construction drawings.
- C. Work includes furnishing and installing geogrid soil reinforcement of the type, size, location, and lengths designated on the construction drawings.
- 1.02 Related Sections**
- A. Section 02300 (31 00 00) - Earthwork
- 1.03 Reference Documents**
- A. American Society for Testing and Materials (ASTM)
- ASTM C140 Sampling and Testing Concrete Masonry Units
 - ASTM C1372 Specification for Direct Segmental Retaining Wall Units
 - ASTM D422 Particle-Size Analysis of Soils
 - ASTM D698 Laboratory Compaction Characteristics of Soil - Standard Effort
 - ASTM D1557 Laboratory Compaction Characteristics of Soil - Modified Effort
 - ASTM D3034 Polyvinyl Chloride Pipe (PVC)
 - ASTM D4318 Liquid Limit, Plastic Limit and Plasticity Index of Soils
 - ASTM D4475 Horizontal Shear Strength of Pultruded Reinforced Plastic Rods
 - ASTM D4476 Flaxural Properties of Fiber Reinforced Pultruded Plastic Rods
 - ASTM D4585 Tensile Properties of Geotextiles - Wide Width Strip
 - ASTM D5262 Unconfined Tension Creep Behavior of Geosynthetics
 - ASTM D5818 Evaluate Insulation Damage of Geosynthetics
 - ASTM D6637 Tensile Properties of Geogrids - Single or Multi-Rib
 - ASTM D6638 Connection Strength - Reinforcement/Segmental Units
 - ASTM D6706 Geosynthetic Pullout Resistance in Soil
 - ASTM D6916 Shear Strength Between Segmental Concrete Units
- B. American Association of State Highway and Transportation Officials (AASHTO)
- AASHTO M 252 Corrugated Polyethylene Drainage Pipe
- C. Geotechnical Research Institute (GRI)
- GRI-GG4 Determination of Long Term Design Strength of Geogrids
 - GRI-GG5 Determination of Geogrid (soil) Pullout
- D. National Concrete Masonry Association (NCMA)
- NCMA SRWU-1 Test Method for Determining Connection Strength of SRW
 - NCMA SRWU-2 Test Method for Determining Shear Strength of SRW
- 1.04 Submittals/Certification**
- A. Contractor shall submit a Manufacturer's certification, prior to start of work, that the retaining wall system components meet the requirements of this specification and the structure design.
- B. Contractor shall submit construction drawings and design calculations for the retaining wall system prepared and stamped by a Professional Engineer registered in the state of the project. The engineering designs, techniques, and material evaluations shall be in accordance with the Keystone Design Manual.
- 1.05 Quality Assurance**
- A. Contractor shall submit a list of five (5) previously constructed projects of similar size and magnitude by the wall installer where the specific retaining wall system has been constructed successfully. Contact names and telephone numbers shall be listed for each project.
- B. Contractor shall provide evidence that the design engineer has a minimum of five years of documented experience in the design of reinforced soil structures. The design engineer shall provide proof of current professional liability insurance with an aggregate coverage limit of not less than \$2,000,000.
- C. Owner shall provide soil testing and quality assurance inspection during earthwork and wall construction operations. Contractor shall provide any quality control testing or inspection not provided by the Owner. Owner's quality assurance program does not relieve the contractor of responsibility for quality control and wall performance.
- 1.06 Delivery, Storage and Handling**
- A. Contractor shall check all materials upon delivery to assure that the proper type, grade, color, and certification have been received.
- B. Contractor shall protect all materials from damage due to jobsite conditions and in accordance with manufacturer's recommendations. Damaged materials shall not be incorporated into the work.

