SITE USE PLANS

127 STOW STREET, ACTON, MA 01720 &
0 SOUTH ACTON ROAD (REAR), STOW, MA 01775
2798.82 kW DC STC RATED SOLAR ELECTRIC SYSTEM

GENERAL NOTES

1. AS CONTAINED HEREIN, "CONTRACTOR" IS ASSUMED TO BE BORREGO SOLAR SYSTEMS, INC AND "SUBCONTRACTOR" IS BORREGO'S INSTALLATION SUBCONTRACTOR.
2. THESE NOTES SET MINIMUM STANDARDS FOR CONSTRUCTION. THE DRAWINGS GOVERN OVER THESE NOTES TO THE EXTENT SHOWN.
3. ALL WORK SHALL CONFORM TO THE MINIMUM STANDARDS OF THE FOLLOWING: LOCAL BUILDING CODE, LOCAL ELECTRICAL CODE, ANY OTHER REGULATING AGENCIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK AND THOSE CODES AND STANDARDS LISTED IN THESE DRAWINGS AND IN THE SUBCONTRACTOR AGREEMENT.
4. EXCEPTIONS TO THE CONTRACT DOCUMENTS ARE PERMITTED ONLY WITH THE APPROVAL OF BORREGO.
5. COORDINATE THESE DRAWINGS WITH SPECIFICATIONS AND MANUFACTURER INSTALLATION AND OPERATION MANUALS AND NOTIFY BORREGO OF ANY DISCREPANCIES PRIOR TO BEGINNING WORK.
6. DRAWINGS HAVE BEEN DETAILED IN COMPLIANCE WITH U.L. LISTING REQUIREMENTS AND THE BUILDING CODE FOR THE MATERIALS SPECIFIED. IF AN ALTERNATE OR SUBSTITUTED MATERIAL IS ACCEPTED AS AN EQUAL BY BORREGO, THE SUBCONTRACTOR WILL ASSUME THE RESPONSIBILITY FOR WHATEVER CONSTRUCTION MODIFICATION AND/OR ADDITIONAL COST THAT IS REQUIRED BY REASON OF THIS ACCEPTANCE.
7. PRIOR TO THE COMMENCEMENT OF ANY WORK, EACH TRADE SHALL VERIFY EXISTING CONDITIONS AND NOTIFY BORREGO OF ANY DISCREPANCIES TO THAT WHICH IS SHOWN IN THESE DRAWINGS, INCLUDING BUT NOT LIMITED TO DIMENSIONS OF THE WORK AREA, STRUCTURE, EXISTING ELECTRICAL SERVICE, CONDUIT PATHS, OBSTRUCTIONS, ACCESSIBILITY ISSUES, AND WORKING CLEARANCES. ANY WORK PERFORMED IN CONFLICT WITH THE CONTRACT DOCUMENTS OR ANY CODE REQUIREMENTS SHALL BE CORRECTED BY THE SUBCONTRACTOR AT HIS OWN EXPENSE.
8. SUBCONTRACTOR INITIATED CHANGES SHALL BE SUBMITTED IN WRITING TO BORREGO FOR APPROVAL PRIOR TO MAKING ANY CHANGES. APPROVED CHANGES REQUIRE A DRAWING REVISION TO MAINTAIN CONTROL OVER THE APPROVED DESIGN. DEVIATION FROM THESE PLANS PRIOR TO BORREGO APPROVAL PLACES ALL LIABILITY ON THE SUBCONTRACTOR.
9. UNLESS INDICATED AS EXISTING (E), ALL PROPOSED MATERIALS AND EQUIPMENT ARE NEW.
10. ALL ITEMS TO BE REMOVED AND RELOCATED OR REPLACED SHALL BE HANDLED WITH PROPER CARE AND STORED IN A SAFE PLACE TO PREVENT DAMAGE; OR BE REPLACED AT THE SUBCONTRACTOR'S EXPENSE.
11. ALL EQUIPMENT SHALL BE MOUNTED AS SHOWN. WHERE DETAILS ARE NOT PROVIDED, THE SUBCONTRACTOR SHALL USE DILIGENT EFFORTS TO MOUNT EQUIPMENT SUCH THAT IT WILL BE CLEAN, LEVEL AND SOLID.
12. ALL SURFACES SHALL BE PATCHED AND PAINTED AROUND NEW DEVICES AND EQUIPMENT TO MATCH EXISTING FINISHES.
13. ANY METAL SHAVINGS RESULTING FROM SITE WORK SHALL BE CLEANED FROM ROOF SURFACES, ENCLOSURES AND ANY ADDITIONAL AREAS WHERE OXIDIZED OR CONDUCTIVE METAL SHAVINGS MAY CAUSE RUST, ELECTRICAL SHORT CIRCUITS OR OTHER DAMAGE.
14. NO STRUCTURAL MEMBER SHALL BE DRILLED UNLESS SPECIFICALLY AUTHORIZED BY BORREGO.
15. SUBCONTRACTOR ACKNOWLEDGES THAT THE SYSTEM AS INDICATED ON THE PLANS REQUIRES ALL COMPONENTS TO BE INSTALLED TO PROPERLY RESIST WIND LOADS, SUCH AS BALLAST, WIND DEFLECTORS, ETC. IT IS THE RESPONSIBILITY OF THE SUBCONTRACTOR TO PROVIDE TEMPORARY MEANS TO RESIST WIND LOADS FOR ALL COMPONENTS NOT YET INSTALLED DURING AND AFTER REGULAR WORKING HOURS. THIS MAY INCLUDE TEMPORARY TIE DOWNS, COVERING, BALLAST OR ANY OTHER MEANS. DAMAGE TO ANY INSTALLED SYSTEM COMPONENT OR THE EXISTING FACILITY AS A RESULT OF THE UNFINISHED CONDITION NOT ADEQUATELY RESISTING WIND SHALL BE THE RESPONSIBILITY OF THE SUBCONTRACTOR TO REPAIR OR REPLACE AT THE SUBCONTRACTOR'S COST.
16. TREES MAY GROW DURING THE LIFE OF THE SYSTEM AND IMPACT THE PRODUCTION.

