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SUNPIN ENERGY SERVICES, LLC

4.493 MW DC GROUND-MOUNT SOLAR PV DEVELOPMENT

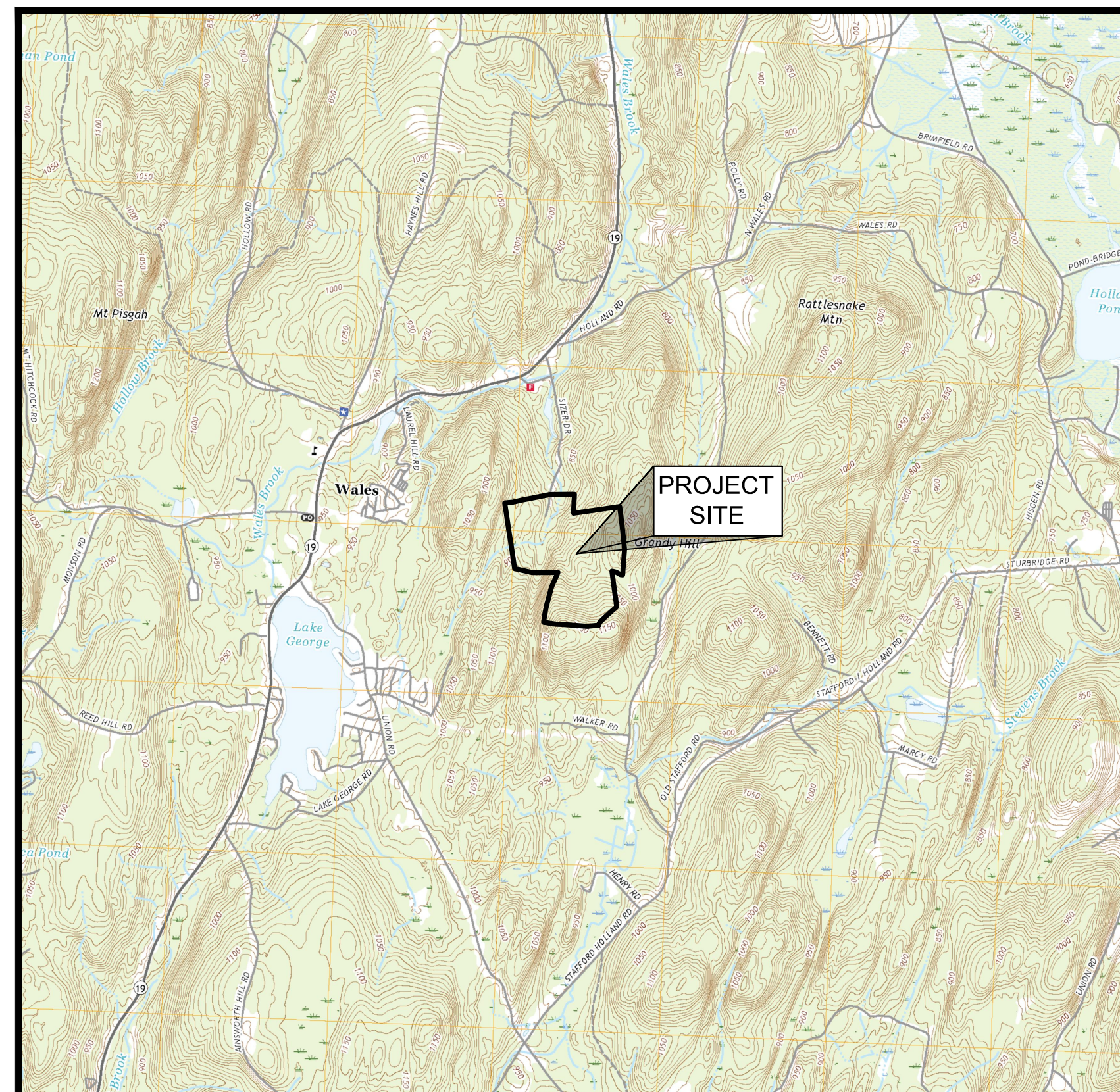
40 SIZER DRIVE

WALES, MASSACHUSETTS

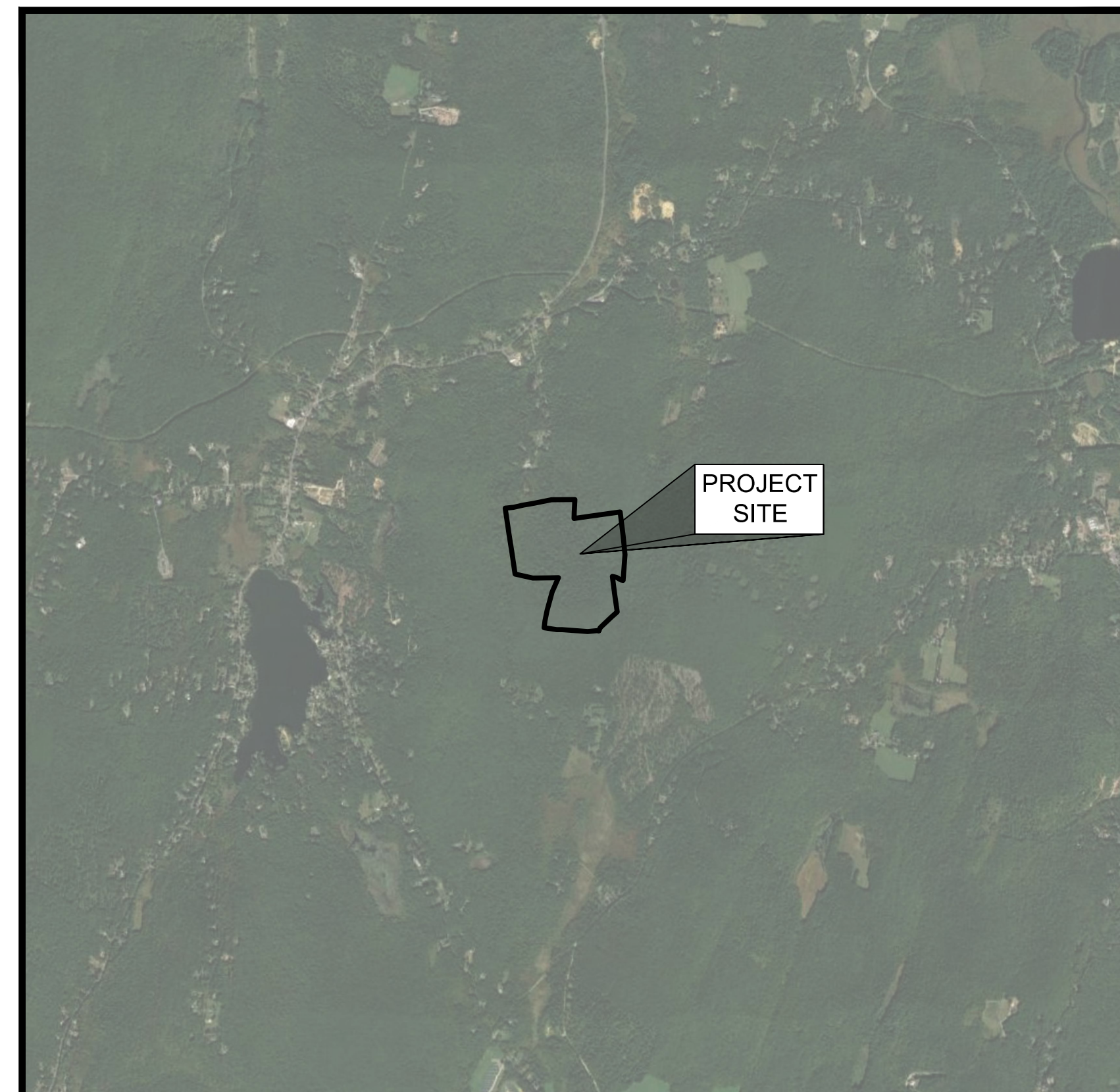
APRIL 29, 2021

LAST REVISED NOVEMBER 10, 2021

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION



LOCUS MAP
NOT TO SCALE



AERIAL IMAGE
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PROPERTY OWNER

CINDY BOUCHER
40 SIZER DRIVE
WALES, MASSACHUSETTS 01081

DEVELOPED BY

SUNPIN ENERGY SERVICES, LLC



12424 WILSHIRE BOULEVARD, #750
LOS ANGELES, CA 90025

PREPARED BY



WOOD MASSACHUSETTS, INC.
271 MILL ROAD
CHELMSFORD, MASSACHUSETTS 01824

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271 MILL ROAD CHELMSFORD
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EXISTING CONDITIONS:

- THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AND STRUCTURES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANY, ANY GOVERNING PERMITTING AUTHORITY, AND "DIGSAFE" AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST EXACT FIELD LOCATION OF UTILITIES. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION SHALL BE TAKEN BEFORE PROCEEDING WITH THE WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLAN.
- EXISTING PROPERTY LINE INFORMATION BY ANDREWS SURVEY & ENGINEERING, INC. TOPOGRAPHY PROVIDED FROM AERIAL MAPPING BY EASTERN TOPOGRAPHICS. SEE PLAN HEREIN. PROPERTY BOUNDARIES ARE BASED ON A LIMITED FIELD SURVEY AND PLANS OF RECORD. BOUNDARIES ARE APPROXIMATE ONLY AND ARE SUBJECT TO ANY REVISIONS WHICH A COMPLETE BOUNDARY SURVEY MAY REVEAL.
- DATUM: NAVD88
- BENCH MARKS: NAVD88
- COORDINATE SYSTEM: MASSACHUSETTS STATE PLANE
- WETLANDS DELINEATION PERFORMED BY ECOTEC, INC. WITH SUPPLEMENTAL DELINEATION PROVIDED BY WOOD.

MATERIAL SPECIFICATIONS AND PLACEMENT REQUIREMENTS:

- ANGULAR ROCK FILL
ANGULAR ROCK FILL SHALL BE USED FOR THE CONSTRUCTION ENTRANCE AS SHOWN ON THE DRAWINGS, AND SHALL MEET THE GRADATION REQUIREMENTS LISTED BELOW.
U.S. STANDARD SIEVE PERCENT PASSING
2 INCH 100
1 1/2 INCH 70-100
1 INCH 50-85
NO. 200 0-10

PRIOR TO USE, THE ANGULAR ROCK FILL SHALL BE TESTED FOR APPROVAL AS DESCRIBED IN SECTION 2.0 AND SHALL BE PLACED AS DESCRIBED IN SECTION 3.0.

- DENSE GRADED CRUSHED STONE
DENSE GRADED CRUSHED STONE SHALL BE USED TO CONSTRUCT THE CRUSHED STONE ACCESS ROAD, AND SHALL MEET THE REQUIREMENTS OF A MATERIAL SUCH AS MASSDOT SPECIFICATION M2.01.7 CRUSHED STONE, OR APPROVED EQUAL. THIS MATERIAL SHALL BE PLACED AT A MINIMUM THICKNESS OF 6 INCHES AND SHALL BE IN DIRECT CONTACT WITH THE BALLAST BLOCKS. THIS MATERIAL SHALL CONSIST OF CLEAN, HARD, DURABLE CRUSHED ROCK OR CRUSHED GRAVEL STONE, FREE FROM LOAM AND CLAY AND DELETERIOUS MATERIAL AND NO MORE THAN 10 PERCENT PASSING THE U.S. NO. 200 SIEVE. THIS MATERIAL SHALL MEET THE FOLLOWING GRADATION:
SIEVE DESIGNATION PERCENT PASSING
2-INCH 100
1 1/2-INCH 70-100
1-INCH 50-85
NO. 4 30-55
NO. 50 8-24
NO. 200 3-10

PRIOR TO USE, THE DENSE GRADED CRUSHED STONE SHALL BE TESTED FOR APPROVAL AS DESCRIBED BELOW IN SECTION 2.0 AND SHALL BE PLACED AS DESCRIBED BELOW IN SECTION 3.0.

- GRANULAR FILL MATERIAL
CLEAN GRANULAR FILL MAY BE USED FOR FILL OR GRADING MATERIAL. GRANULAR FILL SHALL CONSIST OF MASSDOT MATERIAL M1.03.0, GRAVEL BORROW, TYPE C, OR APPROVED EQUAL, AND MEET THE FOLLOWING GRADATION:
SIEVE DESIGNATION PERCENT PASSING
2-INCH 100
1 1/2-INCH 60-85
NO. 4 40-75
NO. 50 8-28
NO. 200 0-10

PRIOR TO USE, THE GRANULAR FILL SHALL BE TESTED FOR APPROVAL AS DESCRIBED IN SECTION 2.0 AND SHALL BE PLACED AS DESCRIBED IN SECTION 3.0.

- LOAM BORROW MATERIAL
THE LOAM BORROW SHALL CONFORM TO MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, DIVISION III - MATERIALS SPECIFICATIONS, SECTION M1.05.0 "LOAM BORROW". THE LOAM SHALL CONTAIN NOT LESS THAN 4% NOR MORE THAN 20% ORGANIC MATTER.
- GEOTEXTILE FABRIC
FIBERS USED IN MANUFACTURING OF THE GEOTEXTILES SHALL CONSIST OF POLYPROPYLENE, POLYVINYL CHLORIDE, NYLON, POLYOLEFINS, POLYAMIDES, OR POLYESTER. THE FIBERS SHALL BE FORMED INTO A NETWORK SUCH THAT THE FILAMENTS OR YARNS RETAIN DIMENSIONAL STABILITY RELATIVE TO EACH OTHER, INCLUDING SELVAGES. THE GEOTEXTILE SHALL CONTAIN STABILIZERS AND/OR INHIBITORS TO MAKE THE FIBERS RESISTANT TO DETERIORATION RESULTING FROM EXPOSURE TO SUNLIGHT, WATER, OR HEAT. THE GEOTEXTILE SHALL BE FREE OF DEFECTS OR FLAWS WHICH WILL AFFECT ITS PHYSICAL PROPERTIES. PROVIDE A GEOTEXTILE MEETING THE PROPERTIES LISTED IN TABLE 1:

PROPERTY	TEST METHOD	NON-WOVEN	WOVEN
MASS PER UNIT AREA (OZ/YD ²)	D 5261	6	N/A
GRAB TENSILE STRENGTH (LBS)	D 4632	170	N/A
TENSILE STRENGTH (LBS/FT)	D 4595	N/A	7200
ELONGATION (%)	D 4632	50	N/A
PUNCTURE STRENGTH (LBS)	D 6241	435	N/A
TRAPEZOID TEAR (LBS)	D 4533	70	N/A
PERMITTIVITY (SEC ⁻¹)	D 4491	1.50	0.90
WATER FLOW RATE (GPM/FT ²)	D 4491	110	65
ULTRAVIOLET STABILITY (% FOR MIN 500 HRS)	D 4355	70	80
APPARENT OPENING SIZE (AOS) (STANDARD SIEVE)	D 4751	70	20

- TABLE NOTES:
- ALL NUMERICAL VALUES EXCEPT AOS AND ULTRAVIOLET STABILITY REPRESENT MINIMUM AVERAGE ROLL VALUES (MARV), IN THE WEAKER PRINCIPAL DIRECTION.
 - AOS VALUE IS A MAXIMUM AVERAGE ROLL VALUE OR MAXARV.
 - ULTRAVIOLET STABILITY IS MEASURED AS A MINIMUM AVERAGE PERCENTAGE.
 - SEE DETAILS ON DRAWING C-501 FOR LOCATIONS OF WOVEN AND NON-WOVEN GEOTEXTILES.

- BORROW SOURCE TESTING REQUIREMENTS
PRIOR TO USE, BORROW SOURCE TESTING, INCLUDING GEOTECHNICAL CHARACTERIZATION REQUIREMENTS, SHALL BE CONDUCTED ON ALL SOIL MATERIALS PROPOSED FOR CONSTRUCTION AND SUBMITTED TO THE ENGINEER TO ASSESS PERFORMANCE TO MATERIAL SPECIFICATIONS.

- MATERIAL PLACEMENT AND FIELD QUALITY CONTROL REQUIREMENTS
1. FILL MATERIAL SHALL NOT BE PLACED ON SURFACES THAT ARE MUDDY, FROZEN, OR CONTAIN FROST OR ICE.
2. SURFACES ON WHICH THE GEOTEXTILE WILL BE PLACED SHALL BE PREPARED TO A RELATIVELY SMOOTH SURFACE CONDITION. SURFACES SHALL BE FREE FROM OBSTRUCTION, DEBRIS, DEPRESSIONS, EROSION FEATURE, OR VEGETATION. ANY IRREGULARITIES SHALL BE REMOVED SO AS TO ENSURE CONTINUOUS, INTIMATE CONTACT OF THE GEOTEXTILE WITH THE SURFACE. ANY LOOSE MATERIAL, OR SOFT OR LOW DENSITY POCKETS OF MATERIAL, SHALL BE REMOVED, FILLED WITH SUITABLE SUBGRADE FILL, AND COMPACTED. EROSION FEATURES SUCH AS RILLS AND GULLIES MUST BE GRADED OUT OF THE SURFACE BEFORE GEOTEXTILE PLACEMENT.
3. AT THE TIME OF INSTALLATION, FABRIC SHALL BE REJECTED IF IT HAS DEFECTS, RIPS, HOLES, FLAWS, DETERIORATION OR DAMAGE INCURRED DURING MANUFACTURE, TRANSPORT OR STORAGE.
4. FABRIC SHALL BE PLACED WITH THE LONG DIMENSION PARALLEL TO THE CENTERLINE OF THE BALLASTS AND LAY SMOOTH AND FREE OF TENSION, STRESS, FOLDS, WRINKLES, OR CREASES.
5. CRUSHED STONE FOR ACCESS ROADS SHALL BE PLACED IN MAXIMUM 6-INCH LOOSE LIFTS AND COMPACTED TO A MINIMUM OF 92% OF MAXIMUM DRY DENSITY (MODIFIED PROCTOR (ASTM D 1557)).
6. LOAM BORROW FOR BASIN A BERM SHALL BE PLACED IN MAXIMUM 6-INCH LOOSE LIFTS AND COMPACTED TO A MINIMUM OF 92% OF MAXIMUM DRY DENSITY (MODIFIED PROCTOR (ASTM D 1557)).