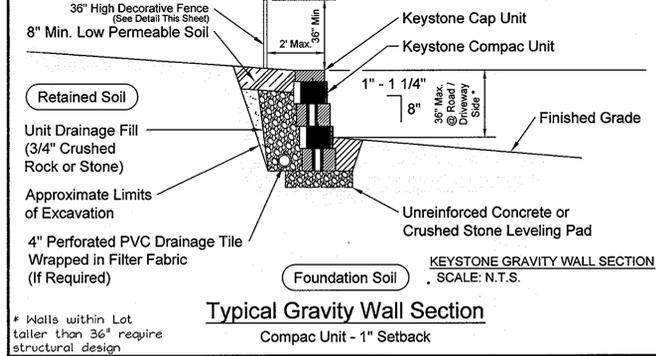
PART 2: PRODUCTS

- 2.01 Definitions**
- A. **Keystone Unit** - a concrete retaining wall element made from Portland cement, water, and aggregates.
- B. **Structural Geogrid** - a structural element formed by a regular network of integrally connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock, or earth and function primarily as reinforcement.
- C. **Unit Drainage Fill** - drainage aggregate that is placed within and immediately behind the Keystone concrete units.
- D. **Reinforced Backfill** - compacted soil that is placed within the reinforced soil volume as outlined on the plans.
- 2.02 Keystone Concrete Retaining Wall Units**
- A. Keystone concrete units shall conform to the following architectural requirements:
- Face color - concrete gray, unless otherwise specified. The Owner may specify standard manufacturer's color.
 - Face finish - sculptured rock face in angular tri-planer configuration. Other face finishes will not be allowed without written approval of Owner.
 - Bond configuration - running with bonds nominally located at midpoint vertically adjacent units, in both straight and curved alignments.
 - Exposed surfaces of units shall be free of chips, cracks or other imperfections when viewed from a distance of 10 feet (3 m) under diffused lighting.
- B. Keystone concrete materials shall conform to the requirements of ASTM C1372 - Standard Specifications for Segmental Retaining Wall Units.
- C. Keystone concrete units shall conform to the following structural and geometric requirements measured in accordance with ASTM C1372 - Standard Specifications for Segmental Retaining Wall Units:
- Compressive strength: 5000 psi (21 MPa).
 - Absorption: ≤ 6% (6% in northern states) for standard weight aggregates;
 - Dimensional tolerances: ± 1/8" (3 mm) from nominal unit dimensions not including rough split face, ± 1/16" (1.5 mm) unit weight - top and bottom planes;
 - Unit size: 8" (203 mm) (H) x 18" (457 mm)(W) x 12" (304 mm)(D) minimum;
 - Unit weight: 75-lbs/unit (35 kg/unit) minimum for standard weight aggregates.
- D. Keystone concrete units shall conform to the following performance testing:
- Inter-unit shear strength in accordance with ASTM D6916 (NCMA SRWU-2): 600-610 (8 kN) minimum at 2-psi (13 kPa) normal pressure;
 - Geogrid/Unit Pullout strength in accordance with ASTM D6638 (NCMA SRWU-1): 500-610 (7 kN/m) minimum at 2-psi (13 kPa) normal force.
- E. Keystone concrete units shall conform to the following constructability requirements:
- Vertical setback: 1/8" (3 mm) ± per course (near vertical) or 1" (25 mm) ± per course per the design;
 - Alignment and grid positioning mechanism - fiberglass pins, two per unit minimum;
 - Maximum horizontal gap between erected units shall be ≤ 1/2 inch (13 mm).
- 2.03 Shear Connectors**
- A. Shear connectors shall be 1/2-inch (12 mm) diameter, thermoset, isotactic polyester resin-pultruded fiberglass reinforcement rods to provide connection between vertically and horizontally adjacent units with the following requirements:
- Flexural Strength in accordance with ASTM D4476: 128,000 psi (882 MPa) minimum; Short Beam Shear in accordance with ASTM D4475: 6,400 psi (44 MPa) minimum.
- B. Shear connectors shall be capable of holding the geogrid in the proper design position during grid pre-tensioning and backfilling.
- 2.04 Base Leveling Pad Material**
- A. Material shall consist of a compacted crushed stone base or non-reinforced concrete as shown on the construction drawings.
- 2.05 Unit Drainage Fill**
- A. Unit drainage fill shall consist of clean 1" (25 mm) minus crushed stone or crushed gravel meeting the following gradation tested in accordance with ASTM D-422:
- | Sieve Size | Percent Passing |
|------------------|-----------------|
| 1 inch (25 mm) | 100 |
| 3/4-inch (19 mm) | 100-75 |
| No. 4 (4.75mm) | 0-10 |
| No. 50 (300µm) | 0-5 |
- B. Drainage fill shall be placed within the cores of, between, and behind the units as indicated on the design drawings. Not less than one cubic foot (0.028 m³) of drainage fill shall be used for each square foot (0.093 m²) of wall face unless otherwise specified.

