ENVIRONMENTAL CONCEPT PLAN
HENRYTON SOLAR
1755 HENRYTON ROAD
LIBER 18078 FOLIO 386
HOWARD COUNTY, MARYLAND

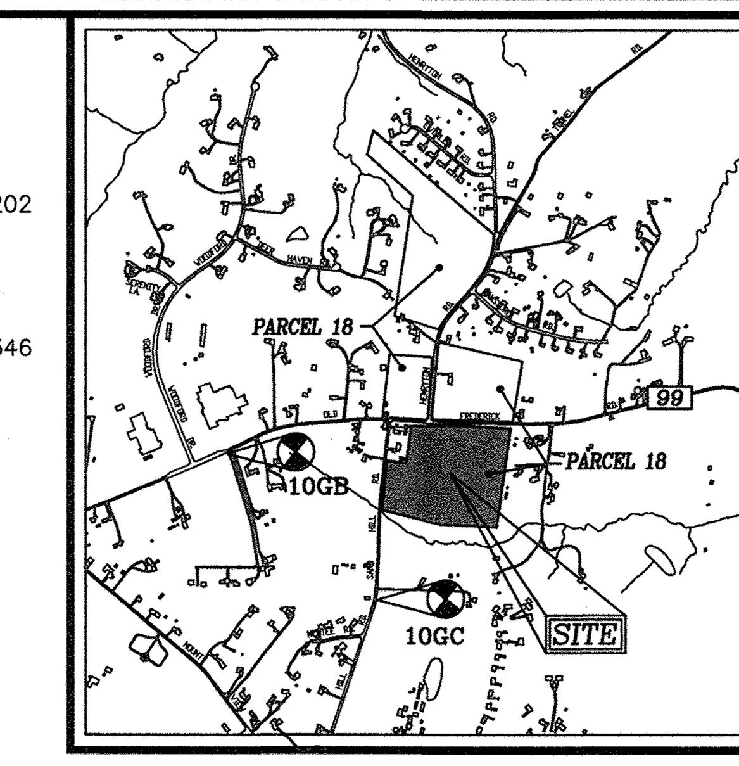
GENERAL NOTES

1. THE PROJECT IS IN CONFORMANCE WITH THE LATEST HOWARD COUNTY STANDARDS UNLESS WAIVERS HAVE BEEN APPROVED.
2. THE EXISTING TOPOGRAPHY SHOWN HEREON IS BASED ON A TOPOGRAPHIC SURVEY PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED NOVEMBER 2018. OFFSITE TOPOGRAPHY FROM HOWARD COUNTY GIS.
3. THIS PLAT IS BASED ON A BOUNDARY SURVEY PERFORMED BY ROBERT H. VOGEL ENGINEERING, INC. ON NOVEMBER, 2018.
4. THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NOS. 10GB AND 10GC WERE USED FOR THIS PROJECT.
5. THE SUBJECT PROPERTY IS ZONED "RR-DEO" IN ACCORDANCE WITH THE 10/6/13 ZONING REGULATIONS, AND IS SUBJECT TO THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS EFFECTIVE 10/2/03 PER COUNCIL BILL 75-2003.
6. NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE WETLANDS, STREAM(S) OR THEIR REQUIRED BUFFERS, FOREST CONSERVATION EASEMENT AREAS AND 100-YEAR FLOODPLAIN.
7. EXISTING UTILITIES LOCATED FROM HOWARD COUNTY GIS. CONTRACTOR SHALL LOCATE EXISTING UTILITIES WELL IN ADVANCE OF CONSTRUCTION.
8. THERE IS NO 100 YEAR FLOODPLAIN LOCATED ON-SITE.
9. NO STEEP SLOPES OVER 20,000 SF CONTIGUOUS ARE LOCATED ONSITE.
10. FOREST CONSERVATION OBLIGATIONS FOR THIS PROJECT SHALL BE ADDRESSED BY A FOREST CONSERVATION PLAN SUBMITTED WITH THE FUTURE PRELIMINARY PLAN.
11. WETLANDS AND STREAMS SHOWN ONSITE ARE BASED ON ENVIRONMENTAL REPORT BY ECO-SCIENCE PROFESSIONALS, INC. C/O MR. JOHN CANOLES, DATED JANUARY 10, 2019.
12. GEOTECHNICAL INVESTIGATIONS SHALL BE COMPLETED AND SUBMITTED WITH THE FUTURE SUBDIVISION PLANS.
13. A NOISE STUDY IS NOT REQUIRED FOR THIS SITE.
14. FOREST STAND DELINEATION WAS PREPARED BY ECO-SCIENCE PROFESSIONALS, INC. C/O MR. JOHN CANOLES, DATED JANUARY 9, 2019.
15. SAND HILL ROAD IS CLASSIFIED AS A LOCAL PUBLIC ROAD AND OLD FREDERICK ROAD IS CLASSIFIED AS A MINOR ARTERIAL ROAD.
16. TO THE BEST OF THE OWNERS KNOWLEDGE, THERE ARE NO BURIAL GROUNDS, CEMETERIES, OR HISTORIC STRUCTURES LOCATED ON THIS PROPERTY.
17. STORMWATER MANAGEMENT FOR THE PROJECT IS PROVIDED BY THE USE OF STRUCTURAL, NON-STRUCTURAL PRACTICES AND MICRO-SCALE PRACTICES IN ACCORDANCE WITH ENVIRONMENTAL SITE DESIGN CRITERIA. NON-STRUCTURAL PRACTICES INCLUDE NON-ROOFTOP DISCONNECTION (N-2). MICRO-SCALE PRACTICES INCLUDE MICRO-BIORETENTION (M-6). THESE FACILITIES WILL BE PRIVATELY OWNED AND MAINTAINED.
18. APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) DOES NOT CONSTITUTE AN APPROVAL OF ANY SUBSEQUENT AND ASSOCIATED SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN AND/OR RED-LINE REVISION PLAN. 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 SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN AND/OR RED-LINE REVISION PROCESS. THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED REVIEW COMMENTS (INCLUDING COMMENTS THAT MAY ALTER THE OVERALL SITE DESIGN) AS THIS PROJECT PROGRESSES THROUGH THE PLAN REVIEW PROCESS.
19. APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) BY THE HOWARD SOIL CONSERVATION DISTRICT DOES NOT GRANT APPROVAL OF THE PROPOSED SEDIMENT CONTROL SCHEME. THE FINAL PLAN SHALL INCLUDE A SEQUENCE OF CONSTRUCTION WHICH SHALL DETAIL SEDIMENT & EROSION CONTROLS AND PHASING AND ADDRESS THE PROJECT TEMPORARY STORMWATER MANAGEMENT REQUIREMENTS.
20. THIS PROJECT IS SUBJECT TO ZONING AND LAND USE BOARD OF APPEALS CASE BA-18-013C. ON OCTOBER 16, 2019; THE ZONING AND LAND USE BOARD OF APPEALS GRANTED THE PETITION OF POWER52 ENERGY SOLUTIONS, LLC PROVIDE THAT THE PETITIONER MEET CERTAIN CONDITIONS. THE PETITION IS GRANTED PROVIDED THAT THE PETITIONER MEET THE FOLLOWING CONDITIONS:
    1. THE COMMERCIAL SOLAR FACILITY CONDITIONAL USE SHALL BE CONDUCTED IN CONFORMANCE WITH, AND SHALL APPLY ONLY TO THE PETITION AS SUBMITTED AND AS SHOWN ON THE FINAL CONDITIONAL USE PLAN DATED SEPTEMBER 4, 2018, AND NOT ANY OTHER ACTIVITIES, USES, OR STRUCTURES ON THE PROPERTY.
    2. PETITIONER SHALL COMPLY WITH ALL CONDITIONAL USE STANDARDS.
    3. THE SITE DEVELOPMENT PLAN, OR ITS EQUIVALENT, SHALL INCLUDE A NOTE CONTAINING ALL CONDITIONS OF APPROVAL.
    4. PETITIONER SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.