EROSION AND SEDIMENTATION CONTROL PLAN:

THIS PLAN HAS BEEN DEVELOPED TO PROVIDE A STRATEGY FOR CONTROLLING SOIL EROSION AND SEDIMENTATION DURING AND AFTER CONSTRUCTION OF THE PROPOSED PROJECT.

THIS PLAN IS BASED ON STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION IN DEVELOPING AREAS AS CONTAINED IN MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, 2003.

GENERAL EROSION AND SEDIMENTATION CONSTRUCTION DETAIL NOTES:

SEE DRAWING C-101 FOR SEDIMENT AND EROSION CONTROL CONSTRUCTION SEQUENCING. DURING CONSTRUCTION, THE CONTRACTOR SHALL TAKE ALL REASONABLE MEASURES TO SCHEDULE EARTHWORK OPERATIONS SUCH THAT THE AREA OF EXPOSED AND DISTURBED SOIL IS MINIMIZED. CONSTRUCTION SHALL BE PHASED TO MINIMIZE THE AREA OF DISTURBED SOIL THAT IS EXPOSED AT ANY ONE TIME. UPGRADIENT STORM WATER DIVERSION AND DISPERSION MEASURES SHALL BE INSTALLED WHERE APPROPRIATE. ALL CUT AND FILL SLOPES SHALL BE STABILIZED UPON COMPLETION. THE FOLLOWING MEASURES WILL BE UNDERTAKEN TO PROVIDE MAXIMUM PROTECTION TO THE SOIL, WATER, AND ABUTTING LANDS:

PRIOR TO GRUBBING OR ANY EARTH MOVING OPERATION, SEDIMENT BARRIERS, OR OTHER APPROPRIATE PERIMETER CONTROL, BEST MANAGEMENT PRACTICES (BMPs) SHALL BE INSTALLED ACROSS THE SLOPE ON THE CONTOUR AT THE DOWNHILL LIMIT OF THE WORK AS PROTECTION AGAINST CONSTRUCTION RELATED EROSION. INSTALL ALL NECESSARY STORMWATER DIVERSIONS AND DISPERSION MEASURES.

- PERMANENT SOIL STABILIZATION MEASURES FOR ALL SLOPES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN FOURTEEN CALENDAR DAYS AFTER FINAL GRADING HAS BEEN COMPLETED. WHEN IT IS NOT POSSIBLE OR PRACTICAL TO PERMANENTLY STABILIZE DISTURBED LAND, TEMPORARY EROSION CONTROL MEASURES SHALL BE IMPLEMENTED ON DISTURBED AREAS (INCLUDING STOCKPILES) WITHIN FOURTEEN CALENDAR DAYS OF EXPOSURE OF SOIL OR FORMATION OF PILES, UNLESS THESE AREAS ARE TO BE SUBSEQUENTLY SURFACED WITH PERMANENT STRUCTURES. ALL DISTURBED AREAS SHALL BE MULCHED FOR EROSION CONTROL UPON COMPLETION OF ROUGH GRADING.
- ANY EXPOSED SLOPES 3:1 OR GREATER SHALL BE STABILIZED WITH EROSION CONTROL BLANKETS (ERONET C125 BY NORTH AMERICAN GREEN, OR APPROVED EQUAL) TO PREVENT EROSION DURING CONSTRUCTION AND TO FACILITATE REVEGETATION AFTER TOPSOILING AND SEEDING.
- EXISTING TOPSOIL SHALL BE SAVED, STOCKPILED, AND REUSED AS MUCH AS POSSIBLE ON SITE. SEDIMENT BARRIER SHALL BE INSTALLED AT THE BASE OF STOCKPILES AT THE DOWNHILL LIMIT TO PROTECT AGAINST EROSION. STOCKPILES ANTICIPATED TO REMAIN FOR MORE THAN 14 CALENDAR DAYS SHALL BE STABILIZED BY SEEDING AND MULCHING UPON FORMATION OF THE PILES. UPGRADIENT OF THE STOCKPILES, STABILIZED DITCHES AND/OR BERMS SHALL BE CONSTRUCTED TO DIVERT STORMWATER RUNOFF AWAY FROM THE PILES.
- INTERCEPTED SEDIMENT SHALL BE REMOVED WHEN IT REACHES ONE-HALF THE HEIGHT OF THE SEDIMENT BARRIER, OR AS DIRECTED IN THE DRAWING DETAILS FOR OTHER BMPs, AND SHALL BE DEPOSITED IN AN AREA THAT SHALL NOT CONTRIBUTE TO SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED. ALL DAMAGED EROSION CONTROL DEVICES SHALL BE REPAIRED AND/OR REPLACED IMMEDIATELY. DEVICES NO LONGER SERVICEABLE DUE TO SEDIMENT ACCUMULATION SHALL ALSO BE REPAIRED AND/OR REPLACED AS REQUIRED.
- SOIL CUTTINGS GENERATED DURING THE DRILLING OF PILOT HOLES FOR GROUND SCREWS SHALL BE REMOVED AND COLLECTED. SOIL CUTTINGS MAY BE STOCKED PILED TEMPORARILY, BUT ULTIMATELY SHALL BE DISPOSED AND SPREAD IN AN AREA THAT SHALL NOT CONTRIBUTE TO OFF-SITE SEDIMENTATION AND BE PERMANENTLY STABILIZED.
- ADDITIONAL EROSION CONTROL METHODS SHALL BE IMPLEMENTED IF CONSTRUCTION OCCURS AFTER DECEMBER 15TH. ALL DISTURBED AREAS SHALL BE MINIMIZED TO THE EXTENT POSSIBLE. PRIOR TO FREEZING, ADDITIONAL EROSION CONTROL DEVICES SHALL BE INSTALLED AS APPROPRIATE. INSPECTION OF THESE EROSION CONTROL ITEMS SHALL BE FREQUENT, WITH PARTICULAR ATTENTION PAID TO WEATHER PREDICTIONS TO ENSURE THAT THESE MEASURES ARE PROPERLY IN PLACE TO HANDLE LARGE QUANTITIES OF RUNOFF RESULTING FROM HEAVY RAINS OR EXCESSIVE THAWS.
- GENERAL EROSION AND SEDIMENTATION CONTROL ACTIONS SHALL INCLUDE THE FOLLOWING:
 - MARK SOIL DISTURBANCE LIMITS
 - INSTALL SEDIMENT BARRIERS BEFORE DISTURBING ANY SOILS
 - DIVERT AND DISPERSE STORM WATER RUNOFF TO UNDISTURBED AREAS WHEREVER POSSIBLE
 - MULCH DISTURBED AREAS
 - PROTECT STEEP SLOPES
 - INSPECT AND REPAIR EROSION CONTROLS AND SEDIMENT BARRIERS

DUST CONTROL:

- CONSTRUCTION ACTIVITIES SHALL BE SCHEDULED TO MINIMIZE THE AREA OF DISTURBED SOIL THAT IS EXPOSED AT ONE TIME.
- DUST CONTROL SHALL BE USED ON CONSTRUCTION ROUTES AND OTHER DISTURBED AREAS SUBJECT TO SURFACE DUST MOVEMENT AND DUST BLOWING.
- MAINTAIN DUST CONTROL MEASURES PROPERLY THROUGH DRY WEATHER PERIODS UNTIL ALL DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.
- DUST CONTROL METHODS SHALL BE APPROVED BY THE ENGINEER AND MAY INCLUDE VEGETATIVE COVER, MULCH (INCLUDING GRAVEL MULCH), SPRINKLING, STONE, AND BARRIERS.
- VEGETATIVE COVER - FOR DISTURBED AREAS NOT SUBJECT TO TRAFFIC, VEGETATION PROVIDES THE MOST PRACTICAL METHOD OF DUST CONTROL.
- MULCH (INCLUDING GRAVEL MULCH) - WHEN PROPERLY APPLIED, MULCH OFFERS A FAST, EFFECTIVE MEANS OF CONTROLLING DUST. SEE MANUFACTURER'S RECOMMENDATIONS OR THE MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, 2003 FOR APPLICATION RATES.
- SPRINKLING - EXPOSED SOILS MAY BE SPRINKLED UNTIL THE SURFACE IS WET. SPRINKLING IS ESPECIALLY EFFECTIVE FOR DUST CONTROL ON HAUL ROADS AND OTHER TRAFFIC ROUTES.
- STONE - USED TO STABILIZE CONSTRUCTION ROADS; CAN ALSO BE EFFECTIVE FOR DUST CONTROL.
- BARRIERS - A BOARD FENCE, WIND FENCE, SEDIMENT FENCE, OR SIMILAR BARRIER CAN CONTROL AIR CURRENTS AND BLOWING SOIL. ALL OF THESE FENCES ARE NORMALLY CONSTRUCTED OF WOOD AND THEY PREVENT EROSION BY OBSTRUCTING THE WIND NEAR THE GROUND AND PREVENTING THE SOIL FROM BLOWING OFFSITE.

MONITORING PROGRAM:

- EROSION AND SEDIMENTATION CONTROLS SHALL BE INSPECTED AT LEAST ONCE EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.25 INCHES OR GREATER. DAILY RAINFALL SHALL BE MONITORED AND RECORDED BY THE CONTRACTOR. ALL STRUCTURES DAMAGED BY CONSTRUCTION EQUIPMENT, VANDALS, OR THE ELEMENTS SHALL BE REPAIRED OR REPLACED IMMEDIATELY, PRIOR TO CONTINUING THE CONSTRUCTION.
- FOLLOWING THE FINAL SEEDING, THE SITE SHALL BE INSPECTED IN ACCORDANCE WITH THE SCHEDULE OUTLINED IN #1 ABOVE, TO ENSURE THAT THE VEGETATION HAS BEEN ESTABLISHED (70% COVER ACHIEVED), IN THE EVENT OF ANY UNSATISFACTORY GROWTH, RESEEDING WILL BE CARRIED OUT, WITH FOLLOW-UP INSPECTION.
- AFTER THE CONSTRUCTION INSPECTOR HAS DETERMINED THAT THE PROJECT AREA HAS BEEN PERMANENTLY STABILIZED (70% COVER HAS BEEN ACHIEVED OR NON-VEGETATED MEASURES HAVE BEEN IMPLEMENTED), THE CONTRACTOR SHALL REMOVE ALL SEDIMENT BARRIERS, TEMPORARY SEDIMENTATION CONTROL RISERS AND ANY OTHER TEMPORARY EROSION CONTROL MEASURES.

SEEDING AND REVEGETATION PLAN:

IMMEDIATELY FOLLOWING THE COMPLETION OF TREE CLEARING, ALL DISTURBED AREAS SHALL BE TREATED AS STATED BELOW IN ORDER TO MINIMIZE CONSTRUCTION PERIOD EROSION.

- APPLY SEED/TACKIFIER MIX ACCORDING TO THE FOLLOWING SPECIFICATIONS:
- SEED: ERNST SEEDS QUICK EROSION CONTROL COVER MIX CONSISTING OF (% BY WEIGHT):
 - 50% LOLIUM MULTIFLORUM (ANNUAL RYEGRASS)
 - 50% LOLIUM PERENNE, 'BIGLEAGUE' (PERENNIAL RYEGRASS, 'BIGLEAGUE')
 SEEDING RATE: 50 LBS PER ACRE
 - TACKIFIER: GEOPERM BONDED FIBER MATRIX (OR APPROVED EQUAL) APPLIED PER MANUFACTURER SPECIFICATIONS.

UPON COMPLETION OF SITE CONSTRUCTION, ALL AREAS PREVIOUSLY DISTURBED SHALL BE TREATED AS STATED BELOW. THESE AREAS WILL BE CLOSELY MONITORED BY THE CONTRACTOR UNTIL SUCH TIME AS A SATISFACTORY GROWTH OF VEGETATION IS ESTABLISHED. SATISFACTORY GROWTH SHALL MEAN A MINIMUM OF 70% OF THE AREA IS VEGETATED WITH VIGOROUS GROWTH.

- APPLY SEED AS DIRECTED BELOW:
 - (APRIL 1ST THROUGH OCTOBER 1ST)
 - SEED DISTURBED AREAS AT THE RATE OF 30 LBS PER ACRE OF ERNST SEEDS NORTHEAST SOLAR POLLINATOR 4 MIX CONSISTING OF (% BY WEIGHT):
 - 35% BOUTELOUA CURTIPENDULA, BUTTE (SIDEOATS GRAMA, BUTTE)
 - 35% SCHIZACHYRIUM SCOPARIUM, 'CAMPER' (LITTLE BLUESTEM, 'CAMPER')
 - 10% PANICUM SPHAERONCARPON (ROUNDSEED PANICGRASS)
 - 4% ASCLEPIAS TUBEROSA (BUTTERFLY MILKWEED)
 - 4% CHAMAECRISTA FASCICULATA, PA ECOTYPE (PARTRIDGE PEA, PA ECOTYPE)
 - 4% COREOPSIS LANCEOLATA (LANCELEAF COREOPSIS)
 - 4% RUDECKIA HIRTA (BLACKEYED SUSAN)
 - 0.9% PYCNANTHEMUM TENUIFOLIUM (NARROWLEAF MOUNTAINMINT)
 - 0.7% ASTER OBLONGIFOLIUS, (AROMATIC ASTER, PA ECOTYPE)
 - 0.5% ASTER PRENANTHOIDES, PA ECOTYPE (ZIGZAG ASTER, PA ECOTYPE)
 - 0.5% PENSTEMON DIGITALIS (TALL WHITE BEARDTONGUE)
 - 0.5% TRADESCANTIA OHIENSIS (OHIO SPIDERWORT, PA ECOTYPE)
 - 0.5% ZIZA AUREA (GOLDEN ALEXANDERS)
 - 0.3% OENOTHERA FRUTICOSA VAR. FRUTICOSA (SUNDRUPS)
 - 0.1% SOLIDAGO MEMORIALIS, PA ECOTYPE (GRAY GOLDENROD, PA ECOTYPE)
 - APPLY WOOD FIBER MULCH AT A RATE OF 2,000 LBS PER ACRE FOR MAXIMUM MOISTURE RETENTION.
 - SEEDING SHALL HAVE A MINIMUM GERMINATION PERCENTAGE OF 85%.
 - (NOVEMBER 1ST THROUGH DECEMBER 15TH)
 - SEED DISTURBED AREAS AT THE RATE OF 3 LBS PER 1,000 SQ. FT. OF WINTER RYE
 - APPLY HAY MULCH AT THE RATE OF 100 LBS PER 1,000 SQ. FT.
 - (AFTER DECEMBER 15TH)
 - DO NOT SEED.
 - APPLY HAY MULCH AT THE RATE OF 100 LBS PER 1,000 SQ. FT.

- SEEDING METHODS MAY BE DRILL SEEDINGS, BROADCASTS AND ROLLED, CULTPACKED, OR TRACKED WITH A SMALL TRACK PIECE OF CONSTRUCTION EQUIPMENT, OR HYDRO-SEEDING, WITH SUBSEQUENT TRACKING.
- WATERING MAY BE REQUIRED DURING DRY PERIODS CONSULT SEED MANUFACTURER'S INSTRUCTIONS.
- INSPECT SEEDED AREAS FOR FAILURE AND MAKE NECESSARY REPAIRS AND RESEED IMMEDIATELY. CONDUCT A FOLLOW-UP SURVEY AFTER ONE YEAR AND RESEED WHERE NECESSARY.
- ALL SEDIMENT CONTROL STRUCTURES LOCATED DOWN GRADIENT OF SOILS STABILIZED BY VEGETATIVE MEASURES SHALL REMAIN IN PLACE UNTIL VEGETATION IS ESTABLISHED. ESTABLISHED MEANS A MINIMUM OF 70% OF THE AREA IS VEGETATED WITH VIGOROUS GROWTH.

11/10/2021	7	REVISION	DATE
10/28/2021	6		
09/24/2021	5		
06/29/2021	4		
05/20/2021	3		
04/29/2021	2		
03/15/2021	1		
		ISSUE / REVISION DESCRIPTION	APPROVED
CC PEER REVIEW			
CC PEER REVIEW			
CC PEER REVIEW			
REVISOR			
ISSUED			

PROJECT: 4.493 MW DC GROUND-MOUNT SOLAR PV DEVELOPMENT 40 SIZER DRIVE WALES, MASSACHUSETTS

TITLE: CONSTRUCTION, EROSION, AND SEDIMENTATION CONTROL NOTES

CLIENT: SUNPIN ENERGY SERVICES, LLC

SECURING A BRIGHTER FUTURE THROUGH SOLAR

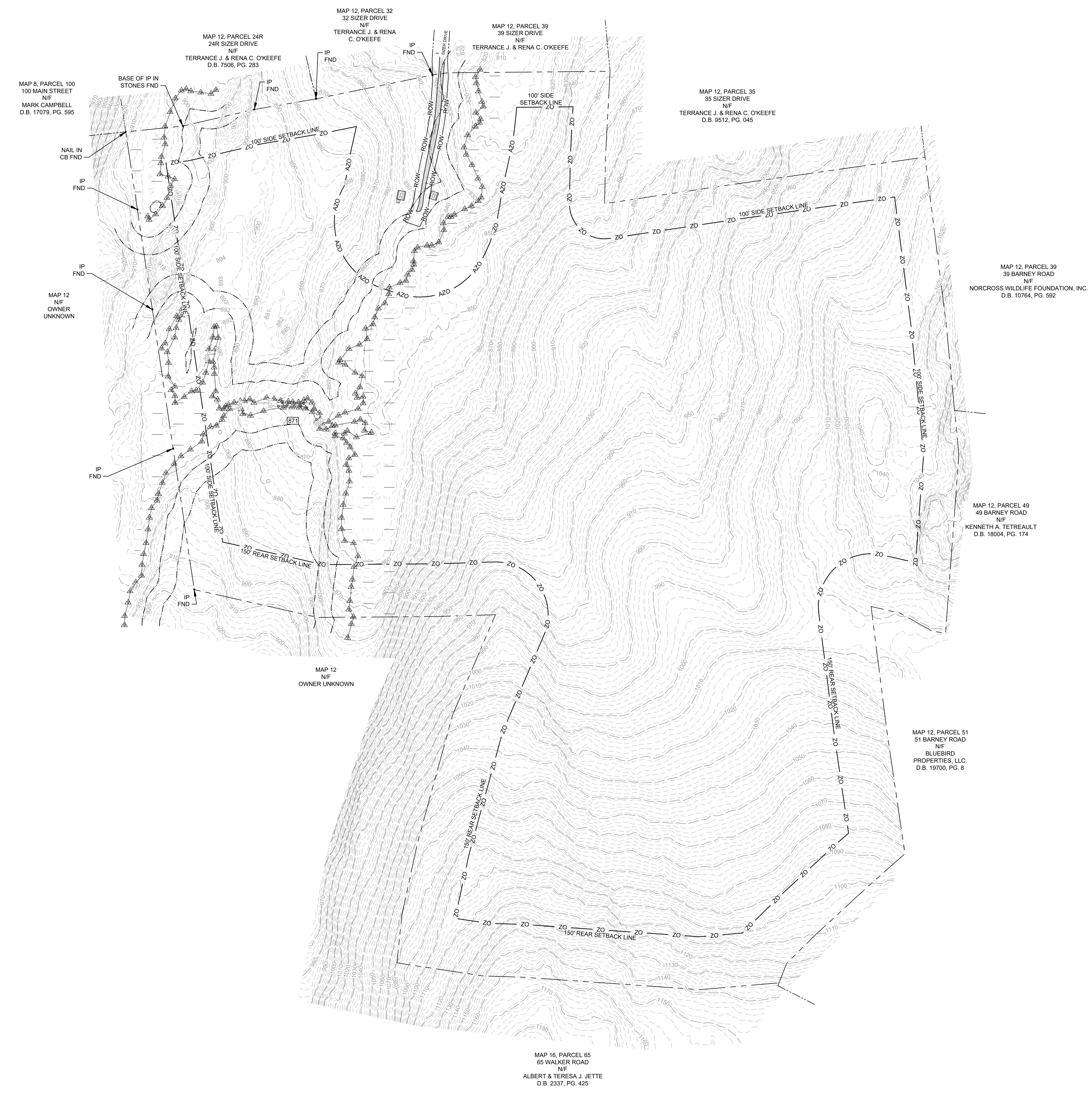
SEAL: ANDREW P. VARDOLAKIS CIVIL No. 52524 REGISTERED PROFESSIONAL ENGINEER 11/10/2021

DESIGNED BY: MJW	DRAWN BY: DED
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER: 3652200259	
DRAWING NUMBER: G-001	
SHEET NUMBER: 1 OF 11	

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

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NOTES:
1. ELECTRONIC BASE PLAN FROM ANDREWS SURVEY & ENGINEERING, INC., 104 MENDON STREET, PO BOX 312, UXBRIDGE, MA 01569.



