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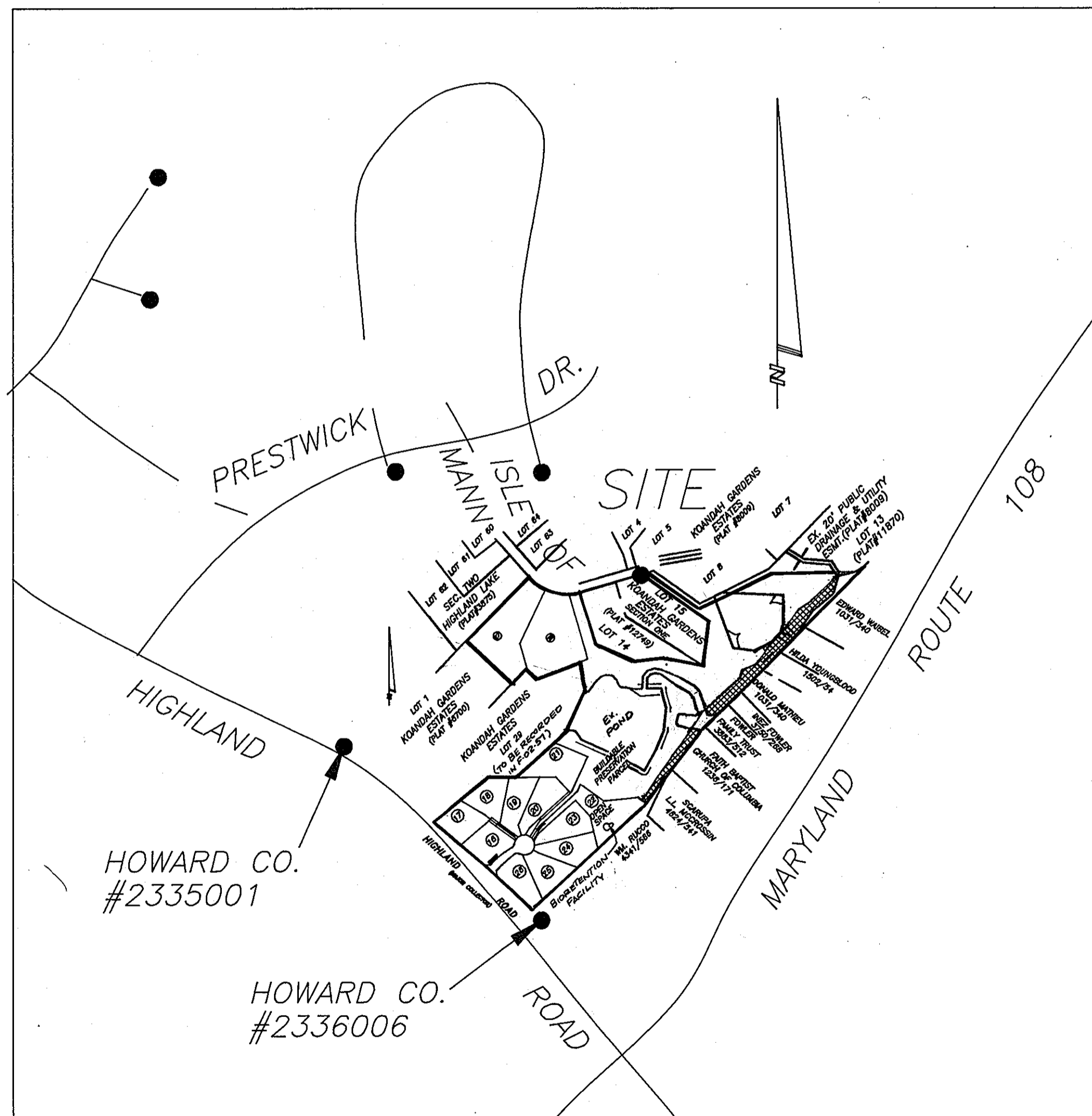
FINAL ROAD CONSTRUCTION, GRADING AND STORM DRAIN PLANS KOANDAH GARDENS ESTATES LOTS 16-28 & PRESERVATION PARCEL 'A' TAX MAP 34 BLOCK 23 PARCEL 78 FIFTH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

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 410-313-1880 AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE START OF WORK.
- THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
- TRAFFIC CONTROL DEVICES, MARKINGS AND SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). ALL STREETS AND REGULATORY SIGNS SHALL BE IN PLACE PRIOR TO THE PLACEMENT OF ANY ASPHALT.
- STREET LIGHT PLACEMENT AND THE TYPE OF FIXTURE AND POLE SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL, VOLUME III (1993) AND AS MODIFIED BY "GUIDELINES FOR STREET LIGHTS IN RESIDENTIAL DEVELOPMENTS (JUNE 1993)
A MINIMUM SPACING OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.
- THE EXISTING ON-SITE TOPOGRAPHY IS TAKEN FROM FIELD-RUN SURVEY WITH A (MAXIMUM TWO FOOT) CONTOUR INTERVAL BY SHANABERGER AND LANE IN FEBRUARY OF 1987 AND UPDATED IN OCTOBER, 1989, MAY, 1998, & JUNE, 2000. THE EXISTING OFF-SITE TOPOGRAPHY IS TAKEN FROM HOWARD COUNTY 1"=200' AERIAL PHOTOGRAMMETRY.
- THE HORIZONTAL DATUM SHOWN IS BASED ON A BOUNDARY SURVEY BY SHANABERGER & LANE IN NOVEMBER 1985 TIED TO NAD 27 HOWARD COUNTY CONTROL STATIONS:

HOWARD COUNTY MONUMENT NO. 2335001	N491927.689 E810007.883
HOWARD COUNTY MONUMENT NO. 2336006	N490911.794 E811231.155

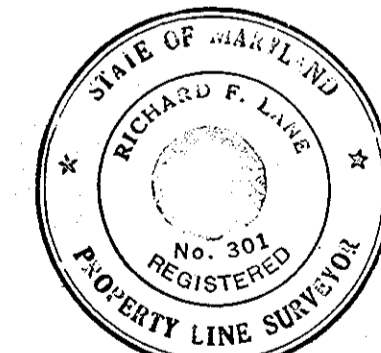
BENCHMARKS:
 HOWARD COUNTY MONUMENT NO. 2335001 EL:517.98
 HOWARD COUNTY MONUMENT NO. 2336006 EL:507.69
- WATER IS PRIVATE.
- SEWER IS PRIVATE.
- STORMWATER MANAGEMENT IS PROVIDED FOR THE PUBLIC ROAD IN THIS PROJECT BY A PRIVATELY OWNED AND MAINTAINED BIORETENTION FACILITY LOCATED ON OPEN SPACE LOT 22.
- EXISTING UTILITIES SHOWN HEREON WERE FIELD-LOCATED.
- THE FLOODPLAIN STUDY FOR THIS PROJECT WAS PREPARED IN 1989 BY SHANABERGER & LANE, AND APPROVED WITH F-90-76.
- FOREST STAND DELINEATION AND WETLAND INVESTIGATION WAS PERFORMED BY EXPLORATION RESEARCH INC. DATED SEPTEMBER 17, 1997.
- A TRAFFIC STUDY WAS PERFORMED BY LEE CUNNINGHAM & ASSOC. INC., APPROVED UNDER S-99-07.
- PROJECT BACKGROUND INFORMATION:
 TAX MAP 34 PARCEL 78
 TOTAL AREA TRACT: 40.0001 AC.±
 NO. OF PROPOSED LOTS:
 RESIDENTIAL: 3-ACRE LOTS: 2
 CLUSTER LOTS: 10
 BUILDABLE PRESERVATION PARCEL: 1
 OPEN SPACE: 1
 PRELIMINARY PLAN APPROVAL DATE: MARCH 14, 2001
 PREVIOUS FILE NOS. VP-86-26, S-87-49, P-887-53, F-87-200, F-86-91,
 F-90-76, F-95-121, F-97-145, S-99-07, P-01-003.
 DESIGN MANUAL WAIVER APPROVED SEPT. 14, 1999 TO USE AN ALTERNATE TYPICAL CROSS SECTION FOR KOANDAH CT. WAS APPROVED WITH S-99-07.
 3 DEMONSTRATION UNITS ARE BEING TRANSFERRED TO THIS SUBDIV. FROM THE "HOLTZINGER PROPERTY" (TAX MAP 16, PARCEL 7)
- A GEOTECHNICAL INVESTIGATION WAS PREPARED BY MARSHALL ENGINEERING INC.
- FOREST CONSERVATION OBLIGATIONS ARE MET THROUGH OFFSITE RETENTION = 4.18 AC. & ON-SITE RETENTION = 2.05 AC.
 FOREST CONSERVATION SURETY HAS BEEN PROVIDED IN THE AMOUNT OF \$56,275.76 FOR RETENTION



VICINITY MAP
SCALE: 1" = 600'

ROAD CLASSIFICATION CHART					
ROAD NAME	CLASSIFICATION	R/W WIDTH	DESIGN SPEED	PAVING TYPE	LIMITS
KOANDAH GARDENS	LOCAL	VARIABLE WIDTH	25	PAVING - P-2	0+00-2+90.49

- LANDSCAPING SURETY HAS BEEN PROVIDED IN THE AMOUNT OF \$16,050.00 WITH THE DEVELOPERS AGREEMENT.
- 3.2264 ACRES OF LAND HAVE BEEN TRANSFERRED TO AN ADJOINING LOT THROUGH F-02-57 (PLAT # 18372-1) UPON SUBDIVISION OF THE LOT TO WHICH IT IS TRANSFERRED, SEPARATE FOREST CONSERVATION CALCULATIONS AND REQUIREMENTS WILL BE PROVIDED BASED ON ITS ACREAGE AND LOT SIZE.
- THIS PLAN IS SUBJECT TO COMPLIANCE WITH THE FOURTH EDITION OF THE SUBDIVISION REGULATIONS. IN ADDITION, BECAUSE IT HAD A PRELIMINARY PLAN APPROVAL PRIOR TO NOVEMBER 1, 2001, IT IS SUBJECT TO THE OCTOBER 18, 1995 ZONING REGULATIONS (AS AMENDED 7-12-01).



Richard F. Lane #301
ROAD & STORM DRAIN AS-BUILT

APPROVED: DEPARTMENT OF PUBLIC WORKS

Andrew M. Danek 7-12-02
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

Cindy Harvath 7/25/02
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Michael Primm 7/18/02
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE



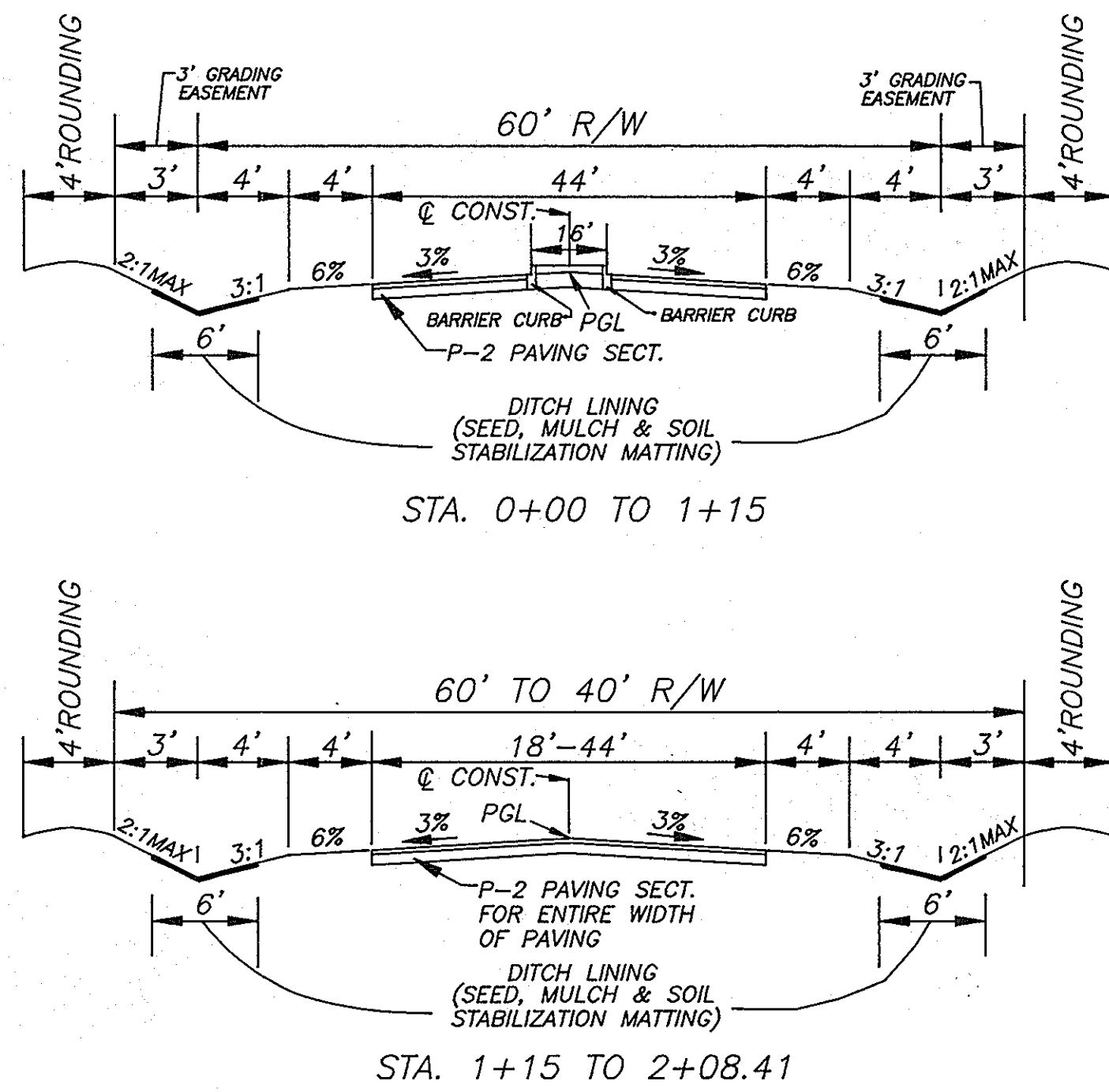
Richard F. Lane
10/10/2001
11/1/2002

OWNERS/DEVELOPERS
 JAMES M. SANBORN
 EMILIE S. SANBORN
 4967 TEN OAKS ROAD
 DAYTON, MD. 21036

KOANDAH GARDENS
 ESTATES
 LOTS 16-28 & PRESERVATION
 PARCEL 'A'
 ZONED: RR-DEO
 5TH ELECTION DIST. HOWARD CO., MD.
 SCALE AS SHOWN DATE: JULY, 2001 DWG. 1 OF 14
 DES. *ESL* DRN. RGF CHK. GSS
 SHANABERGER & LANE
 8726 TOWN & COUNTRY BLVD.
 SUITE 201
 ELLICOTT CITY, MD., 21043
 (410)-461-9563

Q CURVE DATA KOANDAH GARDENS					
CURVE NO.	DELTA	RADIUS	LENGTH	TAN	CHORD
①	24°42'36"	500.00'	215.64'	109.52	N54°01'51"E 213.97'

LINEAR PROFILE CURVE DATA KOANDAH GARDENS					
CURVE NO.	DELTA	RADIUS	LENGTH	TAN	CHORD
②	53°39'27"	40.00'	37.46'	20.23'	N31°02'05"E 36.11'
③	295°24'53"	52.00'	268.11'	-32.86'	S28°05'07"E 55.56'
④	62°38'19"	40.00'	43.73'	24.34'	S88°18'05"W 41.59'



TYPICAL ROAD SECTION
N.T.S.

APPROVED: DEPARTMENT OF PUBLIC WORKS

Andrew M. Spivey 7-12-02
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING

Conita Hamat 7/25/02
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

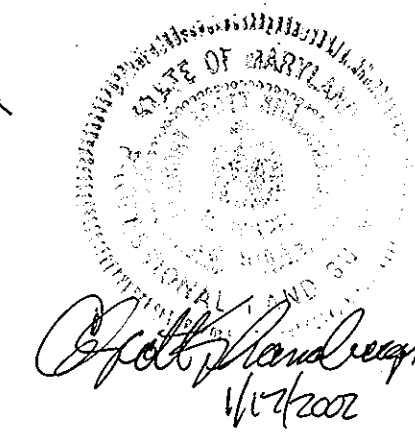
Richard F. Lane 7/18/02
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE



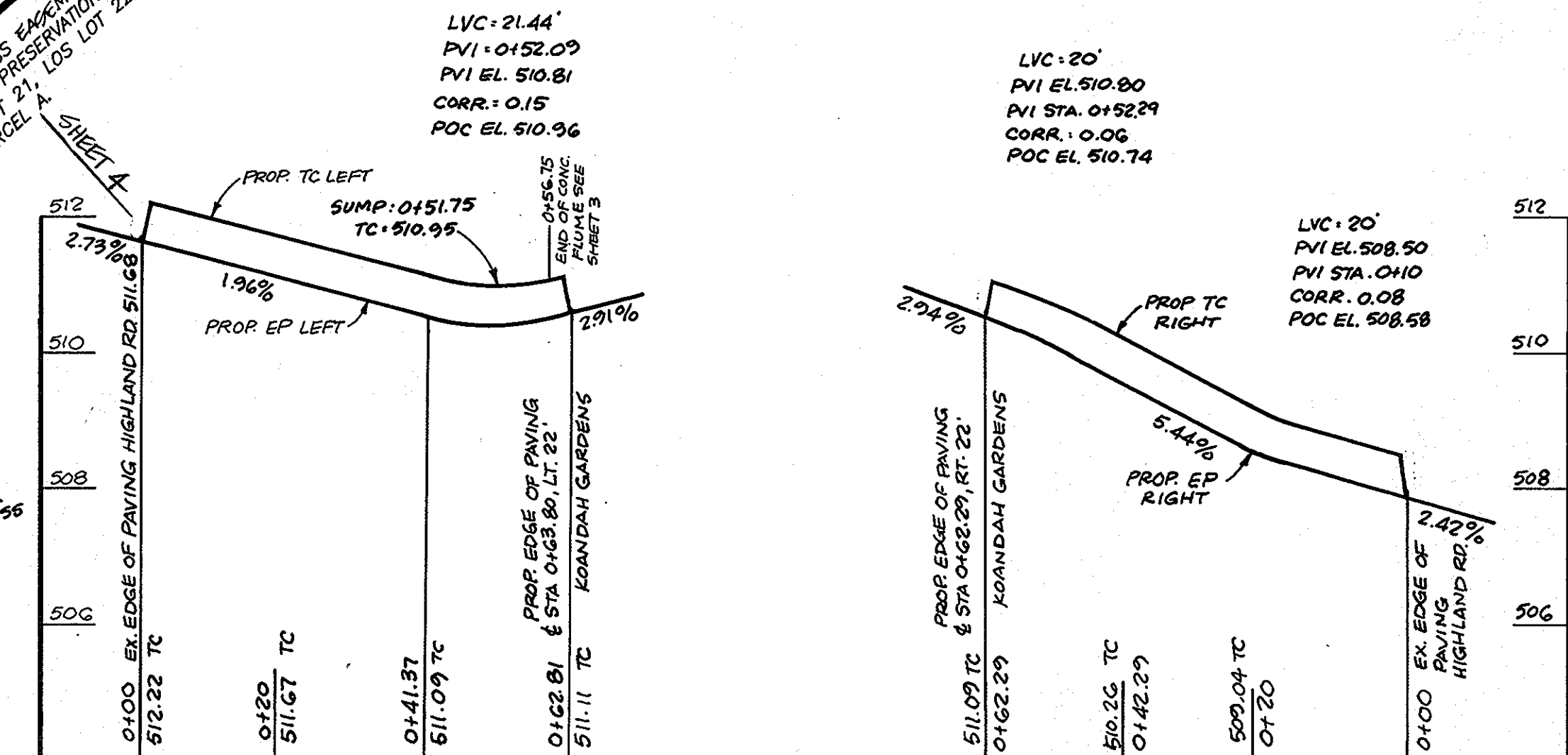
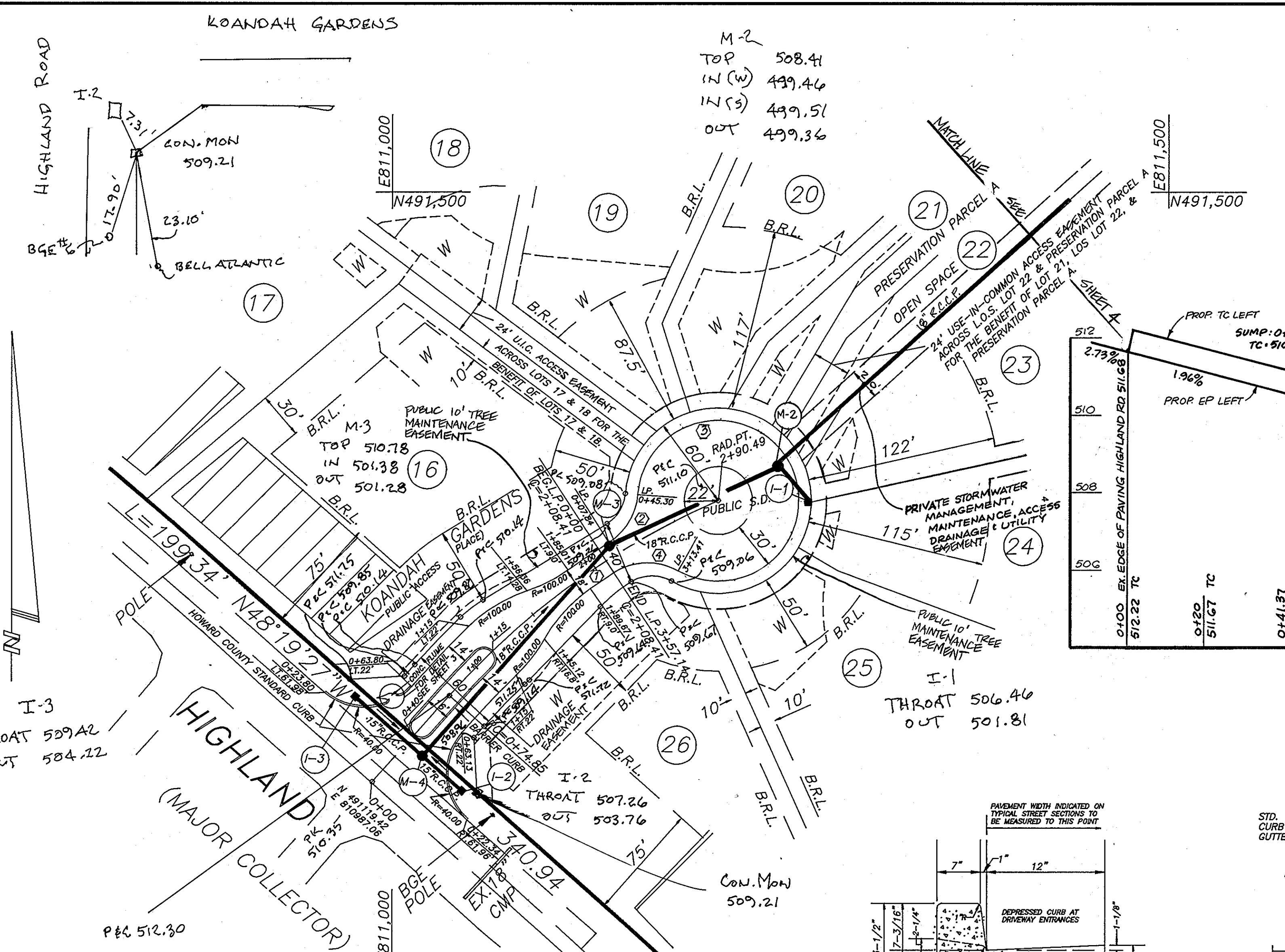
Richard F. Lane #301
ROAD & STORM DRAIN AS-BUILT

