SWM NARRATIVE

This report will demonstrate how the criteria set forth in the Maryland Storm water Design Manual, Volumes I and II (effective October 2000, revised May 2009) will be satisfied for these lots. The goal of creating hydrology similar to that of "woods in good condition" will be accomplished through the use of permeable paving (A-2), a micro bio-retention facility (M-6) and six (6) on-lot drywells (M-5), as suggested within Chapter 5 of previously mentioned manual. The achievement of this goal will remove the requirement of providing channel

GENERAL SITE CONDITIONS:

This property is zoned R-5A-0 and is located on Tax Map 42, Parcel Nos. 353 and 361 of the Howard County, Maryland Tax Map database system. The total of the two parcels is approximately 1.33 acres including two detached single-family dwellings and several accessory structures, all of which are to be removed. The property is bordered by Maryland Route 32 to the south, the Glen Oaks Townhouse subdivision to the north and is set back from Glen Oaks Lane, a public road, which currently provides access from Glen Oaks Lane by means of a shared driveway The project consisting of Parcels 353 and 361 with addresses of 9570 and 9580 Glen Oaks Lane respectively is irregular in shape and is served by public water and sewer. The property is in the Columbia neighborhood within the watershed of an unnamed tributary to the Little Patuxent River (02131105). The existing topography of the site is generally level draining toward a drainage swale within the Maryland Route 32 Right of way and toward a storm drain system with Glen Oaks Lane. The Web Soils Survey shows soils on the site consist of predominately Legore-Montalto-Urban Type "B" soils (LoB) with an area of Udorthents, Highway (UaF) adjacent to Maryland Route 32

A field inspection conducted by Eco-Science Professions (ESP) determined that there are no Wetlands. Streams or associated Environmental buffers within the project boundary; there are however six (6) specimen trees existing on the property, which will be subject to an Alternative Compliance allowing removal due to the location of the Specimen trees within the site.

I. NATURAL RESOURCE PROTECTION:

To ensure the protection of natural resources located on this site, all buffers will be honored and all improvement will be located outside of environmentally sensitive areas. The design will remove six (6) specimen trees in order to properly treat storm water runoff on-site.

- I. <u>MAINTENANCE OF NATURAL FLOW PATTERNS:</u>
- The proposed development is designed with the intent of creating drainage divides similar to those of the natural flow patterns in the project area.

III. <u>REDUCTION OF IMPERVIOUS AREAS THROUGH BETTER SITE DESIGN.</u>

ALTERNATIVE SURFACES AND NONSTRUCTURAL PRACTICES This site proposes the minimum impervious areas necessary to provide adequate access to the proposed lots. All proposed impervious surfaces are receiving treatment using ESD storm water management facilities to the maximum extent practical. Permeable paving is being utilized where possible to reduce the amount of impervious area and effectively provide treatment for a significant amount of impervious paving.

IV. INTEGRATION OF EROSION AND SEDIMENT CONTROLS INTO

STORMWATER STRATEGY:

Sediment control devices have been placed to work in concert with the proposed drainage divides that were created when planning the Stormwater

V. IMPLEMENTATION OF ESD PLANNING TECHNIQUES AND PRACTICES TO THE MAXIMUM EXTENT PRACTICABLE (MEP) drywells (M-5) and an area of permeable paving (A-2) to meet and exceed environmental site design to the maximum extent practicable (ESD

to the MEP). VI. REQUEST FOR DESIGN MANUAL WAIVER:

No waivers are expected to be requested on this project relating to swm

LEGEND				
SYMBOL	DESCRIPTION			
	EXISTING CONTOUR 2' INTERVAL			
	EXISTING CONTOUR 10' INTERVAL			
	PROPOSED CONTOUR 10' INTERVAL			
	PROPOSED CONTOUR 2' INTERVAL			
×362.2	SPOT ELEVATION			
	LIMIT OF DISTURBANCE			
	EXISTING WATER & SEWER UTILITY EASEMENT			
<u> 18" 50</u>	EXISTING STORM DRAIN			
8"W	EXISITNG WATER			
<u>8"5</u>	EXISITNG SEWER			
	BUILDING AND DRIVES (TO BE REMOVED)			
55F	SUPER SILT FENCE			
5F	SILT FENCE			
	DENOTES EXISTING FOREST TO BE REMOVED			
XX	DENOTES EXISTING TREES TO BE REMOVED			
3 *	DENOTES EXISTING TREES TO REMAIN			

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 3.418 8.51.18

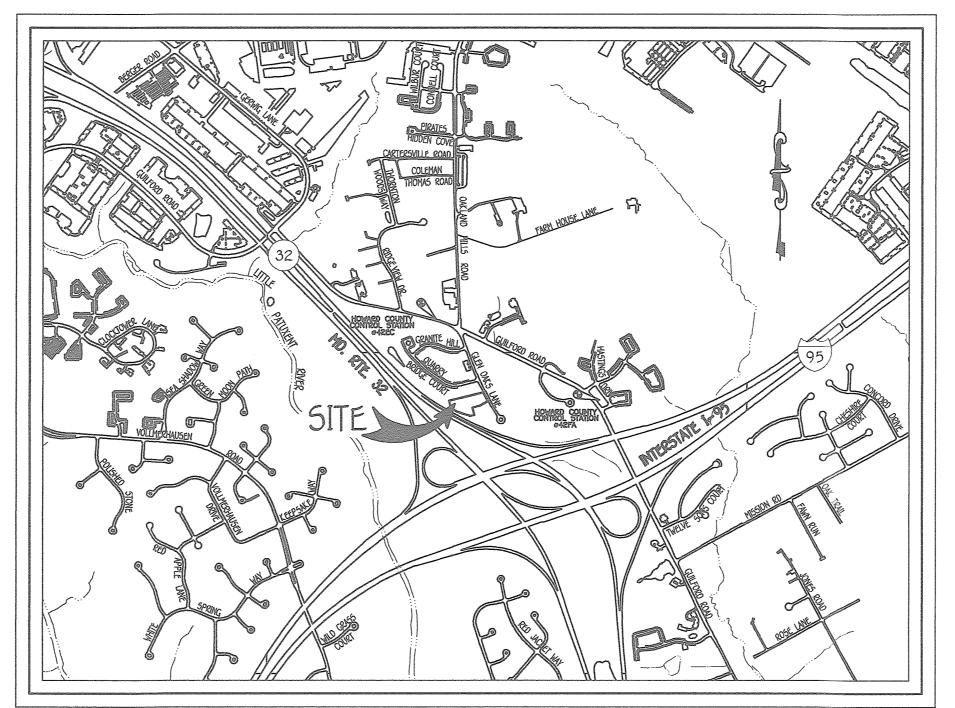
FISHER, COLLINS & CARTER, INC. CIVIL ENGINEERING CONSULTANTS & LAND SURVEYORS nnial square office park — 10272 Baltimore National Pike ELLICOTT CITY, MARYLAND 21042 (410) 461 - 2255

Chief, Development Engineering Division

ENVIRONMENTAL CONCEPT PLAN GLEN OAKS PLACE

LOTS 1 THRU 6 & OPEN SPACE LOT 7

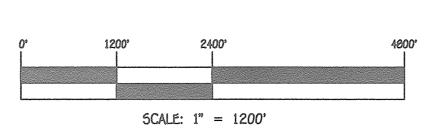
ZONING: R-SA-8 (HIGH DENSITY RESIDENTIAL) DISTRICT TAX MAP No. 42 GRID No. 16 & 17 PARCEL Nos. 353 & 381 SIXTH ELECTION DISTRICT HOWARD COUNTY, MARYLAND



HOWARD COUNTY HOWARD COUNTY GEODETIC SURVEY CONTROL NO. 42EC GEODETIC SURVEY CONTROL NO. 42FA N 544,412.796 E 1,362,179.428 N 545,416,990 E 1,360,140,442 ELEVATION: 365.383' ELEVATION: 341.823'

REFER TO HOWARD CO. ADC MAP 33-E8 & 40-E1

5CALE: 1" = 1200'



TABULATION SUMMARY

(2) PROVIDED REC AREA = 5.953 5a.Ft.