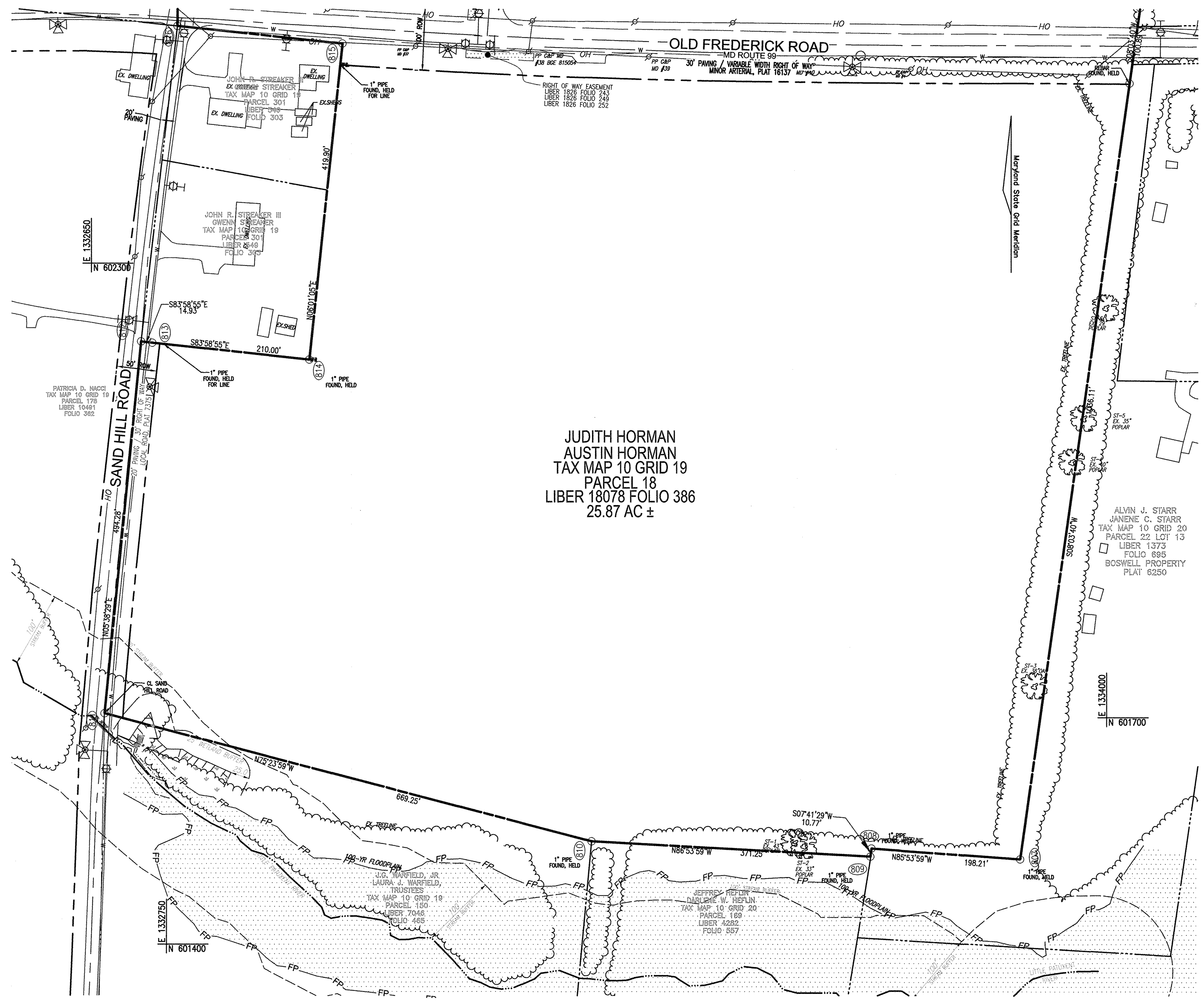
BENCHMARKS

HOWARD COUNTY BENCHMARK 10GC
N 600,761.020 E 1,332,632.438 ELEV. 579.202
CONCRETE MONUMENT WITH DISC –
EAST SIDE OF SAND HILL ROAD
44.3' NORTH OF FIRE HYDRANT

HOWARD COUNTY BENCHMARK 10GB
N 602,275.955 E 1,331,069.409 ELEV. 597.346
CONCRETE MONUMENT WITH DISC –
59.1' EAST OF POLE C&P G-27
100' WEST OF FIRE HYDRANT



VICINITY MAP
SCALE: 1"=2000'
ADC MAP COORDINATES: PAGE: 11 BLOCK: F8



LOCATION MAP
SCALE: 1"=100'

LEGEND:

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING PAVING
- CENTERLINE OF EXISTING STREAM
- EXISTING 100' STREAM BUFFER
- EXISTING WETLANDS
- EXISTING 25' WETLAND BUFFER
- EX. PUBLIC 100-YEAR FLOOD PLAIN

SHEET INDEX

ENVIRONMENTAL SITE DESIGN NARRATIVE:

1. THERE ARE ENVIRONEMTAL FEATURES LOCATED ON THE SOUTHERN PART OF THE SITE. THIS AREA INCLUDES SEVERAL SPECIMEN TREES AND A SMALL WETLAND AREA. THE SOUTHERN SECTION OF THE SITE CONTAINS TWO SPECIMEN TREES. THE EASTERN SECTION OF THE SITE CONTAINS FOUR SPECIMEN TREES WHICH WILL BE RETAINED. THERE IS NO PROPOSED DISTURBANCE TO THE WETLAND OR THE WETLAND BUFFER.