M-4
TOP 509.57
IN (W) 509.57
IN (S) 503.57
OUT 503.47

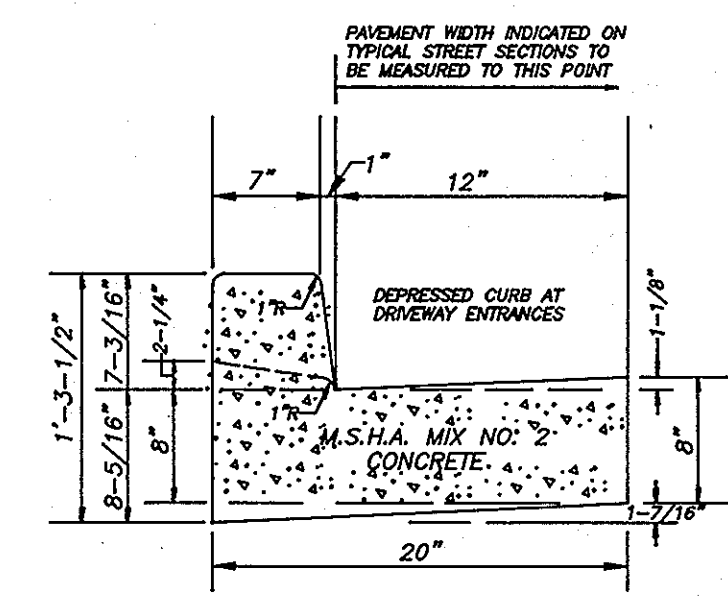
PLAN
SCALE: 1"=50'



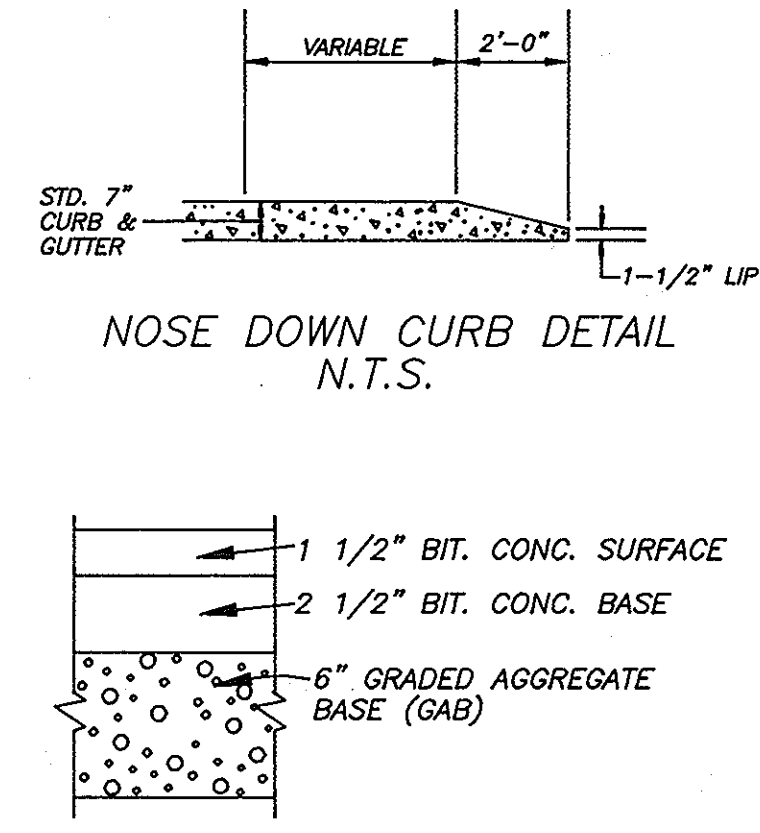
Richard F. Lane 7/18/02



FILLET PROFILES
SCALE: HOR. 1"=20'
VERT. 1"=2'



STANDARD 7" COMBINATION CURB & GUTTER
N.T.S.



NOSE DOWN CURB DETAIL
N.T.S.

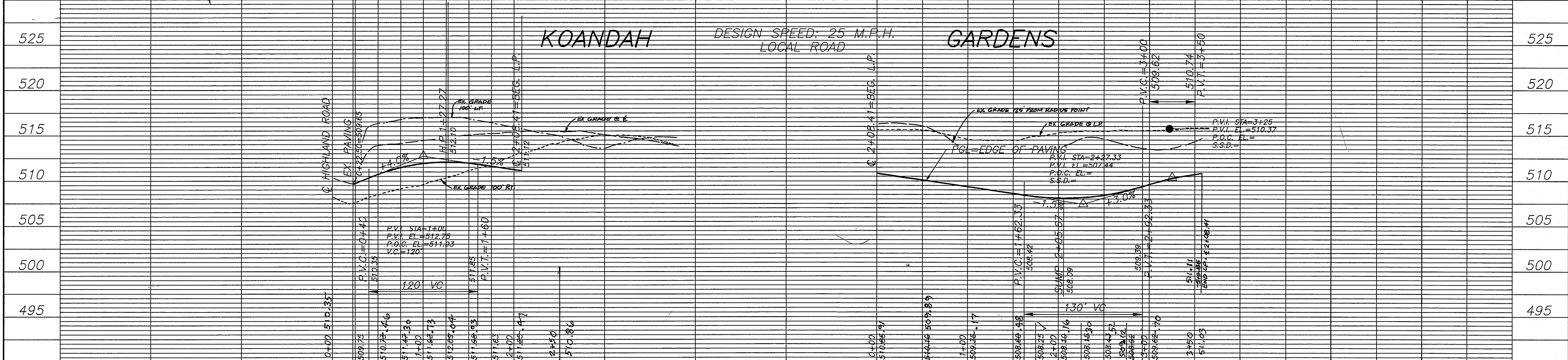
OWNERS/DEVELOPERS
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EMILIE S. SANBORN
4967 TEN OAKS ROAD
DAYTON, MD. 21036

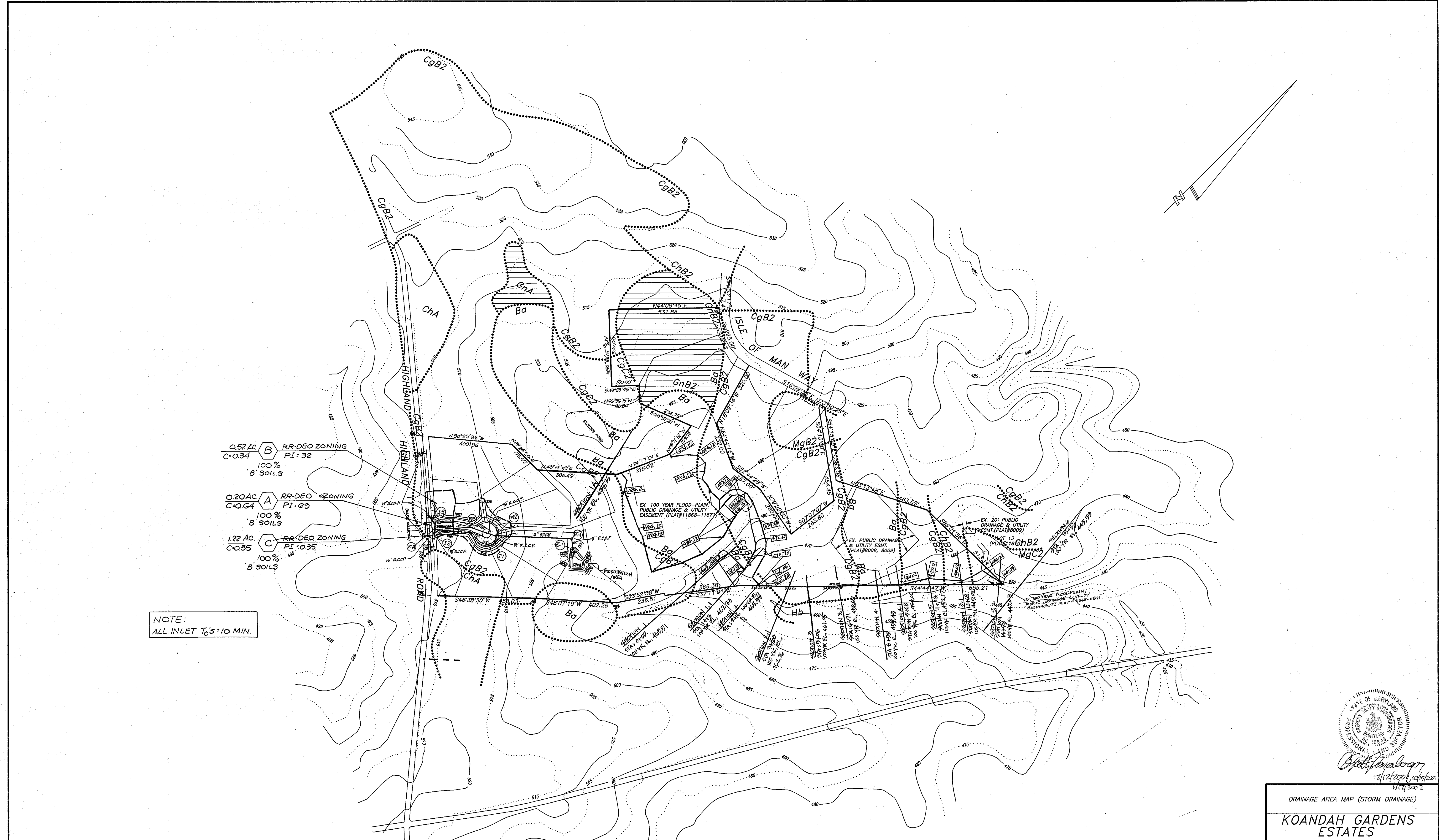
KOANDAH GARDENS ESTATES
LOTS 16-28 & PRESERVATION PARCEL 'A'
ZONED: RR-DEO
3RD ELECTION DIST. HOWARD CO., MD.

KOANDAH GARDENS
PLAN AND PROFILE

SCALE: AS SHOWN DATE: JULY 2001 DWG. 2 OF 14
DES. GSS DRN. RGF CHK. GSS

SHANABERGER & LANE
8726 TOWN & COUNTRY BLVD.
SUITE 201
ELLCOTT CITY, MD. 21043
(410)-461-9563





NOTE:
ALL INLET T_C'S = 10 MIN.

0.52 AC. RR-DEO ZONING
C-0.34 PI=32
100%
B' SOILS

0.20 AC. RR-DEO ZONING
C-0.64 PI=69
100%
B' SOILS

1.22 AC. RR-DEO ZONING
C-0.35 PI=0.35
100%
B' SOILS

APPROVED: DEPARTMENT OF PUBLIC WORKS
Andrew M. Danile 7-12-02
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
Andra Hamrick 7/25/02
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Michael J. ... 7/18/02
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

DRAINAGE AREA MAP
SCALE: 1"=200'

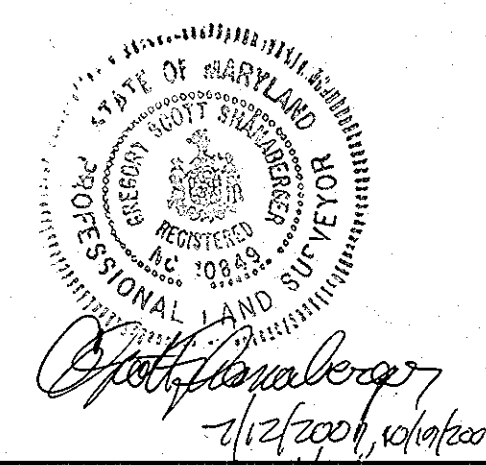
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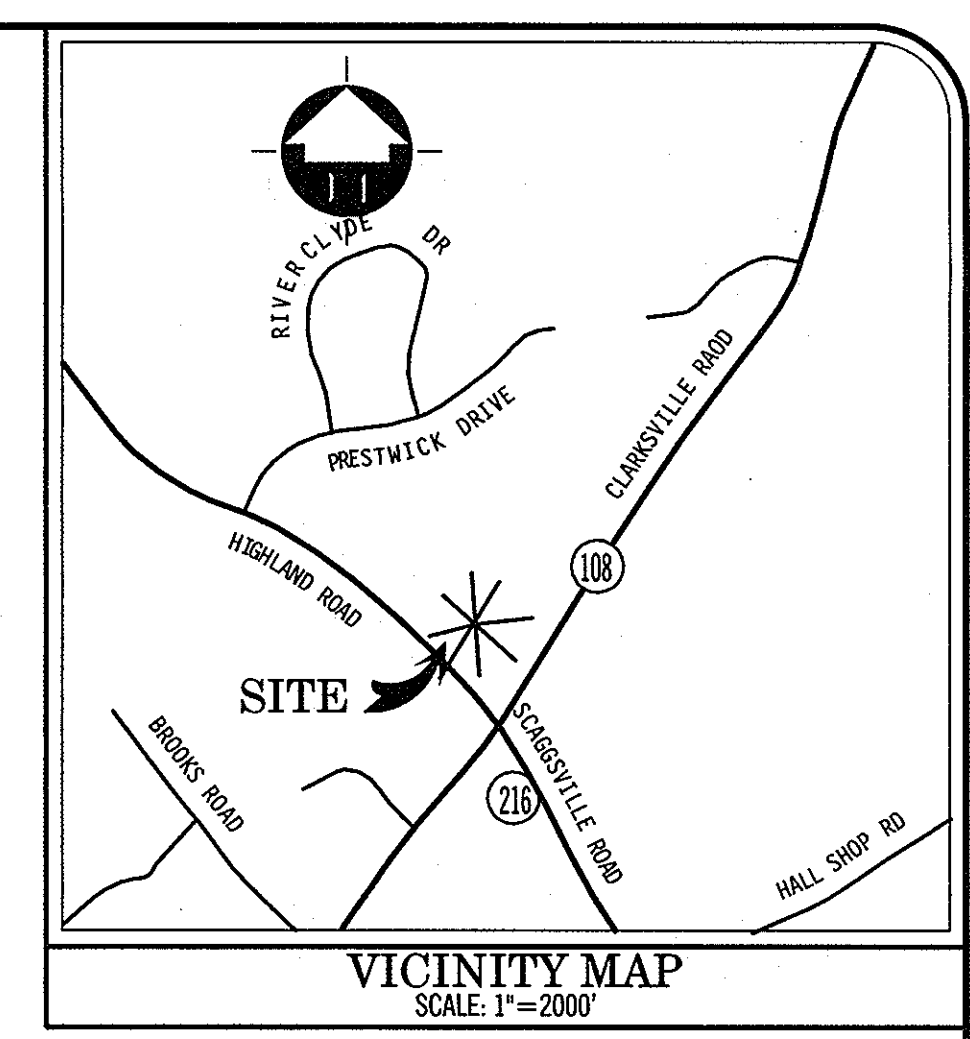
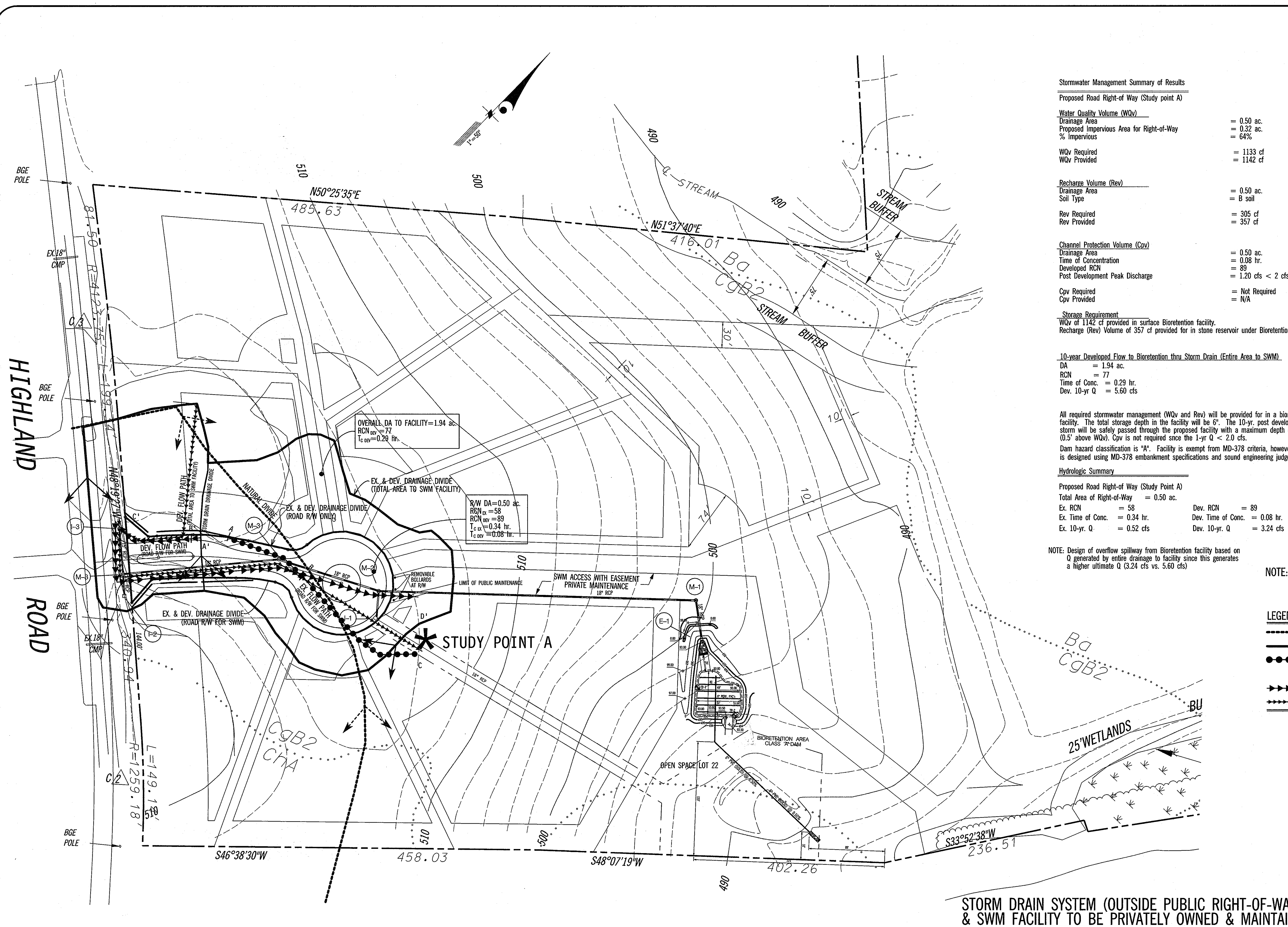
DRAINAGE AREA MAP (STORM DRAINAGE)

KOANDAH GARDENS ESTATES
LOTS 16-28 & PRESERVATION PARCEL 'A'
ZONED: RR-DEO
5TH ELECTION DIST. HOWARD CO., MD.