F. DENSITY PROVIDED: 6 UNITS

A. TOTAL SITE: TAX MAP 42 PARCELS 353 & 301 B. TOTAL SITE AREA: (0.51 Ac. + 0.82 Ac.) = 1.33 AcC. OPEN SPACE: (1) REQUIRED OPEN 5PACE = 1.33 Ac. x 25% = 0.33 Ac. (2) TOTAL OPEN SPACE PROVIDED = 1.04 Ac. (3) TOTAL CREDITED OPEN SPACE PROVIDED = 1.03 Ac.

(4) TOTAL NON-CREDITED OPEN SPACE PROVIDED = 0.01 Ac. D. RECREATIONAL AREA (1) REQUIRED REC AREA = 2,400 Sq.Ft. $400 \text{ Sq.Ft.} / \text{SFD} \times 6 \text{ SFA} = 2,400 \text{ Sq.Ft.}$

E. DENSITY ALLOWED: 1.33 Ac x & UNITS/NET ACRE = 10.64 = 10 UNITS

GENERAL NOTES

- 1. THE SUBJECT PROPERTY IS ZONED R-5A-Ø (PER 10/06/13 COMPREHENSIVE ZONING PLAN). 2. BOUNDARY IS BASED ON A FIELD RUN SURVEY PERFORMED BY FISHER, COLLINS & CARTER ON OR ABOUT FEBRUARY, 2018.
- 3. CONTOURS ARE BASED ON A TOPOGRAPHIC FIELD RUN SURVEY PERFORMED BY FISHER, COLLINS
- AND CARTER, ON OR ABOUT FEBRUARY, 2018. 4. COORDINATES BASED ON NAD'83 MARYLAND COORDINATE SYSTEM AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL
- STATIONS NO. 42EC AND NO. 42FA: HOWARD COUNTY MONUMENT NO. 42EC N 545,416.990
- E 1,360,140.442 ELEV. 365.383 HOWARD COUNTY MONUMENT NO. 42FA N 544,412.796
- E 1,362,179.428 ELEV. 341.823 5. STORM WATER MANAGEMENT IS IN ACCORDANCE WITH THE M.D.E. STORM WATER DESIGN MANUAL, VOLUMES I & II, REVISED 2009. THIS PLAN PROPOSES THE USE OF ONE (1) AREA OF PERMEABLE PAVING, ONE (1) M-6 MICRO- BIORETENTION FACILITY AND SIX (6) M-5 DRY
- 6. THIS PROPERTY IS LOCATED WITHIN THE METROPOLITAN DISTRICT. PUBLIC WATER AND SEWER WILL
- BE UTILIZED FOR THIS PROJECT. 7. ANY DAMAGE TO THE COUNTY'S RIGHT-OF-WAY SHALL BE CORRECTED AT THE DEVELOPER'S
- 6. NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE REQUIRED WETLANDS, STREAM(S) OR THEIR BUFFERS, FOREST
- CONSERVATION EASEMENT AREAS AND 100 YEAR FLOODPLAIN. 9. LANDSCAPING WILL BE PROVIDED AT THE FINAL PLAN STAGE OF THIS PROJECT.
- 10. FOREST CONSERVATION WILL BE ADDRESSED AT THE FINAL PLAN STAGE OF THIS PROJECT. 11. REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE HOWARD COUNTY ZONING REGULATIONS SHALL OCCUR AT THE PRELIMINARY EQUIVALENT SKETCH PLAN AND FINAL PLAN STAGE. THEREFORE, THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED COMMENTS (INCLUDING
- THOSE THAT MAY ALTER OVERALL SITE DESIGN) AS THIS PROJECT PROGRESSES. 12. SOIL BORING INFORMATION WILL BE PROVIDED AT THE FINAL PLAN STAGE OF THIS PROJECT.
- 13. APPROVAL OF THIS ECP DOES NOT CONSTITUTE APPROVAL OF SUBSEQUENT OR ASSOCIATED SUBDIVISION OR SITE DEVELOPMENT PLANS OR RED-LINE REVISIONS.
- 14. THIS PROJECT IS SUBJECT TO AN APPROVAL OF AN ALTERNATIVE COMPLIANCE REQUEST TO REMOVE THREE SPECIMEN TREES.

SITE ANALYSIS DATA CHART

A. TOTAL AREA OF THIS SUBMISSION = 1.33 AC.± B. LIMIT OF DISTURBED AREA = 1.41 Ac.± PRESENT ZONING DESIGNATION = R-SA-8.

PROPOSED USE: SINGLE FAMILY ATTACHED HOUSING TOTAL NUMBER OF UNITS PROPOSED: 6 UNITS OPEN SPACE TABULATION SEE TABULATION SUMMARY THIS SHEET. RECREATIONAL OPEN SPACE SEE TABULATION SUMMARY THIS SHEET.

BUILDING COVERAGE OF SITE: 0.14 AC+ OR 10% NO PREVIOUS HOWARD COUNTY FILES TOTAL AREA OF FLOODPLAIN LOCATED ON SITE 0.0 AC. . TOTAL AREA OF SLOPES IN EXCESS OF 25% = 0.0 AC±

L. NET TRACT AREA = 1.33 AC. (TOTAL SITE AREA - FLOODPLAIN - STEEP SLOPES AREA) $(1.33 \text{ Ac} - (0.0 \text{ Ac} + 0.0 \text{ Ac})) = 1.33 \text{ AC} \pm$ M. TOTAL AREA OF WETLANDS (INCLUDING BUFFER) LOCATED ON SITE = 0.0 AC. ±

N. TOTAL FOREST 0.00 Ac. ± . TOTAL GREEN OPEN AREA = 0.95 Ac. ± . TOTAL IMPERVIOUS AREA = 0.38 Ac. ±

Q. AREA OF ERODIBLE SOILS = 9,907 SQ.FT./ 0.23 Ac. ±

TITLE SHEET

RESIDENTIAL SINGLE FAMILY ATTACHED

GLEN OAKS PLACE

LOTS 1 THRU 6 & OPEN SPACE LOT 7 ZONED: R-5A-8

TAX MAP NO.: 42 GRID NO.: 16 & 17 PARCEL NO'S.: 353 & 381 SIXTH ELECTION DISTRICT HOWARD COUNTY, MARYLAND SCALE: AS SHOWN DATE: APRIL, 2018