LEGEND:

---	PROPERTY LINE
- - - -	ABUTTER'S PROPERTY LINE
- - - -	APPROXIMATE RIGHT-OF-WAY
—ROW—	ROW
—850—	MAJOR CONTOUR
—	MINOR CONTOUR
—OHW—	OVERHEAD ELECTRIC LINE
---	WETLAND LINE
---	50' WETLAND BUFFER
---	100' WETLAND BUFFER
---	PROPERTY LINE SETBACK
---	APPROXIMATE PROPERTY LINE SETBACK
---	WETLAND AREA
---	PAVEMENT
○	UTILITY POLE
△	GUY POLE
△	WETLAND FLAG



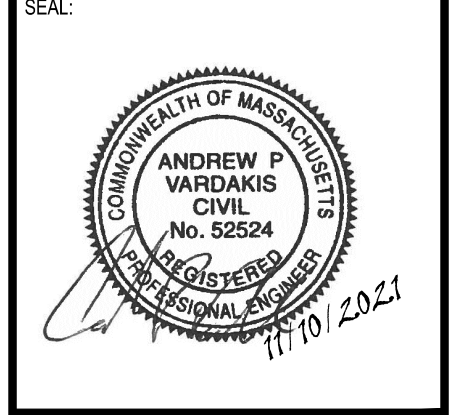
REVISION	DATE	ISSUE / REVISION DESCRIPTION	ISSUED	APPROVED
7	11/10/2021	CC PEER REVIEW	MJW	APV
6	10/28/2021	CC PEER REVIEW	MJW	APV
5	09/24/2021	CC PEER REVIEW	MJW	APV
4	06/29/2021	REVISED PER CONSERVATION COMMISSIONS	MJW	APV
3	05/20/2021	ISSUED TO CONSERVATION COMMISSION	MJW	APV
2	04/29/2021	CONSERVATION COMMISSION COMMENTS	MJW	APV
1	03/15/2021	CONSERVATION COMMISSION COMMENTS	MJW	APV

PROJECT: 4.493 MW DC GROUND-MOUNT SOLAR PV DEVELOPMENT
40 SIZER DRIVE
WALLES, MASSACHUSETTS

TITLE: EXISTING CONDITIONS PLAN

SUNPIN ENERGY SERVICES, LLC

SUNPIN
Securing a brighter future through solar



DESIGNED BY: MJW	DRAWN BY: DED
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER: 3652200259	
DRAWING NUMBER: V-101	
SHEET NUMBER: 2 OF 11	

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

SHEET C-102
SHEET C-104

MAP 8, PARCEL 100
100 MAIN STREET
N/F
MARK CAMPBELL
D.B. 17079, PG. 595

MAP 12, PARCEL 24R
24R SIZER DRIVE
N/F
TERRANCE J. & RENA C. O'KEEFE
D.B. 7506, PG. 283

MAP 12, PARCEL 32
32 SIZER DRIVE
N/F
TERRANCE J. & RENA C. O'KEEFE

MAP 12, PARCEL 39
39 SIZER DRIVE
N/F
TERRANCE J. & RENA C. O'KEEFE

MAP 12, PARCEL 35
35 SIZER DRIVE
N/F
TERRANCE J. & RENA C. O'KEEFE
D.B. 9512, PG. 045

MAP 12, PARCEL 39
39 BARNEY ROAD
N/F
NORCROSS WILDLIFE FOUNDATION, INC.
D.B. 10764, PG. 592

MAP 12, PARCEL 49
49 BARNEY ROAD
N/F
KENNETH A. TETREULT
D.B. 19004, PG. 174

MAP 12, PARCEL 51
51 BARNEY ROAD
N/F
BLUEBIRD
PROPERTIES, LLC.
D.B. 19700, PG. 8

MAP 12
N/F
OWNER
UNKNOWN

SHEET C-103
SHEET C-105

SHEET C-106

MAP 12
N/F
OWNER
UNKNOWN

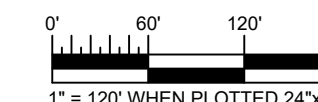
PHASE	AREA (AC)
1	3.5
2	3.7
3	2.8
4	3.3

SOIL EROSION & SEDIMENTATION CONTROL (SESC) CONSTRUCTION SEQUENCING:

- SURVEY AND FLAG LIMITS OF DISTURBANCE.
 - INSTALL PERIMETER EROSION CONTROL BARRIERS AND CONSTRUCTION EXIT. CONTRACTOR TO MAINTAIN AND SUPPLEMENT THROUGHOUT CONSTRUCTION WHERE EVIDENCE OF SEDIMENT EXTENDS BEYOND THE LIMIT OF DISTURBANCE (LOD).
 - CUT AND REMOVE TREES AND STUMPS WITHIN PROPOSED ACCESS ROAD AREA.
 - INSTALL WETLAND CROSSING CULVERT.
- PHASE START
- CUT AND REMOVE TREES AND STUMPS IN SEDIMENT TRAP AREA(S).
 - INSTALL TEMPORARY SEDIMENT TRAP(S).
 - COMPLETE TREE CUTTING, REMOVAL, AND STUMP GRINDING FOR REMAINDER OF PHASE AREA.
 - FOLLOWING TREE CUTTING, IMMEDIATELY APPLY HYDROSEED WITH TACKIFIER TO THE DISTURBED AREA IN ACCORDANCE WITH THE SEEDING AND REVEGETATION PLAN ON SHEET G-001.
 - REMOVE EXISTING PAVEMENT (IF APPLICABLE) AND SCARIFY UNDERLYING SOIL.
 - INSTALL THE CRUSHED STONE ACCESS ROAD.
 - INSTALL SOLAR POSTS, RACKING, PANELS, ELECTRICAL CONDUIT, EQUIPMENT, ETC.
 - REPAIR ANY RUTS OR RILLS PRESENT AS A RESULT OF CONSTRUCTION OPERATIONS.
 - OVERSEED THE SITE WITH POLLINATOR MIX IN ACCORDANCE WITH THE SEEDING AND REVEGETATION PLAN ON SHEET G-001.
 - FOLLOWING ESTABLISHMENT OF VEGETATION, INSTALL BIORETENTION BASIN(S).
- PHASE END
- MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES UNTIL SITE IS FULLY STABILIZED WITH VEGETATION AND NO OBVIOUS EVIDENCE OF EROSION IN THE PROJECT LIMITS IS OBSERVED. ANY CONSTRUCTION SEDIMENT DISCOVERED BEYOND THE LOD SHALL BE PROMPTLY REMOVED AND DAMAGED EROSION CONTROLS SHALL BE REPAIRED. ONCE PROPER VEGETATION ESTABLISHMENT HAS OCCURRED, THE TEMPORARY SEDIMENT TRAPS AND SEDIMENT BARRIERS SHALL BE REMOVED.

NOTES:

- ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM INFORMATION.



wood.

WOOD MASSACHUSETTS, INC.
271 MILL ROAD CHELMSFORD
MASSACHUSETTS 01864
TELEPHONE: (978) 692-9090
FAX: (978) 692-6633
WEB: WWW.WOODPLC.COM

REVISION	DATE	ISSUE / REVISION DESCRIPTION	APV	ISSUED	APPROVED
7	11/10/2021	CC PEER REVIEW	MJW		
6	10/28/2021	CC PEER REVIEW	MJW		
5	09/24/2021	CC PEER REVIEW	MJW		
4	06/29/2021	REVISED PER CONSERVATION COMMISSIONS	MJW		
3	05/20/2021	ISSUED TO CONSERVATION COMMISSION	MJW		
2	04/29/2021	CONSERVATION COMMISSION COMMENTS	MJW		
1	03/15/2021	CONSERVATION COMMISSION COMMENTS	MJW		

PROJECT:	4.493 MW DC GROUND-MOUNT SOLAR PV DEVELOPMENT 40 SIZER DRIVE WALES, MASSACHUSETTS
TITLE:	SHEET INDEX & PHASING PLAN

CLIENT:

SUNPIN ENERGY SERVICES, LLC

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SEAL:

DESIGNED BY:	MJW	DRAWN BY:	DED
CHECKED BY:	APV	SCALE:	AS SHOWN
PROJECT NUMBER:	3652200259		
DRAWING NUMBER:	C-101		
SHEET NUMBER:	3 OF 11		

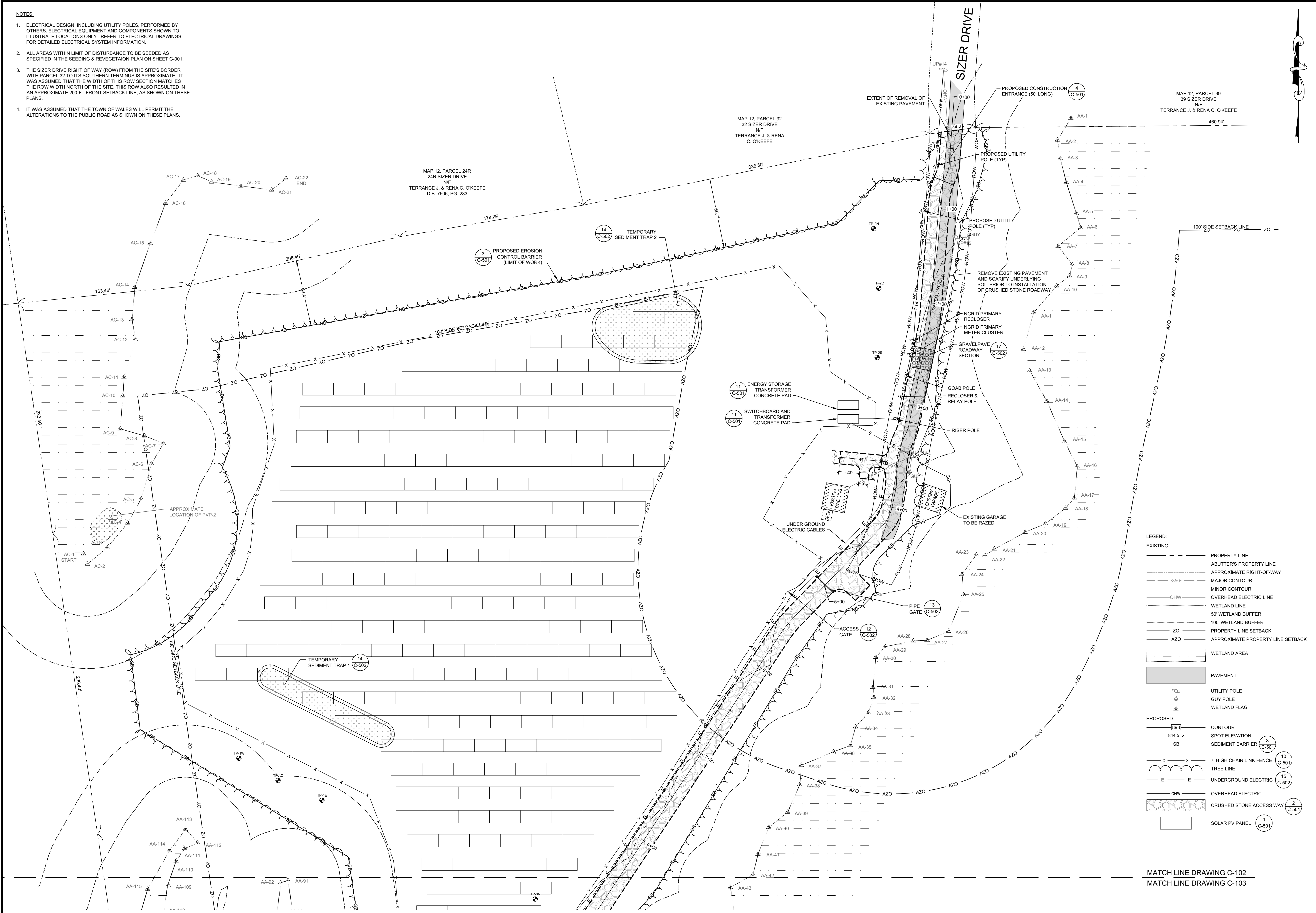
ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

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- THE SIZER DRIVE RIGHT OF WAY (ROW) FROM THE SITE'S BORDER WITH PARCEL 32 TO ITS SOUTHERN TERMINUS IS APPROXIMATE. IT WAS ASSUMED THAT THE WIDTH OF THIS ROW SECTION MATCHES THE ROW WIDTH NORTH OF THE SITE. THIS ROW ALSO RESULTED IN AN APPROXIMATE 200-FT FRONT SETBACK LINE, AS SHOWN ON THESE PLANS.
- IT WAS ASSUMED THAT THE TOWN OF WALES WILL PERMIT THE ALTERATIONS TO THE PUBLIC ROAD AS SHOWN ON THESE PLANS.



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LEGEND:

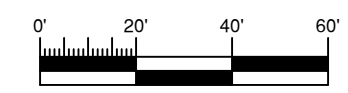
EXISTING:

- PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- APPROXIMATE RIGHT-OF-WAY
- MAJOR CONTOUR
- MINOR CONTOUR
- OVERHEAD ELECTRIC LINE
- WETLAND LINE
- 50' WETLAND BUFFER
- 100' WETLAND BUFFER
- PROPERTY LINE SETBACK
- APPROXIMATE PROPERTY LINE SETBACK
- WETLAND AREA
- PAVEMENT
- UTILITY POLE
- GUY POLE
- WETLAND FLAG

PROPOSED:

- CONTOUR
- SPOT ELEVATION
- SEDIMENT BARRIER (C-501)
- 7' HIGH CHAIN LINK FENCE (C-501)
- TREE LINE
- UNDERGROUND ELECTRIC (C-502)
- OVERHEAD ELECTRIC
- CRUSHED STONE ACCESS WAY (C-501)
- SOLAR PV PANEL (C-501)

MATCH LINE DRAWING C-102
MATCH LINE DRAWING C-103



NO.	DATE	REVISION	ISSUE / REVISION DESCRIPTION	APPROVED
7	11/10/2021			
6	10/28/2021		CC PEER REVIEW	
5	09/24/2021		CC PEER REVIEW	
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3	05/20/2021		ISSUED TO CONSERVATION COMMISSION	
2	04/29/2021		CONSERVATION COMMISSION COMMENTS	
1	03/15/2021		CONSERVATION COMMISSION COMMENTS	

PROJECT: 4.493 MW DC GROUND-MOUNT SOLAR PV DEVELOPMENT
40 SIZER DRIVE
WALES, MASSACHUSETTS

TITLE: PROPOSED SITE PLAN (SHEET 1 OF 2)