- 2.06 Reinforced Backfill**
- A. Reinforced backfill shall be free of debris and meet the following gradation tested in accordance with ASTM D-422:
- | Sieve Size | Percent Passing |
|------------------|-----------------|
| 2 inch (50 mm) | 100 |
| 3/4-inch (19 mm) | 100-75 |
| No. 4 (4.75mm) | 0-60 |
| No. 200 (75µm) | 0-35 |
- Plasticity Index (PI) <15 and Liquid Limit <40 per ASTM D-4318.
- B. The maximum aggregate size shall be limited to 3/4 inch (19 mm) unless field tests have been performed to evaluate potential strength reductions to the geogrid design due to damage during construction.
- C. Material can be site-excavated soils where the above requirements can be met. Unsuitable soils for backfill (high plastic clays or organic soils) shall not be used in the backfill or in the reinforced soil mass.
- D. Contractor shall submit reinforced fill sample and laboratory test results to the Architect/Engineer for approval prior to the use of any proposed reinforced fill material.
- 2.08 Drainage Pipe**
- A. If required, the drainage pipe shall be perforated or slotted PVC pipe manufactured in accordance with ASTM D-3034 or corrugated HDPE pipe manufactured in accordance with AASHTO M252.
- 2.09 Geotextile Filter Fabric**
- A. When required, Geotextile filter fabric shall be 4.0 oz/sy, polypropylene, needlepunched nonwoven fabric.

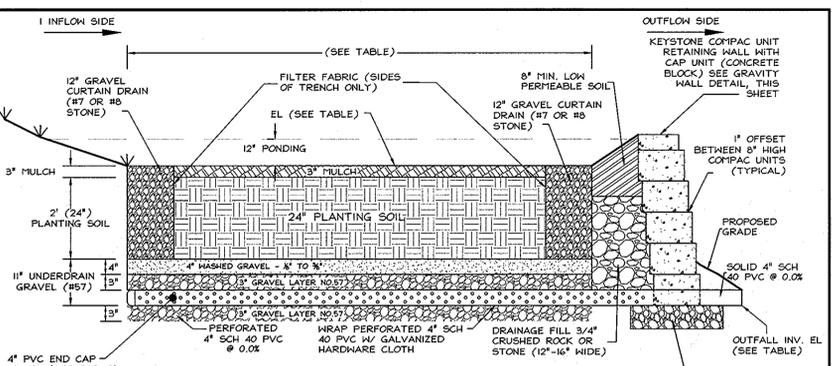
PART 3: EXECUTION

- 3.01 Excavation**
- A. Contractor shall excavate to the lines and grades shown on the construction drawings. Owner's representative shall inspect the excavation and approve prior to placement of leveling material or fill soils. Proof roll foundation area as directed to determine if remedial work is required.
- B. Over-excavation and replacement of unsuitable foundation soils and replacement with approved compacted fill will be compensated as agreed upon with the Owner.
- 3.02 Base Leveling Pad**
- A. Leveling pad material shall be placed to the lines and grades shown on the construction drawings, to a minimum thickness of 6 inches (150 mm) and extend laterally a minimum of 6" (150 mm) in front and behind the Keystone wall unit.
- B. Soil leveling pad materials shall be compacted to a minimum of 95 % Standard Proctor density per ASTM D-698 or 92% Modified Proctor Density per ASTM D1557.
- C. Leveling pad shall be prepared to insure full contact to the base surface of the concrete units.
- 3.03 Keystone Unit Installation**
- A. First course of units shall be placed on the leveling pad at the appropriate line and grade. Alignment and level shall be checked in all directions and insure that all units are in full contact with the base and properly seated.
- B. Place the front of units side-by-side. Do not leave gaps between adjacent units. Layout of corners and curves shall be in accordance with manufacturer's recommendations.
- C. Install shear/connecting devices per manufacturer's recommendations.
- D. Place and compact drainage fill within and behind wall units. Place and compact backfill soil behind drainage fill. Follow wall erection and drainage fill closely with structure backfill.
- E. Maximum stacked vertical height of wall units, prior to unit drainage fill and backfill placement and compaction, shall not exceed two courses.
- 3.04 Structural Geogrid Installation**
- A. Geogrid shall be oriented with the highest strength axis perpendicular to the wall alignment.
- B. Geogrid reinforcement shall be placed at the strengths, lengths, and elevations shown on the construction design drawings or as directed by the Engineer.
- C. The geogrid shall be laid horizontally on compacted backfill and attached to the Keystone wall units. Place the next course of Keystone concrete units over the geogrid. The geogrid shall be pulled taut, and anchored prior to backfill placement on the geogrid.
- D. Geogrid reinforcements shall be continuous throughout their embedment lengths and placed side-by-side to provide 100% coverage at each level. Spliced connections between shorter pieces of geogrid or gaps between adjacent pieces of geogrid are not permitted.
- 3.05 Reinforced Backfill Placement**
- A. Reinforced backfill shall be placed, spread, and compacted in such a manner that minimizes the development of slack in the geogrid and installation damage.
- B. Reinforced backfill shall be placed and compacted in lifts not to exceed 6 inches (150 mm) where hand compaction is used, or 8-10 inches (200 to 250 mm) where heavy compaction equipment is used. Lift thickness shall be decreased to achieve the required density as required.
- C. Reinforced backfill shall be compacted to a minimum of 95 % Standard Proctor density per ASTM D-698 or 92% Modified Proctor Density per ASTM D1557. The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer and shall be dry of optimum, ± 0% - 3%.
- D. Only lightweight hand-operated equipment shall be allowed within 3 feet (1 m) from the tail of the concrete unit.
- E. Tracked construction equipment shall not be operated directly upon the geogrid reinforcement. A minimum fill thickness of 6 inches (150 mm) is required prior to operation of tracked vehicles over the geogrid. Tracked vehicle turning should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.
- F. Rubber tired equipment may pass over geogrid reinforcement at slow speeds, less than 10 MPH (15 KPH). Sudden braking and sharp turning shall be avoided.
- G. At the end of each day's operation, the Contractor shall slope the last lift of reinforced backfill away from the wall units to direct runoff away from wall face. The Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.
- 3.06 Cap Installation**
- A. Cap units shall be glued to underlying units with an all-weather adhesive recommended by the manufacturer such as Keystone Kapsal.
- 3.07 As-built Construction Tolerances**
- A. Vertical alignment: ± 1.5" (40 mm) over any 10' (3 m) distance.
- B. Wall Batter: within 2 degrees of design batter.
- C. Horizontal alignment: ± 1.5" (40 mm) over any 10' (3 m) distance.
- D. Corners, bends & curves: ± 1" (25 mm) to theoretical location.
- E. Maximum horizontal gap between erected units shall be ≤ 1/2 inch (13 mm).
- 3.08 Field Quality Control**
- A. **Quality Assurance** - The Owner shall engage inspection and testing services, including independent laboratories, to provide quality assurance and testing services during construction. This does not relieve the Contractor from securing the necessary construction quality control testing.
- B. **Quality Assurance** should include foundation soil inspection, verification of geotechnical design parameters, and verification that the contractor's quality control testing is adequate as a minimum. Quality assurance shall also include observation of construction for general compliance with design drawings and project specifications. (Quality Assurance is usually best performed by the site geotechnical engineer.)
- C. **Quality Control** - The Contractor shall engage inspection and testing services to perform the minimum quality control testing described in the retaining wall design plans and specifications. Only qualified and experienced technicians and engineers shall perform testing and inspection services.
- D. **Quality Control** testing shall include soil and backfill testing to verify soil types and compaction and verification that the retaining wall is being constructed in accordance with the design plans and project specifications.