2. THE SITE NATURALLY SLOPES FROM THE NORTH TO SOUTHEAST AND SOUTHWEST. THE SITE HAS BEEN DESIGNED TO MAINTAIN THE NATURAL DRAINAGE PATTERNS, WITH NO CHANGES TO THE NATURAL DRAINAGE PATTERN.

3. THE CONCEPTUAL REDUCTION IN IMPERVIOUS AREA THROUGH BETTER SITE DESIGN IS ACHIEVED THROUGH THE ENVIRONMENTAL SITE DESIGN (ESD) FOR THE PROJECT TO THE MAXIMUM EXTENT PRACTICABLE (MEP). THE RESULTS OF THE ENVIRONMENTAL SITE DESIGN FOR THIS PROJECT WILL REFLECT "WOODS IN GOOD CONDITION". THE ESD CONCEPT INCLUDES THE USE OF MICRO-BIORETENTION FACILITIES (M-6), AND NON-ROOFTOP DISCONNECTION (N-2).

4. SEDIMENT CONTROL FOR THIS SPECIFIC SITE PLAN WILL BE PROVIDED THROUGH THE USE A PROPOSED CLEAR WATER DIKES, AND SUPER SILT FENCE PERIMETER CONTROLS. SEDIMENT CONTROL SHALL BE IN ACCORDANCE WITH CURRENT REQUIREMENTS AND SHALL BE APPROVED BY THE HOWARD SOIL CONSERVATION DISTRICT DURING THE FUTURE SITE DEVELOPMENT PLAN PHASE OF THE PROJECT.

5. STORMWATER MANAGEMENT FOR THE PROJECT SHALL BE MET THROUGH THE USE OF MICRO-BIO RETENTION FACILITIES (M-6), AND NON-ROOFTOP DISCONNECTION (N-2). PROPOSED PRACTICES HAVE BEEN MAXIMIZED TO THE EXTENT PRACTICAL. THE CALCULATED RAINFALL TARGET (PE) FOR THIS PROJECT IS 1.0", AND THE TOTAL RUNOFF VOLUME (ESDv) REQUIRED IS 4,753 CF. THE CALCULATED RAINFAL PROVIDED (PE) FOR THIS PROJECT IS 2.4", AND THE TOTAL RUNOFF VOLUME (ESDv) PROVIDED IS 8,887 CF.

6. AT THIS CONCEPT STAGE OF DEVELOPMENT, NO DESIGN MANUAL WAIVERS ARE REQUIRED. ALTERNATIVE COMPLIANCE FOR THE REMOVAL OF TWO SPECIMEN TREES SHALL BE SUBMITTED UNDER SEPARATE COVER AT THE SKETCH OR PRELIMINARY PLAN PHASE OF THE PROJECT.

SITE ANALYSIS DATA CHART

A. TOTAL PROJECT AREA:	25.87 AC
B. AREA OF PLAN SUBMISSION:	25.87 AC
C. AREA OF WETLANDS AND BUFFERS:	6,740.74 SF OR 0.15 AC.
D. AREA OF FLOODPLAIN:	0.00 SF OR 0.00 AC.
E. AREA OF 100' STREAM BUFFER:	6,820 SF OR 0.16 AC.
F. AREA OF FOREST:	1.09 AC.
G. AREA OF STEEP SLOPES (25% & GREATER):	0.00 SF OR 0.00 AC. +/-
H. ERODIBLE SOILS:	1,030,143.95 SF OR 23.64 AC.
I. LIMIT OF DISTURBED AREA:	841,794 SF OR 19.32 AC. +/-
J. PROPOSED USES FOR SITE AND STRUCTURES:	SOLAR PANEL FARM
K. GREEN OPEN AREA:	24.63 AC.+/-
L. PROPOSED IMPERVIOUS AREA:	0.02 AC.+/-
M. PRESENT ZONING DESIGNATION:	RC-DEO
N. OPEN SPACE REQUIRED:	N/A
O. DPZ FILE REFERENCES:	BA-18-013C

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[signature] 10.2.19
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

[signature] 9-30-19
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

DEVELOPER

POWER 52 ENERGY SOLUTIONS
ATTN. JASON JANNATI
10020 BALTIMORE NATIONAL PIKE
ELLICOTT CITY, MD 21042
PHONE: 410-988-8216

OWNER

AUSTIN K. HORMAN
1730 HENRYTON ROAD
MARRIOTTSVILLE MD 21104
PHONE: 410-442-1831

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

COVER SHEET

HENRYTON SOLAR
1755 HENRYTON ROAD
LIBER 18078 FOLIO 386

TAX MAP: 10 BLOCK: 19
3RD ELECTION DISTRICT

ZONED: RR-DEO
PARCEL 18
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS PLANNERS
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043
TEL: 410.461.7666 FAX: 410.461.8961