SCALE: AS SHOWN DATE: JULY, 2001 DWG. 6 OF 14
DES. GSS DRN. RGF CHK. GSS

SHANABERGER & LANE
8726 TOWN & COUNTRY-BLVD.
SUITE 201
ELLICOTT CITY, MD., 21043
(410)-461-9563





Stormwater Management Summary of Results

Proposed Road Right-of-Way (Study point A)

Water Quality Volume (WQv)	
Drainage Area	= 0.50 ac.
Proposed Impervious Area for Right-of-Way	= 0.32 ac.
% Impervious	= 64%
WQv Required	= 1133 cf
WQv Provided	= 1142 cf
Recharge Volume (Rev)	
Drainage Area	= 0.50 ac.
Soil Type	= B soil
Rev Required	= 305 cf
Rev Provided	= 357 cf
Channel Protection Volume (Cpv)	
Drainage Area	= 0.50 ac.
Time of Concentration	= 0.08 hr.
Developed RCN	= 89
Post Development Peak Discharge	= 1.20 cfs < 2 cfs
Cpv Required	= Not Required
Cpv Provided	= N/A
Storage Requirement	
WQv of 1142 cf provided in surface Bioretention facility.	
Recharge (Rev) Volume of 357 cf provided for in stone reservoir under Bioretention.	
10-year Developed Flow to Bioretention thru Storm Drain (Entire Area to SWM)	
DA	= 1.94 ac.
RCN	= 77
Time of Conc.	= 0.29 hr.
Dev. 10-yr Q	= 5.60 cfs

All required stormwater management (WQv and Rev) will be provided for in a bioretention facility. The total storage depth in the facility will be 6". The 10-yr. post development storm will be safely passed through the proposed facility with a maximum depth of 1.0' (0.5' above WQv). Cpv is not required since the 1-yr Q < 2.0 cfs.

Dam hazard classification is "A". Facility is exempt from MD-378 criteria, however, facility is designed using MD-378 embankment specifications and sound engineering judgement.

Hydrologic Summary

Proposed Road Right-of-Way (Study Point A)

Total Area of Right-of-Way	= 0.50 ac.	Dev. RCN	= 89
Ex. RCN	= 58	Dev. Time of Conc.	= 0.08 hr.
Ex. Time of Conc.	= 0.34 hr.	Dev. 10-yr. Q	= 3.24 cfs
Ex. 10-yr. Q	= 0.52 cfs		

NOTE: Design of overflow spillway from Bioretention facility based on Q generated by entire drainage to facility since this generates a higher ultimate Q (3.24 cfs vs. 5.60 cfs)

NOTE: EXISTING & DEVELOPED DRAINAGE DIVIDES ARE ASSUMED TO BE IDENTICAL FOR THE SWM REQUIRED FOR ROAD.

LEGEND

---	NATURAL DRAINAGE DIVIDES
---	DEVELOPED DRAINAGE DIVIDES
●●●●●	EXISTING FLOW PATH (R/W ONLY FOR SWM)
*	STUDY POINT
▶▶▶▶▶	DEVELOPED FLOW PATH (R/W ONLY FOR SWM)
▶▶▶▶▶	DEVELOPED FLOW PATH (ENTIRE DA TO SWM)

APPROVED: DEPARTMENT OF PUBLIC WORKS
Robert M. Saker 7/25/02
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
David Hamilton 7/25/02
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

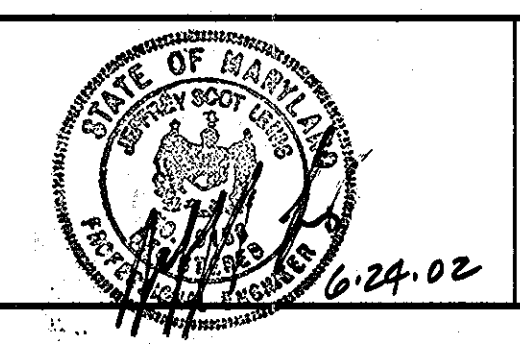
Michael D. ... 7/10/02
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

STORM DRAIN SYSTEM (OUTSIDE PUBLIC RIGHT-OF-WAY) & SWM FACILITY TO BE PRIVATELY OWNED & MAINTAINED

SITE SOLUTIONS, INC.
 19660 Club House Road Suite 105
 Gaithersburg, Maryland 20886-3039
 (301) 947-8900 Fax (301) 947-7704
 Planning Engineering Landscape Architecture

OWNER:
 James M. Sanborn
 Emile S. Sanborn
 4967 Ten Oaks Road
 Dayton, MD 21036

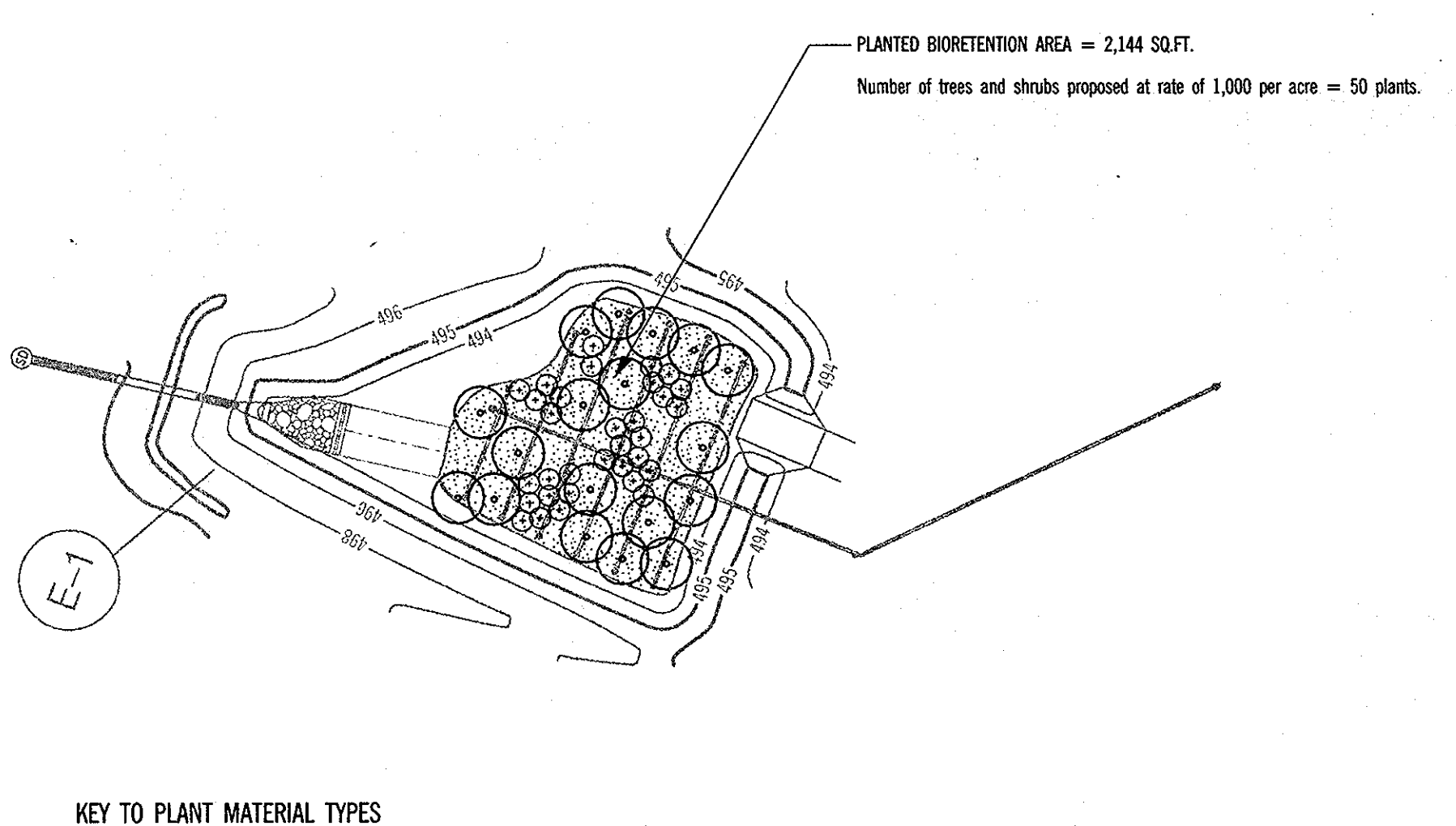
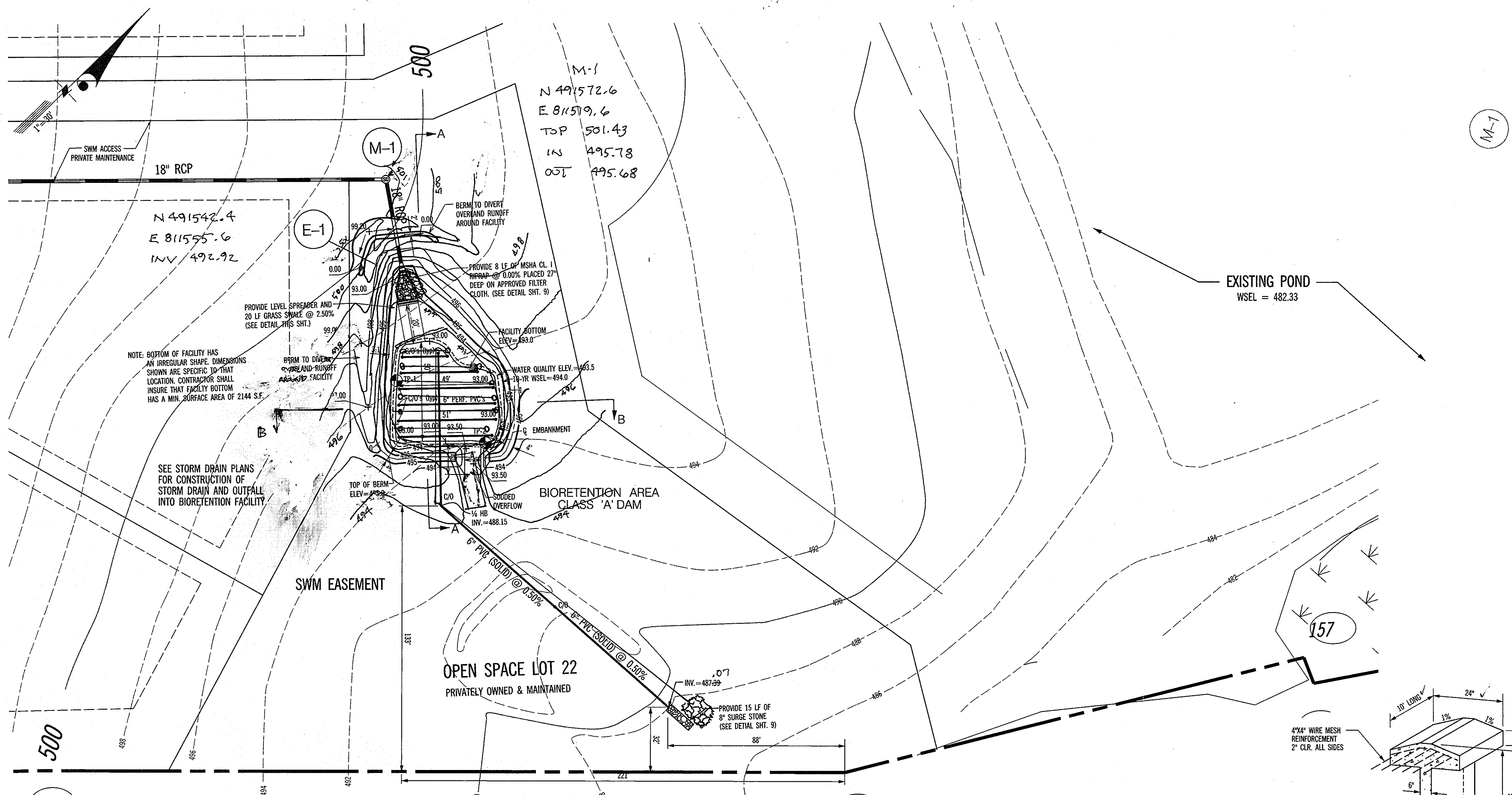
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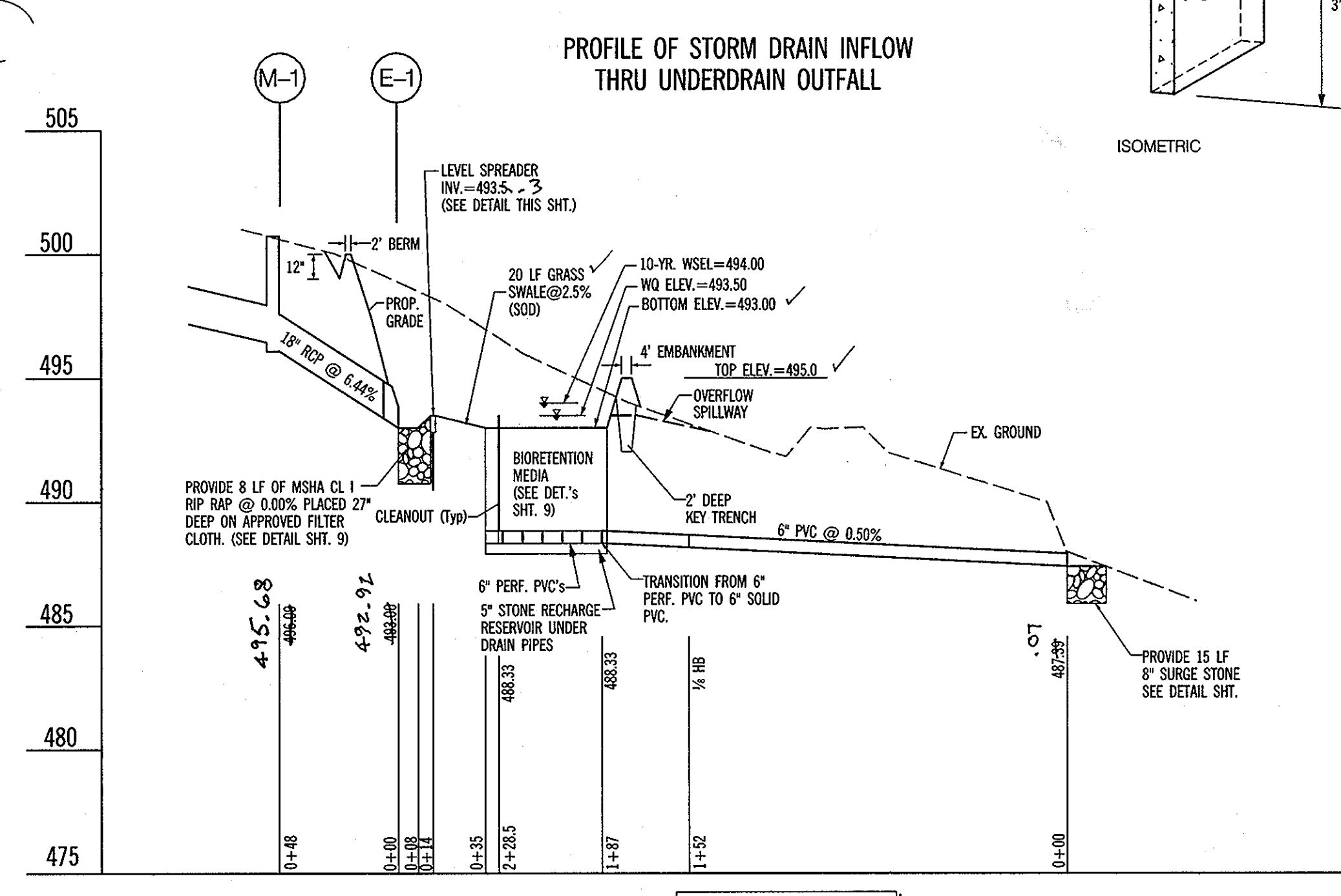
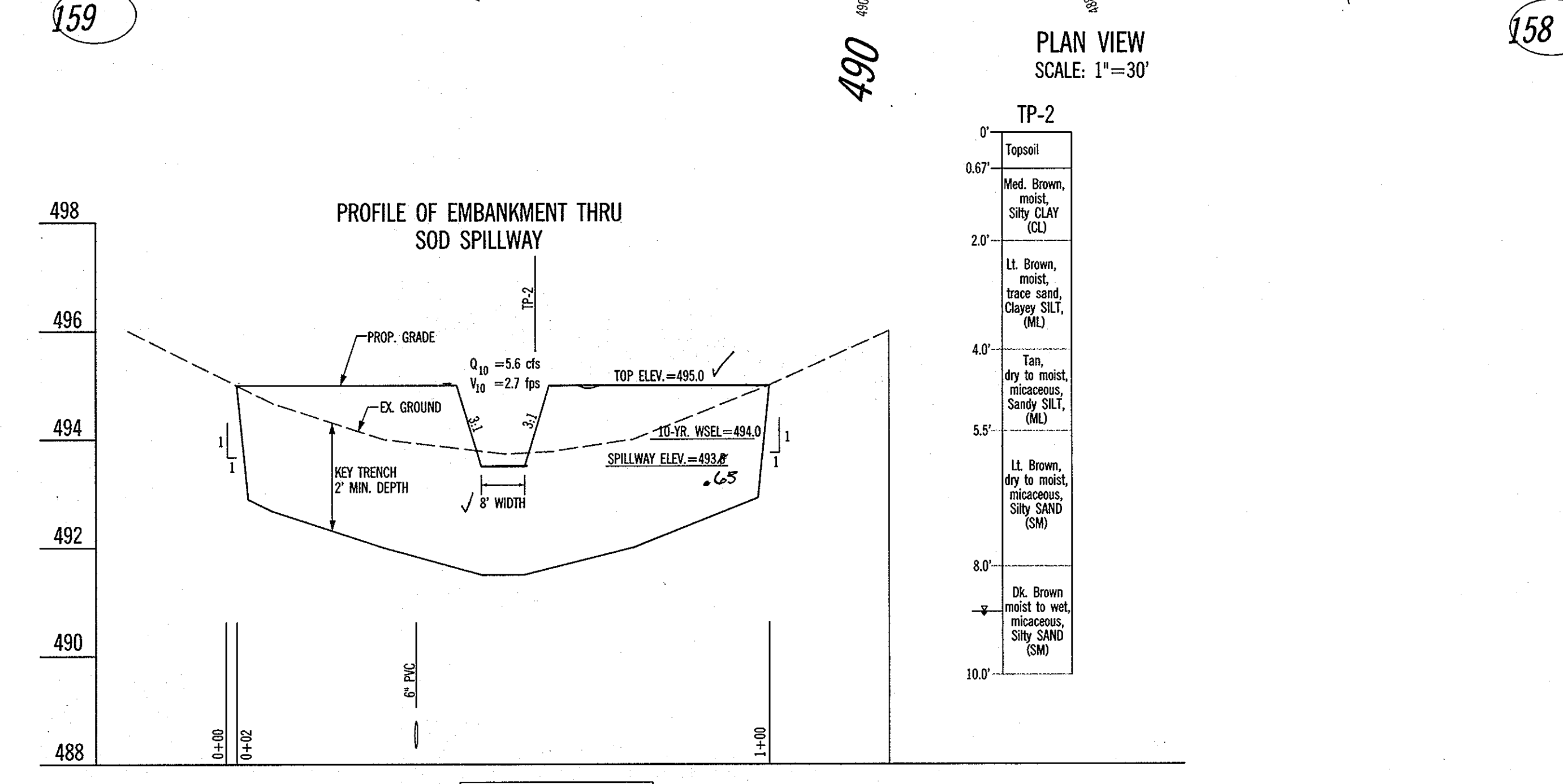
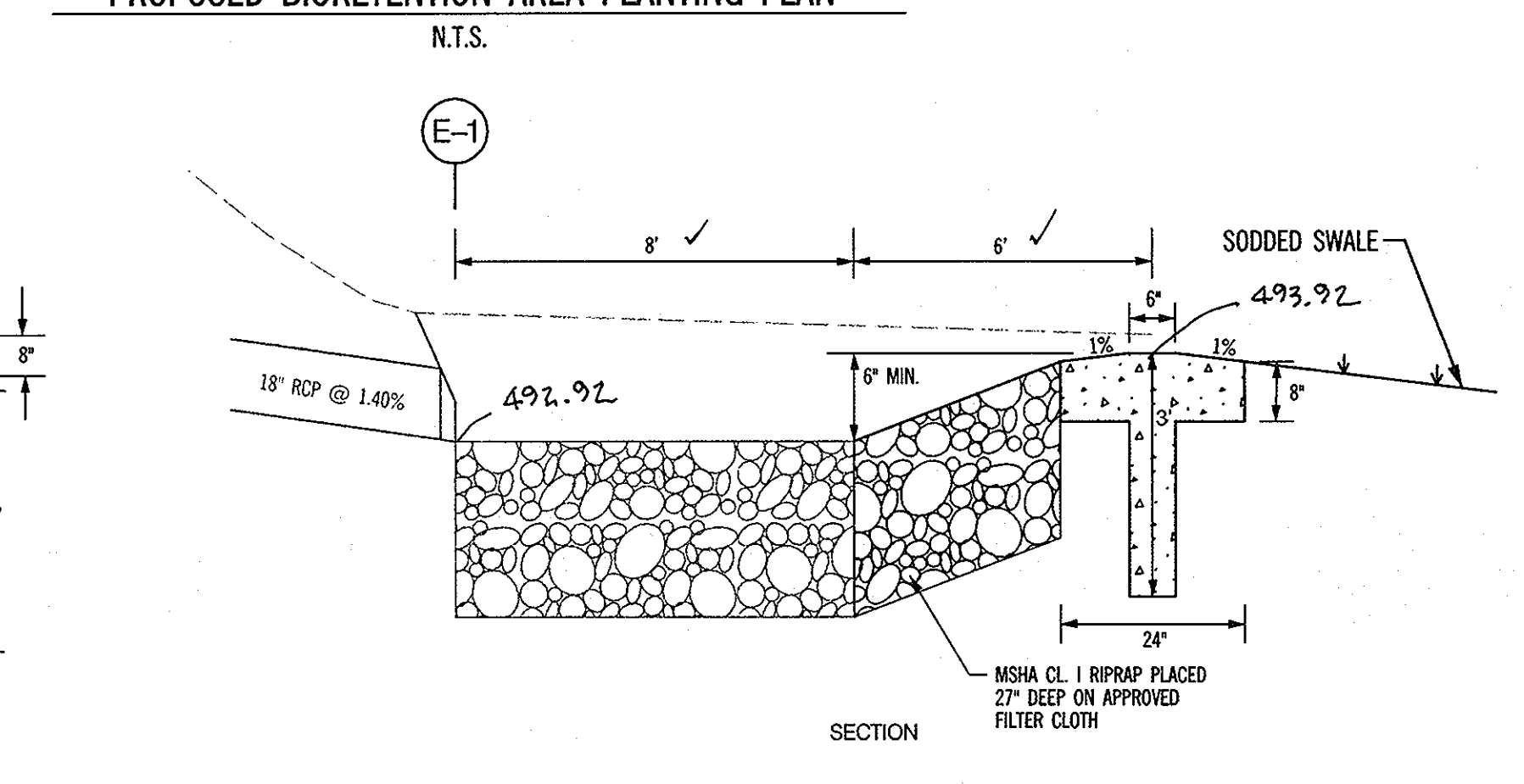
STORMWATER MANAGEMENT DRAINAGE AREA MAP
KOANDAH GARDENS ESTATES
 5th ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND

ACD	SCALE	1"=50'
DESIGN		
JSL	CHECKED	7 OF 14
JULY 2000	SHEET	
DATE	PROJ. No.	1072

F-02-04 0-01



- KEY TO PLANT MATERIAL TYPES**
- SHADE & UNDERSTORY TREES - 18 TREES PROPOSED**
- River Birch (*Betula nigra*) @ 1"-1.25" cal. / 8'-10' ht. Quan. = 6
 - Black Locust (*Robinia pseudoacacia*) @ 1"-1.25" cal. / 8'-10' ht. Quan. = 6
 - Eastern Red Cedar (*Juniperus virginiana*) @ 8'-10' ht. Quan. = 6
- SHRUBS - 32 SHRUBS PROPOSED**
- Witch Hazel (*Hamamelis virginiana*) @ 2'-3' ht. Quan. = 11
 - Red Osier Dogwood (*Cornus stolonifera*) @ 2'-3' ht. Quan. = 11
 - Winged Euonymus (*Euonymus alatus*) @ 2'-3' ht. Quan. = 10
- Note: Plant trees and shrubs in random pattern and mix approximately per plan above.
- HERBACEOUS LAYER - 2,144 SQ.FT. PROPOSED**
- Switch Grass (*Panicum virgatum*) - seeded Quan. = 2,144 sq.ft.



- LEVEL SPREADERS SHALL BE INSTALLED UNDER THE DIRECT SUPERVISION OF THE ENGINEER/SPECTOR.
- CONSTRUCT LEVEL LIP ON ZERO PERCENT GRADE TO INSURE UNIFORM SPREADING OF SEDIMENT FREE RUNOFF (CONVERTING CHANNEL FLOW TO SHEET FLOW).
- LEVEL SPREADER SHALL BE CONSTRUCTED ON UNDISTURBED SOIL (NOT ON FILL).
- CONCRETE FOR LIP TO BE FC 3500 PSI @ 28 DAYS AND IS TO BE AIR ENTRAINED.
- REINFORCING FOR CONCRETE LIP TO BE #4" WIRE MESH AT 2" CLEAR AS PER DETAIL.
- STORM RUNOFF CONVERTED TO SHEET FLOW SHALL OUTFALL ONTO STABILIZED AREAS. WATER SHALL NOT BE RECONCENTRATED IMMEDIATELY BELOW THE POINT OF DISCHARGE.
- PERIODIC INSPECTION AND REQUIRED MAINTENANCE SHALL BE PROVIDED BY PROPERTY OWNER.

STATE OF MARYLAND
RICHARD F. LANE
P.O. # 301
REGISTERED
PLANNING ENGINEER

APPROVED: DEPARTMENT OF PUBLIC WORKS
7-12-02
DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
7/12/02
DATE

APPROVED: DEPARTMENT OF PUBLIC WORKS
7-12-02
DATE

ROAD & STORM DRAIN AS-BUILT

SITE SOLUTIONS, INC.
19650 Club House Road Suite 105
Gaithersburg, Maryland 20886-3039
(301) 947-8900 Fax (301) 947-7704
Planning Engineering Landscape Architecture

OWNER: James M. Sanborn
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4967 Ten Oaks Road
Dayton, MD 21036

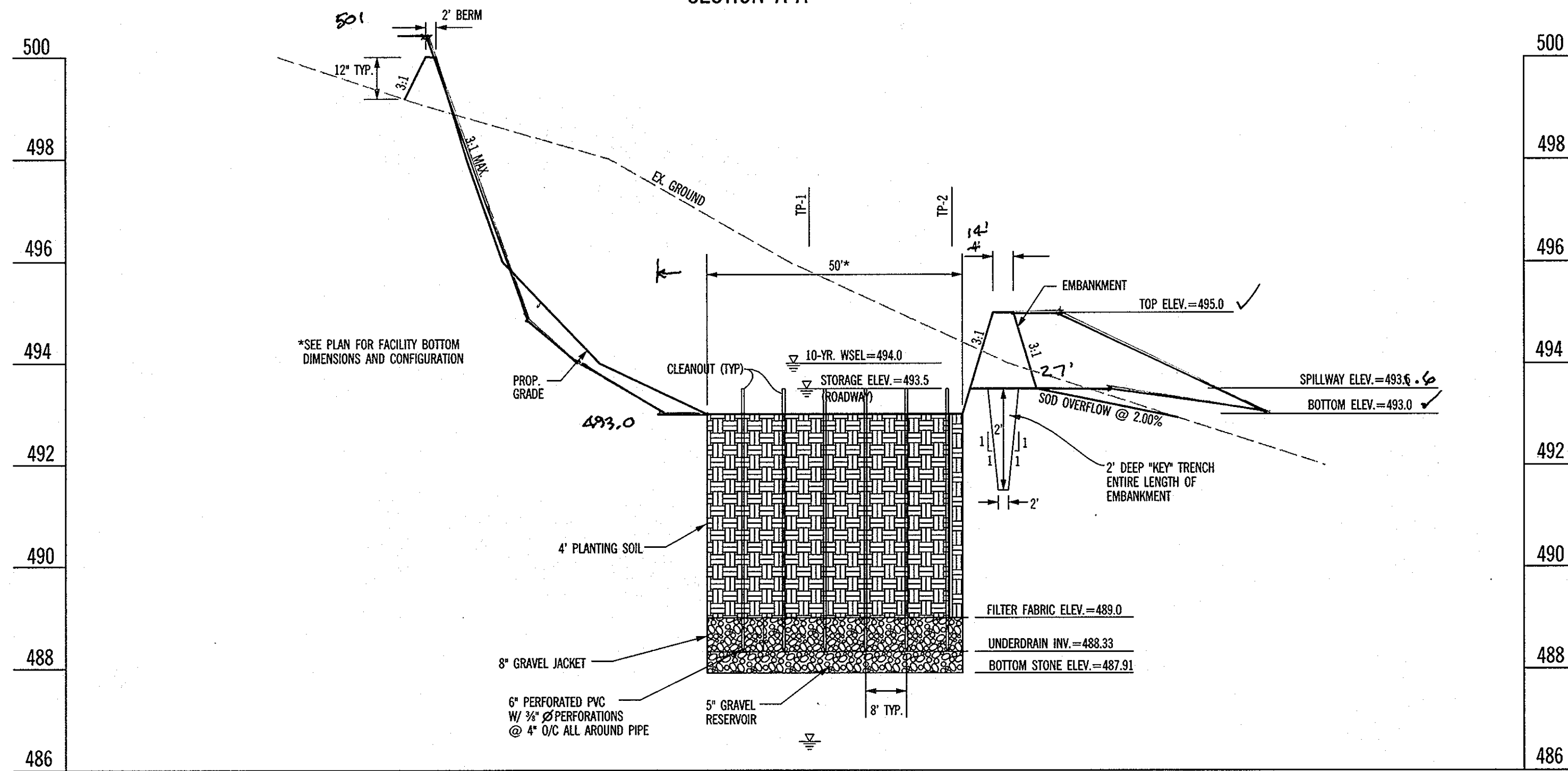
STORMWATER MANAGEMENT PLAN
KOANDAH GARDENS ESTATES
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

NO REVISION DATE

ACD AS SHOWN
DESIGN SCALE
JSL 8 OF 14
CHECKED SHEET
JULY 2000 DATE
PROJ. No. 1072
D-01

F-03-04

SECTION A-A

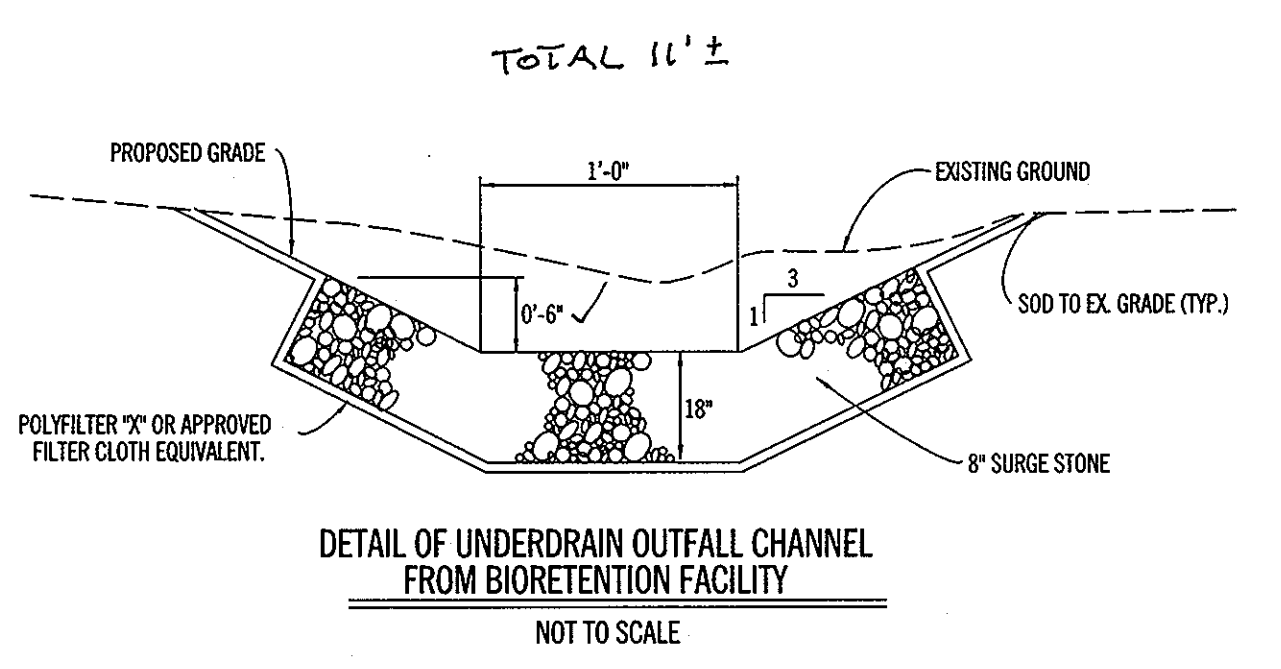
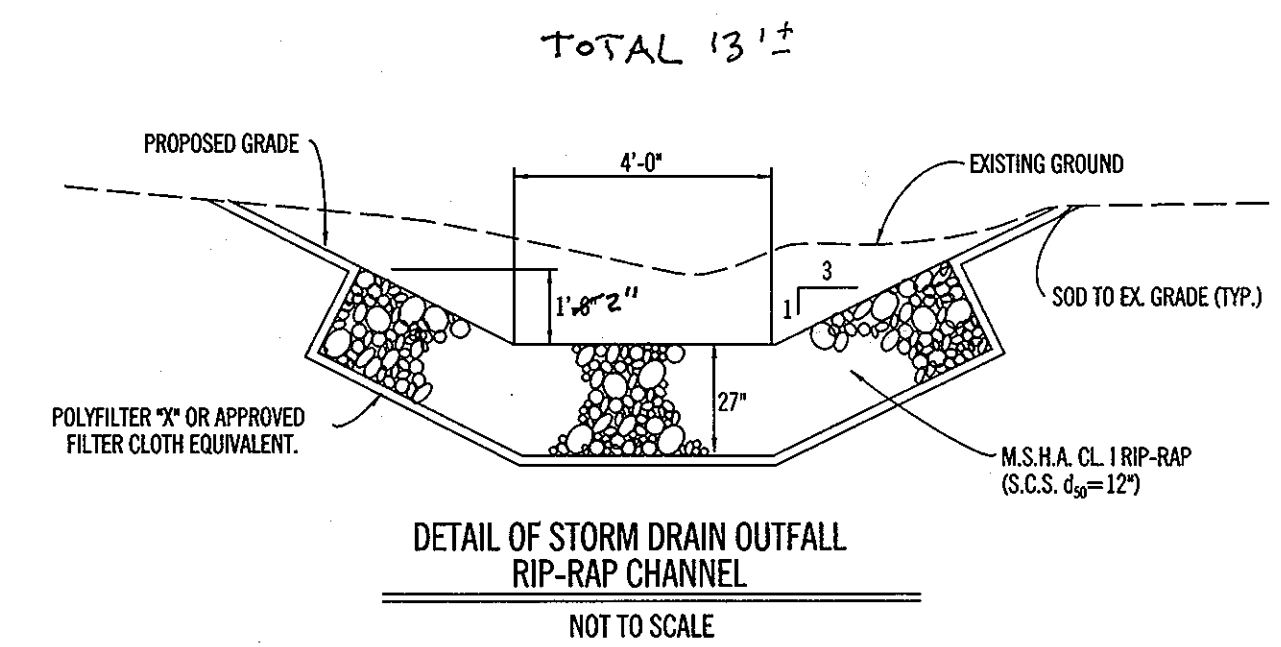


TP-1

0	Topsoil
0.67	Med. Brown, moist, Silty CLAY (CL)
2.0	Lt. Brown, moist, trace sand, Clayey SILT, (ML)
3.5	Tan, dry to moist, micaceous, Sandy SILT, (ML)
6.0	Lt. Brown, dry to moist, micaceous, Silty SAND (SM)
9.0	Dk. Brown moist to wet, micaceous, Silty SAND (SM)
11.0	

TP-2

0	Topsoil
0.67	Med. Brown, moist, Silty CLAY (CL)
2.0	Lt. Brown, moist, trace sand, Clayey SILT, (ML)
4.0	Tan, dry to moist, micaceous, Sandy SILT, (ML)
5.5	Lt. Brown, dry to moist, micaceous, Silty SAND (SM)
8.0	Dk. Brown moist to wet, micaceous, Silty SAND (SM)
10.0	



- I. BIORETENTION AREA SOIL SPECIFICATIONS
- A. Planting Soil
- The bioretention areas shall consist of a planting soil having the following composition:
- Sand: 35-60%
 - Silt: 30-55%
 - Clay: 10-25%
- and shall be of a sandy loam or loamy sand texture. In addition, the furnished planting soil shall be of uniform composition, free of stones, stumps, roots or similar objects larger than one inch, brush, or any other material or substance which may be harmful to plant growth, or a hindrance to planting or maintenance operations.
- The planting soil shall be free of plants or plant parts of Bermuda grass, Quack grass, Johnson grass, Mugwort, Nutsedge, Poison Ivy, Canadian Thistle or other noxious weeds as specified under COMAR 15.08.01.05. It shall not contain toxic substances harmful to plant growth.
- The planting soil shall be tested and meet the following criteria:
- | | |
|-------------------|-----------------------|
| pH range | 5.2-7.0 |
| Organic matter | 1.5 - 4.0% |
| Magnesium - Mg | 35 lbs./acre |
| Phosphorus - P2O5 | 75 lbs./acre |
| Potassium - K2O | 85 lbs./acre |
| Soluble salts | not to exceed 500 ppm |
- The following testing frequencies shall apply to the above soil constituents:
- pH, Organic Matter: 1 test 90 cubic yards, but not more than 1 test per Bioretention Area
- Phosphorus, Potassium, Soluble Salts: 1 test per 500 cubic yards, but no less than 1 test per borrow source
- One gram size analysis shall be performed per 90 cubic yards of planting soil, but no less than 1 test per Bioretention Area. All tests shall be performed by the same testing facility.
- B. Mulch Layer Specifications
- A 2"-3" mulch layer shall be provided on top of the planting soil. Shredded hardwood mulch is the only accepted mulch.
- The mulch must be well aged, uniform in color, and free of foreign material including plant material. Well aged mulch is defined as mulch that has been stockpiled or stored for at least twelve (12) months.
- C. Sand Specifications
- The sand shall be clean and free of deleterious material. Sand shall be 0.02" to 0.04" and meet AASHTO M-6 or ASTM C-33 concrete sand specifications.
- D. Underdrain Gravel
- Underdrain gravel shall be clean, uniform, 0.375" to 0.75" and meet AASHTO M-43 specifications.
- E. Geotextile Fabric
- The filter cloth used in bioretention facilities shall be Class "C" - apparent open size per ASTM D-4751, grab tensile strength per ASTM D-4532, and puncture resistance per ASTM D-4533.
- F. Underdrains
- Underdrain piping shall be rigid schedule 40 or SDR PVC, as specified on the plans. Piping shall meet specifications for F 758, Type PS28 or AASHTO M-278.
- D. Compaction
- Soil shall be placed in lifts less than 18 inches and lightly compacted (minimal compactive effort) by tamping with a bucket from a dozer or a backhoe.