RETAINING WALL NOTES

1. The details and notes shown hereon are for informational purposes and do not represent a design for construction purposes. The Construction Plans and details shall be shown on the Site Development plans as required by Howard County.
2. All retaining walls 30" in height or greater shall require a fence of at least 36" in height with openings less than 4" in width along the walls entire top length. The specified fence shall be able to withstand 200 lbs of loading (applied horizontally) minimally at any point.



TYP. SECTION FOR PROPOSED PRIVATE RAIN GARDENS OUTFALLING THRU KEYSTONE GRAVITY RETAINING WALL
SCALE: N.T.S.

RAIN GARDEN FACILITY DIMENSION TABLE

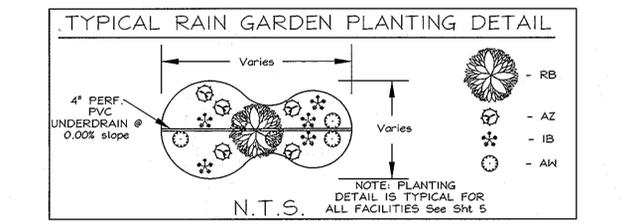
Facility No.	Width	Length	Square Feet	Depth	Top of Trench	Inv. Out.	Top Mulch Elev.	Location
1	8'	12.5'	100	3.17'	220.42	217.25	220.42	Lot 2
2	8'	12.0'	96	3.17'	218.84	215.67	218.84	Lot 2
3	7'	14'	98	3.17'	215.84	212.67	215.84	Lot 3
4	9.5'	11'	104.5	3.17'	214.84	211.67	214.84	Lot 3

* Inv. = 4" Pipe Invert
- Top Mulch Layer

RAIN GARDEN LANDSCAPE SCHEDULE

SYMBOL	QNTY	COMMON NAME	SCIENTIFIC NAME	SIZE	REMARKS
SHADE TREES					
RB	4	River Birch (Heritage) (Zapala Birch)	Betula nigra 'Heritage'	10' - 12' Ht.	B & B
SHRUBS					
AZ	16	Azalea	Azalea sp.	18" - 24" Ht.	container 3" o.c.
IB	12	Inkberry	Ilex glabra	18" - 24" Ht.	container 3" o.c.
AW	12	Amorwood	Viburnum dentatum	18" - 24" Ht.	container 3" o.c.