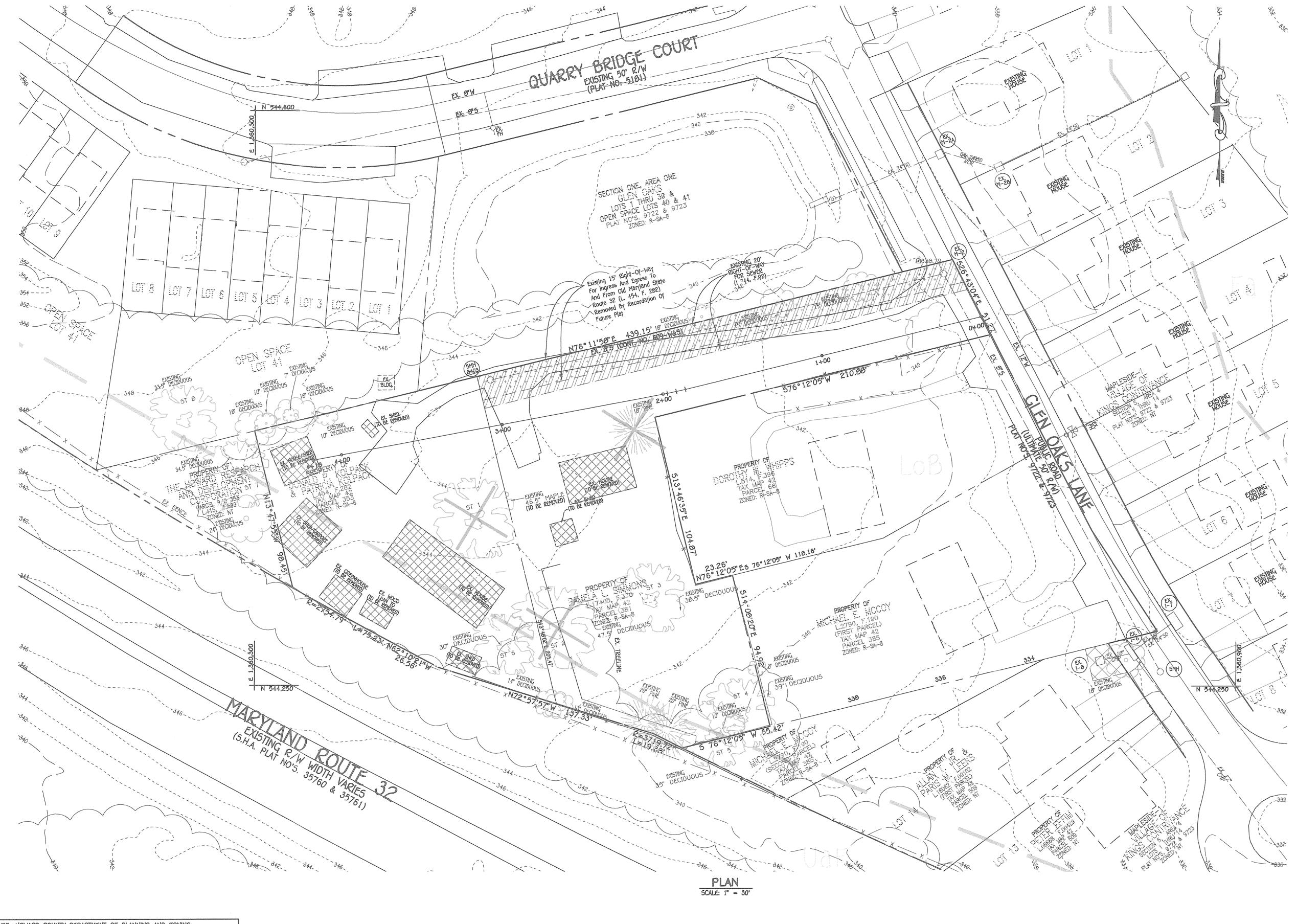
PROFESSIONAL CERTIFICATION HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 21476, EXPIRATION DATE: 7/14/19.

OWNERS DONALD P. KOLPACK PAMELA L. SIMMONS 9580 GLEN OAKS LANE 9570 GLEN OAKS LANE COLUMBIA MARYLAND, 21046 COLUMBIA MARYLAND, 21046 410-992-4600

410-992-4600

GLEN OAKS DEVELOPMENT COMPANY, LLC 8318 FOREST STREET SUITE 200 ELLICOTT CITY, MARYLAND 21043 ATTN: MR DONALD R. REUWER, JR.

410-707-7054



LEGEND				
SYMBOL	DESCRIPTION			
	EXISTING CONTOUR 2' INTERVAL			
	EXISTING CONTOUR 10' INTERVAL			
	PROPOSED CONTOUR 10' INTERVAL			
	PROPOSED CONTOUR 2' INTERVAL			
×362.2	SPOT ELEVATION			
100	LIMIT OF DISTURBANCE			
	EXISTING WATER & SEWER UTILITY EASEMENT			
18" SD	EXISTING STORM DRAIN			
8"W	EXISITNG WATER			
<u>8"5</u>	EXISITNG SEWER			
	BUILDING AND DRIVES TO BE DEMO			
55F	SUPER SILT FENCE			
5F	SILT FENCE			
	DENOTES EXISTING FOREST TO BE REMOVED			
XX	DENOTES EXISTING TREES TO BE REMOVED			
贫業	DENOTES EXISTING TREES TO REMAIN			

Key (X#)	Species	Size (in.dbh)	CRZ (feet radius)	Comments
1	Silver maple	46.5	69.75	fair condition, some trunk rot, CRZ impacted by parking
2	Silver maple	47.5	71.25	poor condition, trunk rot
3	Silver maple	38.5	57.75	good
4	Silver maple	39	58.5	good
5	Silver maple	35	52.5	good
6	Red maple	30	45	poor, severe rot
7	Tulip poplar	34.5	51.75	good
8	Sour cherry	33.5	50.25	poor, trunk rot and dieback

50IL5 LEGEND				
50IL	NAME	CLA55	Kw	
Fa	FALLSINGTON SANDY LOAM, 0 TO 2 PERCENT SLOPES D 0.02			
LoB	LEGORE-MONTALTO-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES	В	0.02	
UaF	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES X			

SOIL TYPES TAKEN FROM MAP 28 OF THE <u>SOIL SURVEY OF HOWARD COUNTY, MARYLAND</u> FOUND ON THE HSCD WEBSITE.