V.7

APPLICABLE CODES AND STANDARDS

2014 MASSACHUSETTS ELECTRICAL CODE 527 CMR12.00
MASSACHUSETTS BUILDING CODE 8TH EDITION
UL–1703 – SOLAR MODULES
UL–1741 – INVERTERS, COMBINER BOXES
UL–2703 – RACKING MOUNTING SYSTEMS AND CLAMPING DEVICES FOR PV MODULES

PROJECT SCOPE

THIS PROJECT CONSISTS OF THE INSTALLATION OF SOLAR MODULES, PER THE SYSTEM DESCRIPTION, BELOW. THE MODULES WILL BE INSTALLED ON A GROUND MOUNTED RACKING SYSTEM. THE MODULES WILL BE WIRED IN SERIES STRINGS TO COMBINER BOXES, WHERE THEY WILL BE WIRED IN PARALLEL. THE OUTPUT OF THE COMBINER BOXES WILL BE CONNECTED IN PARALLEL TO THE INVERTERS, WHICH CONVERT THE PHOTOVOLTAIC OUTPUT POWER FROM DC TO AC. THE SOLAR ELECTRIC SYSTEM WILL BE INTERCONNECTED WITH THE EXISTING SITE ELECTRICAL SYSTEM IN ACCORDANCE WITH THE APPLICABLE ELECTRIC CODE AND EVERSOURCE EAST REQUIREMENTS.

SYSTEM DESCRIPTION

SYSTEM SIZE (DC STC)	2798.82 KW	SYSTEM SIZE (AC)	1992 KW
MODULES	(7668) LG ELECTRONICS LG365N2W–B3	CEC RATING	333.6 W
MODULES PER STRING	18	# OF STRINGS	426
RACKING	RBI SOLAR GROUND MOUNT	TILT ANGLE	25°
INVERTER(S)	(32) SUNGROW SG60KU–M	CEC EFFICIENCY	98.5 %
	(2) SUNGROW SG36KU–V11		98%
AZIMUTH	180° (SOUTH = 180°)		

PROJECT DIRECTORY

OWNER
TBD

HOST
BRUCE FLETCHER
FLETCHER REALTY TRUST
(XXX) XXX–XXXX
350 GREAT ROAD
STOW, MA 01775

AUTHORITY HAVING JURISDICTION
TOWN OF STOW BUILDING
(978)897–2193
380 GREAT ROAD
STOW, MA 01775

UTILITY
EVERSOURCE EAST

PROJECT MANAGER
FIRM: BORREGO SOLAR
CONTACT: JOE BUSCH
PHONE: (978)–513–2637

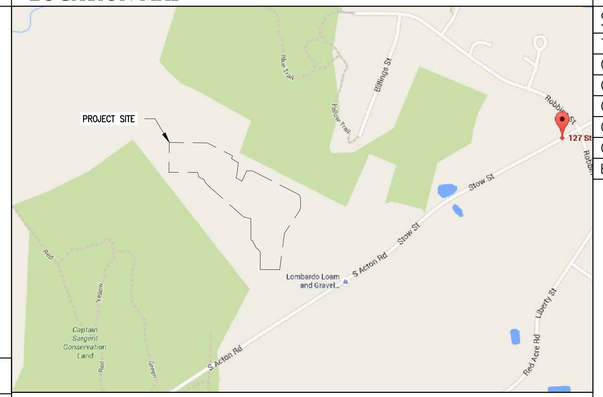
CIVIL ENGINEER
FIRM: BORREGO SOLAR
CONTACT: DAVID ALBRECHT, P.E.
PHONE: (978)–513–2621