CLIENT: SUNPIN ENERGY SERVICES, LLC

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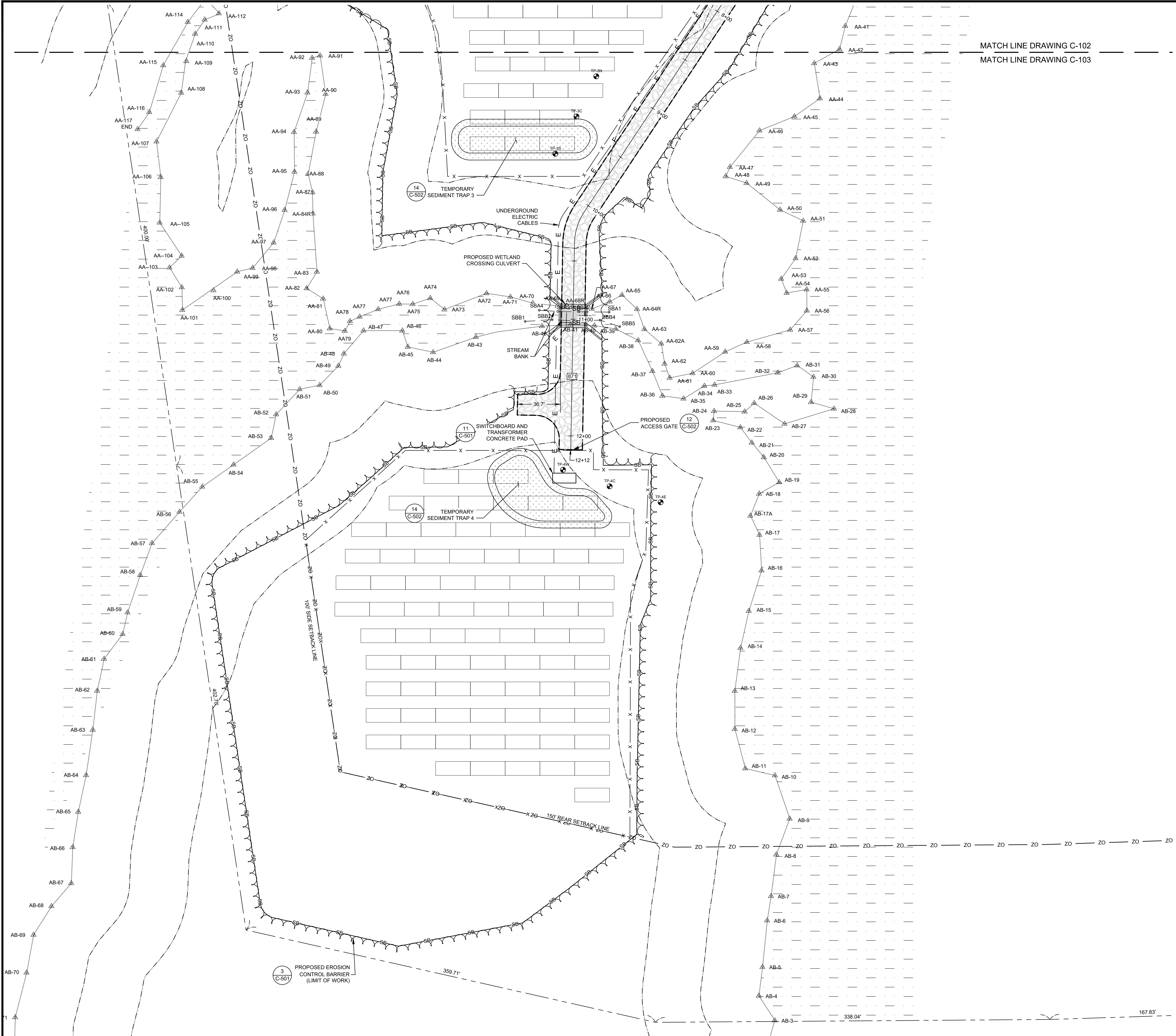
SEAL:

DESIGNED BY: MJW
CHECKED BY: APV
PROJECT NUMBER: 3652200259
DRAWING NUMBER: C-102
SHEET NUMBER: 4 OF 11

DRAWN BY: DED
SCALE: AS SHOWN

ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

MATCH LINE DRAWING C-102
MATCH LINE DRAWING C-103



LEGEND:

EXISTING:

- PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- ROW - ROW APPROXIMATE RIGHT-OF-WAY
- MAJOR CONTOUR
- MINOR CONTOUR
- OHW OVERHEAD ELECTRIC LINE
- WETLAND LINE
- 50' WETLAND BUFFER
- 100' WETLAND BUFFER
- ZO PROPERTY LINE SETBACK
- AZO APPROXIMATE PROPERTY LINE SETBACK
- WETLAND AREA
- PAVEMENT
- UTILITY POLE
- GUY POLE
- WETLAND FLAG

PROPOSED:

- CONTOUR
- SPOT ELEVATION
- SEDIMENT BARRIER
- 7' HIGH CHAIN LINK FENCE
- TREE LINE
- UNDERGROUND ELECTRIC
- OVERHEAD ELECTRIC
- CRUSHED STONE ACCESS WAY
- SOLAR PV PANEL

- NOTES:**
- ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM INFORMATION.
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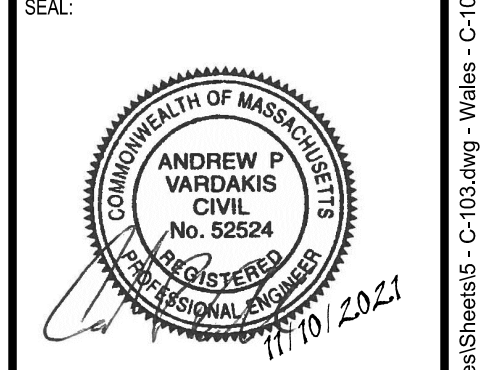
NO.	DATE	REVISION	ISSUE / REVISION DESCRIPTION
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1	03/15/2021		CONSERVATION COMMISSION COMMENTS

PROJECT: **4.493 MW DC GROUND-MOUNT SOLAR PV DEVELOPMENT**
40 SIZER DRIVE
WALLES, MASSACHUSETTS

TITLE: **PROPOSED SITE PLAN**
(SHEET 2 OF 2)

CLIENT: **SUNPIN ENERGY SERVICES, LLC**

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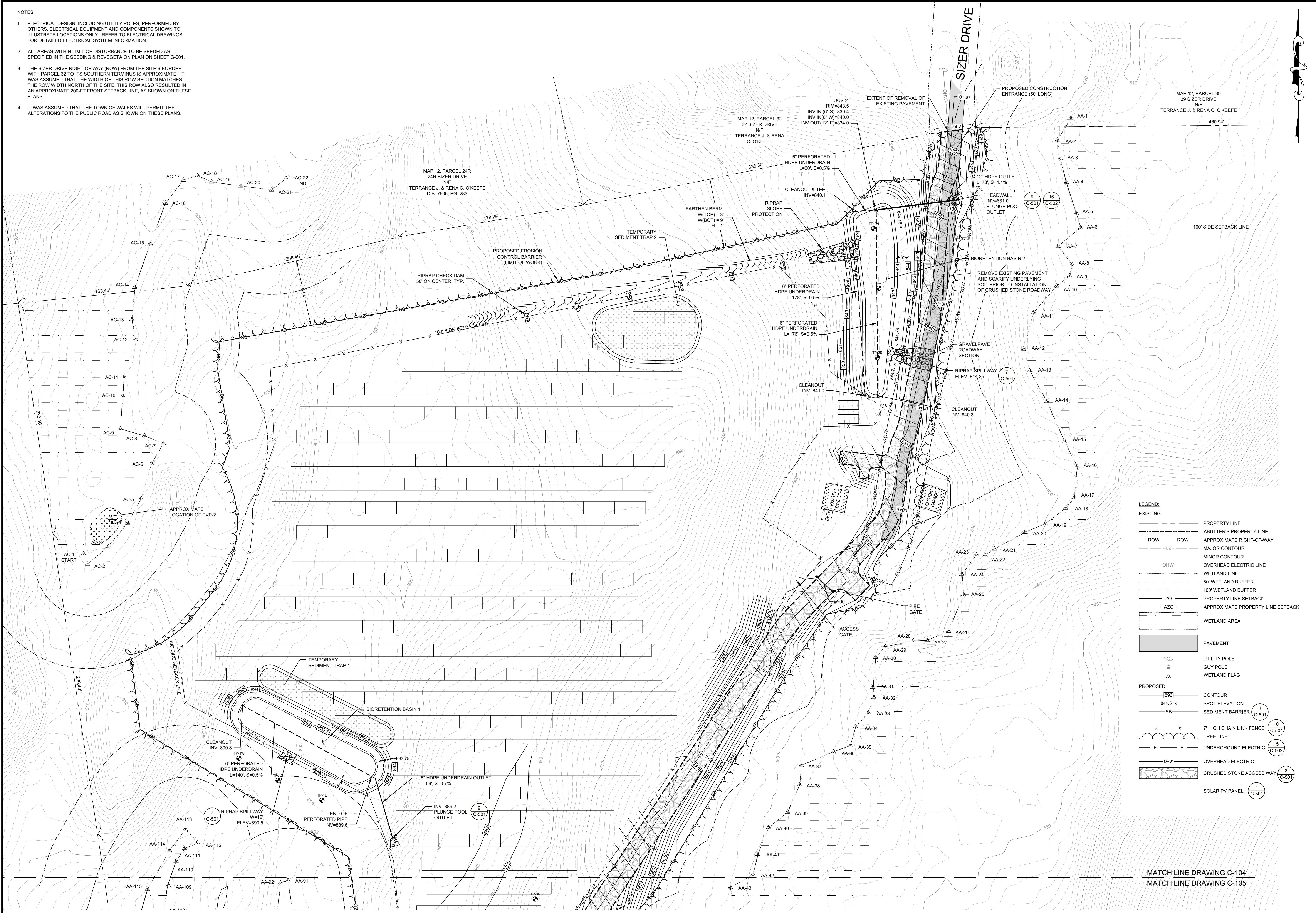


DESIGNED BY: MJW
DRAWN BY: DED
CHECKED BY: APV
SCALE: AS SHOWN
PROJECT NUMBER: 3652200259
DRAWING NUMBER: **C-103**
SHEET NUMBER: **5 OF 11**

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- IT WAS ASSUMED THAT THE TOWN OF WALES WILL PERMIT THE ALTERATIONS TO THE PUBLIC ROAD AS SHOWN ON THESE PLANS.



LEGEND:

EXISTING:

- PROPERTY LINE
- - - BUTTER'S PROPERTY LINE
- - - ROW
- - - - - MAJOR CONTOUR
- - - - - MINOR CONTOUR
- - - - - OHW
- - - - - WETLAND LINE
- - - - - 50' WETLAND BUFFER
- - - - - 100' WETLAND BUFFER
- - - - - ZO
- - - - - AZO
- ▭ WETLAND AREA

PROPOSED:

- ▭ PAVEMENT
- ⊙ UTILITY POLE
- ⊙ GUY POLE
- ⊙ WETLAND FLAG
- 844.5' x
- - - SB
- - - - - CONTOUR
- - - - - SPOT ELEVATION
- - - - - SEDIMENT BARRIER
- - - - - 7' HIGH CHAIN LINK FENCE
- - - - - TREE LINE
- - - - - UNDERGROUND ELECTRIC
- - - - - OVERHEAD ELECTRIC
- - - - - CRUSHED STONE ACCESS WAY
- ▭ SOLAR PV PANEL

wood.

WOOD MASSACHUSETTS, INC.
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NO.	DATE	REVISION	ISSUE / REVISION DESCRIPTION
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1	03/15/2021		CONSERVATION COMMISSION COMMENTS

PROJECT: 4.493 MW DC GROUND-MOUNT SOLAR PV DEVELOPMENT
40 SIZER DRIVE
WALES, MASSACHUSETTS

TITLE: PROPOSED GRADING AND DRAINAGE PLAN (SHEET 1 OF 2)

CLIENT: SUNPIN ENERGY SERVICES, LLC

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SEAL:

DESIGNED BY: MJW
DRAWN BY: DED

CHECKED BY: APV
SCALE: AS SHOWN

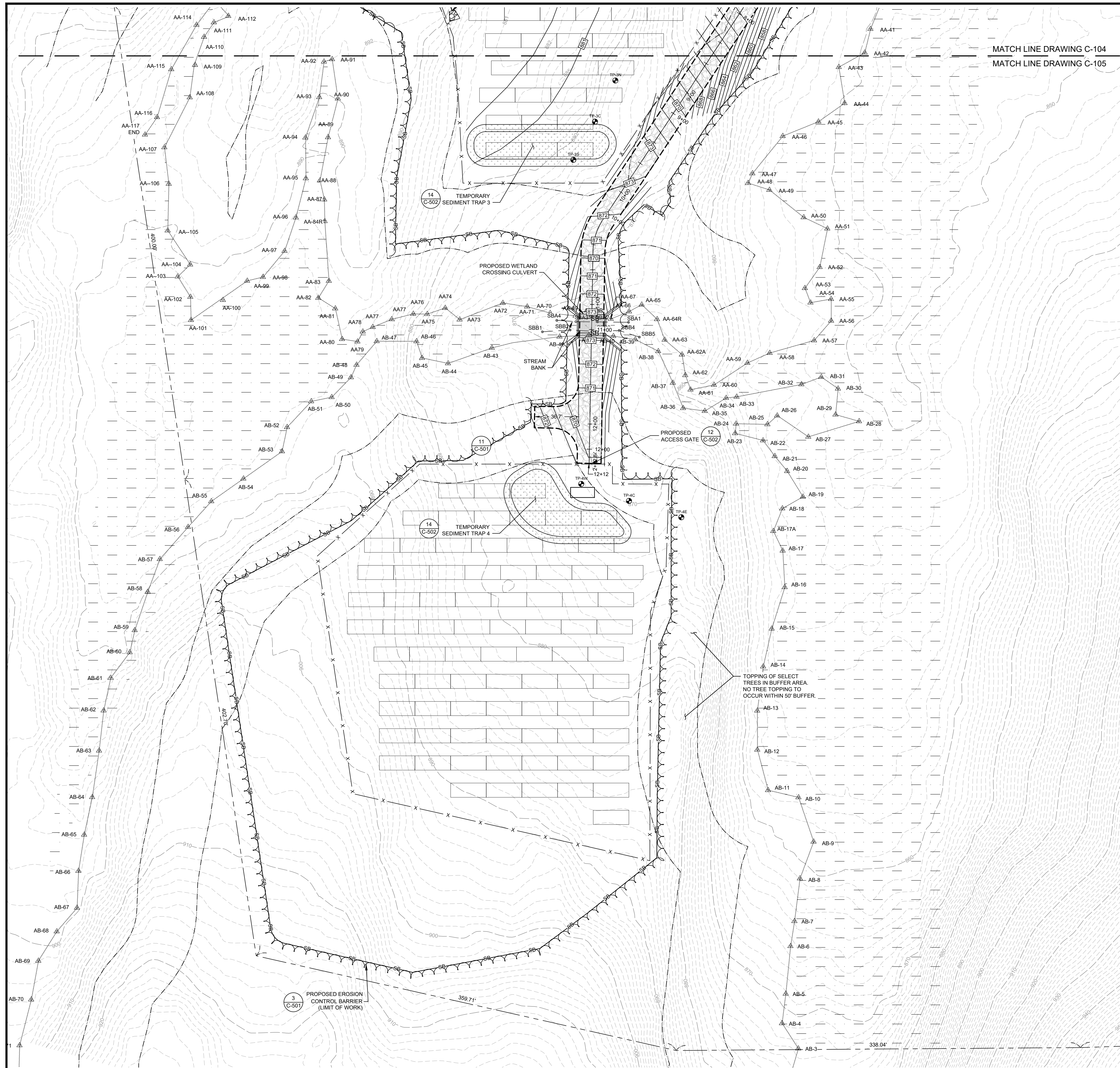
PROJECT NUMBER: 3652200259

DRAWING NUMBER: C-104

SHEET NUMBER: 6 OF 11



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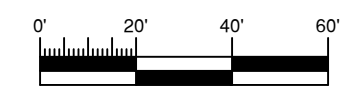



MATCH LINE DRAWING C-104
MATCH LINE DRAWING C-105

LEGEND:

EXISTING:	—	PROPERTY LINE
	- - -	ADJUTER'S PROPERTY LINE
	— ROW —	APPROXIMATE RIGHT-OF-WAY
	— 850 —	MAJOR CONTOUR
	— OHW —	OVERHEAD ELECTRIC LINE
	—	WETLAND LINE
	—	50' WETLAND BUFFER
	—	100' WETLAND BUFFER
	— ZO —	PROPERTY LINE SETBACK
	— AZO —	APPROXIMATE PROPERTY LINE SETBACK
	[Pattern]	WETLAND AREA
	[Pattern]	PAVEMENT
	[Symbol]	UTILITY POLE
	[Symbol]	GUY POLE
	[Symbol]	WETLAND FLAG
PROPOSED:	[Symbol]	CONTOUR
	844.5 x	SPOT ELEVATION
	SB	SEDIMENT BARRIER
	x x	7' HIGH CHAIN LINK FENCE
	[Symbol]	TREE LINE
	E E	UNDERGROUND ELECTRIC
	[Symbol]	OVERHEAD ELECTRIC
	[Pattern]	CRUSHED STONE ACCESS WAY
	[Symbol]	SOLAR PV PANEL

- NOTES:**
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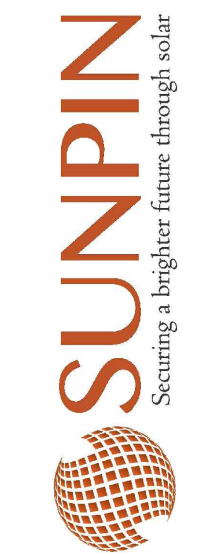
WOOD MASSACHUSETTS, INC.
271 MILL ROAD CHELMSFORD
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4	06/29/2021	REVISED PER CONSERVATION COMMISSIONS	APV	
3	05/20/2021	ISSUED TO CONSERVATION COMMISSION	MJW	
2	04/29/2021	CONSERVATION COMMISSION COMMENTS	APV	
1	03/15/2021	CONSERVATION COMMISSION COMMENTS	MJW	

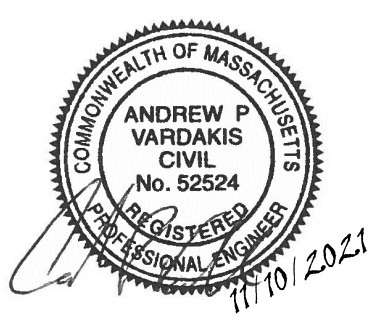
PROJECT: 4.493 MW DC GROUND-MOUNT SOLAR PV DEVELOPMENT
40 SIZER DRIVE
WALLES, MASSACHUSETTS

TITLE: PROPOSED GRADING AND DRAINAGE PLAN
(SHEET 2 OF 2)