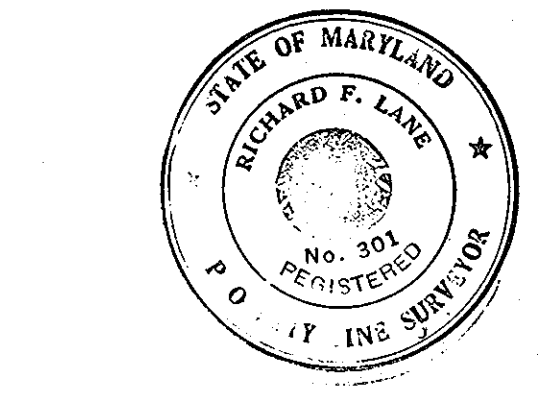
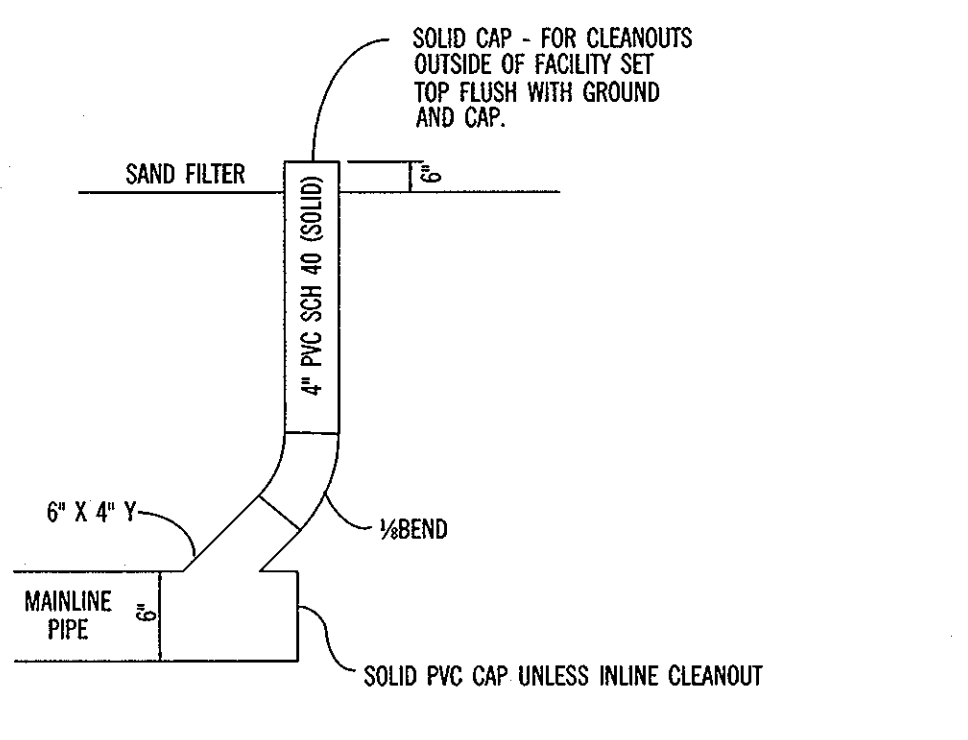
OPERATION AND MAINTENANCE SCHEDULE FOR BIO-RETENTION AREA

- Annual maintenance of plant material, mulch layer and soil layer is required. Maintenance of mulch and soil is limited to correcting areas of erosion or wash out. Key mulch replacement shall be done in the spring. Plant material shall be checked for disease and insect infestation and maintenance will address dead material and pruning.
- Schedule of plant inspection will be twice a year in spring and fall. This inspection will include removal of dead and diseased vegetation considered beyond treatment, treatment of all diseased trees and shrubs and replacement of all deficient stakes and wires.
- Mulch shall be inspected each spring. Remove previous mulch layer before applying new layer once every 2 to 3 years.
- Soil erosion to be addressed on an as-needed basis, with a minimum of once per month and after heavy storm events.

CONSTRUCTION SPECIFICATIONS FOR BIORETENTION FACILITIES

Definition: A shallow facility is any non-structural stormwater management facility, which is constructed on or excavated into the ground, and is not defined as a pond by current Maryland Pond-378 criteria. These will include but are not limited to small detention facilities, sand filters, infiltration trenches, and bioretention facilities. Where applicable, these specifications should be based on the design plans. Clearly label them as to the structures they apply to.

- Site Preparation**
Areas designated for borrow areas, embankment, structure works, filter, and storage areas, shall be cleared, grubbed and stripped of topsoil. All trees, vegetation, roots, and other objectionable material shall be removed. Channel banks and sharp breaks shall be sloped to no steeper than 1:1. All cleared and grubbed material shall be disposed of in a proper manner. When specified, a sufficient quantity of topsoil will be stockpiled in a suitable location for use on the embankment and other designated areas.
- Earth Fill For Facility Embankments**
A. Material - The fill material shall be taken from approved designated borrow areas. It shall be free of roots, stumps, weed, rubbish, stones greater than six inches, frozen or other objectionable materials. Fill material for the center of the embankment and key trench shall conform to Unified Soil Classification GC, SC, CH or CL. Consideration may be given to the use of other materials in the embankment if design and construction are supervised by a geotechnical engineer.
B. Placement - Areas on which fill is to be placed shall be scarified prior to placement of fill. Fill materials shall be placed in maximum eight inch thick (before compaction) layers, which are to be continuous over the entire length of the fill. The most permeable borrow material shall be placed in the downstream portions of the embankment. Pipes or underdrains must be installed concurrent with embankment construction to avoid excavation into the completed embankment at a later time.
C. Compaction - The movement of the hauling and spreading equipment over the fill shall be controlled so that the entire surface of each lift shall be traversed by not less than one tread track of the equipment or compaction shall be achieved by a minimum of four complete passes of a steepsfoot, rubber tired or vibratory roller. Fill material shall contain sufficient moisture such that the required degree of compaction will be obtained with the equipment used. The fill material shall contain sufficient moisture so that if formed into a ball it will not crumble, yet not be so wet that water can be squeezed out.
Where a minimum required density is specified, it shall not be less than 95% of maximum dry density with a moisture content within +2% of the optimum. Each layer of fill shall be compacted as necessary to obtain that density, and is to be certified by the Engineer at the time of construction. All compaction is to be determined by AASHTO Method T-99 (Standard Proctor).
- Key Trench** - Where specified, the cutoff trench shall be excavated into impervious material along or parallel to the centerline of the embankment as shown on the plans. The bottom width of the trench shall be governed by the equipment used for excavation, with the minimum width being two feet. The depth shall be at least two feet below existing grade or as shown on the plans. The side slopes of the trench shall be one to one, or flatter. The backfill shall be compacted with construction equipment, roller, or hand tampers to assure maximum density and minimum permeability.
- Structure Backfill**
Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining fill material. The fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material must completely fill air spaces under and adjacent to the pipe. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless there is a compacted fill of 24 inches or greater over the structure or pipe.
- Pipe Conditions**
A. Polyvinyl Chloride (PVC) Pipe - All of the following criteria shall apply for PVC pipe:
1. Materials - PVC pipe and appurtenances shall be schedule 40 PVC-1120 or PVC-1220 conforming to ASTM D-1785 or ASTM D-2241.
2. Bedding - The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock, soft, spring, or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.
3. Backfilling shall conform to "Structure Backfill."



Richard F. Lane #301
ROAD & STORM DRAIN AS-BUILT

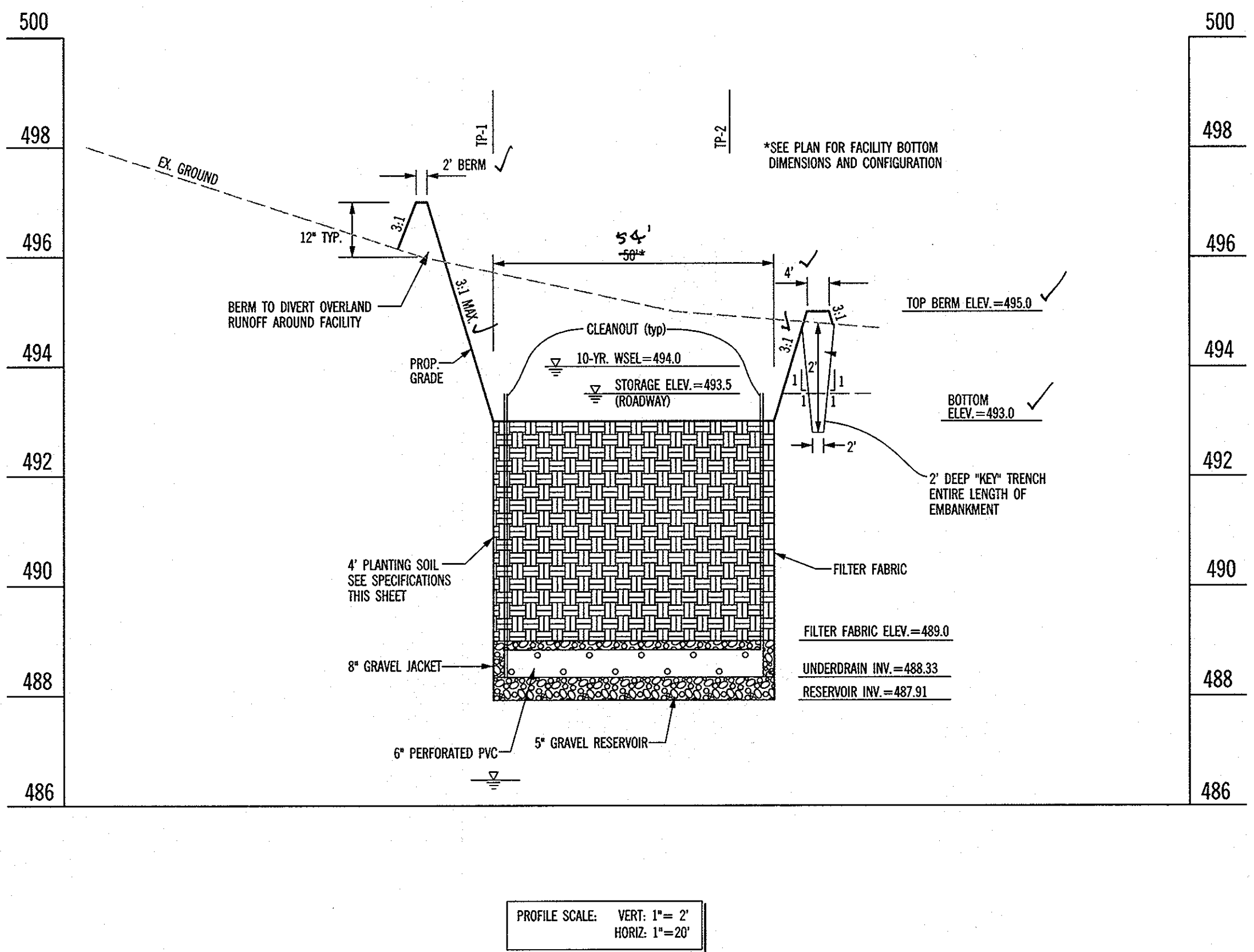
- Gravel**
Gravel shall be washed and meet the requirements of the latest edition of the Maryland Department of Transportation, State Highway Administration Standards and Specifications for Construction and Materials, Section 501. Gravel size shall be as shown on the approved drawings. If the gravel is to be stored on site prior to placement, it shall be protected from contamination.
- Rock Riprap**
Rock riprap shall meet the requirements of the latest edition of the Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Sections 310, 311, and 302.
The riprap shall be placed to the required thickness in one operation. The rock shall be delivered and placed in a manner that will insure the riprap in place shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks filling the voids between the larger rocks. Filter fabric shall be placed under all riprap and shall be per the requirements of the latest edition of the Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 921.09, Class C.
- Stabilization**
All borrow areas shall be graded to provide proper drainage and be left in a slightly condition. All exposed surfaces of the embankment, spillway, spoil and borrow areas, and berms shall be stabilized by seeding, liming, fertilizing, and mulching in accordance with the latest edition of the Maryland Soil Conservation Service Standards and Specifications for Critical Area Planting (MD-342) or as shown on the accompanying drawings.

APPROVED: DEPARTMENT OF PUBLIC WORKS
Richard F. Lane #301 7-12-02
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
Linda Hancock 7/25/02
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

APPROVED: DEPARTMENT OF PLANNING AND ZONING
7/18/02
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

SECTION B-B



SITE SOLUTIONS, INC.
19660 Club House Road Suite 105
Gaithersburg, Maryland 20886-3039
(301) 947-8900 Fax (301) 947-7704
Planning Engineering Landscape Architecture

OWNER:
James M. Sanborn
Emilie S. Sanborn
4967 Ten Oaks Road
Dayton, MD 21036

NO	REVISION	DATE



STORMWATER MANAGEMENT DETAILS
KOANDAH GARDENS ESTATES
5th ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

ACD	AS SHOWN
DESIGN	SCALE
JSL	9 OF 14
CHECKED	SHEET
JULY 2000	DATE
1072	PROJ. No.

F-02-04 P-01

FOREST CONSERVATION WORKSHEET

	Acres
Net Tract Area	
A. Total Tract Area	43.23
B. Area Within 100 Year Floodplain	6.26
C. Other deductions	16.28
D. Net Tract Area	20.69
Zoning Use Category: Medium Density Residential	
Land Use Category	
E. Afforestation Minimum (20% x D)	4.14
F. Conservation Threshold (25% x D)	5.17
Existing Forest Cover	
G. Existing Forest on Net Tract Area	2.05
H. Forest Area Above Afforestation Threshold	0
I. Forest Area Above Conservation Threshold	0
Breakeven Point	
J. Forest Retention Above Threshold with no Mitigation	0
K. Clearing Permitted without Mitigation	0
Proposed Forest Clearing	
L. Forest Areas to be Cleared	0
M. Forest Areas to be Retained	2.05
Planting Requirements	
N. Reforestation for Clearing Above Threshold	0
P. Reforestation for Clearing Below the Threshold	0
Q. Credit for Retention Above Conservation Threshold	0
R. Total Reforestation Required	0
S. Total Afforestation Required	2.09
T. Total Reforestation and Afforestation Requirement	2.09

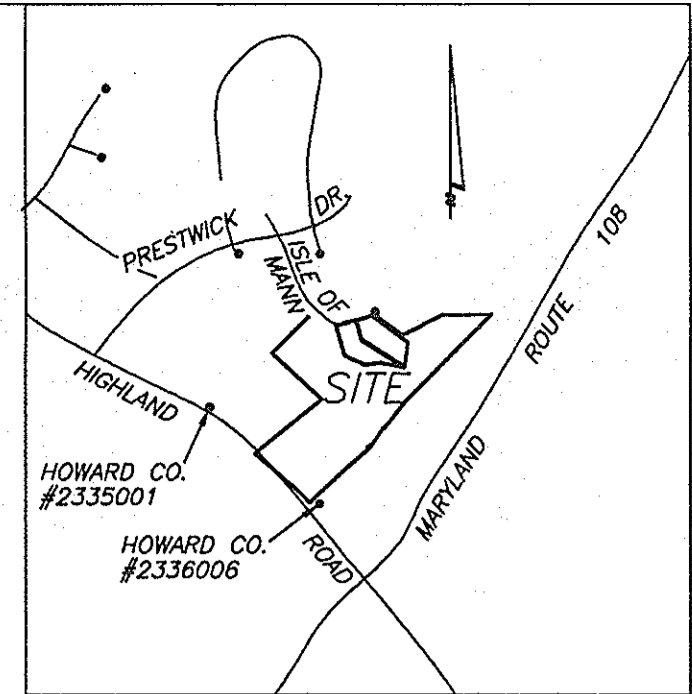
Offsite Forest Conservation Easement Area, providing 4.18 acres of retention of existing forest will be located on the Sanborne Property, Lot 1 (F-91-21). This will meet the required 2.09 ac. of afforestation at 2:1 the offsite ratio.

THIS 3.2264 ACRE AREA WAS SHOWN PREVIOUSLY AS PART OF THIS SUBDIVISION. IT IS THE SUBJECT OF A RESUBDIVISION PLAT (F-02-57, PLAT #15370) WITH KOANDAH GARDENS ESTATES LOT 2, PLAT NUMBER 6700 TO CREATE LOT 29. THE 3.226 ACRE AREA WAS EXCLUDED FROM THE FOREST CONSERVATION CALCULATIONS AND REQUIREMENTS WITH THIS SUBDIVISION DUE TO ITS BEING SOLD TO THE ADJACENT PROPERTY OWNER. HOWEVER, UPON SUBDIVISION OF THE PROPERTY TO WHICH THIS AREA IS BEING TRANSFERRED, SEPERATE FOREST CONSERVATION CALCULATIONS AND REQUIREMENTS WILL BE PROVIDED BASED ON ITS ACREAGE SIZE.

FOREST CONSERVATION NARRATIVE

This Forest Conservation Plan was prepared in accordance with the Howard County Forest Conservation Manual.