STRUCTURAL ENGINEER
FIRM: BORREGO SOLAR SYSTEMS, INC.
CONTACT: DAVID DUTIL, P.E, LEED AP
PHONE: (978)–513–2623

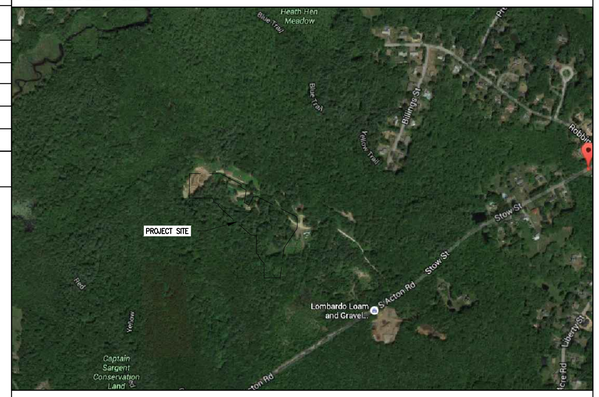
ELECTRICAL ENGINEER
FIRM: BORREGO SOLAR
CONTACT: PAT RETELLE
PHONE: (978)–610–2864

DESIGN ENGINEER
FIRM: BORREGO SOLAR
CONTACT: KATLYN LAWVER
PHONE: (978)–221–3107

LOCATION MAP



AERIAL VIEW



GENERAL ABBREVIATIONS

(E)	EXISTING
AHJ	AUTHORITY HAVING JURISDICTION
AL	ALUMINUM
APPROX	APPROXIMATE
ARY	ARRAY
BLDG	BUILDING
BSS	BORREGO SOLAR SYSTEM
CL	CENTERLINE
DAS	DATA ACQUISITION SYSTEM
DIA	DIAMETER
DO	DITTO
EW	EAST–WEST
FBO	FURNISHED BY OTHERS
FF	FORWARD FACING
GALV	GALVANIZED
HDG	HOT DIP GALVANIZED
HVAC	HEATING VENTILATION AND AIR CONDITIONING
ID	INSIDE DIAMETER
MFR	MANUFACTURER
MOD	SOLAR MODULE
NS	NORTH–SOUTH
NTS	NOT TO SCALE
OAE	OR APPROVED EQUAL
OC	ON CENTER
OD	OUTSIDE DIAMETER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
PV	PHOTOVOLTAIC
PVC	POLY VINYL CHLORIDE
SCH	SCHEDULE
SS	STAINLESS STEEL
SSS	SOLAR SUPPORT STRUCTURE
STC	STANDARD TEST CONDITIONS
TBD	TO BE DETERMINED
TP	TAMPER PROOF
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
VIF	VERIFY IN FIELD
WP	WEATHER PROOF

REV 1.0

SHEET LIST TABLE

SHEET NUMBER	SHEET TITLE
T–1	TITLE PAGE
C–1.0	EXISTING CONDITIONS PLAN
C–2.0	TREE CLEARING PLAN
C–3.0	LAYOUT AND MATERIALS PLAN
C–4.0	GRADING AND EROSION CONTROL PLAN
C–5.0	CIVIL DETAILS
E–0.0	ELECTRICAL SINGLE LINE DIAGRAM

ACTON ZONING SUMMARY TABLE

Zoning District:		R-2 (RESIDENTIAL 2)	R-2 (RESIDENTIAL 2)
		Required	Provided
Minimimum Lot Size:		20,000 s.f.	235,726 sq.ft. (5.4 acres)
Minimum Lot Frontage:		150 ft	138 ft
Yard Dimensions	Front :	30	273 ft
	Side :	10	29.5
	Rear :	10	337 ft
Maximum Height:		36 ft	N/A

STOW ZONING SUMMARY TABLE

Zoning District:		RESIDENTIAL	RESIDENTIAL
		Required	Provided
Minimimum Lot Size:		65,340 sq.ft.	899,470 sq.ft. (20.64 acres)
Minimum Lot Frontage:		200 ft	878 ft
Yard Dimensions	Front :	30 ft	130 ft
	Side :	25 ft	160 ft
	Rear :	40 ft	122 ft
Minimum Open Space in percent:		10%	N/A

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BORREGO SOLAR
55 TECHNOLOGY DRIVE, SUITE 102
LOWELL, MA 01851
PHONE: (888) 898–6273
FAX: (888) 843–6778
WWW.BORREGOSOLAR.COM

NOT FOR CONSTRUCTION

COMMONWEALTH OF MASSACHUSETTS
DAVID M. ALBRECHT
CIVIL
NO. 32210
REGISTERED PROFESSIONAL ENGINEER
2/29/2016

SITE USE PLANS
2798.82 kW SOLAR ENERGY SYSTEM
0 SOUTH ACTON ROAD REAR STOW, MA 01775
127 STOW STREET ACTON, MA 01720

PROJECT NUMBER: 905–0693

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
	2/29/16	FR	DA	SUBMISSIONS TO ACTON/STOW