CLIENT: SUNPIN ENERGY SERVICES, LLC

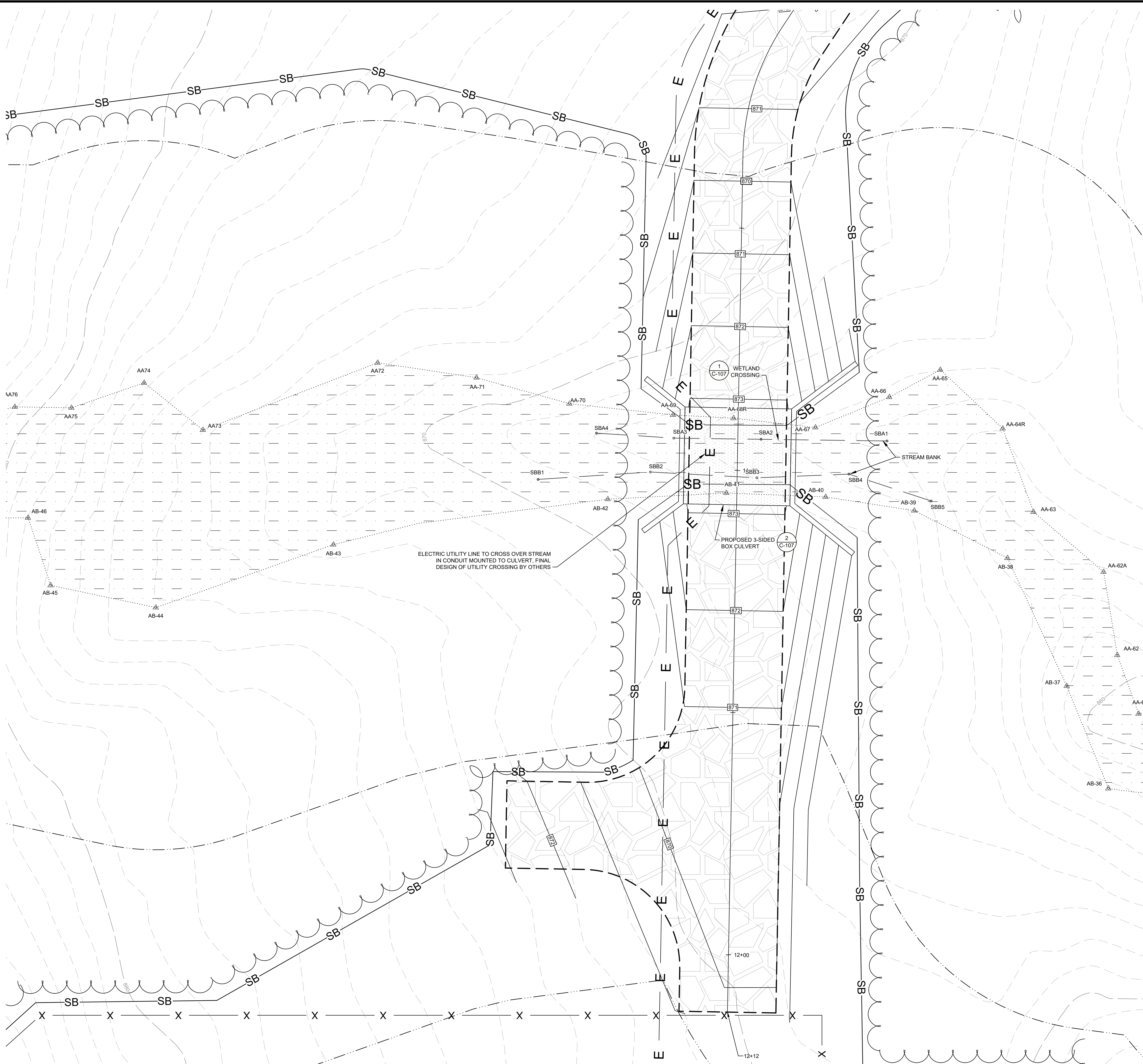


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SEAL:

DESIGNED BY: MJW	DRAWN BY: DED
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER: 3652200259	
DRAWING NUMBER: C-105	
SHEET NUMBER: 7 OF 11	



LEGEND:

EXISTING:

- PROPERTY LINE
- ABUTTER'S PROPERTY LINE
- APPROXIMATE RIGHT-OF-WAY
- MAJOR CONTOUR
- MINOR CONTOUR
- OVERHEAD ELECTRIC LINE
- WETLAND LINE
- 50' WETLAND BUFFER
- 100' WETLAND BUFFER
- PROPERTY LINE SETBACK
- APPROXIMATE PROPERTY LINE SETBACK
- WETLAND AREA

PROPOSED:

- CONTOUR
- SPOT ELEVATION
- SEDIMENT BARRIER
- 7' HIGH CHAIN LINK FENCE
- TREE LINE
- UNDERGROUND ELECTRIC
- OVERHEAD ELECTRIC
- CRUSHED STONE ACCESS WAY
- SOLAR PV PANEL

SYMBOLS:

- UTILITY POLE
- GUY POLE
- WETLAND FLAG

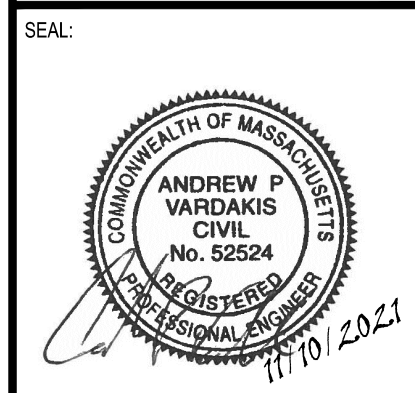
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6	10/28/2021	CC PEER REVIEW	MJW	APV
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1	03/15/2021	CONSERVATION COMMISSION COMMENTS	MJW	APV

PROJECT: 4.493 MW DC GROUND-MOUNT SOLAR PV DEVELOPMENT 40 SIZER DRIVE WALES, MASSACHUSETTS

TITLE: STREAM/WETLAND CROSSING AREA

SUNPIN ENERGY SERVICES, LLC

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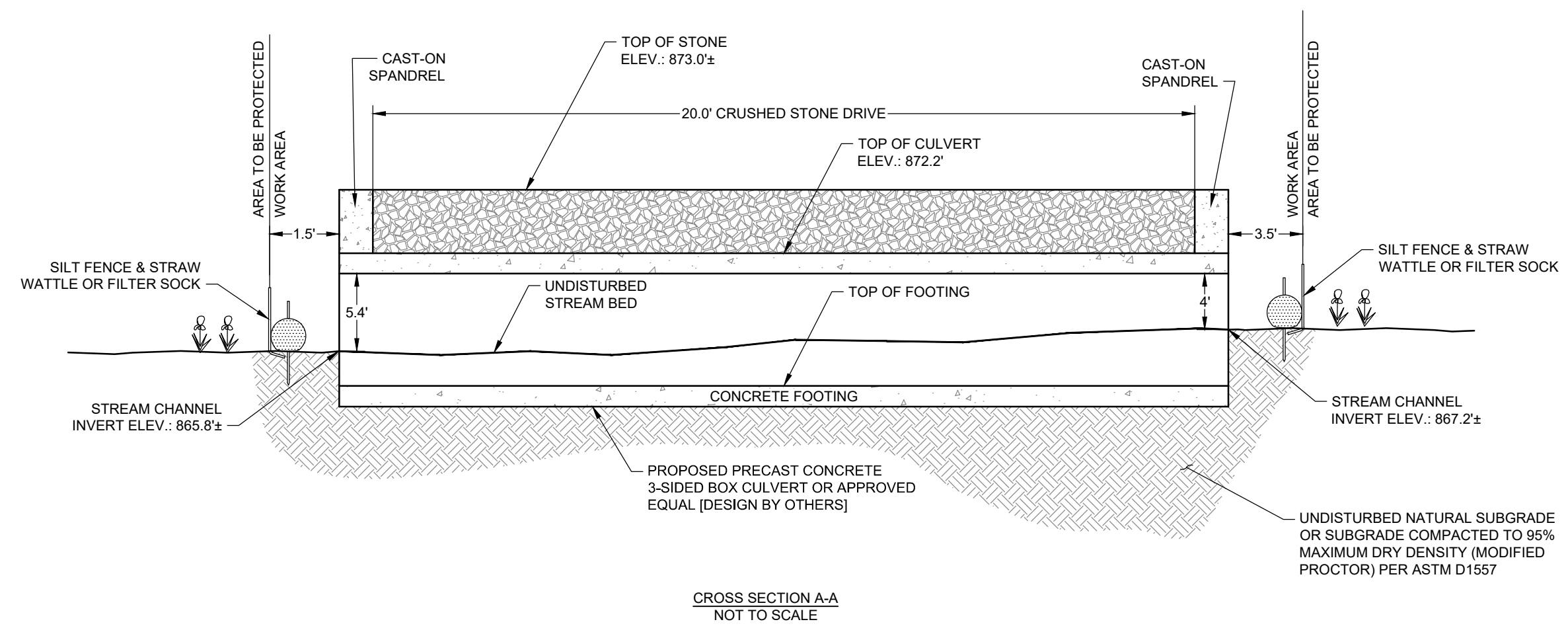
DESIGNED BY: MJW	DRAWN BY: DED
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER: 3652200259	DRAWING NUMBER: C-106
SHEET NUMBER: 8 OF 11	



ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION

TABLE 1. STREAM CROSSING STANDARDS

PERFORMANCE STANDARD:	STANDARDS MET AT STREAM CROSSING:
1. TYPE OF CROSSING • GENERAL: SPANS (BRIDGES, 3-SIDED BOX CULVERTS, OPEN BOTTOM CULVERTS OR ARCHES) ARE STRONGLY PREFERRED. • OPTIMUM: USE A BRIDGE.	A 3-SIDED BOX CULVERT THAT SPANS THE EXISTING STREAM HAS BEEN PROPOSED.
2. EMBEDMENT • ALL CULVERTS SHOULD BE EMBEDDED (SUNK INTO STREAM) A MINIMUM OF 2 FEET, AND ROUND PIPE CULVERTS AT LEAST 25%. • IF PIPE CULVERT CANNOT BE EMBEDDED THIS DEEP, THEN THEY SHOULD NOT BE USED. • WHEN EMBEDMENT MATERIAL INCLUDED ELEMENTS > 15 INCHES IN DIAMETER, EMBEDMENT DEPTHS SHOULD BE AT LEAST TWICE THE D84 (PARTICLE WIDTH LARGER THAN 84% OF PARTICLES) OF THE EMBEDMENT MATERIAL.	A 3-SIDED BOX CULVERT THAT SPANS THE EXISTING STREAM HAS BEEN PROPOSED. THERE IS NO EMBEDDING THAT WILL BE INCORPORATED INTO THIS STREAM CROSSING.
3. CROSSING SPAN • GENERAL: SPANS CHANNEL WIDTH (A MINIMUM OF 1.2 TIMES THE BANKFULL WIDTH OF THE STREAM). • OPTIMUM: SPANS THE STREAMBED AND BANKS (AT LEAST 1.2 TIMES BANKFULL WIDTH) WITH SUFFICIENT HEADROOM TO PROVIDE DRY PASSAGE FOR WILDLIFE.	THE EXISTING BANKFULL WIDTH OF THE STREAM IS APPROXIMATELY 8 FEET. THE PROPOSED SPAN OF THE 3-SIDED BOX CULVERT IS 18 FEET WHICH IS 2.25 TIMES THE WIDTH OF THE EXISTING BANKFULL STREAM.
4. OPENNESS • GENERAL: OPENNESS RATIO (CROSS SECTIONAL AREA/CROSSING LENGTH) OF AT LEAST 0.82 FEET (0.25 METERS). THE CROSSING SHOULD BE WIDE AND HIGH RELATIVE TO ITS LENGTH. • OPTIMUM: OPENNESS RATIO OF AT LEAST 1.04 FEET (0.5 METERS) AND MINIMUM HEIGHT OF 6 FEET. IF CONDITION SIGNIFICANTLY REDUCE WILDLIFE PASSAGE NEAR A CROSSING (E.G. STEEP EMBANKMENTS, HIGH TRAFFIC VOLUMES, AND PHYSICAL BARRIERS), MAINTAIN A MINIMUM HEIGHT OF 8 FEET (2.4 METERS) AND OPENNESS RATIO OF 2.46 FEET (0.75 METERS).	<p><u>X-SEC CULVERT AREA PRE-EMBED - EMBEDDED AREA</u> CULVERT LENGTH</p> <p>115 S.F. - 43 S.F. / 22 FEET = 3.27 (UPSTREAM END)</p> <p>115 S.F. - 18 S.F. / 22 FEET = 4.41 FEET (DOWNSTREAM END)</p> <p>THE PROPOSED 3-SIDED BOX CULVERT MEETS THE GENERAL AND OPTIMUM STREAM CROSSING STANDARDS.</p>
5. CROSSING SPAN • NATURAL BOTTOM SUBSTRATE SHOULD BE USED WITHIN THE CROSSING AND IT SHOULD MATCH THE UPSTREAM AND DOWNSTREAM SUBSTRATES. THE SUBSTRATE AND DESIGN SHOULD RESIST DISPLACEMENT DURING FLOWS AND MAINTAIN APPROPRIATE BOTTOM DURING NORMAL FLOWS.	A 3-SIDED BOX CULVERT THAT SPANS THE EXISTING STREAM HAS BEEN PROPOSED. THERE IS NO EMBEDDING THAT WILL BE INCORPORATED INTO THIS STREAM CROSSING AND THE NATURAL STREAM BED WILL BE UTILIZED. EROSION CONTROL WILL BE PLACED ON BOTH SIDES OF THE NATURAL CHANNEL.
6. WATER DEPTH AND VELOCITY • WATER DEPTHS AND VELOCITIES ARE COMPARABLE TO THOSE FOUND IN THE NATURAL CHANNEL AT A VARIETY OF FLOWS.	A 3-SIDED BOX CULVERT THAT SPANS THE EXISTING INTERMITTENT STREAM HAS BEEN PROPOSED AND THE NATURAL GRADES WILL BE UTILIZED. HOLDING CURRENT ELEVATIONS, DEPTHS AND VELOCITIES WHEN WATER IS PRESENT IS COMPARABLE.

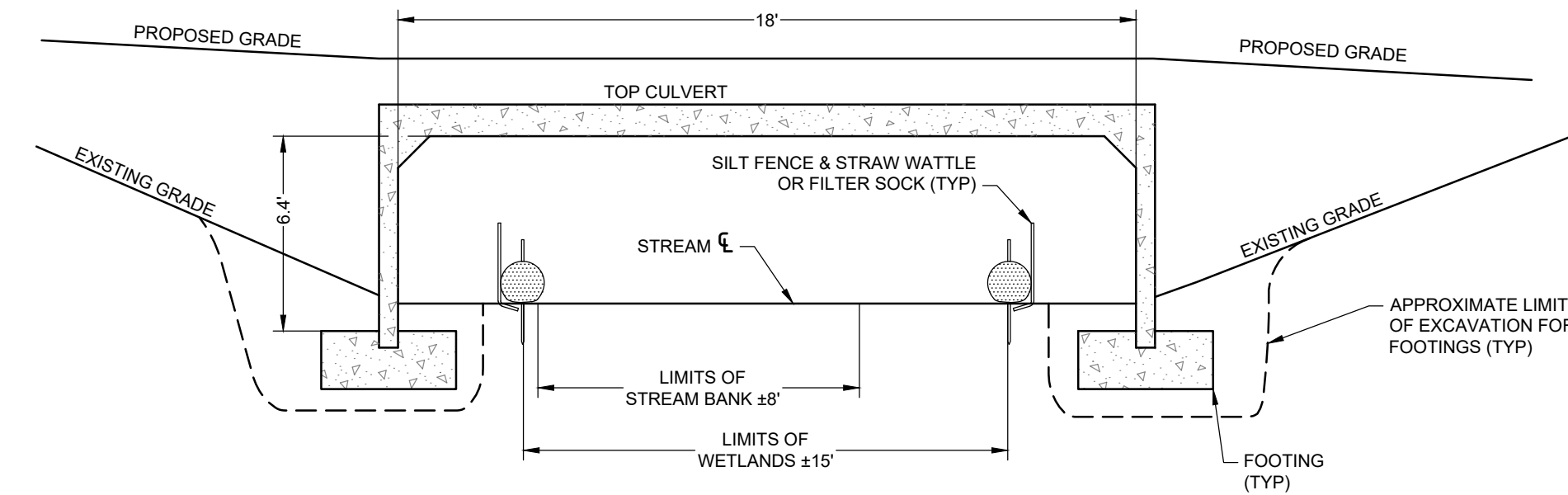


WETLAND CROSSING
NOT TO SCALE

1

NOTES:

1. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS.
2. DESIGN PER ASTM C1504 SPECIFICATION FOR 3-SIDED CULVERT.
3. ALL REINFORCEMENT PER ASTM A-615-75.
4. DESIGN AASHTO H-20 LOADING.
5. TONGUE AND GROOVE JOINT SEALED WITH BUTYL RESIN.
6. STRUCTURAL DESIGN TO BE PERFORMED BY OTHERS. CROSS-SECTIONAL GEOMETRY OF CULVERT TO BE MAINTAINED AS SHOWN ON THESE PLANS.