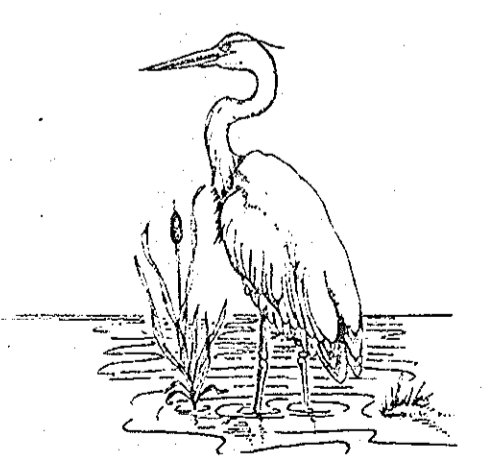
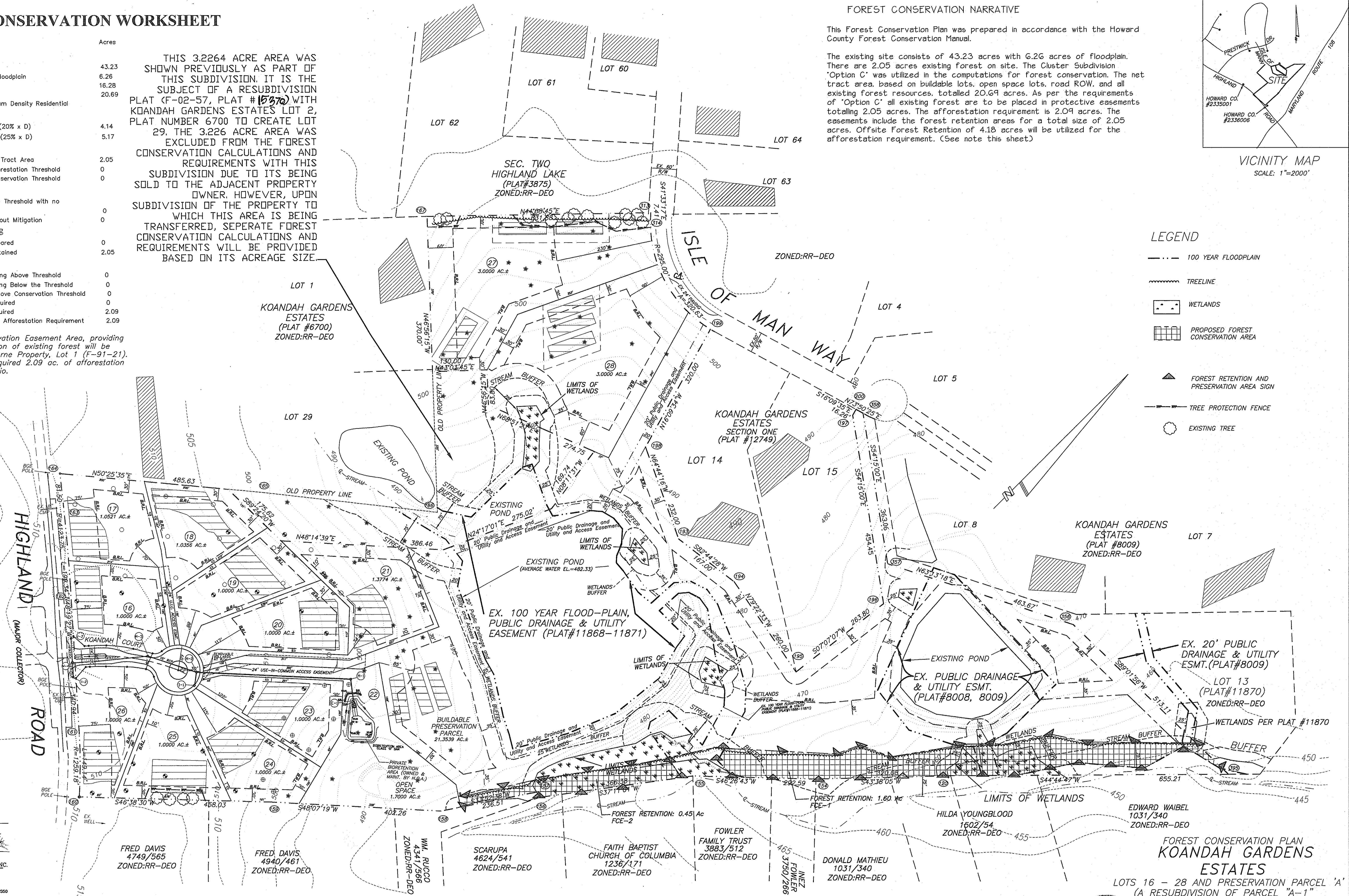
The existing site consists of 43.23 acres with 6.26 acres of floodplain. There are 2.05 acres existing forest on site. The Cluster Subdivision 'Option C' was utilized in the computations for forest conservation. The net tract area, based on buildable lots, open space lots, road ROW, and all existing forest resources, totalled 20.69 acres. As per the requirements of 'Option C' all existing forest are to be placed in protective easements totalling 2.05 acres. The afforestation requirement is 2.09 acres. The easements include the forest retention areas for a total size of 2.05 acres. Offsite Forest Retention of 4.18 acres will be utilized for the afforestation requirement. (See note this sheet)



VICINITY MAP
SCALE: 1"=2000'

LEGEND

- 100 YEAR FLOODPLAIN
- ~~~~~ TREELINE
- WETLANDS
- ▨ PROPOSED FOREST CONSERVATION AREA
- ▲ FOREST RETENTION AND PRESERVATION AREA SIGN
- TREE PROTECTION FENCE
- EXISTING TREE



EXPLORATION RESEARCH, INC.
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8310 FOREST STREET
BELTSVILLE CITY, MARYLAND 21043
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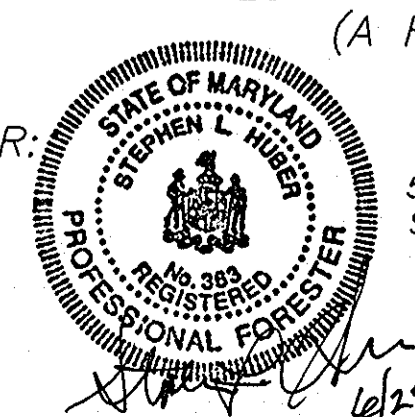
SHANBERGER & LANE
8728 TOWN AND COUNTRY BLVD.
SUITE 201
ELLICOTT CITY, MD. 21043
(410)461-9563 FAX:461-9693

APPROVED: DEPARTMENT OF PUBLIC WORKS
Andrew M. Smith 7-17-02
CHIEF, BUREAU OF HIGHWAYS DATE

SURETY FOR THE REQUIRED FOREST CONSERVATION RETENTION AREAS OF 271,378.8 SQ FT (6.23 ACRES) WILL BE POSTED WITH THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$56,275.76

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Mr. Damman 7/18/02
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE
Andy Hamrick 7/25/02
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

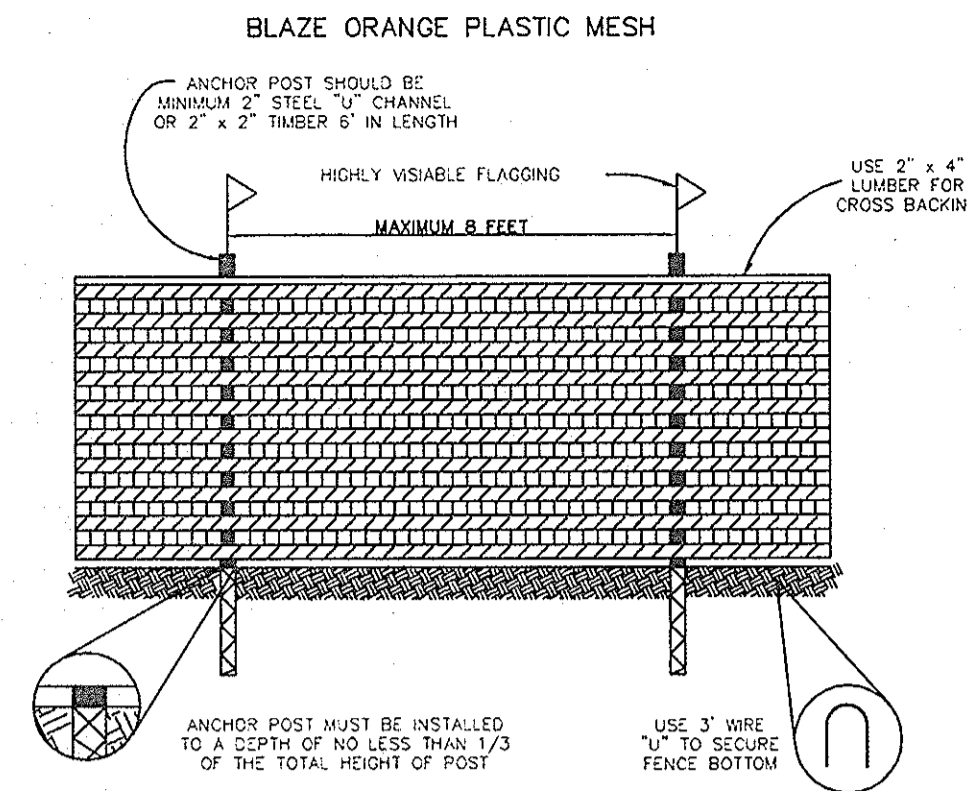
OWNERS/DEVELOPER:
JAMES M. SANBORN
EMILIE S. SANBORN
4367 TEN OAKS ROAD
DAYTON, MD. 21036



FOREST CONSERVATION PLAN
KOANDAH GARDENS ESTATES
LOTS 16 - 28 AND PRESERVATION PARCEL 'A'
(A RESUBDIVISION OF PARCEL "A-1" PLAT NOS. 11868-11871)
TAX MAP 34 BLOCK 23 PARCEL 78
ZONED RR-DEO
5TH ELECTION DIST. HOWARD CO., MD.
SCALE: 1"=100' JUNE 25, 2002
SHEET 10 OF 14

Soil Protection Zone Notes

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



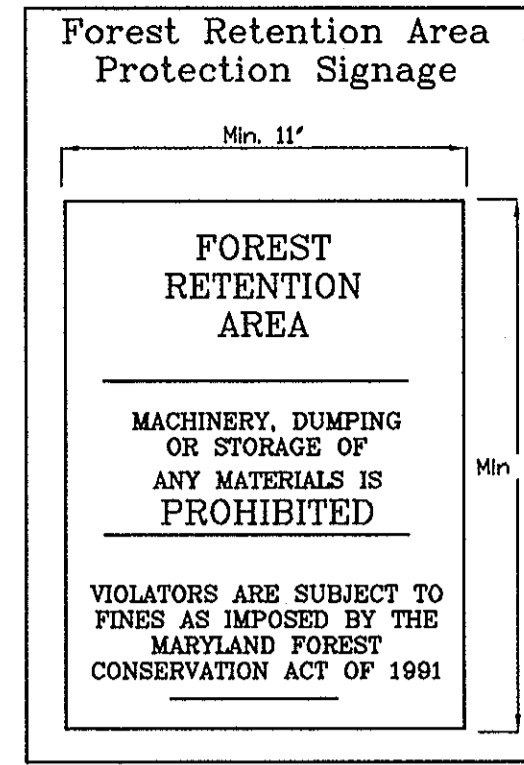
- NOTES:**
- FOREST PROTECTION DEVICE ONLY.
 - RETENTION AREA WILL BE SET AS PART OF THE REVIEW PROCESS.
 - BOUNDARIES OF RETENTION AREA SHOULD BE STAKED AND FLAGGED PRIOR TO INSTALLING DEVICE.
 - ROOT DAMAGE SHOULD BE AVOIDED.
 - PROTECTIVE SIGNAGE MAY ALSO BE USED.
 - DEVICE SHOULD BE MAINTAINED THROUGHOUT CONSTRUCTION.

TREE PROTECTION DETAIL
NOT TO SCALE

FOREST CONSERVATION EASEMENT TABLE		
EASEMENT #	ACREAGE	EASEMENT TYPE
1	1.60 AC	FOREST RETENTION
2	0.45 AC	FOREST RETENTION
Total		2.05 AC RETENTION

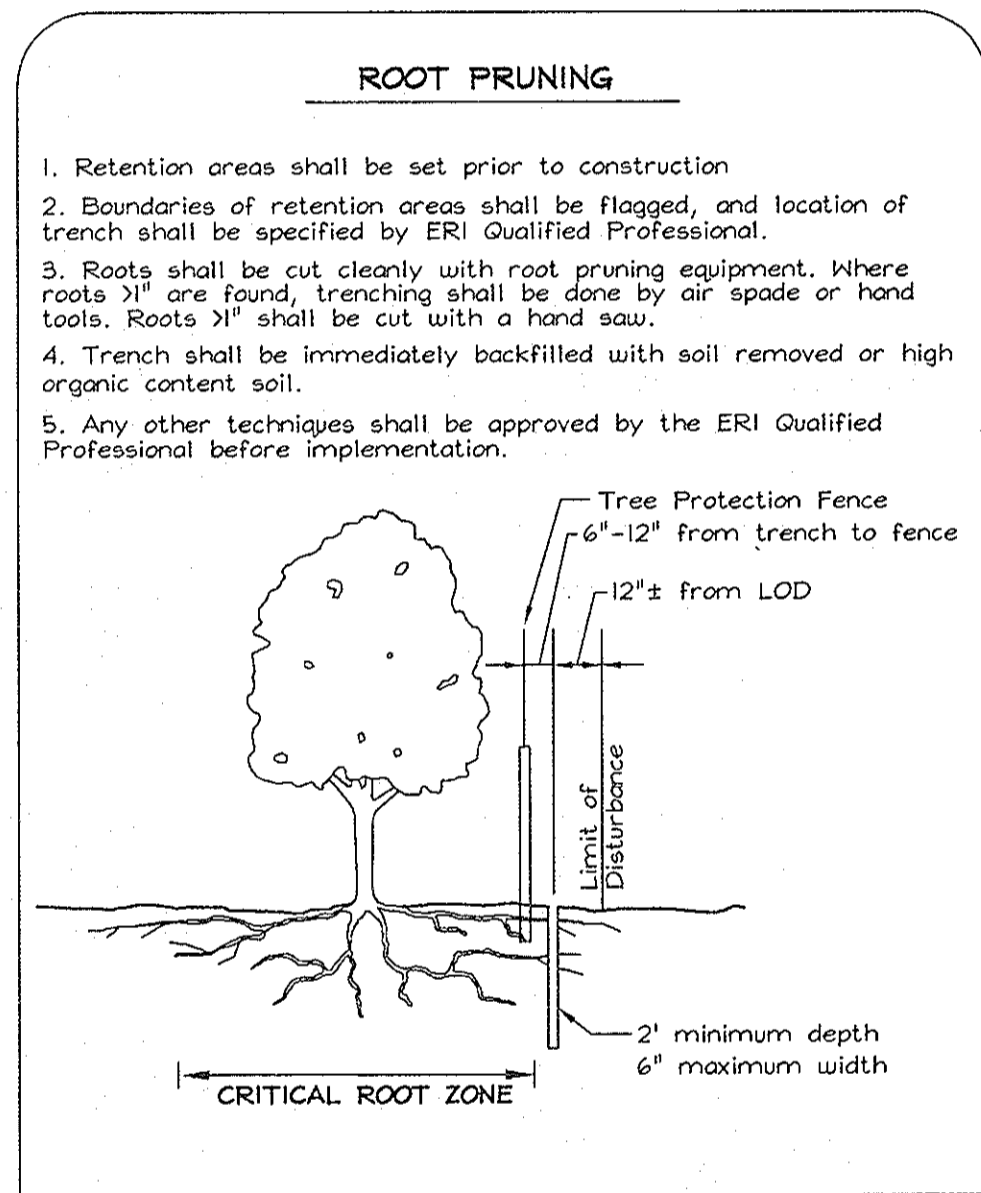
MANAGEMENT NOTES FOR FOREST RETENTION AREAS

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

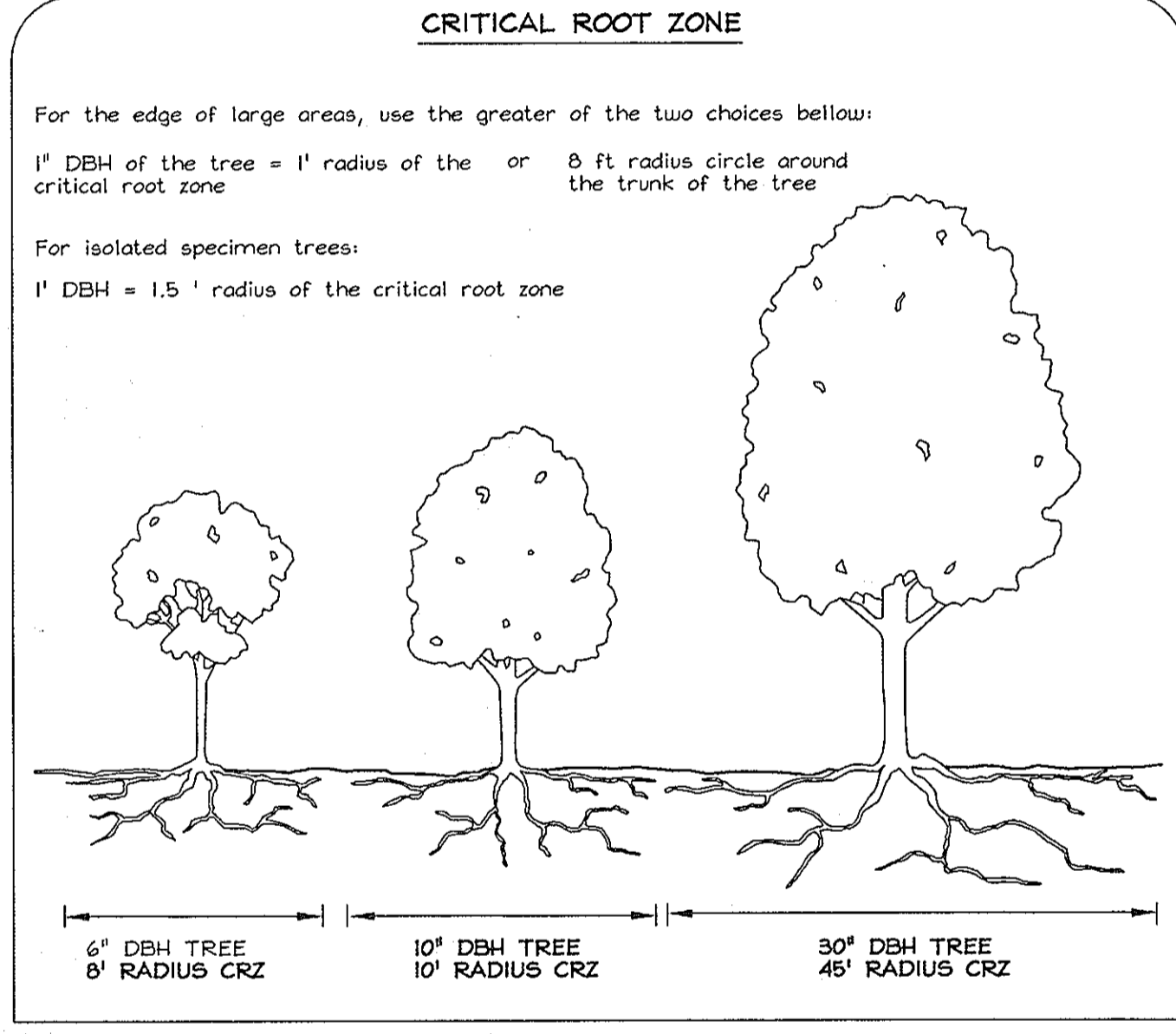


SIGN DETAIL: PERMANENT SIGN

SIGNAGE NOTE: ALL TREE PROTECTION SIGNS SHALL BE PLACED ON ALUMINUM POSTS OR PRESSURE TREATED WOOD POLES. NO ATTACHMENT OF SIGNS TO TREES IS PERMITTED.



- Retention areas shall be set prior to construction
- Boundaries of retention areas shall be flagged, and location of trench shall be specified by ERI Qualified Professional.
- Roots shall be cut cleanly with root pruning equipment. Where roots 3/4\"/>



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

1\"/>

For isolated specimen trees:

1\"/>

Prepared by:



EXPLORATION RESEARCH, INC.
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS
8318 FOREST STREET
BELLICOTT CITY, MARYLAND 21048
TEL: (410) 750-1150 FAX: (410) 750-7350

Prepared for:

SHANBERGER & LANE
8726 TOWN AND COUNTRY BLVD.
SUITE 201
BELLICOTT CITY, MD. 21043
(410)461-9563 FAX:461-9693

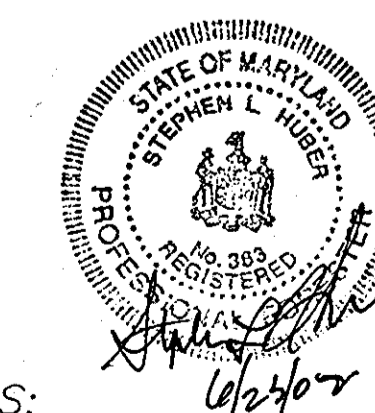
AT LEAST 48 HOURS PRIOR TO DIGGING,
CONTACT MISS UTILITY AT 1-800-267-7777

SURETY FOR THE REQUIRED FOREST
CONSERVATION RETENTION AREAS OF
271,378.8 SQ FT (6.23 ACRES) WILL BE
POSTED WITH THE DEVELOPER'S
AGREEMENT IN THE AMOUNT OF \$56,275.76

APPROVED: DEPARTMENT OF PUBLIC WORKS
Andrew M. Daniels 7-17-02
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Mark D. Williams 7/18/02
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Cindy Hammett 7/25/02
CHIEF, DIVISION OF LAND DEVELOPMENT DATE



OWNERS:
JAMES M. SANBORN
EMILIE S. SANBORN
4967 TEN OAKS ROAD
DAYTON, MD. 21036

FOREST CONSERVATION PLAN
KOANDAH GARDENS
ESTATES
LOTS 16 - 27 AND PRESERVATION PARCEL 'A'
(A RESUBDIVISION OF PARCEL "A-1"
PLAT NOS. 11868-11871)
TAX MAP 34 BLOCK 23 PARCEL 7B
ZONED RR-DEO
5TH ELECTION DIST. HOWARD CO., MD.
SCALE: As Shown JUNE 25, 2002
SHEET 11 OF 14

F.02.07

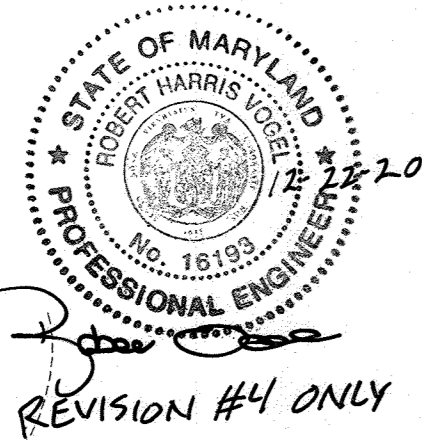
EXISTING TREES AT BUFFER 1

No.	BOTANICAL NAME	COMMON NAME	SIZE
1	Pinus strobus	White Pine	7"
2	Robinia pseudoacacia	Black Locust	10.5"
3	Robinia pseudoacacia	Black Locust	8.5"
4	Robinia pseudoacacia	Black Locust	6"
5	Pinus strobus	White Pine	12"
6	Prunus serotina	Black Cherry	15"
7	Prunus serotina	Black Cherry	6"
8	Prunus serotina	Black Cherry	8"
9	Prunus serotina	Black Cherry	8"
10	X. Cupressocyparis leylandii	Leyland Cypress	10"
11	Prunus serotina	Black Cherry	12"
12	Morus alba	White Mulberry	11.5"
13	Prunus serotina	Black Cherry	12"

THIS 3.2264 ACRE AREA WAS SHOWN PREVIOUSLY AS PART OF THIS SUBDIVISION. IT IS THE SUBJECT OF A RESUBDIVISION PLAT (F-02-57, PLAT #) WITH KOANDAH GARDENS ESTATES LOT 2, PLAT NUMBER 6700 TO CREATE LOT 29. THE 3.226 ACRE AREA WAS EXCLUDED FROM THE FOREST CONSERVATION CALCULATIONS AND REQUIREMENTS WITH THIS SUBDIVISION DUE TO ITS BEING SOLD TO THE ADJACENT PROPERTY OWNER. HOWEVER, UPON SUBDIVISION OF THE PROPERTY TO WHICH THIS AREA IS BEING TRANSFERRED, SEPERATE FOREST CONSERVATION CALCULATIONS AND REQUIREMENTS WILL BE PROVIDED BASED ON ITS ACREAGE SIZE.

SHRUB LIST

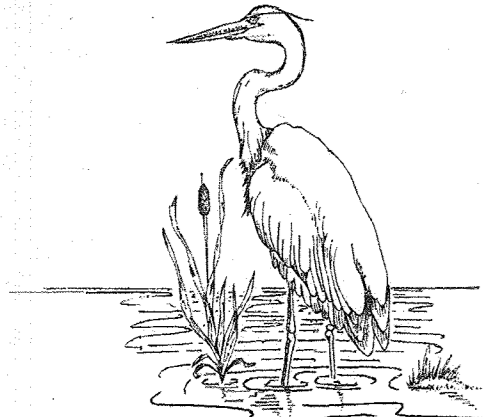
BOTANICAL NAME	COMMON NAME	QUANTITY	SIZE
Euonymus alatus	Winged Euonymus	40	2-3'
Ilex crenata 'Compacta'	Compact Japanese Holly	40	2-3'
Ilex x meserveae	Meservee Holly	20	2-3'



REVISION #4 ONLY

4 high berm planted with 4 Callery Pear, 22 Japanese Holly, 2 Burning Bush, 11 Meservee Holly, and assorted shrubs & ground-cover, including barberry and juniper species.

4 high berm planted with 4 Callery Pear, 10 Japanese Holly, 10 Burning Bush, 4 Meservee Holly, and assorted shrubs and ground-cover, including barberry and juniper species.



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BELLICO CITY, MARYLAND 21043
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No.	Description	Date
4	REVISE THE PLAN TO PROVIDE LANDSCAPING FOR THE NEW CLUSTER LOTS	12-22-20
3	RELOCATE 0.064 ACRES FROM FCE #2 TO FCE #1	12-01-20
2	REVISE LANDSCAPE PER INSTALLED CONDITIONS	08-04-06
1	RELABEL DRIVEWAY CULVERTS	05-26-04

APPROVED: DEPARTMENT OF PUBLIC WORKS

Robert W. Harris 7-17-02
CHIEF, BUREAU OF HIGHWAYS DATE

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

Robert W. Harris
SIGNATURE OF DEVELOPER

6/25/02
DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Robert W. Harris 7/10/02
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Candy Harris 7/25/02
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

TREE LIST

KEY	BOTANICAL NAME	COMMON NAME	QUANTITY	SIZE
AR	Acer rubrum 'October Glory'	October Glory Red Maple	2	2 1/2-3"
CL	Cupressocyparis leylandii	Leyland Cypress	89	5-6"
PA	Platanus x. acerifolia 'Bloodgood'	Bloodgood London Planetree	2	2 1/2-3" CAL.
QP	Quercus phellos	Willow Oak	3	2 1/2-3" CAL.
TO	Thuja occidentalis	Eastern Arborvitae	12	6-8"
PC	Pyrus calleryana	Callery Pear	8	1 1/2 - 2" CAL.

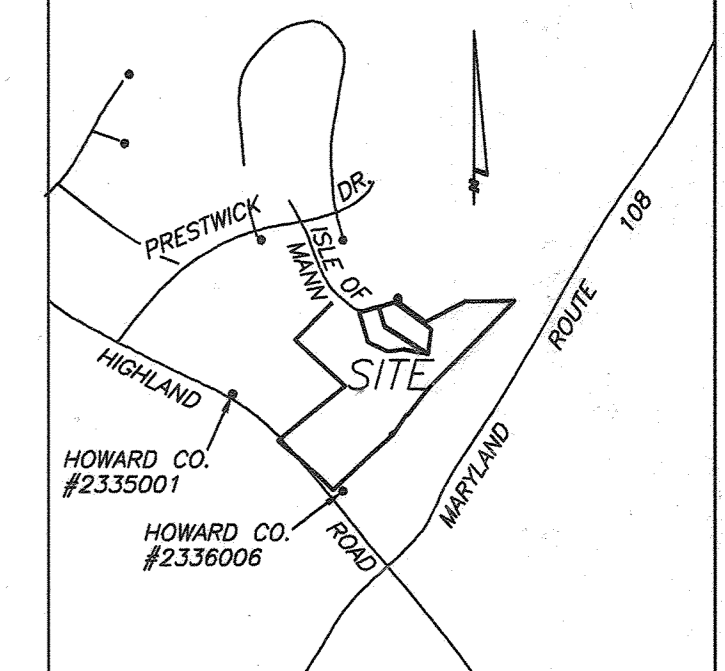
STREET TREE LIST

KEY	BOTANICAL NAME	COMMON NAME	QUANTITY	SIZE
AR	Acer rubrum 'October Glory'	October Glory Red Maple	16	2 1/2 - 3"

THE DEVELOPER IS RESPONSIBLE FOR THE SURETY OF THE LANDSCAPE INSTALLATION AS PER THE DEVELOPERS AGREEMENT. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL.

FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING TREES HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$16,050

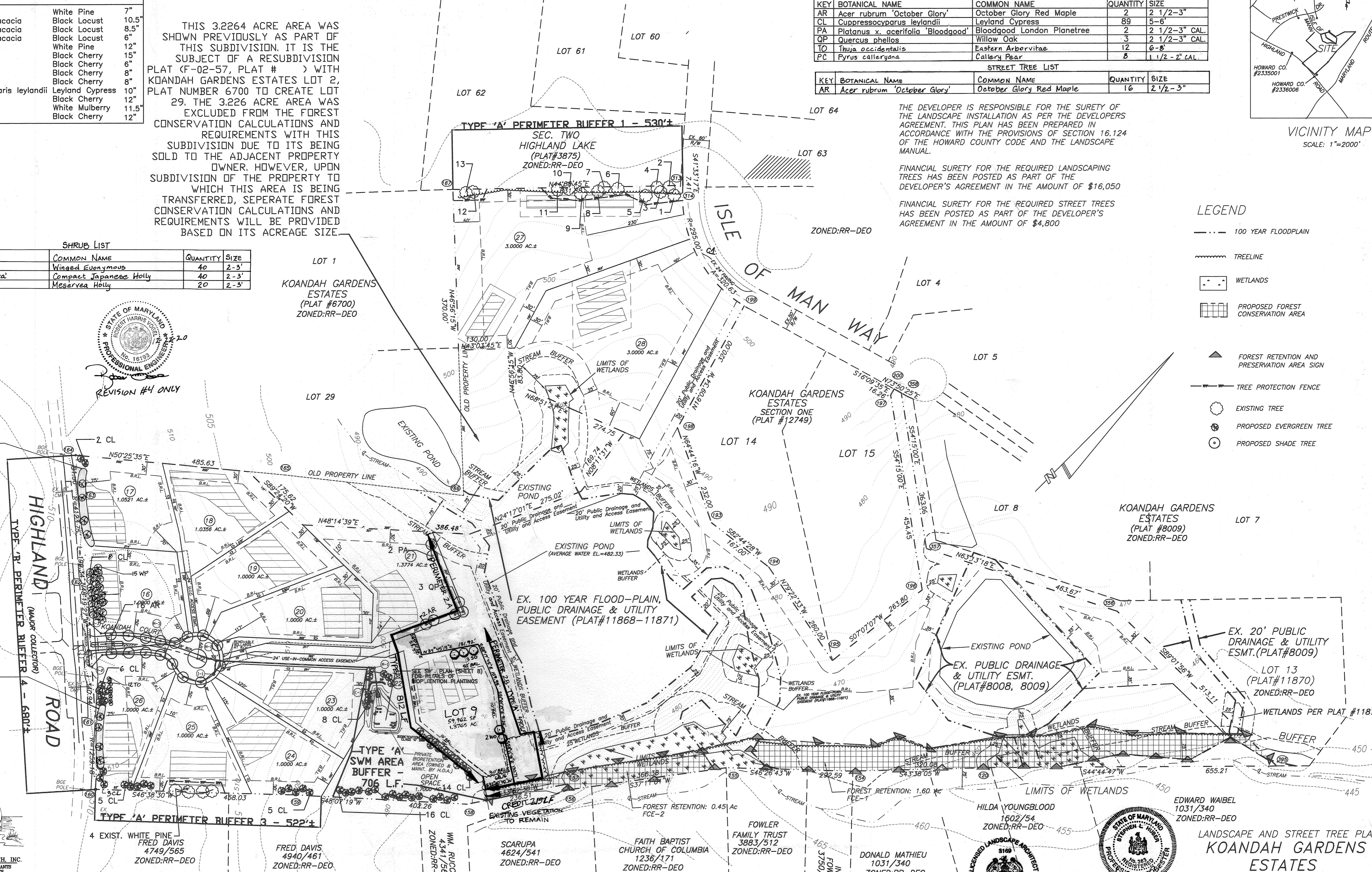
FINANCIAL SURETY FOR THE REQUIRED STREET TREES HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$4,800



VICINITY MAP
SCALE: 1"=2000'

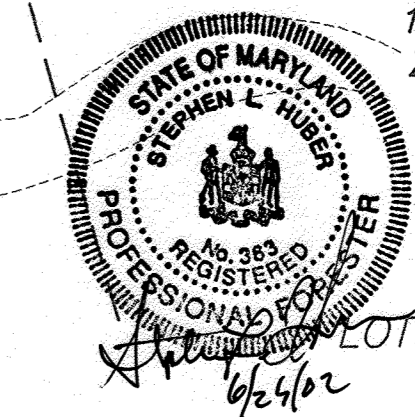
LEGEND

- 100 YEAR FLOODPLAIN
- ~~~~~ TREELINE
- WETLANDS
- ▨ PROPOSED FOREST CONSERVATION AREA
- ▲ FOREST RETENTION AND PRESERVATION AREA SIGN
- TREE PROTECTION FENCE
- EXISTING TREE
- ⊕ PROPOSED EVERGREEN TREE
- ⊙ PROPOSED SHADE TREE