EXISTING CONDITIONS PLAN

RESIDENTIAL SINGLE FAMILY ATTACHED

GLEN OAKS PLACE LOTS 1 THRU 6 & OPEN SPACE LOT 7 ZONED: R-5A-8

TAX MAP NO.: 42 GRID NO.: 16 & 17 PARCEL NO'5.: 353 & 381 SIXTH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

SCALE: AS SHOWN DATE: APRIL, 2018 SHEET 2 OF 5 ECP-18-039

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

8.24.8 Daje Chief, Development Engineering Division 8-29-18

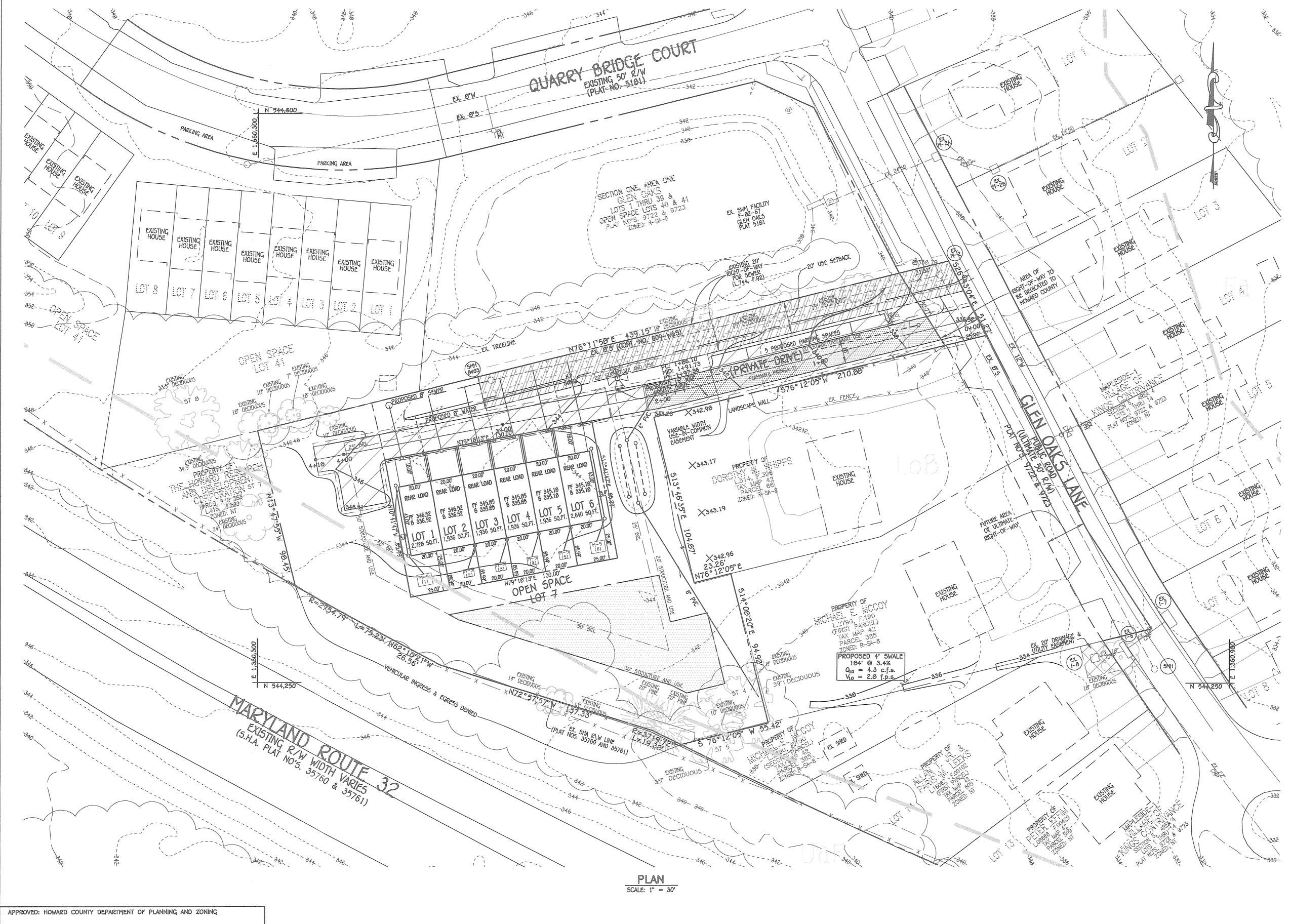
FISHER, COLLINS & CARTER, INC. CIVIL ENGINEERING CONSULTANTS & LAND SURVEYORS VIAL SQUARE OFFICE PARK — 10272 BALTIMORE NATIONAL PIKE ELLICOTT CITY, MARYLAND 21042 (410) 461 — 2855



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DONALD P. KOLPACK PAMELA L. SIMMONS
9580 GLEN OAKS LANE
COLUMBIA MARYLAND, 21046
410-992-4600
PAMELA L. SIMMONS
9570 GLEN OAKS LANE
COLUMBIA MARYLAND, 21046
410-992-4600

DEVELOPER GLEN OAKS DEVELOPMENT COMPANY, LLC
0310 FOREST STREET
SUITE 200
ELLICOTT CITY, MARYLAND 21043
ATTN: MR DONALD R. REUWER, JR.
410-707-7054



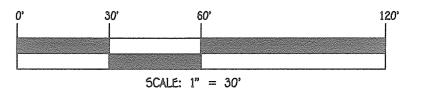
LEGEND				
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****	BUILDING AND DRIVES TO BE DEMO			
55F	SUPER SILT FENCE			
——5F——	SILT FENCE			
	DENOTES EXISTING FOREST TO BE REMOVED			
業業	DENOTES EXISTING TREES TO BE REMOVED			
83 *	DENOTES EXISTING TREES TO REMAIN			

	50IL5 LEGEND		
50IL	NAME CLASS Kw		
Fa	FALLSINGTON SANDY LOAM, 0 TO 2 PERCENT SLOPES	D	0.02
LoB	LEGORE-MONTALTO-URBAN LAND COMPLEX, 0 TO 8 PERCENT SLOPES B 0.0		
UaF	UDORTHENTS, HIGHWAY, 0 TO 65 PERCENT SLOPES	X	

SOIL TYPES TAKEN FROM MAP 28 OF THE <u>SOIL SURVEY OF HOWARD COUNTY, MARYLAND</u> FOUND ON THE HSCD WEBSITE.

STORMWAT	er managem	IENT PR	ACTICES
AREA ID	PERMEABLE PAVING A-2 (Y/N)	DRY WELLS M-5 (Y/N)	MICRO BIO-RETENTION M-6 (Y/N)
LOT 1		Υ	
LOT 2		Υ	Υ
LOT 3		Y	Υ
LOT 4		Υ	Υ
LOT 5		Υ	Υ
LOT 6		Υ	
U5E-IN-COMMON DRIVE	Y		
USE-IN-COMMON DRIVE AND LOTS 1-6			Y

STORMWATER MANAGEMENT PRACTICES					
AREA ID	DRAINAGE AREA	% IMPERVIOUS	ESDV REQUIRED CuF†.	ESDV PROVIDED CuFt.	TYPE
A	960	100%	123	126	M-5 (1)
В	430	100%	62	70	M-5 (2)
С	430	100%	62	70	M-5 (3)
D	430	100%	62	70	M-5 (4)
E	430	100%	62	70	M-5 (5)
F	<i>9</i> 60	100%	123	126	M-5 (6)
G	16,071	48%	1,027	1,227	M-6 (1)
H	3,607	23%	113	714	A-2 (1)



ENVIRONMENTAL CONCEPT PLAN

RESIDENTIAL SINGLE FAMILY ATTACHED

GLEN OAKS PLACE LOTS 1 THRU 6 & OPEN SPACE LOT 7 ZONED: R-5A-8

TAX MAP NO.: 42 GRID NO.: 16 & 17 PARCEL NO'S.: 353 & 381 SIXTH ELECTION DISTRICT HOWARD COUNTY, MARYLAND SCALE: AS SHOWN DATE: APRIL, 2018

SHEET 3 OF 5 ECP-18-039

8-24-18 Date

9.29.18Date

FISHER, COLLINS & CARTER, INC.
CML ENGINEERING CONSULTANTS & LAND SURVEYORS itennial square office park — 10272 Baltimore national pike Ellicott city, maryland 21042 (410) 461 — 2855



PROFESSIONAL CERTIFICATION I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 21476, EXPIRATION DATE: 7/14/19.