PRECAST CONCRETE 3-SIDED BOX CULVERT
NOT TO SCALE

2

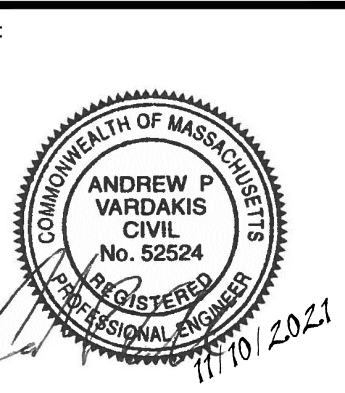
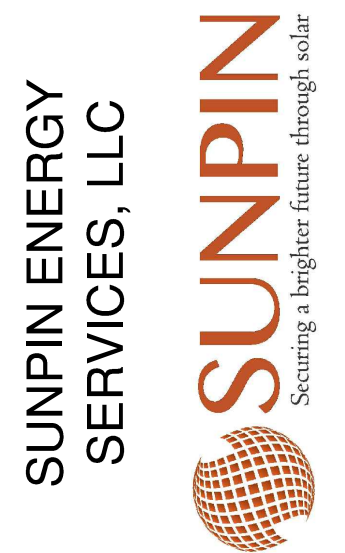


WOOD MASSACHUSETTS, INC.
271 MILL ROAD CHELMSFORD
MASSACHUSETTS 01864
TELEPHONE: (978) 692-9090
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WEB: WWW.WOODPLC.COM

DATE	REVISION	ISSUE / REVISION DESCRIPTION	APV	ISSUED	APPROVED
11/10/2021	7	CC PEER REVIEW	MJW		
10/28/2021	6	CC PEER REVIEW	MJW		
09/24/2021	5	CC PEER REVIEW	MJW		
06/29/2021	4	REVISED PER CONSERVATION COMMISSIONS	MJW		
05/20/2021	3	ISSUED TO CONSERVATION COMMISSION	MJW		
04/29/2021	2	CONSERVATION COMMISSION COMMENTS	MJW		
03/15/2021	1	CONSERVATION COMMISSION COMMENTS	MJW		

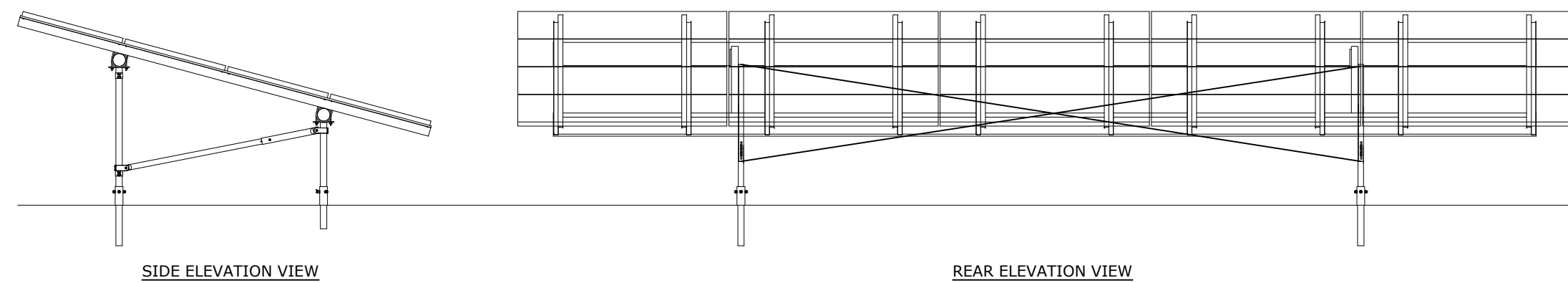
PROJECT:
4,493 MW DC GROUND-MOUNT SOLAR PV
DEVELOPMENT
40 SIZER DRIVE
WALLES, MASSACHUSETTS

TITLE:
STREAM/WETLAND CROSSING
NOTES AND DETAILS



DESIGNED BY: MJW	DRAWN BY: DED
CHECKED BY: APV	SCALE: AS SHOWN
PROJECT NUMBER: 3652200259	DRAWING NUMBER: C-107
SHEET NUMBER:	9 OF 11

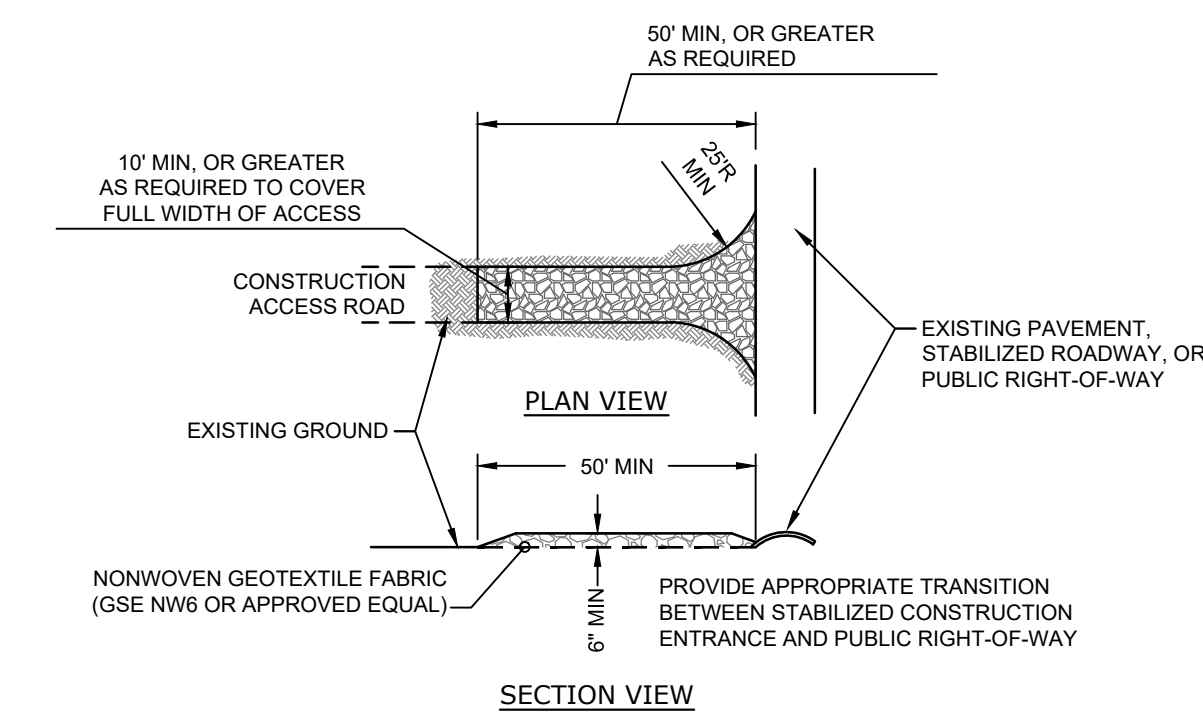
ISSUED FOR PERMITTING/NOT FOR CONSTRUCTION



SOLAR PV ARRAY
NOT TO SCALE

NOTE:
1. DESIGN FOR FOUNDATIONS, RACKING, AND MODULES BY OTHERS. DETAILS SHOWN FOR ILLUSTRATION PURPOSES ONLY.

1

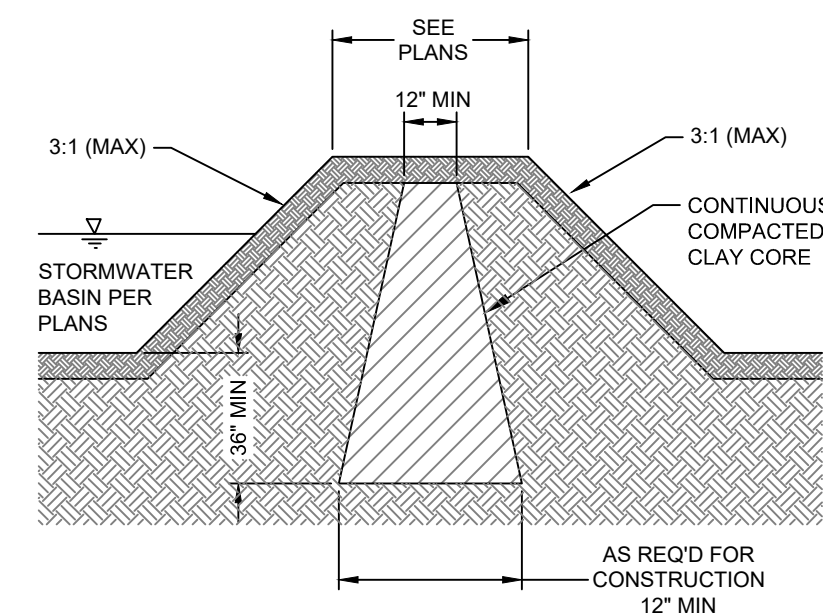


NOTES:

- STONE TO BE 1"-3" STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT.
- LENGTH - AS REQUIRED, BUT NOT LESS THAN 50 FT.
- THICKNESS - NOT LESS THAN SIX (6) INCHES.
- WIDTH - TEN (10) FT. MIN, BUT NOT LESS THAN THE FULL TRAVELED WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
- FILTER CLOTH - SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
- SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCE SHALL BE PIPED ACROSS OR BENEATH THE ENTRANCE.
- MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
- WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. IF WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
- PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

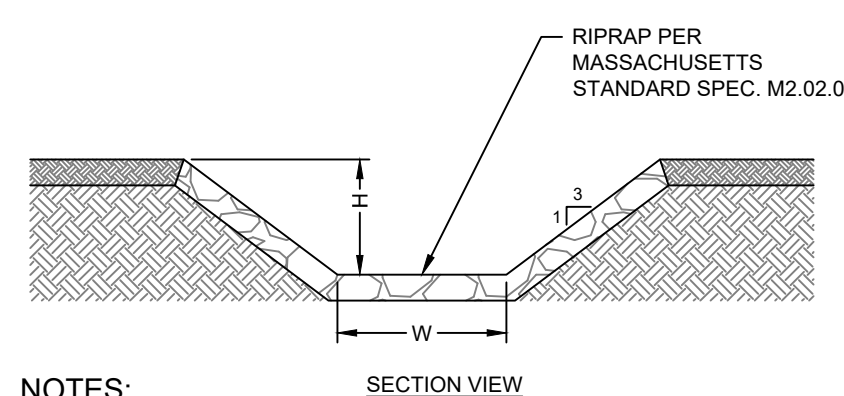
STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE

4



STORMWATER BASIN BERM
NOT TO SCALE

6



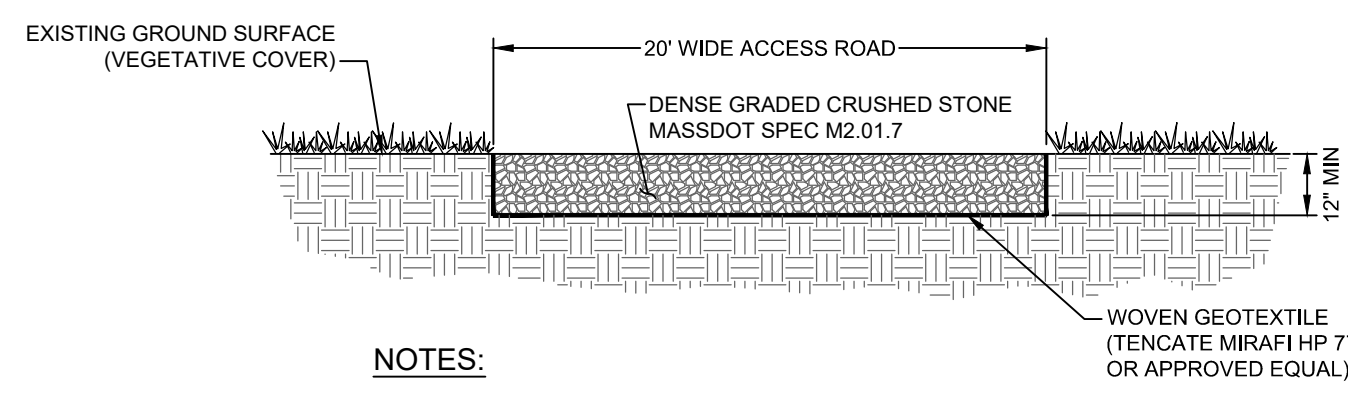
NOTES:

- RIPRAP TO BE INSTALLED WITHIN THE FULL WIDTH OF THE SPILLWAY AND THE FULL LENGTH OF THE BASIN BERM - FROM THE BASIN BOTTOM TO WHERE MATCHING EXISTING GRADE.
- SEE DETENTION BASIN DETAIL FOR ELEVATIONS.

RIP RAP OVERFLOW SPILLWAY
NOT TO SCALE

7

WEIR DIMENSIONS (FT)		
BMP ID	W	H
BIORETENTION BASIN 1	12.00	0.25
BIORETENTION BASIN 2	10.00	0.50



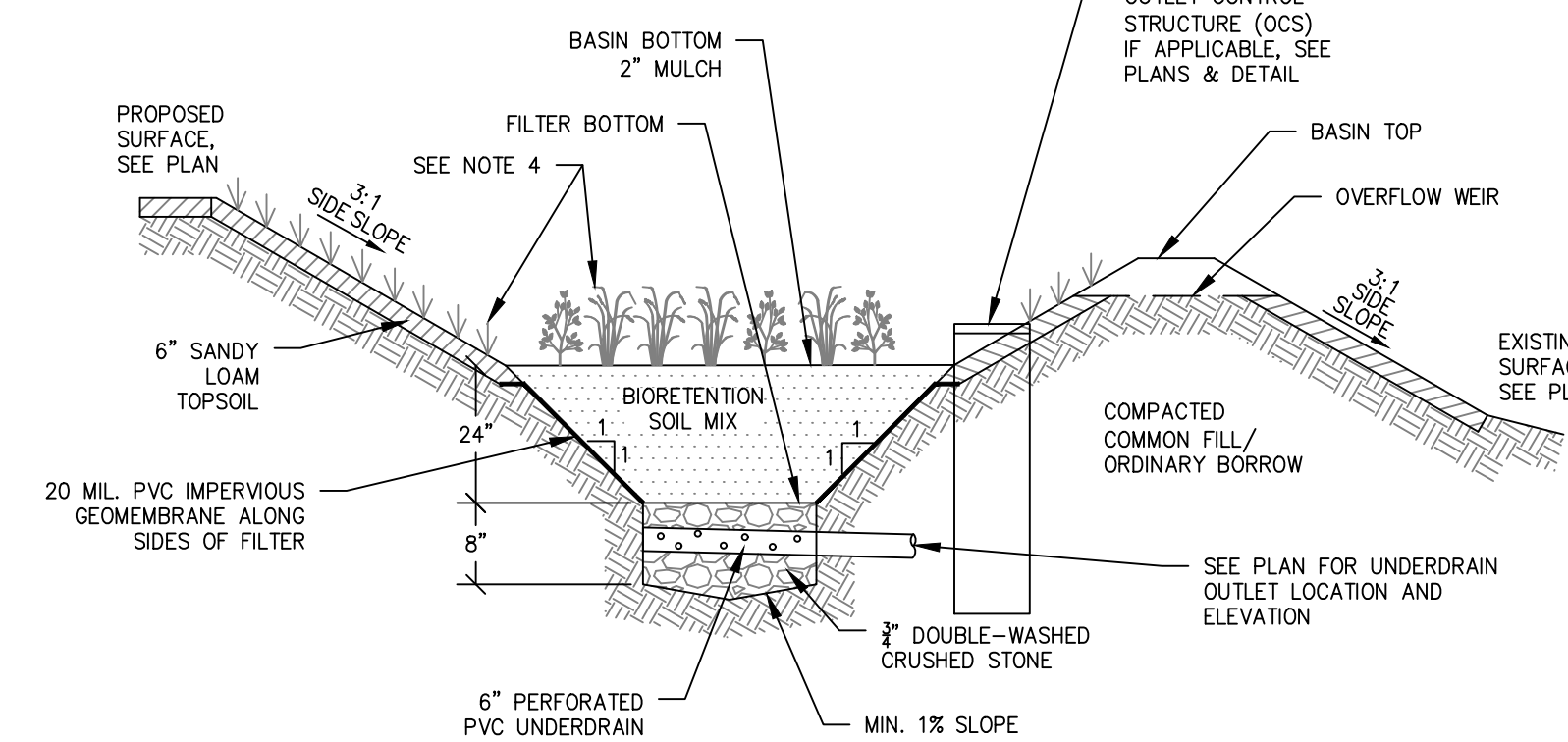
NOTES:

- ACCESS ROAD TO BE CONSTRUCTED OF A MINIMUM 6" OF DENSE GRADED CRUSHED STONE.
- WOVEN GEOTEXTILE TO BE PLACED BETWEEN THE GROUND SURFACE AND THE CRUSHED STONE.
- CRUSHED STONE SHALL BE COMPACTED TO A FIRM AND NON-YIELDING CONDITION.
- EXISTING PAVEMENT SHALL BE REMOVED AND UNDERLYING SOILS SHALL BE SCARIFIED PRIOR TO INSTALLATION OF FABRIC AND CRUSHED STONE.

CRUSHED STONE ACCESS ROAD
NOT TO SCALE

2

BASIN ELEVATIONS (FT)						
BMP ID	BASIN TOP	BASIN BOTTOM	FILTER BOTTOM	OVERFLOW WEIR	OCS GRATE RIM	APPROX. GW ELEVATION
BIORETENTION BASIN 1	893.75	893.00	891.00	893.50	N/A	891.50
BIORETENTION BASIN 2	844.75	843.00	841.00	844.25	843.50	< 840.50



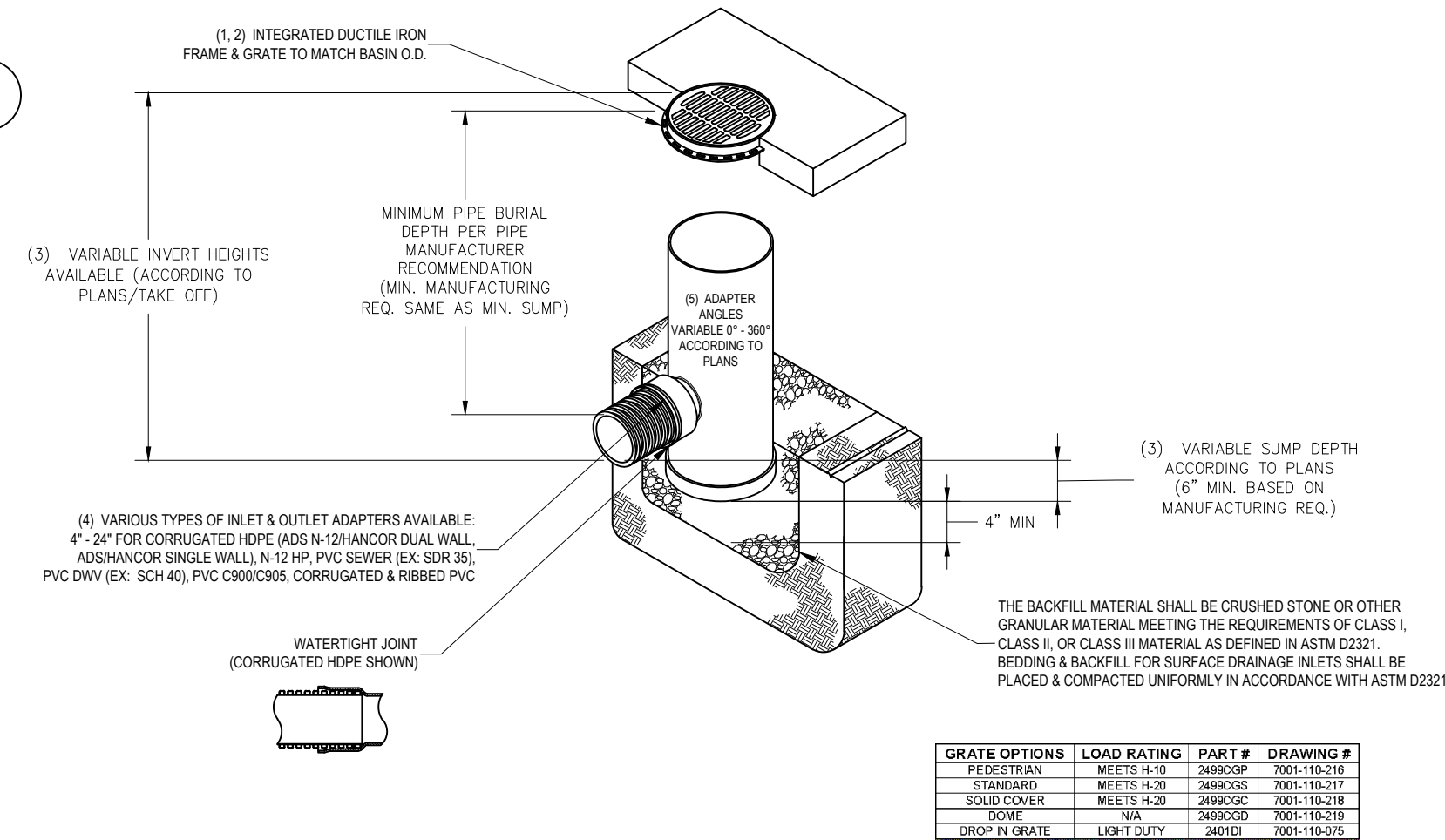
BIORETENTION BASIN
NOT TO SCALE

5

NOTES:

- BIORETENTION SOIL MIX SHALL BE: 40% SAND, 20-30% TOPSOIL, 30-40% COMPOST.
- SIDE SLOPES SHALL BE 3:1 MAX.
- CONTRACTOR SHALL SUBMIT A SIEVE ANALYSIS OF BIORETENTION SOIL MIX TO ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
- PLANTING PLAN SHALL INCLUDE A MIX OF HERBACEOUS PERENNIALS, SHRUBS, AND UNDERSTORY TREES (IF CONDITIONS PERMIT) THAT CAN TOLERATE INTERMITTENT PONDING AND EXTENDED DRY PERIODS. INCLUDE ONE TREE OR SHRUB PER 50 SQ.FT. OF BIORETENTION AREA, AND AT LEAST 3 SPECIES OF HERBACEOUS PERENNIALS AND SHRUBS. UTILIZE THE LIST OF SUITABLE PLANTS FOUND IN VOLUME 2 CHAPTER 2 OF THE MASSACHUSETTS STORMWATER HANDBOOK.