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

T-1
TITLE PAGE

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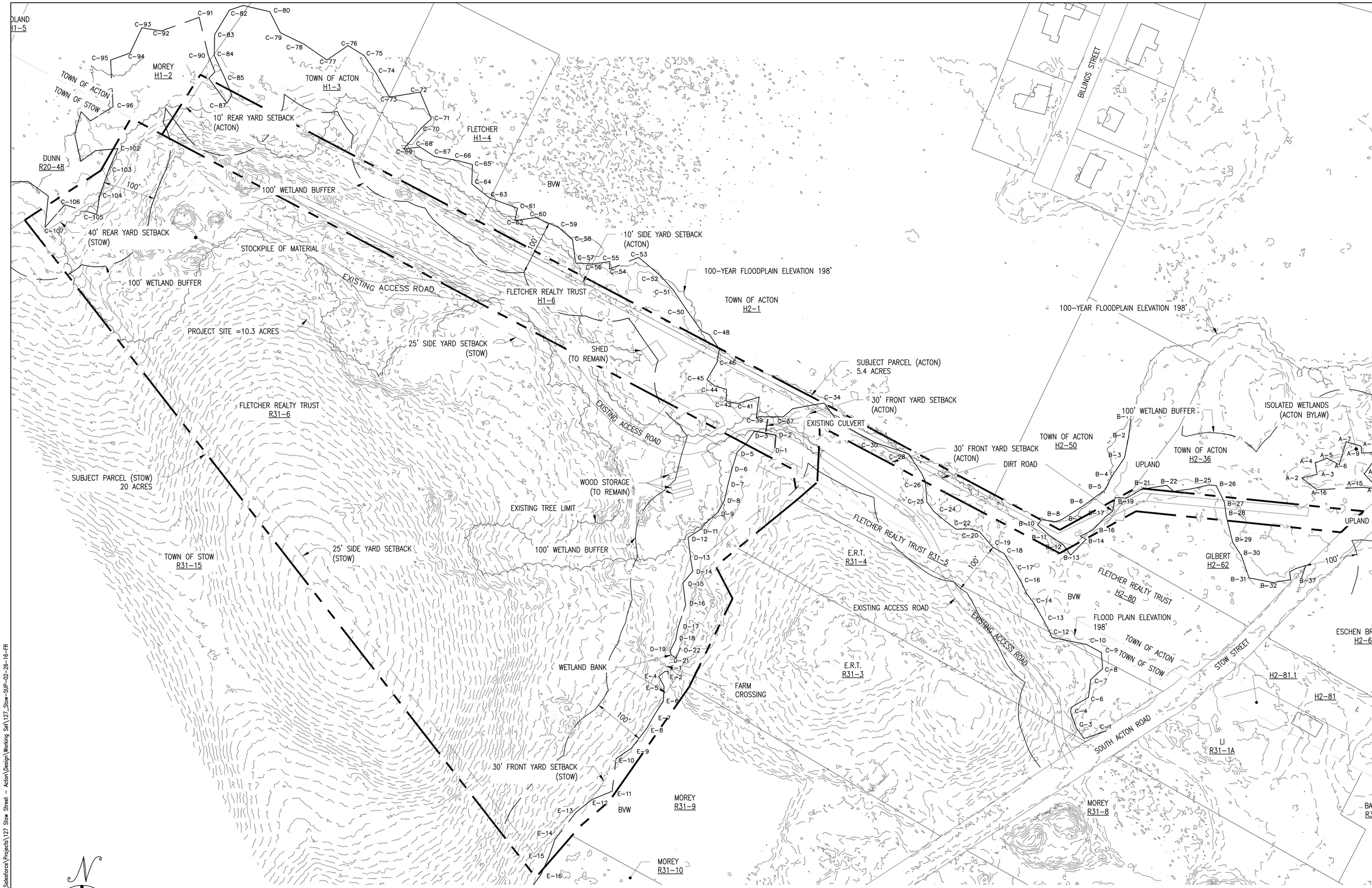

EXISTING CONDITIONS PLAN

SCALE: 1"=80'

0 80' 160'

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55 TECHNOLOGY DRIVE, SUITE 102
LOWELL, MA 01851
PHONE: (888) 898-6273
FAX: (888) 843-6778
WWW.BORREGOSOLAR.COM

NOT FOR CONSTRUCTION

COMMONWEALTH OF MASSACHUSETTS
DAVID M. ALBRECHT
CIVIL
NO. 37319
REGISTERED PROFESSIONAL ENGINEER
2/29/2016

SITE USE PLANS
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0 SOUTH ACTON ROAD REAR STOW, MA 01775
127 STOW STREET ACTON, MA 01720

PROJECT NUMBER:
905-0693

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C-1.0
EXISTING CONDITIONS PLAN

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TREE CLEARING PLAN

SCALE: 1"=60'

0 60' 120'

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55 TECHNOLOGY DRIVE, SUITE 102
LOWELL, MA 01851
PHONE: (888) 898-6273
FAX: (888) 843-6778
WWW.BORREGOSOLAR.COM