Planting Distribution: Rain Garden Facilities #1, #2, #3 & #4
(1) RB, (2) AZ, (3) IB & (3) AW



B.4.C Specifications for Micro-Bioretenion, Rain Gardens, Landscape Infiltration & Infiltration Berms

- 1. Material Specifications**
- The allowable materials to be used in these practices are detailed in Table B.4.1.
- 2. Filtering Media or Planting Soil**
- The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the micro-bioretenion practice that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The planting soil shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds as specified under COTIAR 15.0B.01.05.
- The planting soil shall be tested and shall meet the following criteria:
- Soil Component - Loamy Sand or Sandy Loam (USDA Soil Textural Classification)
 - Organic Content - Minimum 10% by dry weight (ASTM D 2974). In general, this can be met with a mixture of loamy sand (60%-65%) and compost (35% to 40%) or sandy loam (30%), coarse sand (30%), and compost (40%).
 - Clay Content - Field soil shall have a clay content of less than 5%.
 - pH Range - Should be between 5.5 - 7.0. Amendments (e.g., lime, iron sulfate plus sulfur) may be mixed into the soil to increase or decrease pH.
- There shall be at least one soil test per project. Each test shall consist of both the standard soil test for pH, and additional tests of organic matter, and soluble salts. A texture analysis is required from the site stockpiled topsoil. If topsoil is imported, then a texture analysis shall be performed for each location where the topsoil was excavated.
- 3. Compaction**
- It is very important to minimize compaction of both the base of bioretention practices and the required backfill. When possible, use excavation hoers to remove original soil. If practices are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high-pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure.
- Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to refracture the soil profile through the 12 inch composition zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.
- Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfilling the optional sand layer. Pump any ponded water before preparing (rototilling) base.
- When backfilling the topsoil over the sand layer, first place 3 to 4 inches of topsoil over the sand, then rototill the sand/topsoil to create a gradation zone. Backfill the remainder of the topsoil to final grade.
- When backfilling the bioretention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bioretention basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

- 4. Plant Material**
- Recommended plant material for micro-bioretenion practices can be found in Appendix A, Section A.2.3.
- 5. Plant Installation**
- Compost is a better organic material source, is less likely to float, and should be placed in the invert and other low areas. Mulch should be placed in surrounding to a uniform thickness of 2" to 3". Shredded or chipped hardwood mulch is the only accepted mulch. Fine mulch and wood chips will float and move to the perimeter of the bioretention area during a storm event and are not acceptable. Shredded mulch must be well aged (6 to 12 months) for acceptance.
- Rootstock of the plant material shall be kept moist during transport and on-site storage. The plant root ball should be planted so 1/8th of the ball is above final grade surface. The diameter of the planting pit shall be at least six inches larger than the diameter of the planting ball. Set and maintain the plant straight during the entire planting process. Thoroughly water ground bed cover after installation.
- Trees shall be braced using 2" x 2" stakes only as necessary and for the first growing season only. Stakes are to be equally spaced on the outside of the tree ball.
- Grasses and legume seed should be drilled into the soil to a depth of at least one inch. Grass and legume plugs shall be planted following the non-grass ground cover planting specifications.
- The topsoil specifications provide enough organic material to adequately supply nutrients from natural cycling. The primary function of the bioretention structure is to improve water quality. Adding fertilizers defeats, or at a minimum, impedes this goal. Only add fertilizer if wood chips or mulch are used to amend the soil. Rototill urea fertilizer at a rate of 2 pounds per 1000 square feet.
- 6. Underdrains**
- Underdrains should meet the following criteria:
- Pipe - Should be 4" to 6" diameter, slotted or perforated rigid plastic pipe (ASTM F 758, Type PS 28, or AASHTO-M-278) in a gravel layer. The preferred material is slotted, 4" rigid pipe (e.g., PVC or HDPE).
 - Perforations - If perforated pipe is used, perforations should be 3/8" diameter located 6" on center with a minimum of four holes per row. Pipe shall be wrapped with a 1/4" (No. 4 or 4x4) galvanized hardware cloth.
 - Gravel - The gravel layer (No. 57 stone preferred) shall be at least 3" thick above and below the underdrain.
 - The main collector pipe shall be at a minimum 0.5% slope.
 - A rigid, non-perforated observation well must be provided (one per every 1,000 square feet) to provide a clean-out port and monitor performance of the filter.
 - A 4" layer of pea gravel (1/8" to 3/8" stone) shall be located between the filter media and underdrain to prevent migration of fines into the underdrain. This layer may be considered part of the filter bed when bed thickness exceeds 24".
- The main collector pipe for underdrain systems shall be constructed at a minimum slope of 0.5%. Observation wells and/or clean-out pipes must be provided (one minimum per every 1000 square feet of surface area).
- 7. Miscellaneous**
- These practices may not be constructed until all contributing drainage area has been stabilized.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Kat Shuland
CHIEF, DIVISION OF LAND DEVELOPMENT