LANDSCAPE AND STREET TREE PLAN
KOANDAH GARDENS ESTATES

LOTS 16 - 28 AND PRESERVATION PARCEL 'A'
(A RESUBDIVISION OF PARCEL "A-1"
PLAT NOS. 11868-11871)
TAX MAP 34 BLOCK 23 PARCEL 78
ZONED RR-DEO
5TH ELECTION DIST. HOWARD CO., MD.
JUNE 25, 2002
SCALE: 1"=100'



OWNERS/DEVELOPER:
JAMES M. SANBORN
EMILIE S. SANBORN
4967 TEN OAKS ROAD
DAYTON, MD. 21036

SCHEDULE A PERIMETER LANDSCAPE EDGE					
	BUFFER 1	BUFFER 2A	BUFFER 2B*	BUFFER 3	BUFFER 4
CATEGORY	ADJACENT TO PERIMETER PROPERTIES	ADJACENT TO PERIMETER PROPERTIES	ADJACENT TO PERIMETER PROPERTIES	ADJACENT TO PERIMETER PROPERTIES	ADJACENT TO ROADWAYS
Landscape Type	SFD	SFD	SFD	SFD	SFD
Linear Feet of Roadway Frontage/Perimeter	532	812	490	522	680
Credit for Existing Vegetation	YES, 13 TREES; SEE CHART ON SHEET 12/13	NO	YES 215 LF	YES 4 WHITE PINE AT LOT 24	NO
Credit for Wall, Fence, or Berm	NO	NO	NO	NO	NO
Number of Plants Required					
Shade Trees	0	14	5	5	14
Evergreen Trees	0	0	0	0	17
Shrubs	0	0	0	0	0
Number of Plants Provided					
Shade Trees	0	7	5	0	0
Evergreen Trees	0	14	0	10	45
Other Trees	0	0	0	0	0
Shrubs	0	0	0	0	0
Comments	All requirements met by existing vegetation			Perimeter obligations for Lot 22 met by SWM Buffer Requirements	

SCHEDULE D STORMWATER MANAGEMENT AREA LANDSCAPING	
Linear Feet of Perimeter	706 (385' w/ADJ PROPERTY)
Number of Trees Required	12
Shade Trees	0
Evergreen Trees	0
Credit for Existing Vegetation	NO
Credit for Other Landscaping	Yes see below
Number of Trees Provided	12 (All in bioretention area)
Shade Trees	30 (6 in bioretention area)
Evergreen Trees	0
Other Trees	32 (All in bioretention area)
Shrubs	0
Comments	The SWM area is planted for bioretention. We are requesting a Type A buffer. The shade trees being used are smaller than required, but with the extra evergreens and shrubs, should more than adequately screen the facility. Please see Sheet 8 of 13, the Stormwater Management Plan, for details on the bioretention planting area.

* REVISION #4 LANDSCAPE SCHEDULE PERIMETER 2B						
KEY	QUAN.	BOTANICAL NAME	SIZE	CAT.	TYPE	
SO	3	QUERCUS COCCINEA SCARLET OAK	2.5" CAL	B & B	SHADE	
WO	2	QUERCUS PHELLOS WILLOW OAK	2.5" CAL	B & B	SHADE	

FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$1,500.00 FOR THE REQUIRED 5 SHADE TREES.

THE DEVELOPER IS RESPONSIBLE FOR THE SURETY OF THE LANDSCAPE INSTALLATION AS PER THE DEVELOPER'S AGREEMENT. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL.