NOT FOR CONSTRUCTION

COMMONWEALTH OF MASSACHUSETTS
DAVID M. ALBRECHT
CIVIL
NO. 32316
REGISTERED PROFESSIONAL ENGINEER
2/29/2016

SITE USE PLANS
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0 SOUTH ACTON ROAD REAR STOW, MA 01775
127 STOW STREET ACTON, MA 01720

PROJECT NUMBER: 905-0693

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	2/29/16	FR	DA	SUBMISSIONS TO ACTON/STOW

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C-2.0
TREE CLEARING PLAN

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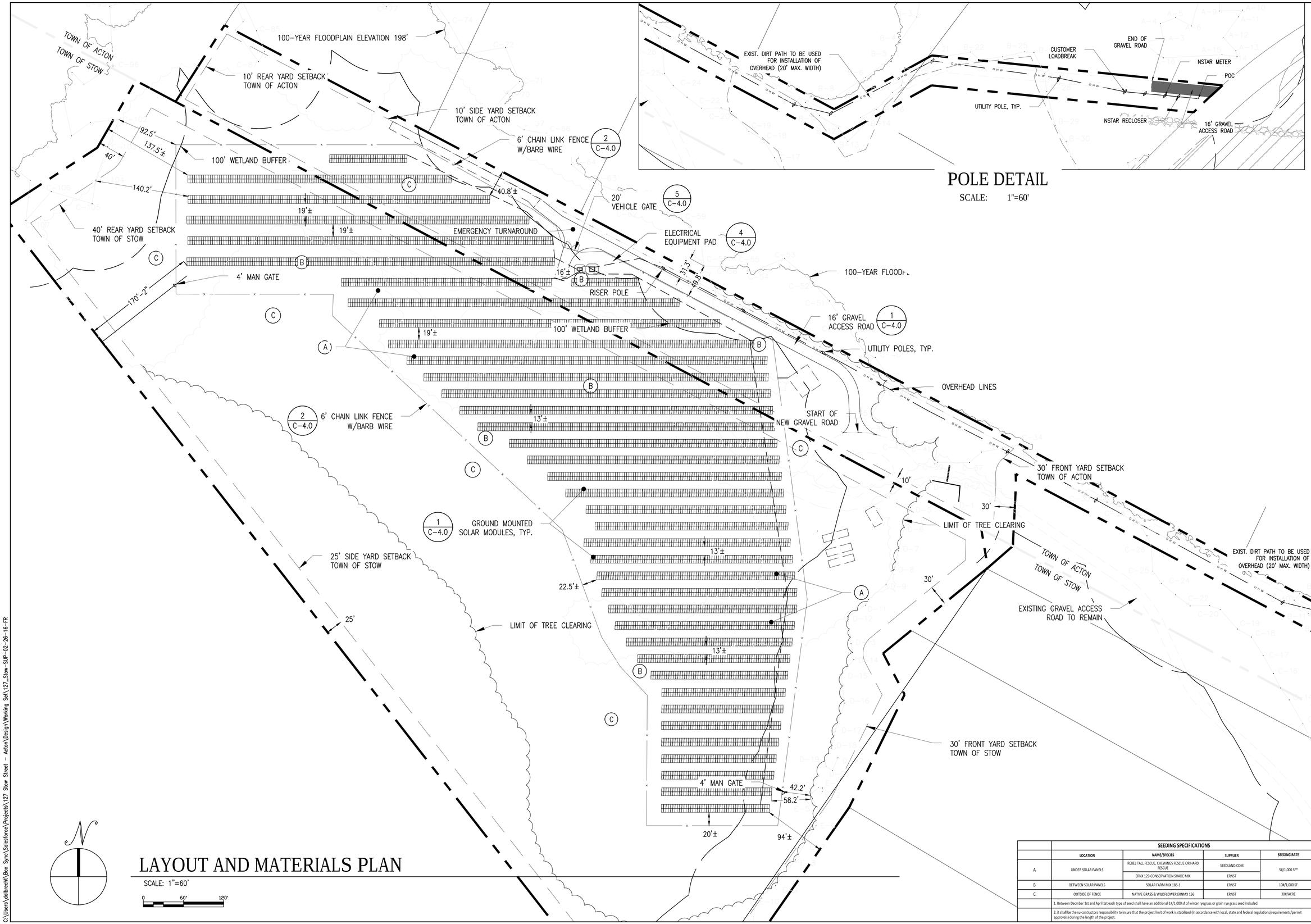

LAYOUT AND MATERIALS PLAN

SCALE: 1"=60'

POLE DETAIL

SCALE: 1"=60'

	SEEDING SPECIFICATIONS			
	LOCATION	NAME/SPECIES	SUPPLIER	SEEDING RATE
A	UNDER SOLAR PANELS	REBEL TALL FESCUE, CHEWINGS FESCUE OR HARD FESCUE	SEEDLAND.COM	54/1,000 SF*
		ERNX 129-CONSERVATION SHADE MIX	ERNST	
B	BETWEEN SOLAR PANELS	SOLAR FARM MIX 186-1	ERNST	10#/1,000 SF
C	OUTSIDE OF FENCE	NATIVE GRASS & WILDFLOWER ERNMX 156	ERNST	30#/ACRE
	1. Between December 1st and April 1st each type of seed shall have an additional 1#/1,000 sf of winter ryegrass or grain rye grass seed included.			
	2. It shall be the su-contractors responsibility to insure that the project limit of work is stabilized (in accordance with local, state and federal regulations/requirements/permit approvals) during the length of the project.			