10/25/10
DATE

John J. Burton
CHIEF, DEVELOPMENT ENGINEERING DIVISION

10/11/10
DATE

FRONT VIEW DECORATIVE FENCE DETAIL
SCALE: 3/4" = 1'-0"

DEVELOPER'S / BUILDER'S CERTIFICATION

I certify that the landscaping shown on this plan will be done according to the plan, Section 16.124 of the Howard County Code and the Howard County Landscape Manual. I further certify that upon completion a Letter of Landscape Installation, accompanied by an executed One Year Guarantee of Plant Materials will be submitted to the Department of Planning and Zoning.

John J. Burton
SIGNATURE OF DEVELOPER / BUILDER

9/20/10
DATE

STATE OF MARYLAND
PROFESSIONAL ENGINEER

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. 19188, EXPIRATION DATE: 6/30/11.

SIGNED: *BRUCE D. BURTON*
BRUCE D. BURTON

DATE: *9/16/10*

REVISIONS

No.	Date	Description

LDE Inc.
Engineers, Surveyors, Planners
9250 Ramsey Road, Suite 106 Columbia, Maryland - 21045
(410)715-1070 - (301)596-3424 - FAX (410)715-9540

DESIGNED: SDH LDE
DRAWN: GDW LDE
CHECKED: BDB

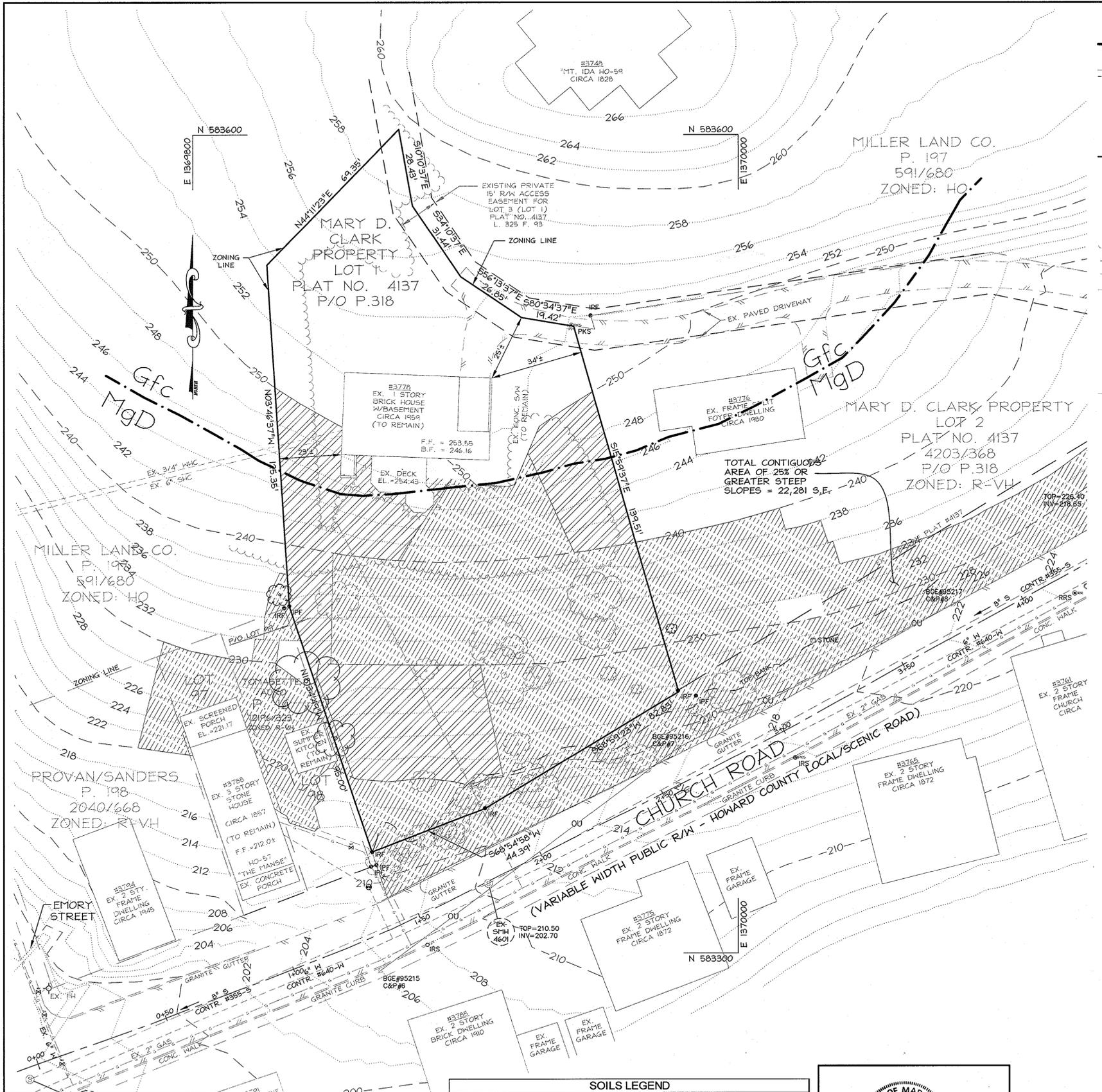
DATE: 9/20/10

SCALE: AS SHOWN
DRAWING: 2 OF 5
JOB NO.: 06-035
FILE NO.: F-10-077

ANN'S DELIGHT
LOTS 1 - 3
A Resubdivision of the Mary D. Clark Property,
Lot 1, Plat No. 4137