OWNER5 UUNALD P. KOLPACK

9500 GLEN OAKS LANE

COLUMBIA MARYLAND, 21046

410-992-4600

PAMELA L. SIMMONS

9570 GLEN OAKS LANE

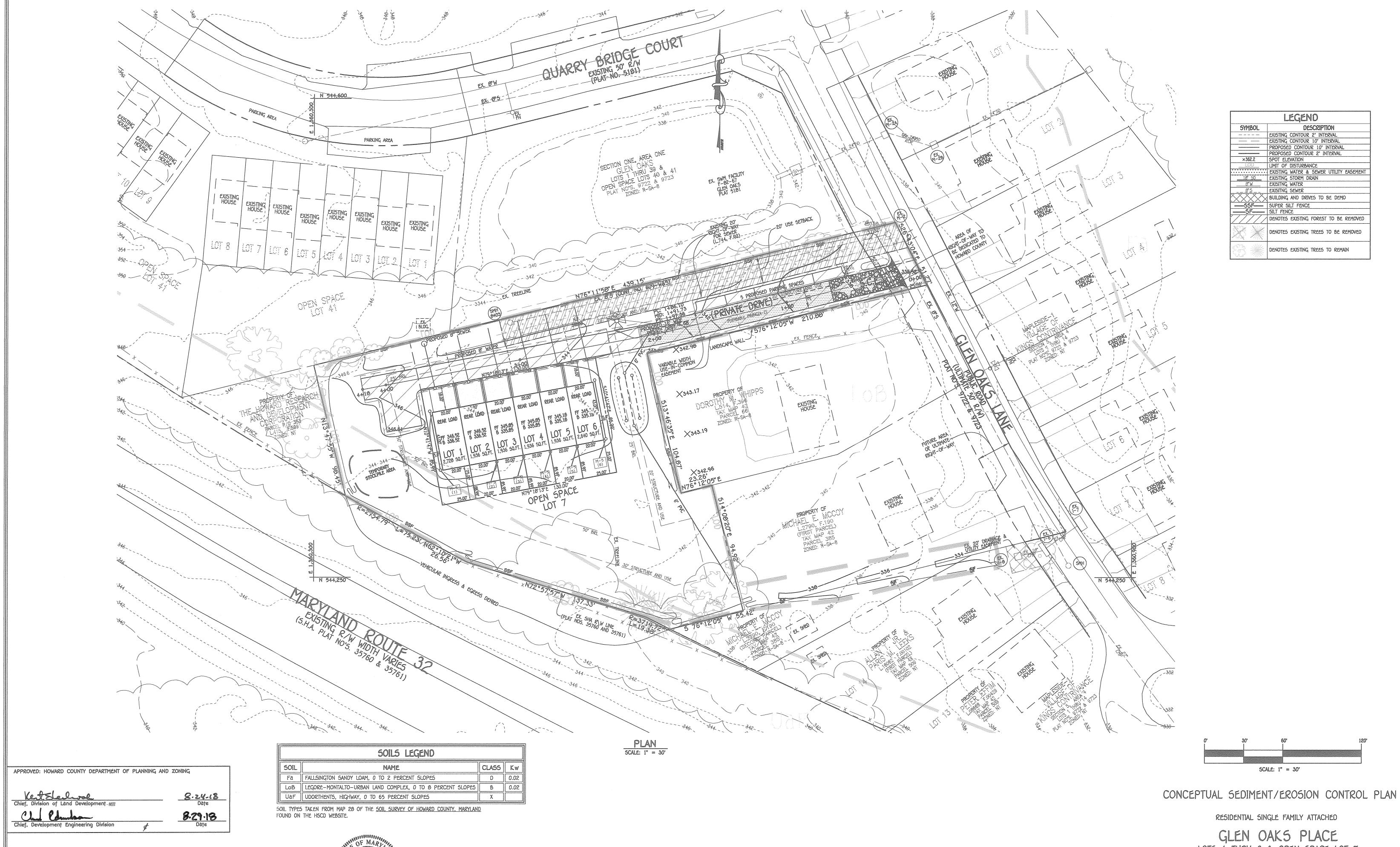
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GLEN OAKS DEVELOPMENT COMPANY, LLC
0310 FOREST STREET
SUITE 200
ELLICOTT CITY, MARYLAND 21043
ATTN: MR DONALD R. REUWER, JR.
410-707-7054

DEVELOPER



FISHER, COLLINS & CARTER, INC.
CIVIL ENGINEERING CONSULTANTS & LAND SURVEYORS nnal square office park — 10272 Baltimore national pike ellicott city, maryland 21042 (410) 461 - 2055

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DEVELOPER GLEN OAKS DEVELOPMENT COMPANY, LLC 0310 FOREST STREET SUITE 200 ELLICOTT CITY, MARYLAND 21043 ATTN: MR DONALD R. REUWER, JR. 410-707-7054

LOTS 1 THRU 6 & OPEN SPACE LOT 7 ZONED: R-5A-8

TAX MAP NO.: 42 GRID NO.: 16 & 17 PARCEL NO'S.: 353 & 381 SIXTH ELECTION DISTRICT HOWARD COUNTY, MARYLAND SCALE: AS SHOWN DATE: APRIL, 2018

SHEET 4 OF 5 ECP-18-039

INFILTRATION AND FILTER SYSTEMS EITHER TAKE ADVANTAGE OF EXISTING PERMEABLE SOILS OR CREATE A PERMEABLE MEDIUM SUCH AS SAND FOR WC), AND RE V. IN SOME INSTANCES WHERE PERMEABILITY IS GREAT, THESE FACILITIES MAY BE USED FOR QP AS WELL. THE MOST COMMON SYSTEMS INCLUDE INFILTRATION TRENCHES, INFILTRATION BASINS, SAND FILTERS, AND ORGANIC FILTERS.