NYLOPLAST 24" DRAIN BASIN: 2824AG _ _X

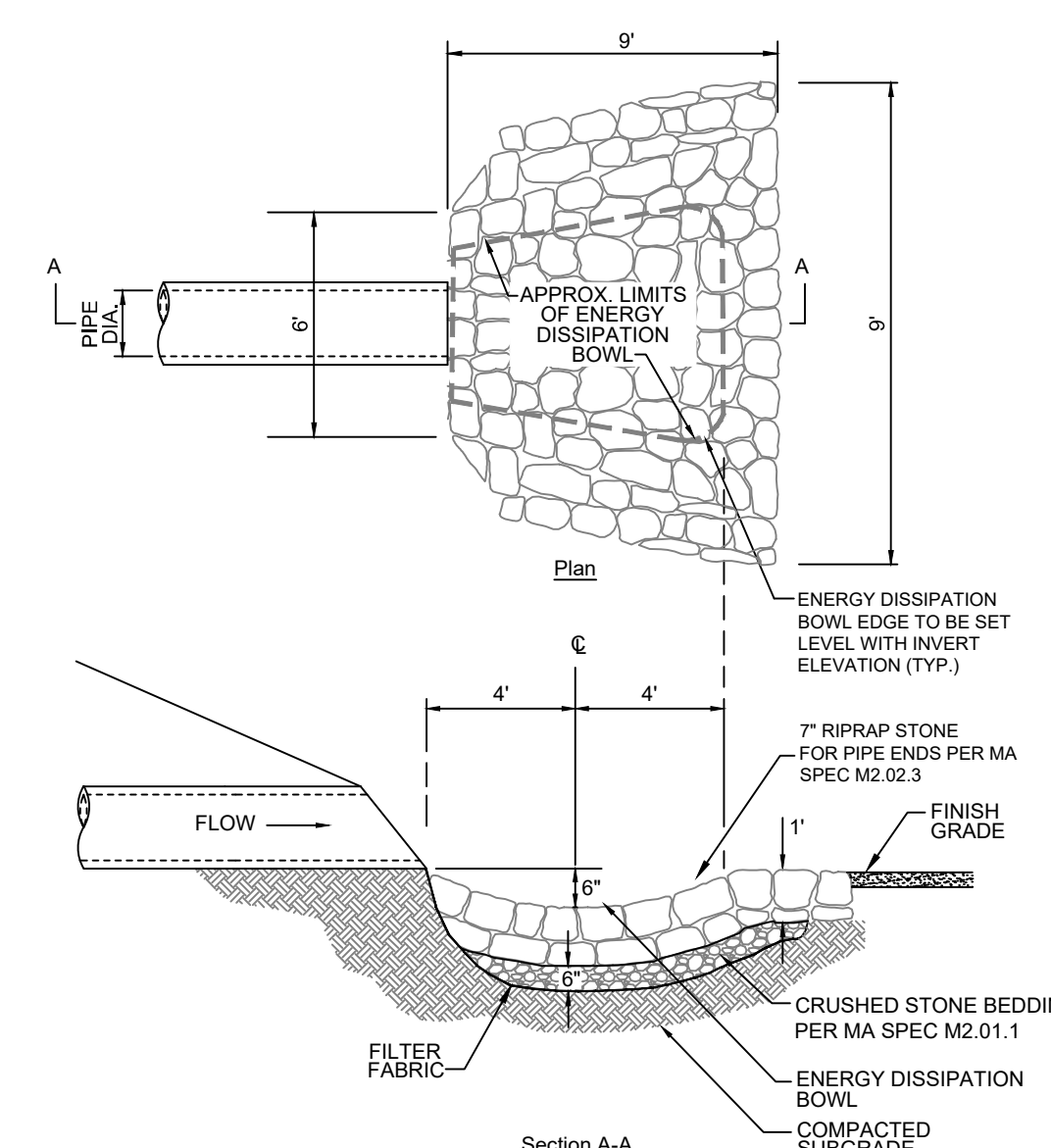


GRATE OPTIONS

TYPE	LOAD RATING	PART #	DRAWING #
STANDARD	MEETS I-30	2824AG-01	100-110-010
SOLE COVER	MEETS I-30	2824AG-02	100-110-011
GRATE	N/A	2824AG-03	100-110-012
DROP IN GRATE	LIGHT DUTY	2824AG-04	100-110-013

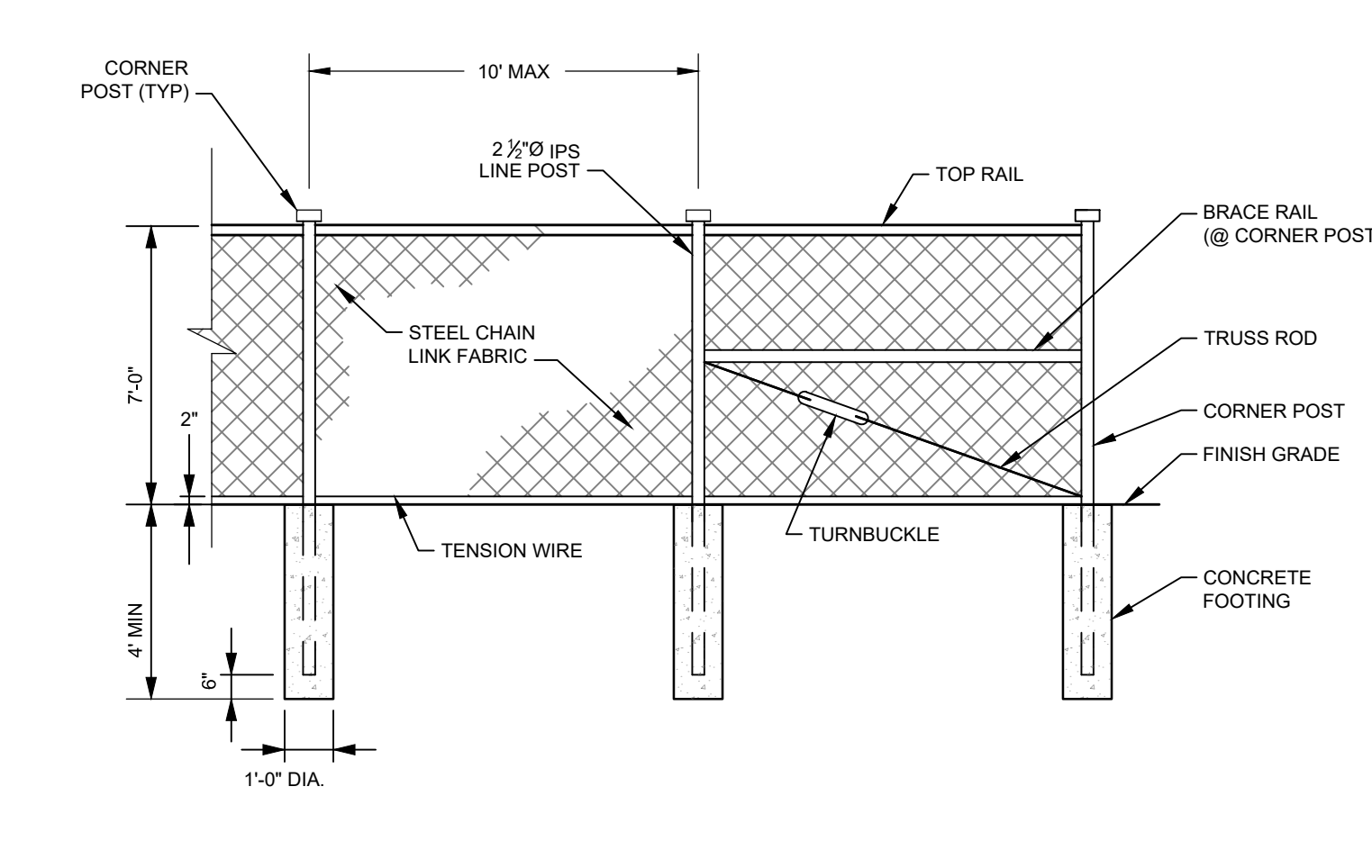
OUTLET CONTROL STRUCTURE (OCS)
NOT TO SCALE

8



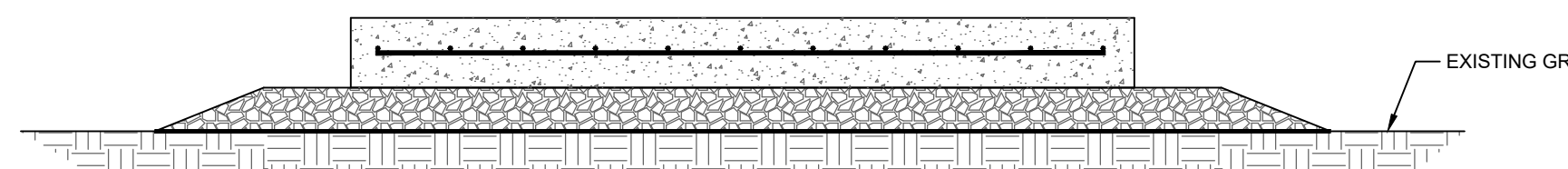
PLUNGE POOL
NOT TO SCALE

9



CHAIN LINK FENCE
NOT TO SCALE

10



NOTES:

- CONCRETE PAD SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. DESIGN TO BE FINALIZED AT LATER DATE.

TYPICAL CONCRETE EQUIPMENT PAD SECTION
NOT TO SCALE

11

DATE	REVISION	ISSUE / REVISION DESCRIPTION
11/10/2021	7	CC PEER REVIEW
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09/24/2021	5	CC PEER REVIEW
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SUNPIN ENERGY SERVICES, LLC
4.493 MW DC GROUND-MOUNT SOLAR PV DEVELOPMENT
40 SIZER DRIVE
WALLES, MASSACHUSETTS

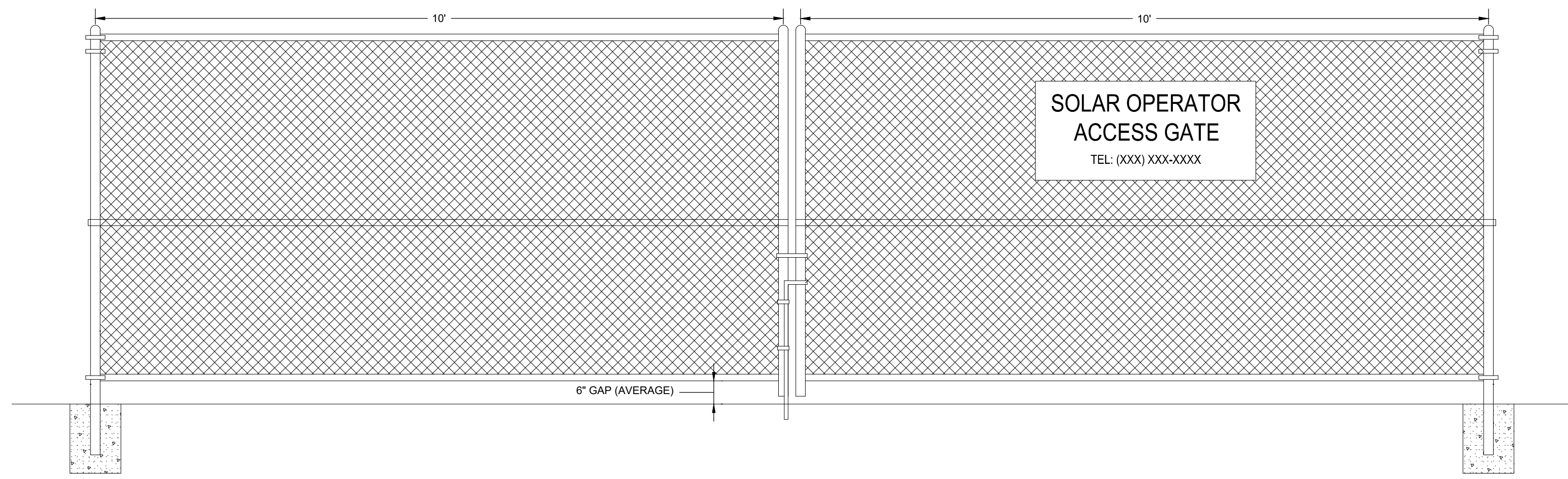
SUNPIN
Securing a brighter future through solar

DETAILS SHEET (1 OF 2)

DESIGNED BY: MJW
CHECKED BY: APV
PROJECT NUMBER: 3652200259
DRAWING NUMBER: C-501
SHEET NUMBER: 10 OF 11

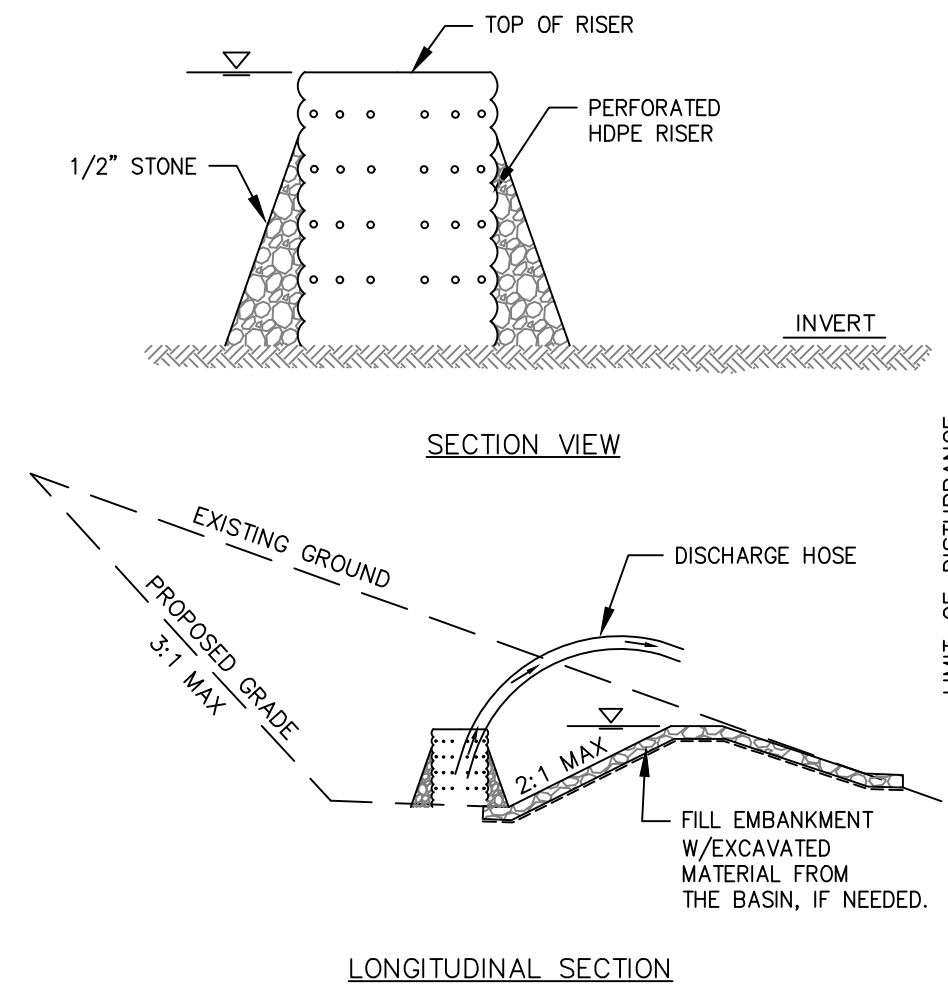
DESIGNED BY: DED
SCALE: AS SHOWN
DRAWN BY: DED
SCALE: AS SHOWN

SEAL: ANDREW P. VARDAKIS, CIVIL ENGINEER, No. 52524, REGISTERED PROFESSIONAL ENGINEER



- NOTES:**
1. A "KNOX BOX" SHALL BE PROVIDED AT EVERY GATE LOCATION FOR EMERGENCY ACCESS.