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55 TECHNOLOGY DRIVE, SUITE 102
LOWELL, MA 01851
PHONE: (888) 898-6273
FAX: (888) 843-6778
WWW.BORREGOSOLAR.COM

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COMMONWEALTH OF MASSACHUSETTS — DAVID M. ALBRECHT — CIVIL — NO. 32316 — REGISTERED PROFESSIONAL ENGINEER — 2/29/2016

SITE USE PLANS
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0 SOUTH ACTON ROAD REAR, STOW, MA 01775
127 STOW STREET ACTON, MA 01720

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	2/29/16	FR	DA	SUBMISSIONS TO ACTON/STOW

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C-3.0
LAYOUT AND MATERIALS PLAN

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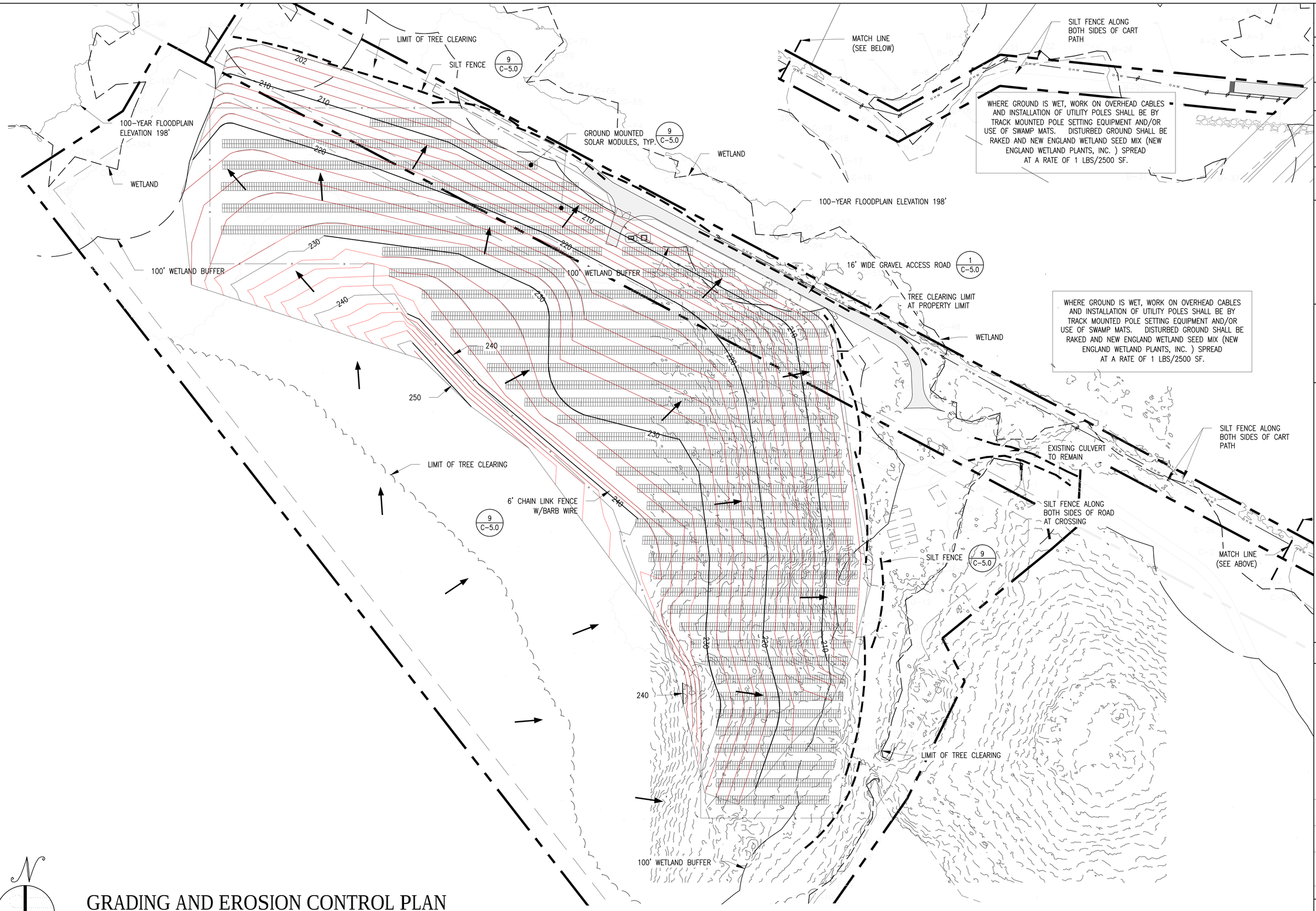