Tax Map No. 25A - Parcel 318
2nd Election District - Howard County, Maryland
Previous Submitters: F78-156, VP78-91, WF 10-074

OWNER/DEVELOPER: Mr. Charles E. Hogg Jr.
3784 Church Road
Ellicott City, MD 21043
Phone: 410-461-1650

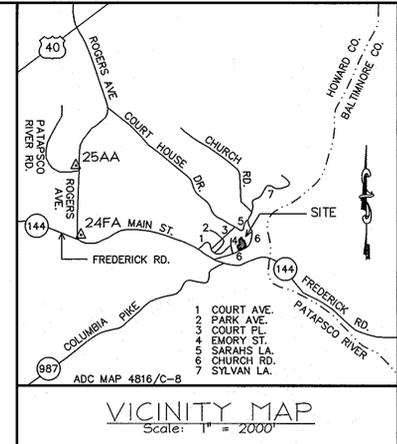


LEGEND:

- SOILS BOUNDARY
- EXISTING CONTOURS
- STEEP SLOPES (15% - 24.9%)
- STEEP SLOPES (25% OR GREATER)
- SUBDIVISION BOUNDARY
- IRON ROD FOUND
- IRON PIPE FOUND
- P. K. NAIL SET
- EX. TREE
- EXISTING BRUSH LINE
- EXISTING PAVING
- EXIST. OVERHEAD ELECTRIC
- EXIST. POWER POLE
- EXIST. WATER METER
- EXIST. WATER VALVE
- EXIST. FIRE HYDRANT
- EXIST. SANITARY MANHOLE
- EXIST. SANITARY CLEAN OUT
- EXIST. GAS LINE
- EXIST. GAS VALVE

LANDSCAPE NOTES:

1. This plan has been prepared in accordance with the provisions of Section 16.124 of the Howard County Code and Landscape Manual.
2. The Owner/Developer is responsible for the planting of all plant material required to meet the standards established by the Howard County Landscape Manual.
3. Financial Surety in the amount of \$2,700.00 for 9 shade trees is deferred until site development plan approval for the initial lot to be developed, Lot 2 or Lot 3.

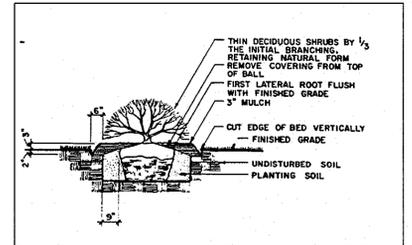
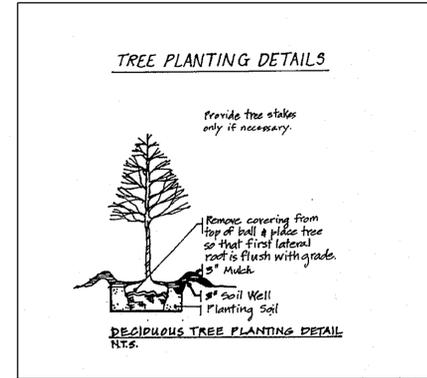