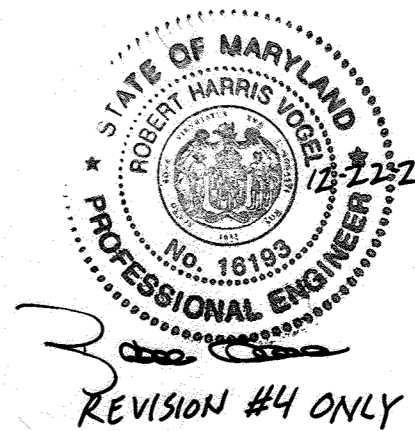
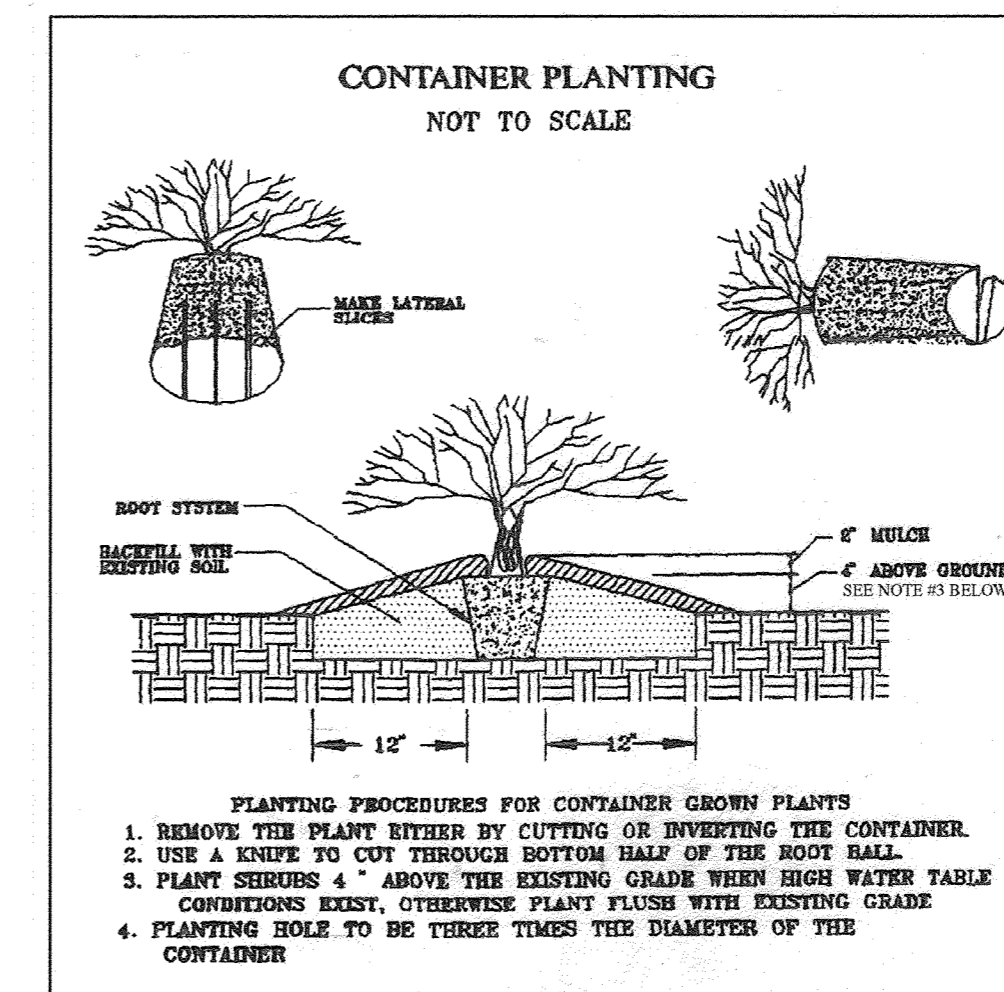
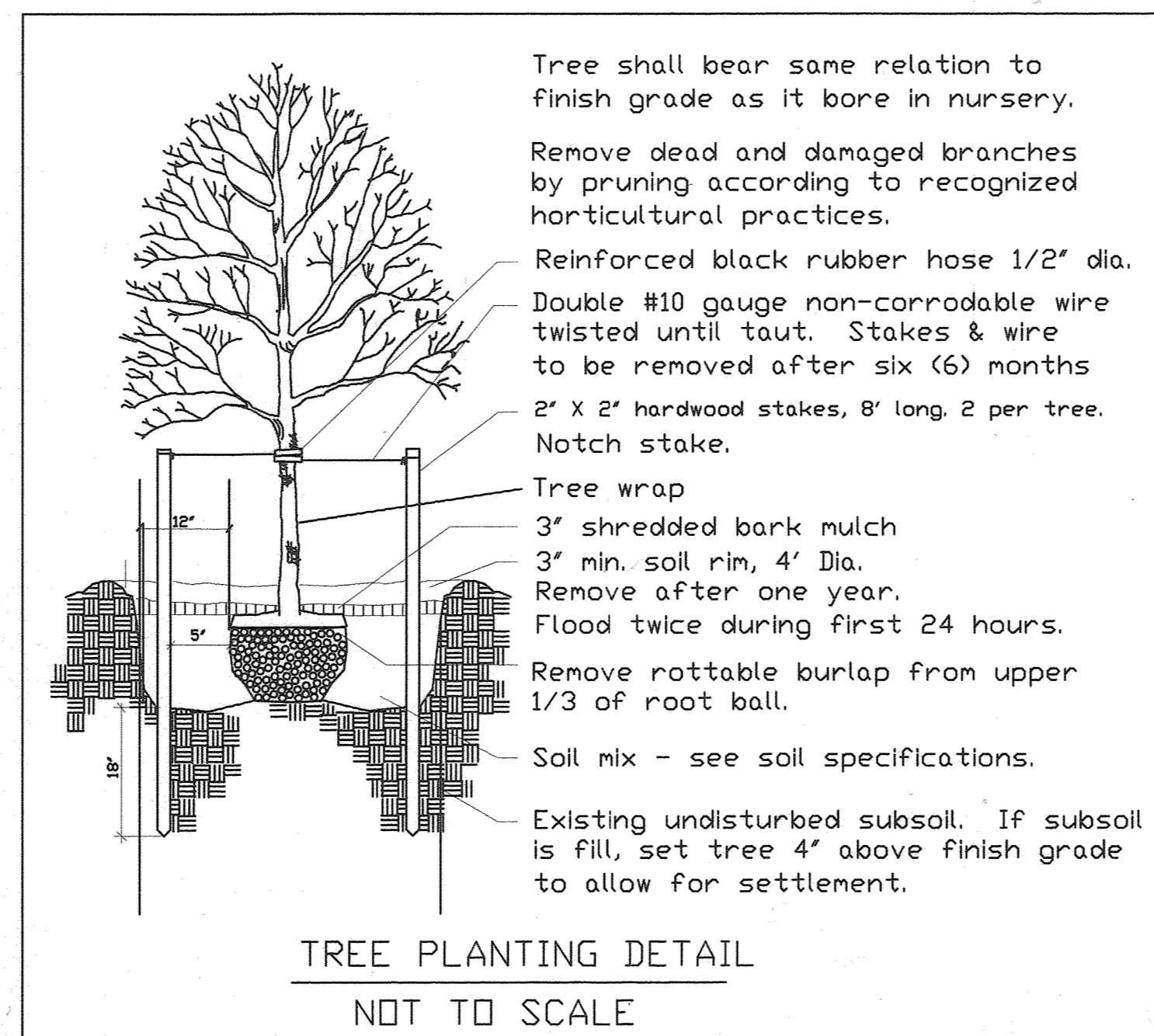
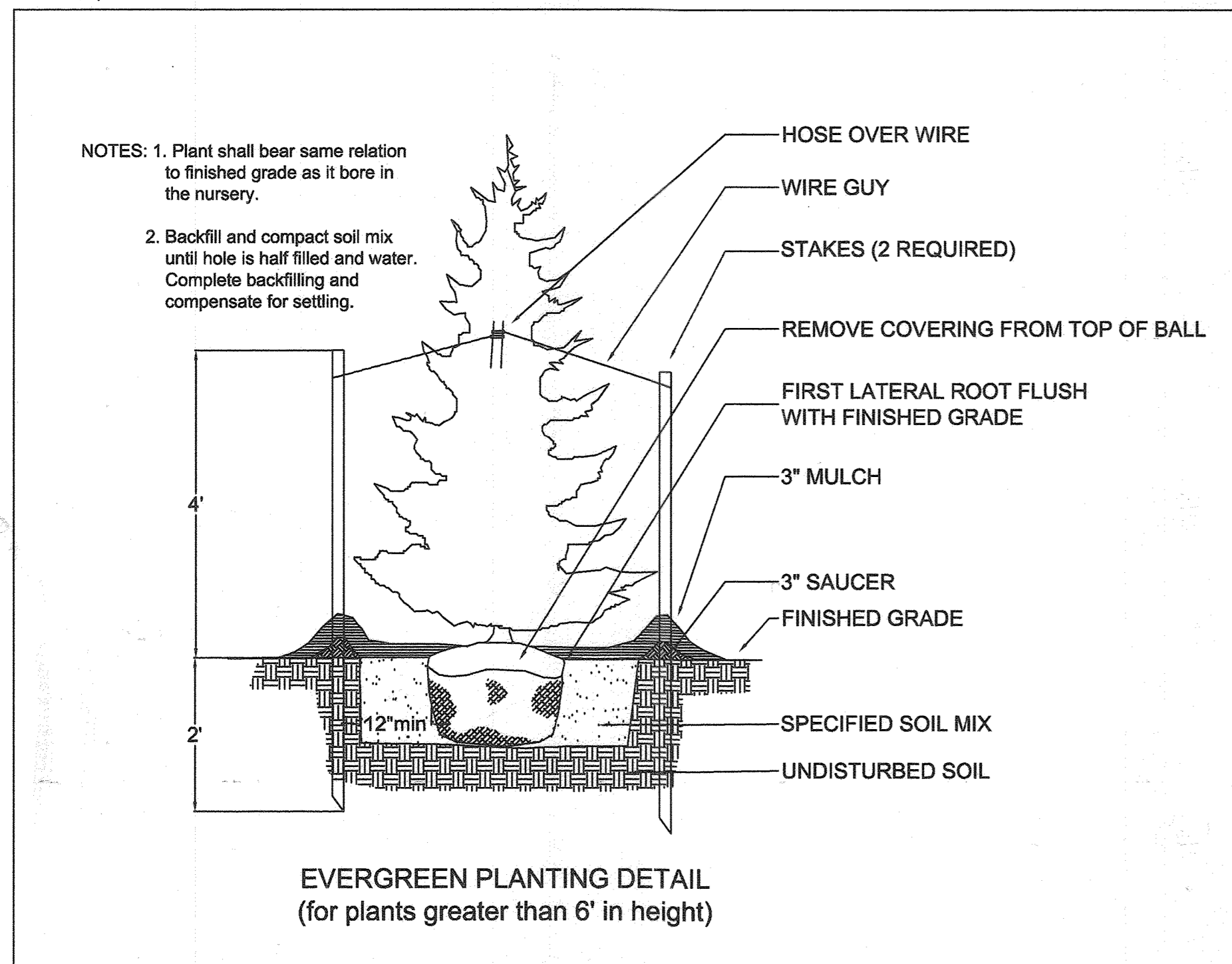
FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING TREES HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$16,050

FINANCIAL SURETY FOR THE REQUIRED STREET TREES HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$4,800

Landscape Notes

- Plants and plant material shall meet the detailed description as given on the plans and as described herein.
- All plant material, unless otherwise specified, shall be nursery grown, of good average, uniformly branched and have a vigorous root system. They shall be healthy, vigorous plants free from defects, decay, disfiguring roots, sunscald injuries, abrasions of the bark, plant disease, insect pest eggs, boxers and all forms of infestations or objectionable disfigurements. Plant materials that are weak or which have been cut back from larger grades to meet certain specified requirements will be rejected. All plants shall be freshly dug; no heeled in plants or plants from cold storage will be accepted.
- All plant characteristics including, but not limited to; ball diameter, caliper and height measurements, shall be in accordance with the current edition of the "U.S.A. Standard for Nursery Stock", as recommended by the American Assoc. of Nurserymen, Inc.
- All trees shall be symmetrically balanced according to their normal habit of growth. No forked leader stock will be accepted.
- All plants shall be planted within the planting season, which shall be defined as beginning September 15 and ending May 30.
- All planting furnished under this contract shall be guaranteed to remain viable and to thrive in a healthy condition for a period of one (1) year. Trees that are not thriving satisfactorily, as determined by the Landscape Architect, within said one year period shall be replaced by the Contractor at his sole expense. All plant materials shall be planted in accordance with the plans and specifications for the original plantings. Replacement shall include the cost of tearing up and replacing that portion of sidewalk or paving, if any, required for tree replacement, all at the Contractor's sole expense. All replacement plants shall be guaranteed for a minimum period of one (1) year.
- The Contractor shall notify all utility companies five (5) days prior to beginning work.
- Any damage to the existing utilities, buildings, paving, curb, walls and vegetation (not so designated for removal on these plans) shall be repaired to previous condition or replaced by the Contractor at his expense.
- The utilities and obstructions shown are based on best available information. The Contractor shall verify the location of all utilities to his satisfaction prior to construction. Necessary precautions shall be taken by the Contractor to protect existing services and mains, any damage to them due to negligence shall be repaired immediately at Contractor's expense.
- All planting beds shall have three (3) inches of shredded hardwood bark mulch placed on top of top soil.

* REVISION #4



REVISION #4 ONLY

APPROVED: DEPARTMENT OF PUBLIC WORKS
Richard M. Daniel 7-17-02
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Cheryl Danvers 7/10/02
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE
Candy Hamrick 7/25/02
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

DEVELOPER'S BUILDER'S CERTIFICATE
I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A CERTIFICATION OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXCLUDED ONE (1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.
E. J. ... 6/25/02
SIGNATURE OF DEVELOPER DATE

NO.	REVISION	DATE
4	REVISE THE PLAN TO PROVIDE LANDSCAPING FOR THE NEW CLUSTER LOTS	12/22/02
3	RELOCATE 0.064 ACRES FROM FCE #2 TO FCE #1	12/01/02
2	REVISE LANDSCAPE PER INSTALLED CONDITIONS	08/04/06
1	RELABEL DRIVEWAY CULVERTS	05/26/04

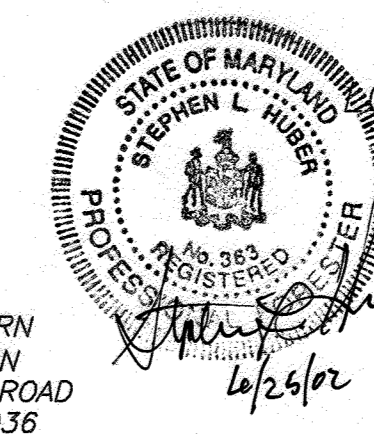
Prepared for:
SHANABERGER & LANE
8726 TOWN AND COUNTRY BLVD.
SUITE 201
ELLICOTT CITY, MD. 21043
(410)461-9563 FAX: 461-9693

AT LEAST 48 HOURS PRIOR TO DIGGING,
CONTACT MISS UTILITY AT 1-800-267-7777

Prepared by:

EXPLORATION RESEARCH, INC.
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS
8310 FOREST STREET
ELLICOTT CITY, MARYLAND 21043
TEL: (410) 760-1150 FAX: (410) 760-7880

OWNERS:
JAMES M. SANBORN
EMILIE S. SANBORN
4967 TEN OAKS ROAD
DAYTON, MD. 21036



LANDSCAPE AND STREET TREE PLAN
KOANDAH GARDENS
ESTATES
LOTS 16 - 28 AND PRESERVATION PARCEL 'A'
(A RESUBDIVISION OF PARCEL "A-1"
PLAT NOS. 11868-11871)
TAX MAP 34 BLOCK 23 PARCEL 78
ZONED RR-DEO
5TH ELECTION DIST. HOWARD CO., MD.
SCALE: As Shown June 25, 2002
SHEET 13 OF 14

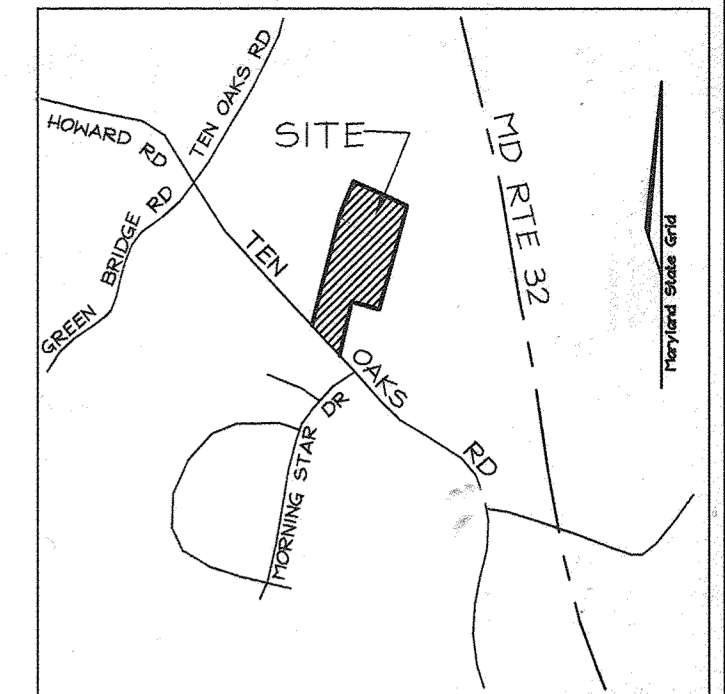


Forest Stand Narrative

The site is a 17.5 acre lot which is subject to subdivision into one additional lot and a preservation parcel. Within the lot there is approximately 1.0 acre of 100 year floodplain. There is a perennial stream running within the floodplain as well as approximately 1.30 acres of wetlands.

F-1 This stand is approximately 4.90 acres. It consists of about 10,000 s.f. of 15-25% slopes. There is a small wetland area of approximately 3360 s.f. The stand is well developed with an average basal area of 95. The canopy consists of Red Oak, Mockernut Hickory, White Oak, and Ash. Understory consists of Allegheny Blackberry, Greenbriar, Black Cherry, American Holly, and Devil's Walking Stick. The last item is mostly found in an area that has been thinned out within the last few years. There are no specimen trees. This would be considered priority retention forest due to erodable soils, steep slopes, wetlands, and maturity of the stand.

The remainder of the site will not be used for forest conservation and was not analyzed.



GENERAL NOTES

- Total area of site: 17.4663 acres
- Zoning of Site: R-R
- Deed Reference: Liber 292, Folio 411
- Soils Map 17
- Topography and Site Data from plans by: Development Consultants Group, Inc. 17904 Georgia Ave, Suite 102 Olney, MD 20832
- Additional Wetlands Delineation performed by Exploration Research, Inc. on Jan. 14, 2002
- Plans on record for Sanborn Property: F-91-21

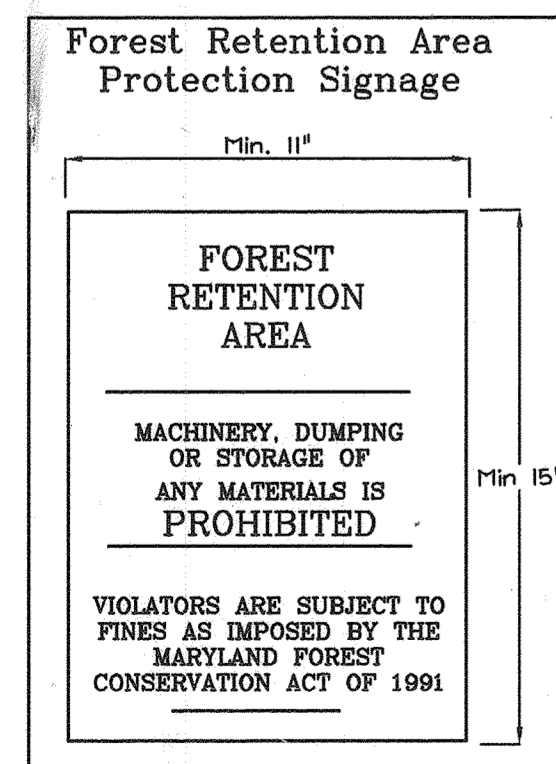
Forest Conservation Narrative

Lot 1 of the Sanborn Property (F-91-21) will be used to offset afforestation requirements due to development on the Koandah Gardens Estates project. Afforestation requirements for that project are 2.09 ac., which would require an offsite retention area of 4.18 ac. The proposed offsite retention on this site is 4.18 ac. The proposed Forest Conservation Easement will be protected with signage as per the county requirements. Per county regulation, in the future a corridor clearing of no more than 24' in width may be created to facilitate access to Lot 2 along the existing Ingress/Egress and Utility Easement.

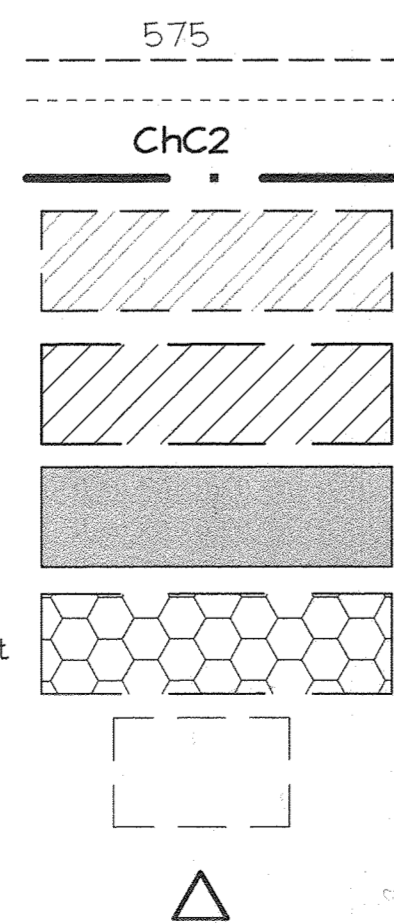
KEY	TYPE OF COMMUNITY	AREA	SOIL INFORMATION			EXISTING VEGETATION (Type and approx. %)	STAND CHARACTERISTICS			FOREST AREA IN SENSITIVE ENVIRONMENTS	
			SOIL TYPE	TYPICAL FOREST COVER	WOODLAND SUITABILITY INDEX		HABITAT VALUE	SIZE AVG. DIAM.	AGE		GENERAL CONDITIONS
F-1	MIXED HARDWOOD	4.90 Ac.	ChB2 ChC2 GIC2	Upland Hardwood	75-84 oak	Good	Red Oak 30% Mockernut 30% Hickory 20% White Oak 10% Ash 6-12% Red Maple 10%	18-24 6-12 8-18 6-12 2-8	70-100	Good condition with minimal invasives. Good understory and ground-cover layers.	10,000 s.f. of 15-25% slopes. 3360 s.f. of wetlands.

SOILS LEGEND		
SYMBOL	NAME / DESCRIPTION	TYPE
ChA	Chester silt loam, 0-3% slopes	B
ChB2	Chester silt loam, 3-8% slopes, moderately eroded	B
ChC2	Chester silt loam, 8-15% slopes, moderately eroded	B
GIB2	Glenelg loam, 3-8% slopes, moderately eroded	B
GIC2	Glenelg loam, 8-15% slopes, moderately eroded	B
GnB2	Glenville silt loam, 3-8% slopes, moderately eroded	C
MgC2	Manor gravelly loam, 8-15% slopes, moderately eroded	B

LEGEND



- Ex. Major Contour
- Ex. Minor Contour
- Soil Type Boundary
- Ex. Ingress/Egress and Utility Easement
- Ex. Septic Field
- 15-25% Slopes
- Forest Conservation Easement
- Ex. Building
- Forest Conservation Easement Sign



SURETY FOR THE REQUIRED FOREST CONSERVATION RETENTION AREAS OF 271,378.8 SQ FT (6.23 ACRES) WILL BE POSTED WITH THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$56,275.76

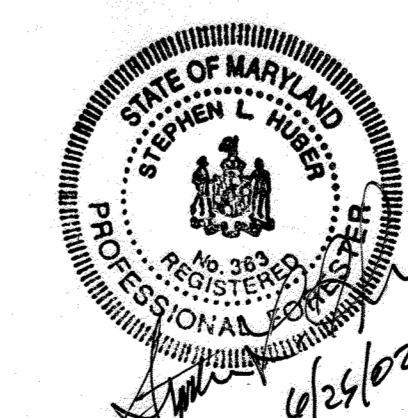
Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.

License No. 22390 Expiration Date: 6-30-21

APPROVED: DEPARTMENT OF PUBLIC WORKS
Andrew M. Donale 7-17-02
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
William Dammann 7/18/02
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Andy Thomas 7/5/02
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE



REV	DATE	BY	REVISION
1	12.1.2020	BE1	RELOCATE 0.004 ACRES FROM FCE#2 TO FCE#1.

LOT 1 OF SANBORN PROPERTY F-91-21

OFFSITE FOREST CONSERVATION PLAN KOANDAH GARDENS ESTATES F-02-04

In partial fulfillment of the forest conservation obligation for F-02-04

TAX MAP 28 PARCEL 43
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DESIGN BY: RAB
 DRAWN BY: RAB
 CHECKED BY: SLH
 SCALE: 1"=100'
 DATE: JUNE 25, 2002
 P.L.O. No.: 98074
 SHEET No.: 14 OF 14

EXPLORATION RESEARCH, INC.
 ENVIRONMENTAL CONSULTANTS
 6510 FOREST STREET
 BELTSVILLE CITY, MARYLAND 21043
 TEL: (410) 760-1150 FAX: (410) 760-7880

OFF-SITE FCE Sanborn lot 1 F-02-04