GRADING AND EROSION CONTROL PLAN

SCALE: 1"=60'

0 60' 120'

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55 TECHNOLOGY DRIVE, SUITE 102
LOWELL, MA 01851
PHONE: (888) 898-6273
FAX: (888) 843-6778
WWW.BORREGOSOLAR.COM

NOT FOR CONSTRUCTION

COMMONWEALTH OF MASSACHUSETTS
DAVID M. ALBRECHT
CIVIL
NO. 32249
REGISTERED PROFESSIONAL ENGINEER
2/29/2016

SITE USE PLANS
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127 STOW STREET ACTON, MA 01720

PROJECT NUMBER: 905-0693

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C-4.0
GRADING AND EROSION CONTROL PLAN

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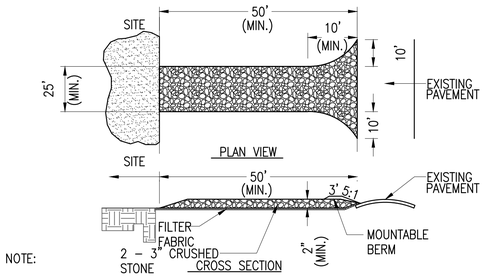


NOTE:

1. ENTRANCE WIDTH SHALL BE A TWENTY–FIVE (25) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL 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 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. BERM SHALL BE PERMITTED. PERIODIC INSPECTION AND MAINTENANCE SHALL BE PROVIDED AS NEEDED.

7 STABILIZED CONSTRUCTION ENTRANCE

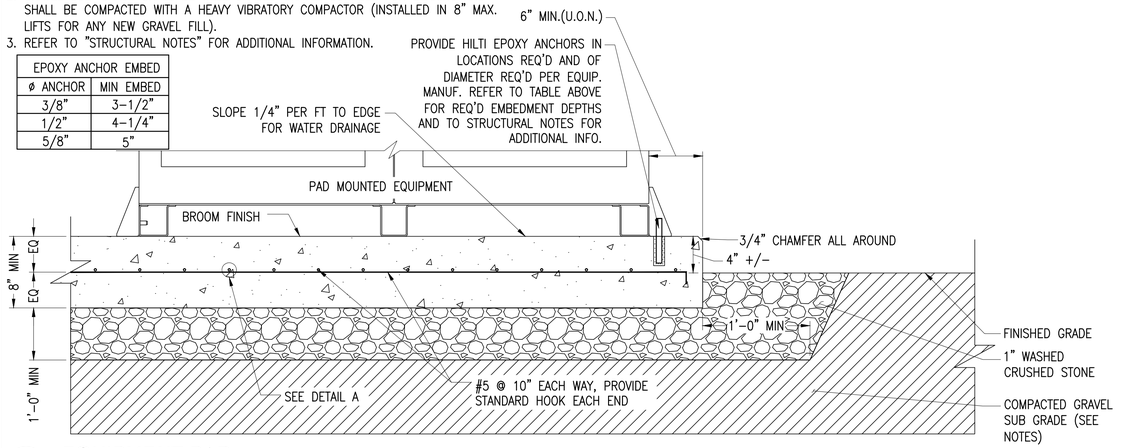
SCALE: N.T.S.

XD_CIVIL_TEMPORARY CONSTRUCTION_STABILIZED CONSTRUCTION ENTRANCE.DWG 2014–1–6

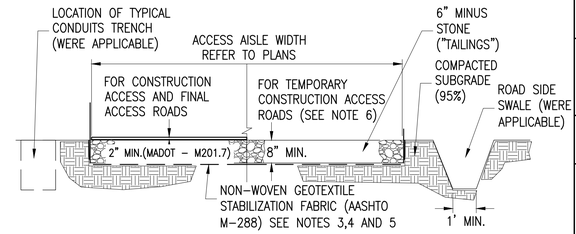
NOTES:

1. REMOVE TOP SOIL AND ORGANIC MATERIAL FULL DEPTH WITHIN PAD BEARING AREA.
2. GRAVEL SUB–GRADE SHALL BE WELL GRADED GRAVEL SUITABLE FOR BEARING AND SHALL BE COMPACTED WITH A HEAVY VIBRATORY COMPACTOR (INSTALLED IN 8" MAX. LIFTS FOR ANY NEW GRAVEL FILL).
3. REFER TO "STRUCTURAL NOTES" FOR ADDITIONAL INFORMATION.