Category	Adjacent to Perimeter Properties		
	A ①	A ②	A ③
Landscape Type	127 L.F.	125 L.F.	83 L.F.
Linear Feet of Roadway Frontage/Perimeter			
Credit for Existing Vegetation (Yes, No, Linear Feet) (Describe below if needed)	YES* (2) Shade	NO	NO
Credit for Wall, Fence or Berm (Yes, No, Linear Feet) (Describe below if needed)	NO	NO	YES** (2) Shade
Number of Plants Required	(2) Shade Tree ***	N/A	(2) Shade Tree ***
Number of Plants Provided	2 Shade CREDIT	N/A	2 Shade CREDIT

SCENARIO A SCENIC ROAD - LANDSCAPE EDGE	
Category	Adjacent to Roadways ④
Landscape Type	B
Linear Feet of Roadway Frontage/Perimeter	128 L.F.
Credit for Existing Vegetation (Yes, No, Linear Feet) (Describe below if needed)	NO
Credit for Wall, Fence or Berm (Yes, No, Linear Feet) (Describe below if needed)	NO
Number of Plants Required	4 = 1 PER 40 = 3.2 3 = 1 PER 50 = 2.6
Number of Plants Provided	7 SHADE TOTAL 0 0 6 MINOR = 3 SHADE 40 SHRUB = 4 SHADE

* CREDIT FOR 2 SHADE TREES ALONG PERIMETER ①
 ** CREDIT FOR 83 L.F. DECORATIVE FENCING ALONG PERIMETER ③
 HOWEVER REQUIRED SURETY FOR 2 REQUIRED TREES SHALL BE POSTED
 *** PERIMETERS ① & ③ = 210 L.F. TOTAL / 160 = 3.5 OR 4 SHADE REQ.

SCENIC ROAD PERIMETER PLANTING SCHEDULE					
SYMB.	COMMON NAME	BOTANICAL NAME	QTY	SIZE	REMARKS
○	Crapemyrtle	Lagerstromia Indica	6	6' to 8' HT	3 Stems Min
□	Compact Japanese Holly	Ilex x Crenata "Compacta"	40	2 1/2' - 3' HT	Train as Hedge to 3' Max HT.



SOILS LEGEND			
HYDROLOGIC SOIL GROUP	SOIL SYMBOL	DESCRIPTION	REMARKS
B	MgD	Manor - Bannertown sandy loams 15% - 25% slopes, rocky	
B	GIC	Gladstone - Urban land complex 8% - 15% slopes	

STATE OF MARYLAND
 BRUCE D. BURTON
 PROFESSIONAL ENGINEER
 No. 19184
 EXPIRATION DATE: 6/30/11

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. 19184. EXPIRATION DATE: 6/30/11.

SIGNED: BRUCE D. BURTON
 DATE: 9/16/10

DEVELOPER'S / BUILDER'S CERTIFICATION
 I certify that the landscaping shown on this plan will be done according to the plan, Section 16.124 of the Howard County Code and the Howard County Landscape Manual. I further certify that upon completion a Letter of Landscape Installation, accompanied by an executed One Year Guarantee of Plant Materials will be submitted to the Department of Planning and Zoning.

SIGNATURE OF DEVELOPER / BUILDER: [Signature]
 DATE: 9/20/10

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[Signature]
 CHIEF, DIVISION OF LAND DEVELOPMENT
 DATE: 10/5/10

[Signature]
 CHIEF, DEVELOPMENT ENGINEERING DIVISION
 DATE: 10/10/10

REVISIONS		
No.	Date	Description

LDE Inc.
 Engineers, Surveyors, Planners
 9250 Ramsay Road, Suite 106 Columbia, Maryland - 21045
 (410)715-1070 - (301)596-3424 - FAX (410)715-9540

DESIGNED: SDH LDE	SOILS MAP AND LANDSCAPE PLAN NOTES & DETAILS	SCALE: 1" = 20'
DRAWN: GDW LDE	ANN'S DELIGHT LOTS 1 - 3 A Resubdivision of the Mary D. Clark Property, Lot 1, Plat No. 4137	DRAWINGS: 4 OF 5
CHECKED: BDB	Tax Map No. 25A - Parcel 318 2nd Election District - Howard County, Maryland Previous Submittals: F78-156, VP78-91, WP 10-074	JOB NO.: 06-035
DATE: 9/20/10	OWNER/DEVELOPER: Mr. Charles E. Hogg Jr. 3784 Church Road Ellicott City, MD 21043 Phone: 410-461-1650	FILE NO.: F-10-077