WHEN PROPERLY PLANTED, VEGETATION WILL THRIVE AND ENHANCE THE FUNCTIONING OF THESE SYSTEMS. FOR EXAMPLE, PRE-TREATMENT BUFFERS WILL TRAP SEDIMENTS THAT OFTEN ARE BOUND WITH PHOSPHOROUS AND METALS. VEGETATION PLANTED IN THE FACILITY WILL AID IN NUTRIENT UPTAKE AND WATER STORAGE. ADDITIONALLY, PLANT ROOTS WILL PROVIDE ARTERIES FOR STORMWATER TO PERMEATE SOIL FOR GROUNDWATER RECHARGE. FINALLY. SUCCESSFUL PLANTINGS PROVIDE AESTHETIC VALUE AND WILDLIFE HABITAT MAKING THESE FACILITIES MORE DESIRABLE TO THE PUBLIC.

DESIGN CONSTRAINTS:

- > PLANTING BUFFER STRIPS OF AT LEAST 20 FEET WILL CAUSE SEDIMENTS TO SETTLE OUT BEFORE REACHING THE FACILITY, THEREBY REDUCING THE POSSIBILITY OF CLOGGING. > DETERMINE AREAS THAT WILL BE SATURATED WITH WATER AND WATER TABLE DEPTH SO THAT APPROPRIATE PLANTS MAY BE SELECTED (HYDROLOGY WILL BE SIMILAR TO BIORETENTION FACILITIES. SEE FIGURE A.5 AND TABLE A.4 FOR PLANTING MATERIAL GUIDANCE).
- > PLANTS KNOWN TO SEND DOWN DEEP TAPROOTS SHOULD BE AVOIDED IN SYSTEMS WHERE FILTER FABRIC IS USED AS PART OF FACILITY DESIGN. > TEST SOIL CONDITIONS TO DETERMINE IF SOIL AMENDMENTS ARE NECESSARY.
- > PLANTS SHALL BE LOCATED SO THAT ACCESS IS POSSIBLE FOR STRUCTURE MAINTENANCE. > STABILIZE HEAVY FLOW AREAS WITH EROSION CONTROL MATS OR SOD.

> TEMPORARILY DIVERT FLOWS FROM SEEDED AREAS UNTIL VEGETATION IS ESTABLISHED. > SEE TABLE A.5 FOR ADDITIONAL DESIGN CONSIDERATIONS.

BIO-RETENTION 50IL BED CHARACTERISTICS

THE CHARACTERISTICS OF THE SOIL FOR THE BIORETENTION FACILITY ARE PERHAPS AS IMPORTANT AS THE FACILITY LOCATION, SIZE, AND TREATMENT VOLUME. THE SOIL MUST BE PERMEABLE ENOUGH TO ALLOW RUNOFF TO FILTER THROUGH THE MEDIA. WHILE HAVING CHARACTERISTICS SUITABLE TO PROMOTE AND SUSTAIN A ROBUST VEGETATIVE COVER CROP. IN ADDITION, MUCH OF THE NUTRIENT POLLUTANT UPTAKE (NITROGEN AND PHOSPHORUS) IS ACCOMPLISHED THROUGH ABSORPTION AND MICROBIAL ACTIVITY WITHIN THE SOIL PROFILE. THEREFORE, SOILS MUST BALANCE THEIR CHEMICAL AND PHYSICAL PROPERTIES TO SUPPORT BIOTIC COMMUNITIES ABOVE AND BELOW GROUND.

THE PLANTING SOIL SHOULD BE A SANDY LOAM, LOAMY SAND, LOAM (USDA), OR A LOAM/SAND MIX (SHOULD CONTAIN A MINIMUM 35 TO 60% SAND, BY VOLUME). THE CLAY CONTENT FOR THESE SOILS SHOULD BE LESS THAN 25% BY VOLUME [ENVIRONMENTAL QUALITY RESOURCES (EQR), 1996; ENGINEERING TECHNOLOGY INC. AND BIOHABITATS, INC. (ETAB), 1993]. SOILS SHOULD FALL WITHIN THE 5M, ML, SC CLASSIFICATIONS OR THE UNIFIED SOIL CLASSIFICATION SYSTEM (USCS). A PERMEABILITY OF AT LEAST 1.0 FEET PER DAY (0.5" /HR) IS REQUIRED (A CONSERVATIVE VALUE OF 0.5 FEET PER DAY IS USED FOR DESIGN). THE SOIL SHOULD BE FREE OF STONES, STUMPS, ROOTS, OR OTHER WOODY MATERIAL OVER 1" IN DIAMETER. BRUSH OR SEEDS FROM NOXIOUS WEEDS (E.G., JOHNSON GRASS, MUGWORT, NUTSEDGE, AND CANADA THISTLE OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05.) SHOULD NOT BE PRESENT IN THE SOILS. PLACEMENT OF THE PLANTING SOIL SHOULD BE IN 12 TO 10 LIFTS THAT ARE LOOSELY COMPACTED (TAMPED LIGHTLY WITH A BACKHOE BUCKET OR TRAVERSED BY DOZER TRACKS). THE SPECIFIC CHARACTERISTICS ARE PRESENTED IN TABLE A.3.

TABLE A.3 PLANTING SOIL CHARACTERISTICS

PARAMETER	VALUE		
PH RANGE	5.2 TO 7.00		
ORGANIC MATTER	1.5 TO 4.0% (BY WEIGHT)		
MAGNESIUM	35 LBS. PER ACRE, MINIMUM		
PHOSPHORUS (PHOSPHATE - P2O5)	75 LBS. PER ACRE, MINIMUM		
POTASSIUM (POTASH -1(K20)	05 LBS. PER ACRE, MINIMUM		
SOLUBLE SALTS	500 PPM		
CLAY	10 TO 25 %		
SILT	30 TO 55 %		
SAND	35 TO 60%		

MULCH LAYER

THE MULCH LAYER PLAYS AN IMPORTANT ROLE IN THE PERFORMANCE OF THE BIORETENTION SYSTEM. THE MULCH LAYER HELPS MAINTAIN SOIL MOISTURE AND AVOIDS SURFACE SEALING, WHICH REDUCES PERMEABILITY. MULCH HELPS PREVENT EROSION. AND PROVIDES A MICROENVIRONMENT SUITABLE FOR SOIL BIOTA AT THE MULCH/SOIL INTERFACE. IT ALSO SERVES AS A PRETREATMENT LAYER, TRAPPING THE FINER SEDIMENTS, WHICH REMAIN SUSPENDED AFTER THE PRIMARY PRETREATMENT.

THE MULCH LAYER SHOULD BE STANDARD LANDSCAPE STYLE, SINGLE OR DOUBLE SHREDDED HARDWOOD MULCH OR CHIPS. THE MULCH LAYER SHOULD BE WELL AGED (STOCKPILED OR STORED FOR AT LEAST 12 MONTHS), UNIFORM IN COLOR, AND FREE OF OTHER MATERIALS, SUCH AS WEED SEEDS, SOIL, ROOTS, ETC. THE MULCH SHOULD BE APPLIED TO A MAXIMUM DEPTH OF THREE INCHES. GRASS CLIPPINGS SHOULD NOT BE USED AS A MULCH MATERIAL

PLANTING GUIDANCE

PLANT MATERIAL SELECTION SHOULD BE BASED ON THE GOAL OF SIMULATING A TERRESTRIAL FORESTED COMMUNITY OF NATIVE SPECIES. BIORETENTION SIMULATES AN UPLAND-SPECIES ECOSYSTEM. THE COMMUNITY SHOULD BE DOMINATED BY TREES, BUT HAVE A DISTINCT COMMUNITY OF UNDERSTORY TREES. SHRUBS AND HERBACEOUS MATERIALS. BY CREATING A DIVERSE, DENSE PLANT COVER, A BIORETENTION FACILITY WILL BE ABLE TO TREAT STORMWATER RUNOFF AND WITHSTAND URBAN STRESSES FROM INSECTS, DISEASE, DROUGHT, TEMPERATURE, WIND, AND EXPOSURE.