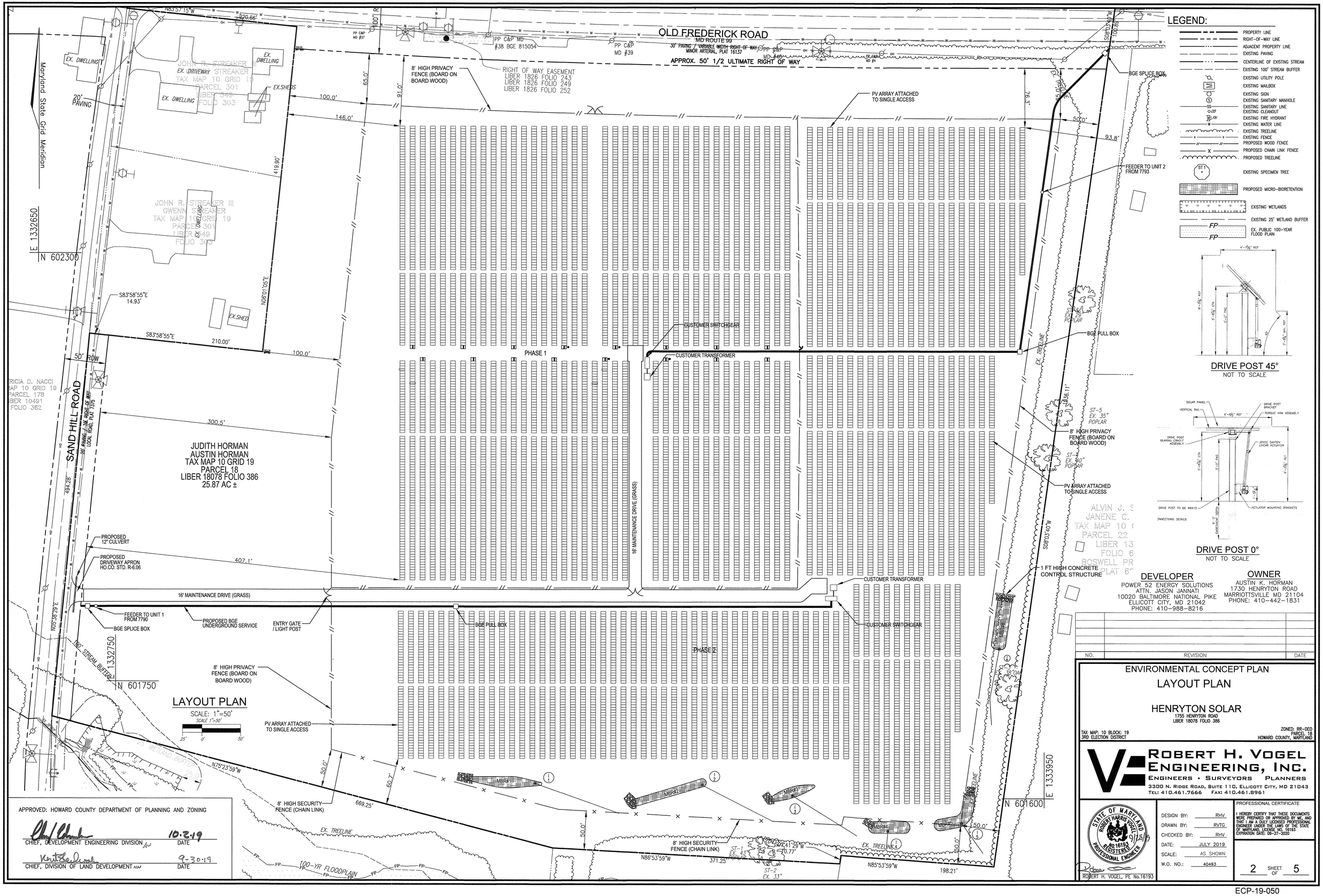
STATE OF MARYLAND — ROBERT HARRIS VOGEL — NO. 16193 — REGISTERED PROFESSIONAL ENGINEER — 9/25/19

ROBERT H. VOGEL, PE No.16193

DESIGN BY: RHV
DRAWN BY: RVTG
CHECKED BY: RHV
DATE: JULY 2019
SCALE: AS SHOWN
W.O. NO.: 40493

PROFESSIONAL CERTIFICATE

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. 16193 EXPIRATION DATE: 09-27-2020



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10.2.19

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 9-30-19

DEVELOPER

POWER 52 ENERGY SOLUTIONS
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10020 BALTIMORE NATIONAL PIKE
ELLICOTT CITY, MD 21042
PHONE: 410-988-8216

OWNER

AUSTIN K. HORMAN
1730 HENRYTON ROAD
MARRIOTTSVILLE MD 21104
PHONE: 410-442-1831

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

LAYOUT PLAN

HENRYTON SOLAR

1755 HENRYTON ROAD
LIBER 18078 FOLIO 386

TAX MAP: 10 BLOCK: 19
3RD ELECTION DISTRICT

ZONED: RR-DEO
PARCEL 18
HOWARD COUNTY, MARYLAND

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ROBERT H. VOGEL, PE No.16193

DESIGN BY:	RHV
DRAWN BY:	RVTG
CHECKED BY:	RHV
DATE:	JULY 2019
SCALE:	AS SHOWN
W.O. NO.:	40493

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SHEET 2 OF 5

ECP-19-050

HSCD NOTES:

APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) BY THE HOWARD SOIL CONSERVATION DISTRICT DOES NOT GRANT APPROVAL OF THE PROPOSED SEDIMENT CONTROL SCHEME.

1. THE FINAL PLAN SHALL INCLUDE A SEQUENCE OF CONSTRUCTION WHICH SHALL DETAIL SEDIMENT & EROSION CONTROLS AND PHASING
2. THE PROJECT SHALL ADDRESS ANY TEMPORARY STORMWATER MANAGEMENT REQUIREMENTS.
3. THE FINAL PLAN SUBMISSION SHALL PROVIDE A DRAINAGE AREA MAP SPECIFIC TO CHOSEN SEDIMENT CONTROLS
4. THE FINAL PLAN SUBMISSION SHALL PROVIDE COMPUTATIONS TO VERIFY VELOCITIES ALONG DIKES, SWALES AND AT DIKES OUTLET LOCATIONS.

NOTES:

1. APPROVAL OF THIS ECP DOES NOT CONSTITUTE AN APPROVAL OF ANY SUBSEQUENT AND ASSOCIATED BUILDING AND/OR GRADING PERMIT
2. REVIEW OF THIS PLAN FOR COMPLIANCE WITH ZONING AND SUBDIVISION AND LAND DEVELOPMENT REGULATIONS SHALL OCCUR AT THE FINAL PLAN AND SITE DEVELOPMENT PLAN STAGES; AND THEREFORE, THIS PLAN IS SUBJECT TO ADDITIONAL AND MORE DETAILED COMMENTS AS THE PLAN PROGRESSES THROUGH THE PERMIT PROCESS.
3. THERE ARE NO ENVIRONMENTAL FEATURES: FLOODPLAIN, WETLANDS, STREAMS, STEEP SLOPES OR FOREST THAT EXISTS WITHIN THE PROPOSED LIMIT OF DISTURBANCE.