ACCESS GATE DETAIL
NOT TO SCALE



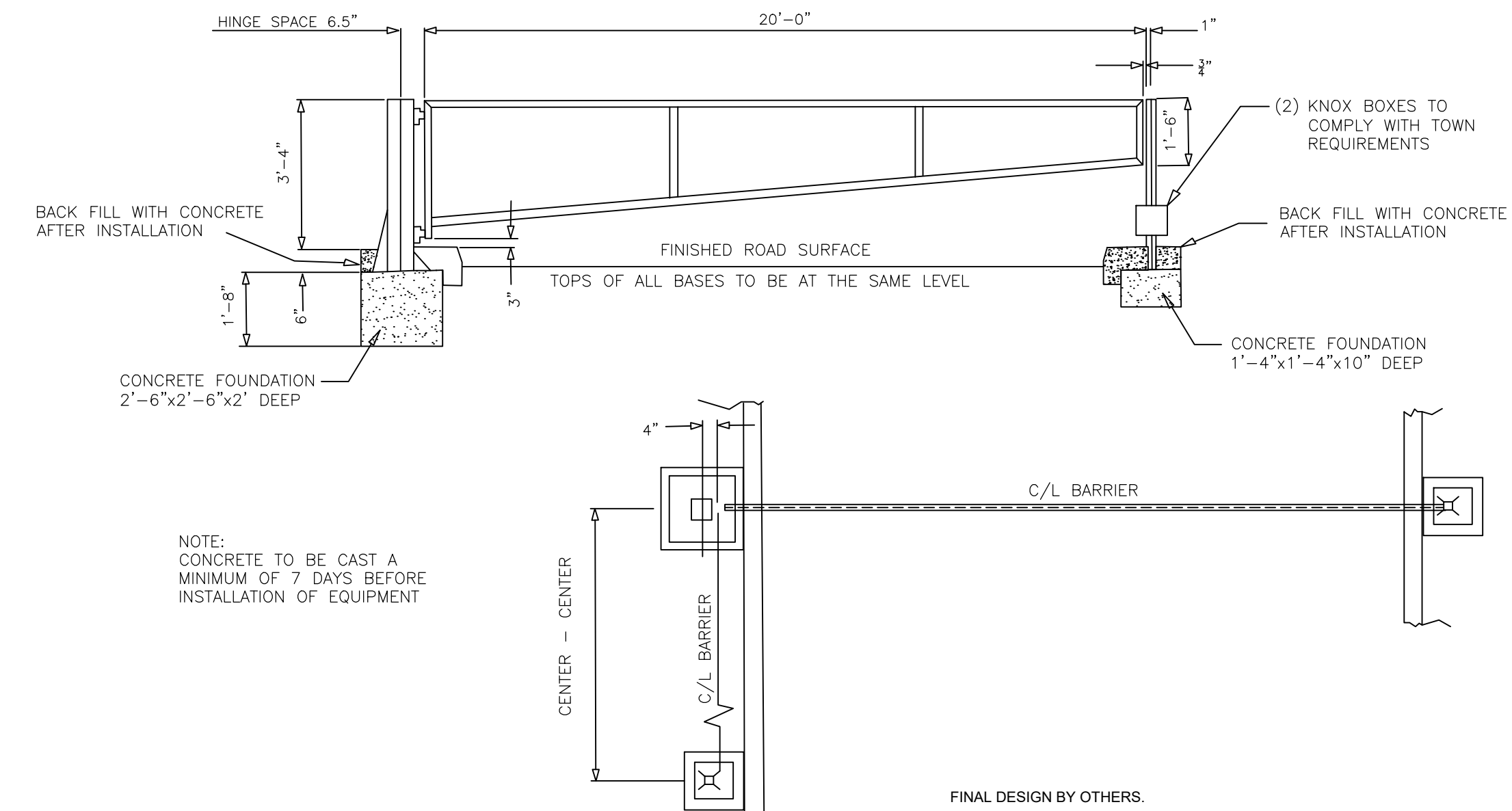
- NOTES:**
1. TOTAL MIN STORAGE VOLUME = 3' X CONTRIBUTING AREA PER MASSACHUSETTS EROSION AND SEDIMENTATION CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS.
 2. SEDIMENT SHALL BE REMOVED WHEN THE TRAP IS 1/2 FULL AT A MINIMUM.
 3. THE BASIN SHALL REMAIN IN PLACE UNTIL THE SITE HAS BEEN STABILIZED WITH BUILDINGS, PAVEMENT, OR ESTABLISHED VEGETATION, AS APPLICABLE.
 4. PUMP DISCHARGE WILL BE DIRECTED TO A SILT BAG IN UPLANDS IN A WELL-VEGETATED AREA, AS NEEDED.

TEMPORARY SEDIMENT TRAP
NOT TO SCALE

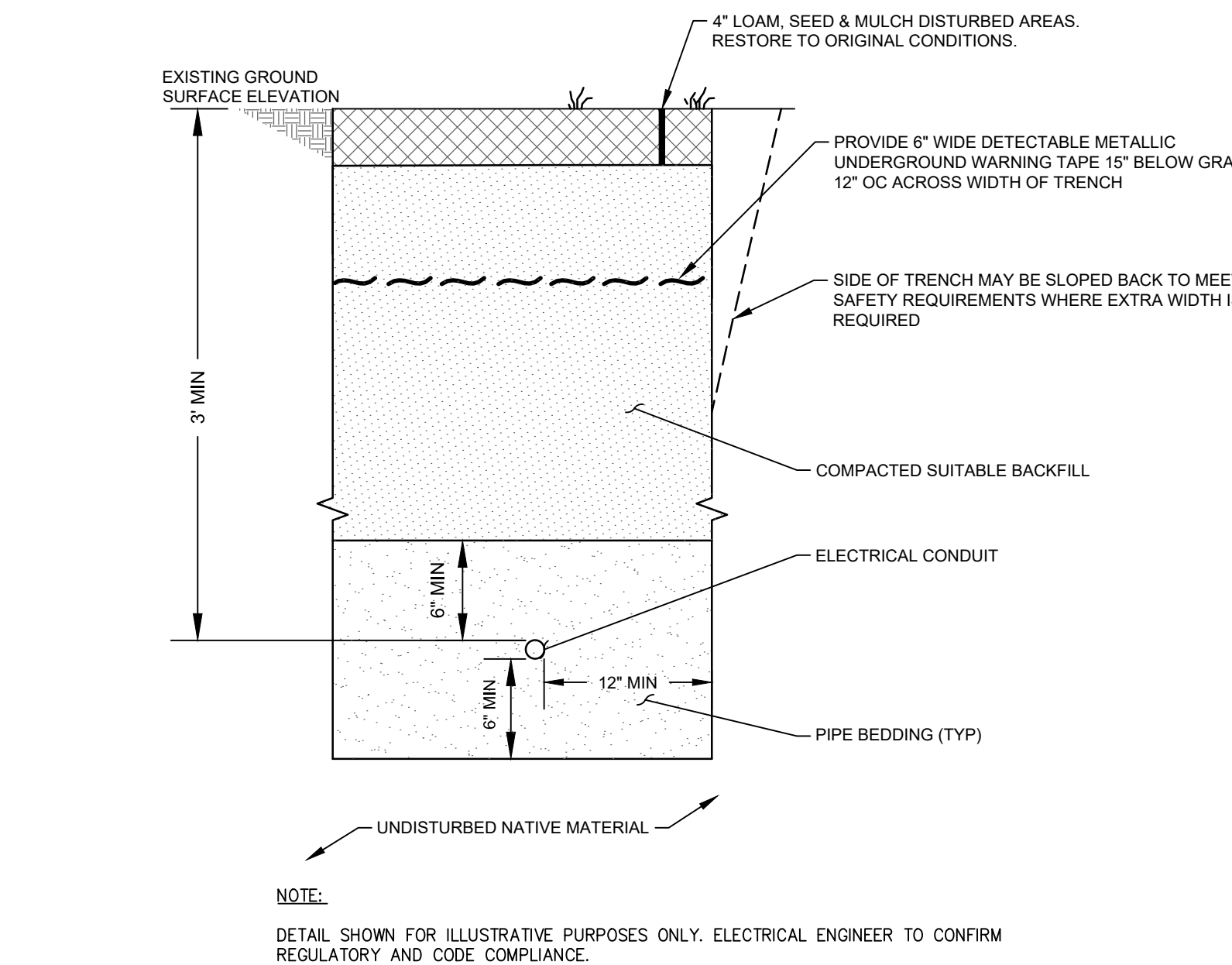
SEDIMENT TRAP ID	SEDIMENT TRAP 1	SEDIMENT TRAP 2	SEDIMENT TRAP 3	SEDIMENT TRAP 4
DRAINAGE AREA, SQ.FT.	61,304	110,975	148,463	172,321
DRAINAGE AREA, AC.	1.41	2.55	3.41	3.96
REQUIRED STORAGE VOLUME, CU.FT. (12-INCH PER ACRE OF DRAINAGE AREA)	2,554	4,624	6,445	7,180
PROPOSED TEMPORARY SEDIMENT TRAP BOTTOM AREA, SQ.FT.	2,553	4,767	2,488	2,845
PROPOSED TEMPORARY SEDIMENT TRAP TOP AREA, SQ.FT.	3,478	5,576	4,120	4,415
PROPOSED TEMPORARY SEDIMENT TRAP DEPTH, FT.	1	1	2	2
PROPOSED TEMPORARY SEDIMENT TRAP STORAGE VOLUME, CU.FT.	3,016	5,172	6,608	7,260

*MAX ALLOWED DRAINAGE AREA TO A SEDIMENT TRAP IS 5 ACRES, PER MASSACHUSETTS EROSION AND SEDIMENTATION CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS

14



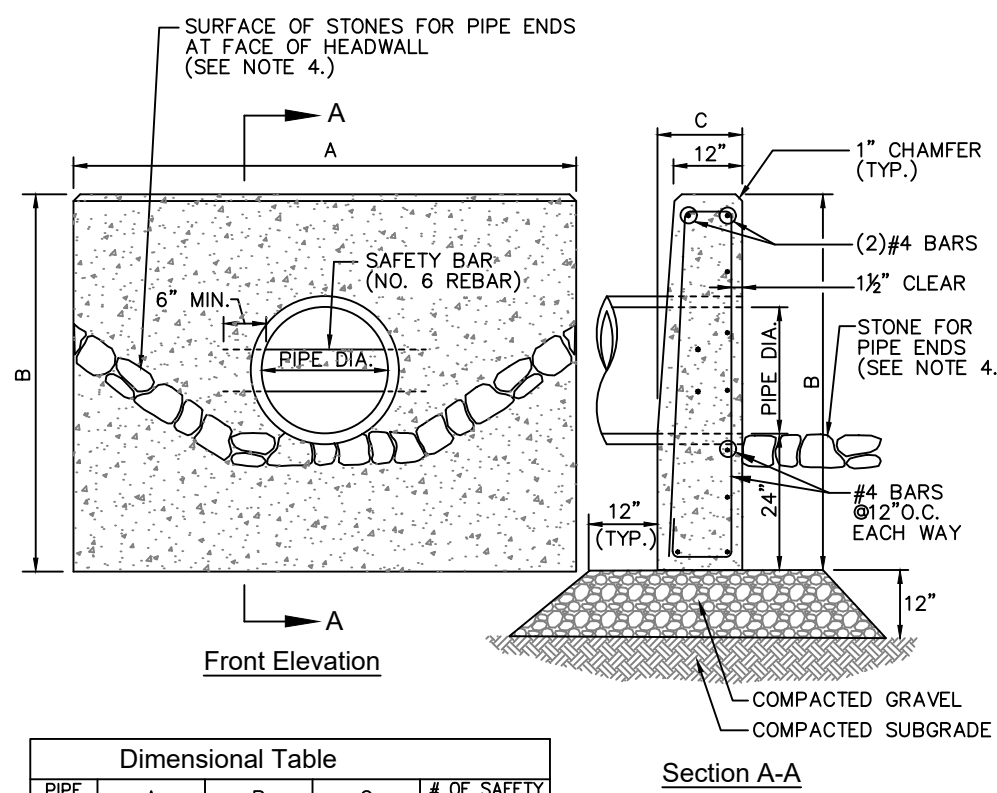
PIPE GATE DETAIL
NOT TO SCALE



- NOTE:**
DETAIL SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. ELECTRICAL ENGINEER TO CONFIRM REGULATORY AND CODE COMPLIANCE.

ELECTRICAL CONDUIT UTILITY TRENCH
NOT TO SCALE

15

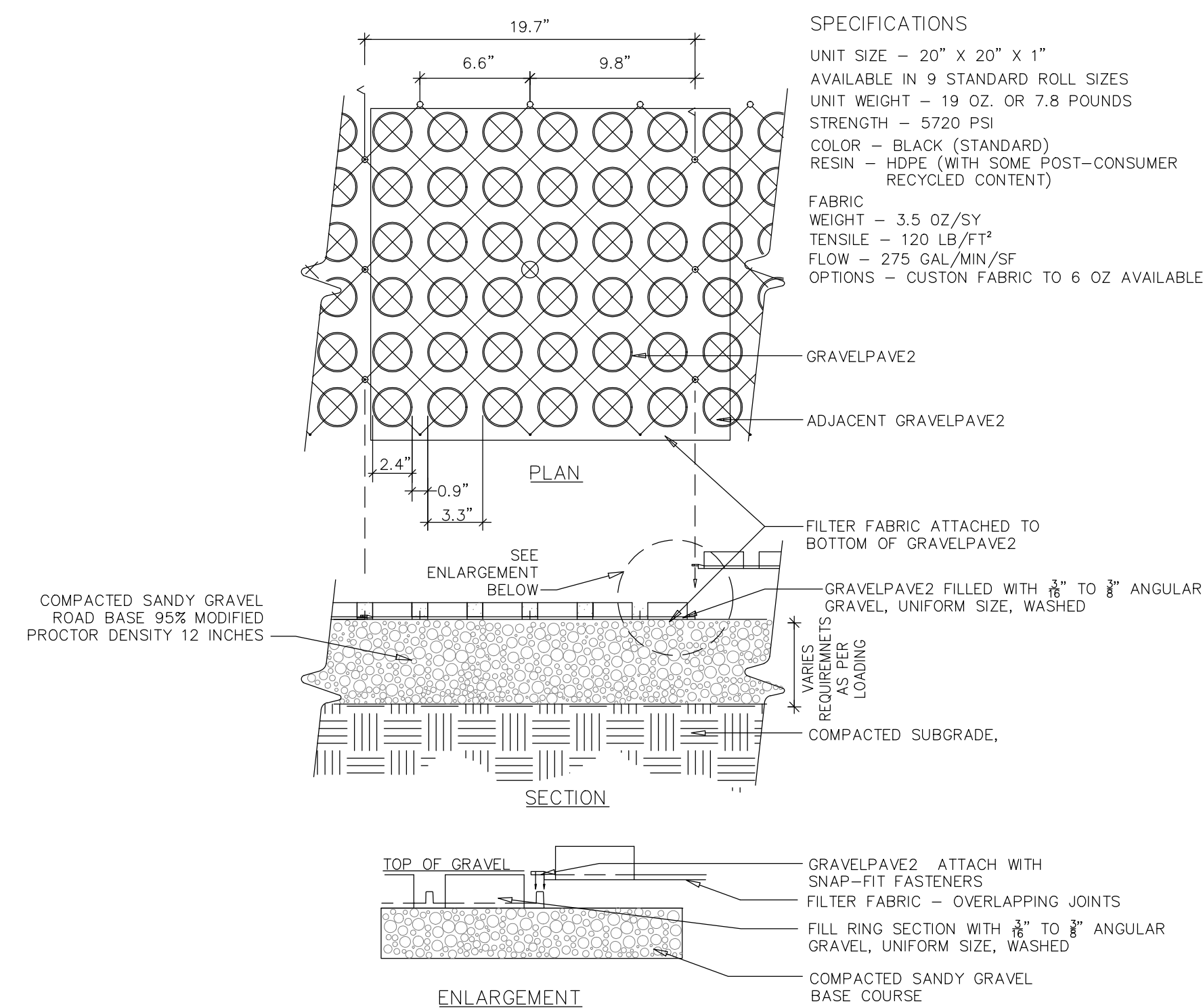


PIPE DIA.	A	B	C	# OF SAFETY BARS
12"	5'-6"	4'-2"	1'-6"	-
15"	6'-6"	4'-5"	1'-6"	-
18"	7'-6"	4'-9"	1'-6"	1
24"	9'-0"	5'-3"	1'-6"	1
30"	11'-0"	5'-10"	1'-6"	2
36"	13'-0"	6'-4"	1'-9"	2
42"	15'-9"	6'-11"	1'-9"	3
48"	17'-9"	7'-5"	2'-0"	3
60"	21'-9"	8'-6"	2'-6"	4
72"	25'-9"	9'-7"	3'-0"	5

- Notes:**
1. CONCRETE SHALL BE MINIMUM COMPRESSIVE STRENGTH 4000 PSI, TYPE II CEMENT.
 2. SAFETY BARS TO BE OMITTED WHERE INDICATED ON PLANS.
 3. SAFETY BARS SHALL BE SET TO CREATE EQUAL OPENING DIMENSIONS.
 4. SEE PLUNGE POOL DETAIL.

CONCRETE HEADWALL
NOT TO SCALE

16



TYPICAL GRAVELPAVE2
NOT TO SCALE

17

REVISION	DATE	ISSUE / REVISION DESCRIPTION	APPROVED
7	11/10/2021	CC PEER REVIEW	APV
6	10/28/2021	CC PEER REVIEW	MJW
5	09/24/2021	CC PEER REVIEW	MJW
4	06/29/2021	REVISED PER CONSERVATION COMMISSIONS	APV
3	05/20/2021	ISSUED TO CONSERVATION COMMISSION	APV
2	04/29/2021	CONSERVATION COMMISSION COMMENTS	APV
1	03/15/2021	CONSERVATION COMMISSION COMMENTS	APV

PROJECT: **4,493 MW DC GROUND-MOUNT SOLAR PV DEVELOPMENT 40 SIZER DRIVE WALES, MASSACHUSETTS**

CLIENT: **SUNPIN ENERGY SERVICES, LLC**

TITLE: **DETAILS (SHEET 2 OF 2)**

DESIGNED BY: MJW
DRAWN BY: DED
CHECKED BY: APV
SCALE: AS SHOWN

PROJECT NUMBER: 3652200259
DRAWING NUMBER: **C-502**
SHEET NUMBER: **11 OF 11**