THE PROPER SELECTION AND INSTALLATION OF PLANT MATERIALS IS KEY TO A SUCCESSFUL SYSTEM. THERE ARE ESSENTIALLY THREE ZONES WITHIN A BIORETENTION FACILITY (FIGURE A.5). THE LOWEST ELEVATION SUPPORTS PLANT SPECIES ADAPTED TO STANDING AND FLUCTUATING WATER LEVELS. THE MIDDLE ELEVATION SUPPORTS PLANTS THAT LIKE DRIFE SOIL CONDITIONS, BUT CAN STILL TOLERATE OCCASIONAL INUNDATION BY WATER. THE OUTER EDGE

IS THE HIGHEST ELEVATION AND GENERALLY SUPPORTS PLANTS ADAPTED TO DRYER CONDITIONS. A SAMPLE OF APPROPRIATE PLANT MATERIALS FOR BIORETENTION FACILITIES ARE INCLUDED IN TABLE A.4. THE LAYOUT OF PLANT MATERIAL SHOULD BE FLEXIBLE, BUT SHOULD FOLLOW THE GENERAL PRINCIPALS DESCRIBED IN TABLE A.5. THE OBJECTIVE IS TO HAVE A SYSTEM, WHICH RESEMBLES A RANDOM, AND NATURAL PLANT LAYOUT, WHILE MAINTAINING OPTIMAL CONDITIONS FOR PLANT ESTABLISHMENT AND GROWTH. FOR A MORE EXTENSIVE BIORETENTION PLAN. CONSULT ETAB. 1993 OR CLAYTOR AND SCHUELER, 1997.

OPERATION AND MAINTENANCE SCHEDULE FOR BIO-RETENTION AREAS (M-6) AND (F-6)

- . ANNUAL MAINTENANCE OF PLANT MATERIAL, MULCH LAYER AND SOIL LAYER IS REQUIRED. MAINTENANCE OF OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY 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.
- 2. SCHEDULE OF PLANT INSPECTION WILL BE TWICE A YEAR IN SPRING AND FALL THIS INSPECTION WILL INCLUDE REMOVAL OF DEAD AND DISEASED VEGETATION CONSIDER BEYOND TREATMENT. TREATMENT OF ALL DISEASED TREES AND SHRUBS AND REPLACEMENT OF ALL DEFICIENT STAKES AND WIRES.
- 3. MULCH SHALL BE INSPECTED EACH SPRING. REMOVE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER ONCE EVERY 2 TO 3 YEARS.
- 4. SOIL EROSION TO BE ADDRESSED ON AN AS NEEDED BASIS. WITH A MINIMUM OF ONCE PER MONTH AND AFTER HEAVY STORM EVENTS.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING 3-24-13 8.29.13

FISHER, COLLINS & CARTER, INC. CIVIL ENGINEERING CONSULTANTS & LAND SURVEYORS NNIAL SQUARE OFFICE PARK - 10272 BALTIMORE NATIONAL PIKE (410) 461 - 2855

OPERATION & MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED DRY WELLS (M-5)

- A. THE OWNER SHALL INSPECT THE MONITORING WELLS AND STRUCTURES ON A QUARTERLY BASIS
- AND AFTER EVERY HEAVY STORM EVENT.
- B. THE OWNER SHALL RECORD THE WATER LEVELS AND SEDIMENT BUILD UP IN THE MONITORING WELLS OVER A PERIOD OF SEVERAL DAYS TO ENSURE TRENCH DRAINAGE. C. THE OWNER SHALL MAINTAIN A LOG BOOK TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
- D. WHEN THE FACILITY BECOMES CLOGGED SO THAT IT DOES NOT DRAIN DOWN WITHIN A SEVENTY-TWO
- (72) HOUR TIME PERIOD, CORRECTIVE ACTION SHALL BE TAKEN. E. THE MAINTENANCE LOG BOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.



STORMWATER MANAGEMENT NOTES

- 1. STORMWATER MANAGEMENT IS PROVIDED IN ACCORDANCE WITH WITH CHAPTER 5, "ENVIRONMENTAL SITE DESIGN" OF THE 2007 MARYLAND STORMWATER MANAGEMENT DESIGN MANUAL,
- EFFECTIVE MAY 4, 2010. 2. MAXIMUM CONTRIBUTING ROOF TOP AREA TO EACH DOWNSPOUT SHALL BE 500 SQ. FT. OR LESS.
- 3. DRYWELLS SHALL BE PROVIDED AT LOCATIONS WHERE THE LENGTH OF DISCONNECTION IS LESS THAN 75' AT 5%. THE SIZE AND CONSTRUCTION OF THE DRYWELL SHALL BE IN ACCORDANCE WITH the detail shown on this sheet

2" (No. 57 STONE)

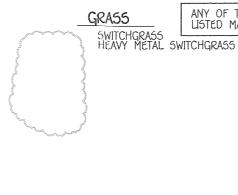
4" (No. 2 STONE)

1'-3" (No. 2 STONE)

used to perform surface cleaning.

calcium magnesium acetate or as pretreated salt.

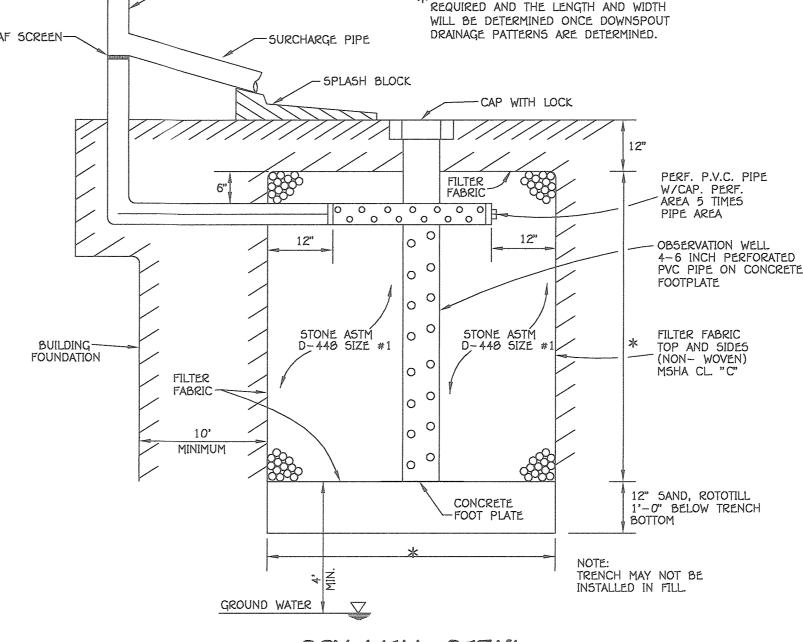
4. FINAL GRADING IS SHOWN ON THIS SITE DEVELOPMENT PLAN



-ROOF LEADER * THE EXACT NUMBER OF DRYWELLS LEAF SCREEN-SURCHARGE PIPE - SPLASH BLOCK FILTER LAMPHOLE FRAME & COVER MATERIAL SHALL BE GRAY IRON CASTING, CASTINGS MUST BE MACHINED ON BEARING SURFACES MIX #1 CONCRETE CLEANOUT/ WATER QUALITY STONE ASTM D-448 SIZE # SAMPLING PORT DETAIL BUILDING — FOUNDATION NOT TO SCALE FILTER FABRIC MINIMUM