SPECIMEN TREE CHART

KEY	DESCRIPTION	CONDITION
ST-1	43" POPLAR	
ST-2	33" POPLAR	
ST-3	38" OAK	
ST-4	40" POPLAR	
ST-5	35" POPLAR	
ST-6	29" POPLAR	

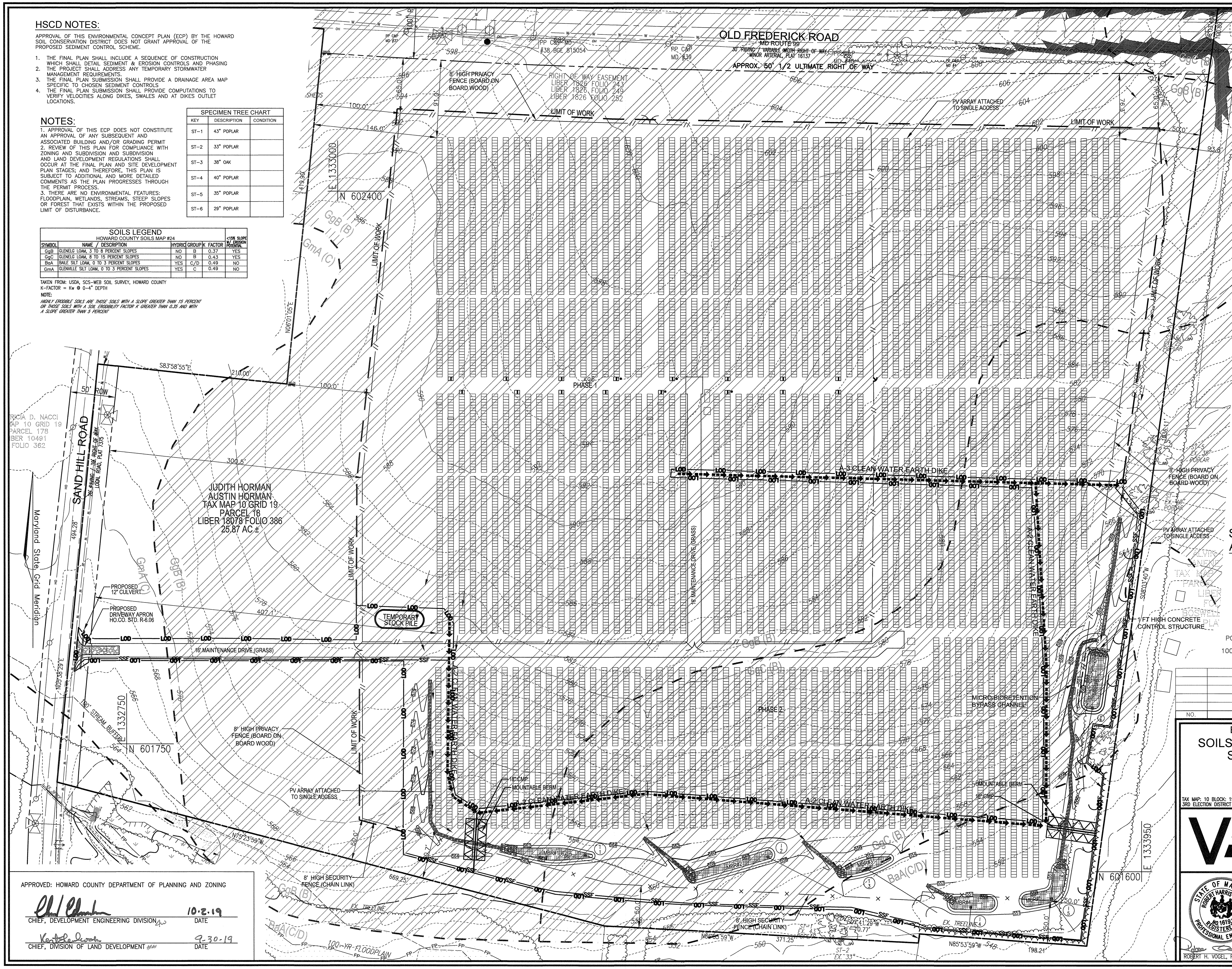
SOILS LEGEND
HOWARD COUNTY SOILS MAP #24

SYMBOL	NAME / DESCRIPTION	HYDRIC	GROUP	K FACTOR	<15% SLOPE W/ EROSION POTENTIAL
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	NO	B	0.37	YES
GgC	GLENELG LOAM, 8 TO 15 PERCENT SLOPES	NO	B	0.43	YES
BaA	BAILE SILT LOAM, 0 TO 3 PERCENT SLOPES	YES	C/D	0.49	NO
GmA	GLENVILLE SILT LOAM, 0 TO 3 PERCENT SLOPES	YES	C	0.49	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY
K-FACTOR = Kw @ 0-4" DEPTH

NOTE:

HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT



LEGEND:

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING PAVING
- EXISTING CONTOUR
- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- CENTERLINE OF EXISTING STREAM
- EXISTING 100' STREAM BUFFER
- EXISTING UTILITY POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING TREELINE
- EXISTING FENCE
- PROPOSED FENCE
- PROPOSED TREELINE
- SOILS BOUNDARY
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- LIMIT OF DISTURBANCE
- LIMIT OF WORK
- STABILIZED CONSTRUCTION ENTRANCE
- SUPER SILT FENCE
- EARTH DIKE
- EXISTING SPECIMEN TREE
- PROPOSED MICRO-BIORETENTION
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- EX. PUBLIC 100-YEAR FLOOD PLAIN
- STEEP SLOPE (>25%)
- HIGHLY ERODIBLE SOILS

NOTE:
- SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.
- SILT FENCE SHALL BE CURLED UPHILL NO MORE THAN 35 FEET APART
- DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.

SOILS MAP, GRADING, EROSION AND SEDIMENT CONTROL PLAN

SCALE: 1"=50'

DEVELOPER
POWER 52 ENERGY SOLUTIONS
ATTN. JASON JANNATI
10020 BALTIMORE NATIONAL PIKE
ELLICOTT CITY, MD 21042
PHONE: 410-988-8216

OWNER
AUSTIN K. HORMAN
1730 HENRYTON ROAD
MARRIOTTSVILLE MD 21104
PHONE: 410-442-1831

NO.	REVISION	DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10.2.19

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 9-30-19

ENVIRONMENTAL CONCEPT PLAN

SOILS MAP, GRADING, EROSION AND SEDIMENT CONTROL PLAN

HENRYTON SOLAR

1755 HENRYTON ROAD
LIBER 18078 FOLIO 386

TAX MAP: 10 BLOCK: 19
3RD ELECTION DISTRICT

ZONED: RR-DEO
PARCEL 18
HOWARD COUNTY, MARYLAND

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STATE OF MARYLAND — ROBERT HARRIS VOGEL — NO.16193 REGISTERED PROFESSIONAL ENGINEER — 9/25/19

ROBERT H. VOGEL, PE No.16193

DESIGN BY:	RHV
DRAWN BY:	RVTG
CHECKED BY:	RHV
DATE:	JULY 2019
SCALE:	AS SHOWN
W.O. NO.:	40493

PROFESSIONAL CERTIFICATE

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ECP-19-050

LEGEND:

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJACENT PROPERTY LINE
- EXISTING PAVING
- 598 EXISTING CONTOUR
- +02.68 PROPOSED SPOT ELEVATION
- +02.68 EXISTING SPOT ELEVATION
- CENTERLINE OF EXISTING STREAM
- EXISTING 100' STREAM BUFFER
- EXISTING UTILITY POLE
- EXISTING MAILBOX
- EXISTING SIGN
- S EXISTING SANITARY MANHOLE
- SS EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- W EXISTING WATER LINE
- EXISTING TREELINE
- X EXISTING FENCE
- PROPOSED FENCE
- PROPOSED TREELINE
- M1B2 / M1D3 SOILS BOUNDARY
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- ST1 EXISTING SPECIMEN TREE
- DRAINAGE DIVIDE
- PROPOSED MICRO-BIORETENTION
- NON-ROOFTOP DISCONNECTION
- EXISTING WETLANDS
- EXISTING WETLAND BUFFER
- FP EX. PUBLIC 100-YEAR FLOOD PLAIN
- STEEP SLOPE (>25%)

STORMWATER MANAGEMENT DRAINAGE AREA MAP

SCALE: 1"=50'

SCALE 1"=50'

25' 0' 50'

DEVELOPER
POWER 52 ENERGY SOLUTIONS
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CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 10.2.19

CHIEF, DIVISION OF LAND DEVELOPMENT NM — DATE 9.30.19

ENVIRONMENTAL CONCEPT PLAN

STORMWATER MANAGEMENT DRAINAGE AREA MAP

HENRYTON SOLAR

1755 HENRYTON ROAD
LIBER 18078 FOLIO 386

TAX MAP: 10 BLOCK: 19
3RD ELECTION DISTRICT

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STATE OF MARYLAND — ROBERT HARRIS VOGEL — NO. 16193 — REGISTERED PROFESSIONAL ENGINEER — 9/25/19

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SHEET 4 OF 5

ECP-19-050

APPENDIX B.4.C SPECIFICATIONS FOR MICRO-BIORETENTION. RAIN GARDEN, LANDSCAPE INFILTRATION & INFILTRATION BERMS

1. MATERIAL SPECIFICATIONS
THE ALLOWABLE MATERIALS TO BE USED IN THESE PRACTICES ARE DETAILED IN TABLE B.4.1.

2. FILTERING MEDIA OR PLANTING SOIL
THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE MICRO-BIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERMUDA GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05. THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:

* SOIL COMPONENT – LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION).
* ORGANIC CONTEN – MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-65%) AND COMPOST (35% TO 40%) OR SANDY LOAM (30%), COARSE SAND (30%), AND COMPOST (40%).
* CLAY CONTENT – MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 5%.
* PH RANGE – SHOULD BE BETWEEN 5.5 – 7.0. AMENDMENTS (E.G., LIME, IRON SULFATE PLUS SULFUR) MAY BE MIXED IN TO THE SOIL TO INCREASE OR DECREASE PH.

THERE SHALL BE AT LEAST ONE SOIL TEST PER PROJECT. EACH TEST SHALL CONSIST OF BOTH THE STANDARD SOIL TEST FOR PH, AND ADDITIONAL TESTS OF ORGANIC MATTER, AND SOLUBLE SALTS. A TEXTURAL ANALYSIS IS REQUIRED FROM THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.

3. COMPACTION
IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF BIORETENTION PRACTICES AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORIGINAL SOIL. IF PRACTICES ARE EXCAVATED USING LOADER, THE CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TYPE TIRES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LUGS, OR HIGH-PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.

COMPACTION CAN BE ALLEVIATED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS CHISEL PLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO REFRACTURE THE SOIL PROFILE THROUGH THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.

ROTOTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY PONDED WATER BEFORE PREPARING (ROTOTILLING) BASE. WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE. WHEN BACKFILLING THE BIORETENTION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION BASIN. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE BASIN TO SUPPLY SOILS AND SAND. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.

4. PLANT MATERIAL
RECOMMENDED PLANT MATERIAL FOR MICRO-BIORETENTION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.

5. PLANT INSTALLATION
COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLOAT, AND SHOULD BE PLACED IN THE INVERT AND OTHER LOW AREAS. MULCH SHOULD BE PLACED IN SURROUNDING TO A UNIFORM THICKNESS OF 2" TO 3". SHREDDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCEPTANCE.
ROOTSTOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/8TH OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION. TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL. GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS. THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS DEFEATS, OR AT A MINIMUM, IMPEDES THIS GOAL. ONLY ADD FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET.

6. UNDERDRAINS
UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA:

* PIPE – SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTMF 758, TYPE PS 28, OR AASHTO-M-278) IN A GRAVEL LAYER. THE PREFERRED MATERIAL IS SLOTTED, 4" RIGID PIPE (E.G., PVC OF HDPE).
* PERFORATIONS – IF PERFORATED PIPE IS USED, PERFORATIONS SHOULD BE 3/8" DIAMETER LOCATED 6" ON CENTER WITH A MINIMUM OF FOUR HOLES PER ROW. PIPE SHALL BE WRAPPED WITH A 1/4" (NO. 4 OR 4x4) GALVANIZED HARDWARE CLOTH.
* GRAVEL – THE GRAVEL LAYER (NO. 57 STONE PREFERRED) SHALL BE AT LEAST 3" THICK ABOVE AND BELOW THE UNDERDRAIN.
* THE MAIN COLLECTOR PIPE SHALL BE AT A MINIMUM 0.5% SLOPE.
* A RIGID, NON-PERFORATED OBSERVATION WELL MUST BE PROVIDED (ONE PER EVERY 1,0000 SQUARE FEET) TO PROVIDE A CLEAN-OUT PORT AND MONITOR PERFORMANCE OF THE FILTER.
* A 4" LAYER OF PEA GRAVEL (1/8" TO 3/8" STONE) SHALL BE LOCATED BETWEEN THE FILTER MEDIA AND UNDERDRAIN TO PREVENT MIGRATION OF FINES IN TO THE UNDERDRAIN. THIS LAYER MAY BE CONSIDERED PART OF THE FILTER BED WHEN BED THICKNESS EXCEEDS 24".

THIS MAIN COLLECTOR PIPE FOR UNDERDRAIN SYSTEMS SHALL BE CONSTRUCTED AT A MINIMUM SLOPE OF 0.5%. OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (ONE MINIMUM PER EVERY 1000 SQUARE FEET OF SURFACE AREA).