HOLE SIZE: 3/6" CENTER TO CENTER: 3 ROWS OF HOLES: 2 @ 90° 2 @ 160° (+/-3°)

SCH40 PVC PERFORATED UNDERDRAIN PIPE DETAIL FOR HORIZONTAL DRAIN PIPE NOT TO SCALE



DRY WELL DETAIL NOT TO SCALE

WIDTH VARIES ^ 4" PERFORATED PIPE/GRAVEL-OVERDRAIN SYSTEM NOTE: THE BOTTOM OF EACH BIO-RETENTION FACILITY (M-6 SHALL BE ROTOTILLED PRIOR TO STONE INSTALLATION. TYPICAL SECTION BIO-RETENTION FACILITY (M-6)

NOT TO SCALE

A B

344.00 340.92

FACILITY NO.

M-6 (1)

PLANTING SPECIFICATIONS

Plants, related material, and operations shall meet the detailed description as given on the plans and as described herein.

All plant material, unless otherwise specified, shall be nursery grown, uniformly branched, have a vigorous root system, and shall conform to the species, size, root and shape shown on the plant list and the American Association of Nurserymen (AAN) Standards. Plant material shall be healthy, vigorous, free from defects, decay, disfiguring roots, sun scald injuries, abrasions of the bark, plant disease, insect pest eggs, borers and all forms of insect infestations or objectionable disfigurements. Plant material that is weak or which has been cut back from larger grades to meet specified requirements will be rejected. Trees with forked leaders will not be accepted. All plants shall be freshly dug; no healed-in plants from cold storage will be accepted. Unless otherwise specified, all general conditions, planting operations, details and planting specification shall conform to "Landscape Specification Guidelines for Baltimore-Washington Metropolitan Areas", (hereinafter "Landscape Guidelines") approved by the Landscape Contractors Association of Metropolitan Washington and the Potomac Chapter of the American Society of Landscape Architect, latest edition, including all agenda.

Contractor shall be required to quarantee all plant material for a period of one year after date of acceptance in accordance with the appropriate section of the Landscape Guidelines Contractor's attention is directed to the maintenance requirements found within the one year specifications including watering and replacement of specified plant material.

Contractor shall be responsible for notifying utility companies, utility contractors and "Miss Utility" a minimum of 48 hours prior to beginning any work. Contractor may make minor adjustments in spacing and location of plant material to avoid conflicts with utilities. Damage to existing structure and utilities shall be repaired at the expense of the Contractor.

Protection of existing vegetation to remain shall be accomplished by the temporary installation of 4 foot high snow fence or blaze orange safety fence at the drip line. Contractor id responsible for installing all material in the proper planting season for each plant type. All planting is to be completed within the growing

season of completion of site construction. Bid shall be base on actual site conditions. No extra payment shall be made for work arising from site conditions differing from those indicated on drawings and specifications

Plant quantities are provided for the convenience of the contractor only. If discrepancies exist between quantities shown on plan and those shown on the plant list, the quantities on the plan take precedence

All shrubs shall be planted in continuous trenches or prepared planting beds and mulched with composted hardwood mulch as details and specified except where noted on plans.

Positive drainage shall be maintained in planting beds 2 percent slope).

Planting mix shall be as follows: Deciduous Plants - Two parts topsoil, one part well-rotted cow or horse manure. Add 3 lbs. of standard fertilizer per cubic yard of planting mix. Evergreen Plants - two parts topsoil, one part humus or other approved organic material. Add 3 lbs. of evergreen (acidic) fertilizer per cubic yard of planting mix. Topsoil shall conform to the Landscape Guidelines.

Weed Control: Incorporate a pre-emergent herbicide into the planting bed following recommended rates on the label. Caution: Be sure to carefully check the chemical used to assure its adaptability to the specific ground cover to be treated.

All areas within contract limits disturbed during or prior to construction not designated to receive plants and mulch shall be fine graded and seeded. This plan is intended for landscape use only. see other plan sheets for more information on grading, sediment control, layout, etc.

STORMWATER MANAGEMENT NOTES & DETAILS

RESIDENTIAL SINGLE FAMILY ATTACHED

GLEN OAKS PLACE LOTS 1 THRU 6 & OPEN SPACE LOT 7 ZONED: R-SA-8

TAX MAP NO.: 42 GRID NO.: 16 & 17 PARCEL NO'S.: 353 & 361 SIXTH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

SCALE: AS SHOWN DATE: APRIL, 2018 SHEET 5 OF 5

ECP-18-039

STANDARD PERMEABLI

-UNDERDRAIN

TYPICAL SECTION - A-2 PERMEABLE SECTION

w/ OVERDRAIN & UNDERDRAIN

(SEE CHART ABOVE FOR PAVEMENT THICKNESS)

PERMEABLE PAVING CHART

OPERATION AND MAINTENANCE SCHEDULE FOR

PRIVATELY OWNED AND MAINTAINED

a. The owner shall periodically sweep (or vacuum porous concrete pavement) the pavement surfaces to

reduce sediment accumulation and insure continued surface porosity. Sweeping should be performed at

least twice annually with a commercial cleaning unit. Washing or compressed air units should not be

b. The owner shall periodically clean drainage pipes, inlets, stone edge drains and other structures

c. The owner shall use deicers in moderation. Deicers should be non-toxic and be applied either as

d. The owner shall ensure snow plowing is performed carefully with blades set one inch above the

surface. Plowed snow piles and snowmelt should not be directed to permeable pavement.

PERMEABLE PAVEMENT (A-2)

DEPTH

1.10'

PERM. PAV. AREA NO.

A-2(1)



DOME GRATE

24" PLANTING

4" #7 STONE / (BRIDGING LAYER)

TYPICAL CLEAN-OUT DETAIL

NOT TO SCALE

PROFESSIONAL CERTIFICATION HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 21476, EXPIRATION DATE: 7/14/19.

OWNERS DONALD P. KOLPACK PAMELA L. SIMMONS 9580 GLEN OAKS LANE 9570 GLEN OAKS LANE COLUMBIA MARYLAND, 21046 COLUMBIA MARYLAND, 21046 410-992-4600 410-992-4600

DEVELOPER GLEN OAKS DEVELOPMENT COMPANY, LLC 8318 FOREST STREET **SUITE 200** ELLICOTT CITY, MARYLAND 21043 ATTN: MR DONALD R. REUWER, JR 410-707-7054