7. MISCELLANEOUS
THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.

OPERATION AND MAINTENANCE SCHEDULE FOR LANSCAPE INFILTRATION (M-3), MICRO-BIORETENTION (M-6), RAIN GARDENS (M-7), BIORETENTION SWALE (M-8), AND ENHANCED FILTERS (M-9)

1. THE OWNER SHALL MAINTAIN THE PLANT MATERIAL, MULTCH LAYER AND SOIL LAYER ANNUALLY. MAINTENANCE 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 PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUME II, TABLE A.4.1 AND 2.

2. THE OWNER SHALL PERFORM A PLANT IN THE SPRING AND IN THE FALL OF EACH YEAR. DURING THE INSPECTION, THE OWNER SHALL REMOVE DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT, REPLACE DEAD PLANT MATERIAL WITH ACCEPTABLE REPLACEMENT PLANT MATERIAL, TREAT DISEASED TREES AND SHRUBS, AND REPLACE ALL DEFICIENT STAKES AND WIRES.

3. THE OWNER SHALL INSPECT THE MULCH EACH SPRING. THE MULCH SHALL BE REPLACED EVERY TWO TO THREE YEARS. THE PREVIOUS MULCH LAYER SHALL BE REMOVED BEFORE THE NEW LAYER IS APPLIED.

4. THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH HEAVY STORM.

N-2. DISCONNECTION OF NON-ROOFTOP RUNOFF

CONSTRUCTION CRITERIA:

THE FOLLOWING ITEMS SHOULD BE ADDRESSED DURING THE CONSTRUCTION OF PROJECTS WITH PLANNED ROOFTOP DISCONNECTIONS:

– EROSION AND SEDIMENT CONTROL: EROSION AND SEDIMENT CONTROL PRACTICES (E.G., SEDIMENT TRAPS) SHALL NOT BE LOCATED IN VEGETATED AREAS RECEIVING DISCONNECTED RUNOFF

– SITE DISTURBANCE: CONSTRUCTION VEHICLES AND EQUIPMENT SHOULD AVOID AREAS RECEIVING DISCONNECTED RUNOFF TO MINIMIZE DISTURBANCE AND COMPACTION. SHOULD AREAS RECEIVING DISCONNECTED RUNOFF BECOME COMPACTED, SCARIFYING THE SURFACE OR ROTOTILLING THE SOIL TO A DEPTH OF FOUR TO SIX INCHES SHALL BE PERFORMED TO ENSURE PERMEABILITY. ADDITIONALLY, AMENDMENTS MAY BE NEEDED FOR TIGHT, CLAYEY SOILS.

INSPECTION:

A FINAL INSPECTION SHALL BE CONDUCTED BEFORE USE AND OCCUPANCY APPROVAL TO ENSURE THAT SIZING FOR TREATMENT AREAS HAVE BEEN MET AND PERMANENT STABILIZATION HAS BEEN ESTABLISHED.

MAINTENANCE CRITERIA:

MAINTENANCE OF AREAS RECEIVING DISCONNECTED RUNOFF IS GENERALLY NO DIFFERENT THAN THAT REQUIRED FOR OTHER LAWN OR LANDSCAPED AREAS. THE AREAS RECEIVING RUNOFF SHOULD BE PROTECTED FROM FUTURE COMPACTION (E.G., BY PLANTING TREES OR SHRUBS ALONG THE PERIMETER). IN COMMERCIAL AREAS, FOOT TRAFFIC SHOULD BE DISCOURAGED AS WELL.

HOWARD COUNTY – OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED DISCONNECTION OF NON-ROOFTOP RUNOFF (N-2)

A. MAINTENANCE OF AREAS RECEIVING DISCONNECTED RUNOFF IS GENERALLY NO DIFFERENT THAN THAT REQUIRED FOR OTHER LAWN OR LANDSCAPED AREAS. THE OWNER SHALL ENSURE THE AREAS RECEIVING RUNOFF ARE PROTECTED FROM FUTURE COMPACTION OR DEVELOPMENT OF IMPERVIOUS AREA. IN COMMERCIAL AREAS, FOOT TRAFFIC SHOULD BE DISCOURAGED AS WELL.

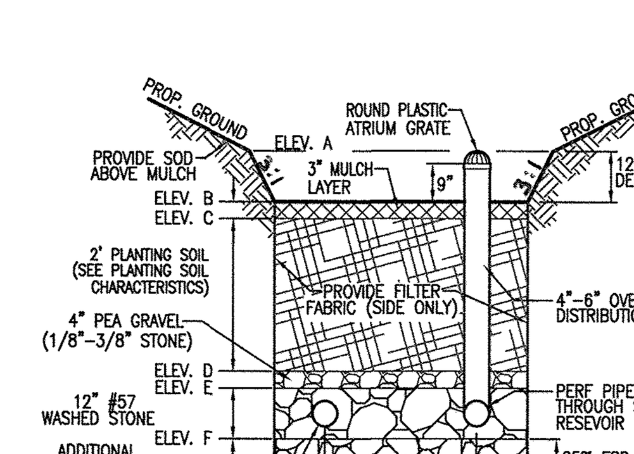
ROUTE 99 SOLAR - ECP - ESDv COMPUTATIONS

SITE AREA:	25.87	AC
TARGET Pe:	1.00	IN
SITE IMPERVIOUS:	0.07	PERCENT
SITE Rv:	0.0506	
SITE ESDv:	4753	

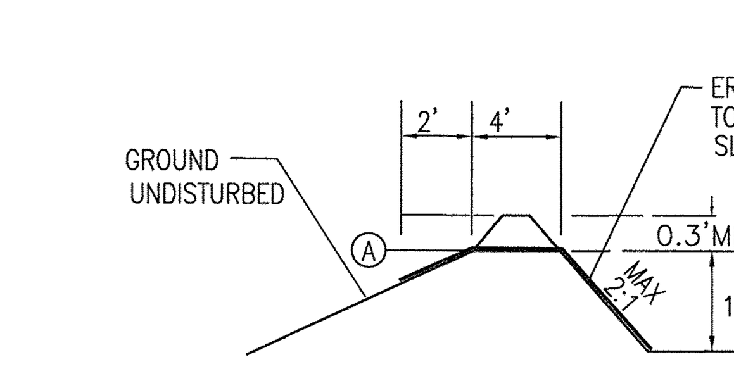
-AREAS DRAINING TO A 10/100 YR MANAGEMENT FACILITY SHALL PROVIDE 1.0" ESDv
-OTHER AREAS SHALL PROVIDE FULL ESDv = 1.6"

Rv=0.05+0.009XI
V min=1.0" rainfall (1.0x0.95xA)/12
Vmax= 1yr rainfall=2.6" (2.6x0.95xA)/12

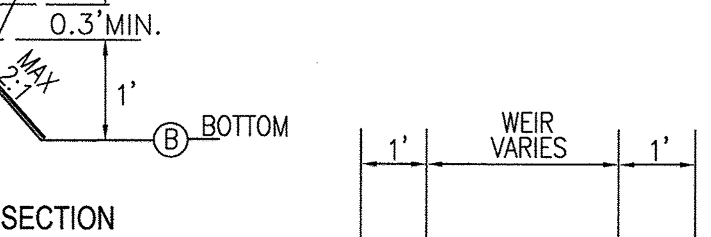
DA/PRACTICE #	% IMPERV	Rv	DA (SF)	DA (AC)	1.0" VOLUME	MAXIMUM VOLUME	1.6" VOLUME	VOLUME PROVIDED*	IMPERV (SF)	IMPERV (AC)	GREEN AREA	REMARKS
NON-ROOFTOP DISCONNECTION 1	0.01	0.0501	140905	3.23	**588**	1529	941	**588**	15	0.00	3.23	NON STRUCTURAL PRACTICE - NON-ROOFTOP DISCONNECT 588 CF - EACH 21' DISCONNECT 1 EA 588 ESDv
NON-ROOFTOP DISCONNECTION 2	0.01	0.0501	165615	3.80	**691**	1797	1106	**691**	14	0.00	3.80	NON STRUCTURAL PRACTICE - NON-ROOFTOP DISCONNECT 691 CF - EACH 21' DISCONNECT 1 EA 691 ESDv
NON-ROOFTOP DISCONNECTION 3	30.41	0.3237	1266	0.03	**34**	89	55	**34**	385	0.01	0.02	NON STRUCTURAL PRACTICE - NON-ROOFTOP DISCONNECT 34 CF - EACH 75' DISCONNECT 1 EA 34 ESDv
DA 4 MBR#1	0.00	0.0500	150470	3.45	**627**	1631	1004	**1347**	7	0.00	3.45	MICRO-BIORETENTION #1 1347 CF = 1010 SF BIO
DA 5 MBR#2	0.01	0.0501	49099	1.13	**205**	532	328	**1313**	3	0.00	1.13	MICRO-BIORETENTION #2 1313 CF = 985 SF BIO
DA 6 MBR#3	0.01	0.0501	66239	1.52	**276**	719	442	**840**	6	0.00	1.52	MICRO-BIORETENTION #3 840 CF = 630 SF BIO
DA 7 MBR#4	0.43	0.0539	36408	0.84	**164**	425	262	**1011**	158	0.00	0.83	MICRO-BIORETENTION #4 1011 CF = 758 SF BIO
DA 8 MBR#5	0.01	0.0501	38205	0.88	**159**	414	255	**1437**	3	0.00	0.88	MICRO-BIORETENTION #5 1437 CF = 1078 SF BIO
DA 9 MBR#6	0.01	0.0501	230585	5.29	**962**	2501	1539	**1609**	16	0.00	5.29	MICRO-BIORETENTION #6 1609 CF = 1207 SF BIO
NON-ROOFTOP DISCONNECTION 10	21.24	0.2412	306	0.01	**6**	16	10	**6**	65	0.00	0.01	NON STRUCTURAL PRACTICE - NON-ROOFTOP DISCONNECT 6 CF - EACH 21' DISCONNECT 1 EA 6 ESDv
NON-ROOFTOP DISCONNECTION 11	12.99	0.1669	693	0.02	**10**	25	15	**10**	90	0.00	0.01	NON STRUCTURAL PRACTICE - NON-ROOFTOP DISCONNECT 10 CF - EACH 21' DISCONNECT 1 EA 10 ESDv
TOTAL	**0.09**	**0.0508**	**879791**	**20.20**	**3723**	**9680**	**5957**	**8887**	**762**	**0.02**	**20.18**	



MICRO-BIORETENTION (OVERFLOW) (M-6)
NOT TO SCALE



TYPICAL SPILLWAY SECTION
NOT TO SCALE



TYPICAL SPILLWAY PROFILE
NOT TO SCALE

DETAIL WEIR OUTLET BIORETENTION

Appendix B.4. Construction Specifications for Environmental Site Design Practices

Table B.4.1 Materials Specifications for Micro-Bioretention, Rain Gardens & Landscape Infiltration-

Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil [2' to 4' deep]	loamy sand (60 - 65%) & compost (35 – 40%) or sandy loam (30%), coarse sand (30%) & compost (40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)		
Mulch	shredded hardwood		aged 6 months, minimum; no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile		n/a	PE Type 1 nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe; 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes. Perforated pipe shall be wrapped with ¼-inch galvanized hardware cloth
Poured in place concrete (if required)	MSHA Mix No. 3; f'c = 3500 psi @ 28 days, normal weight, air-entrained; reinforcing to meet ASTM-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) *not using previously approved State or local standards* requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 350.R/89; vertical loading [H-10 or H-20]; allowable horizontal loading (based on soil pressures); and analysis of potential cracking
Sand	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone (**AASHTO**) #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

10.2.19
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

9-30-19
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

DEVELOPER
POWER 52 ENERGY SOLUTIONS
ATTN. JASON JANNATI
10020 BALTIMORE NATIONAL PIKE
ELLICOTT CITY, MD 21042
PHONE: 410-988-8216

OWNER
AUSTIN K. HORMAN
1730 HENRYTON ROAD
MARRIOTTSVILLE MD 21104
PHONE: 410-442-1831

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN
STORMWATER MANAGEMENT DETAILS & NOTES
HENRYTON SOLAR
1755 HENRYTON ROAD
LIBER 18078 FOLIO 386

TAX MAP: 10 BLOCK: 19
3RD ELECTION DISTRICT

ZONED: RR-DEO
PARCEL 18
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
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TEL: 410.461.7666 FAX: 410.461.8961

STATE OF MARYLAND
ROBERT HARRIS VOGEL
NO. 16193
REGISTERED
PROFESSIONAL ENGINEER
ROBERT H. VOGEL, PE No.16193

DESIGN BY: RHV
DRAWN BY: RVTG
CHECKED BY: RHV
DATE: JULY 2019
SCALE: AS SHOWN
W.O. NO.: 40493

PROFESSIONAL CERTIFICATE
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. 16193 EXPIRATION DATE: 09-27-2020