EPOXY ANCHOR EMBED	
ø ANCHOR	MIN EMBED
3/8"	3–1/2"
1/2"	4–1/4"
5/8"	5"



4 EQUIPMENT PAD



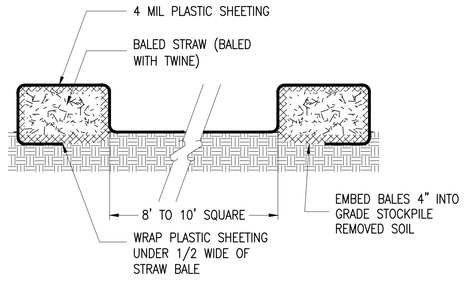
NOTES:

1. SUBCONTRACTOR SHALL EXCAVATE TO SUITABLE MATERIAL FOR SUBGRADE.
2. SUBCONTRACTOR SHALL COMPACT SUBGRADE TO PROVIDE SUITABLE SURFACE TO PLACE ROAD.
3. GEOTEXTILE FABRIC SHALL MEET THE FOLLOWING REQUIREMENTS:
   - TENSILE STRENGTH: 150 LB MIN.
   - ELONGATION: 50%
   - CBR PUNCTURE: 400 LB MIN.
   - MINIMUM WATER FLOW RATE: 120 GPM / FT²
4. SUBCONTRACTOR SHALL FOLLOW GEOTEXTILE FABRIC MANUFACTURER INSTALLATION PROCEDURES.
5. WHERE OVERLAPPING OF GEOTEXTILE FABRIC IS REQUIRED, SUBCONTRACTOR SHALL OVERLAP A MINIMUM OF 24".
6. SUBCONTRACTOR SHALL REMOVE TEMPORARY CONSTRUCTION ACCESS ROADS, AND RESTORE TO PRE–CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE CEOR AND THE GOVERNING AGENCIES.

1 GRAVEL ACCESS ROAD WITH SWALE

SCALE: NTS

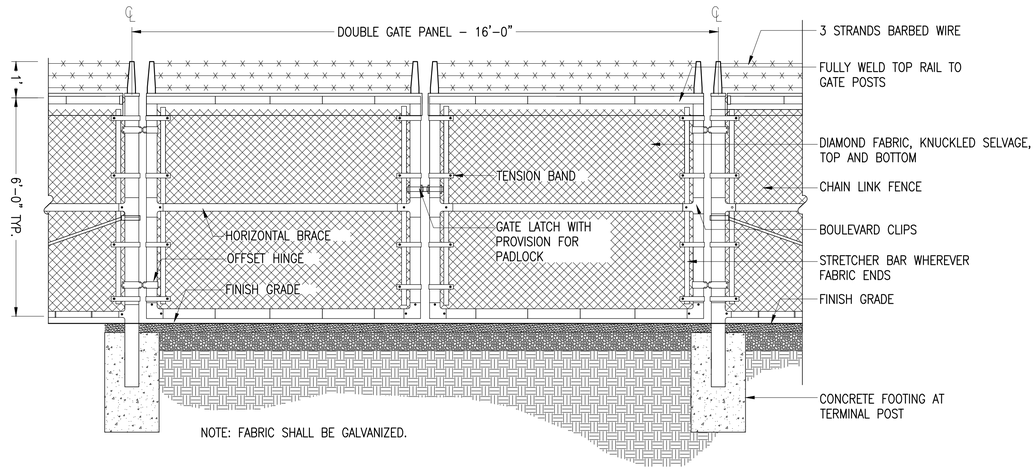
XD_CIVIL_GRAVEL_ROAD_W_SWALE.DWG 2014–1–6



NOTE: PLASTIC SHEETING SHOULD BE FREE OF TEARS OR HOLES. AFTER BASIN IS USED, WASHWATER FROM WASHOUT BASIN SHOULD BE ALLOWED TO EVAPORATE OR BE VACUUMED OUT. REMOVE REMAINING HARDENED SOLIDS. REPLACE PLASTIC SHEETING AND STRAWBALES AS REQUIRED.

8 CONCRETE WASHOUT BASINS

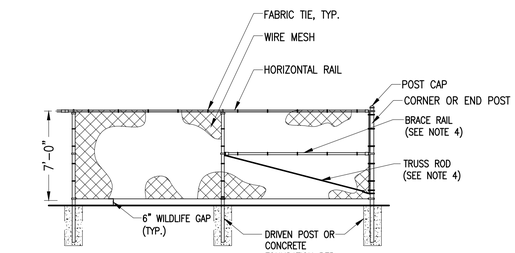
SCALE: NTS



5 VEHICLE GATE

SCALE: NTS

2014–1–6



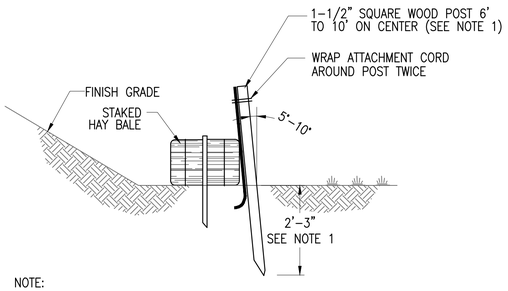
NOTES:

1. THE FENCE SHALL MEET OR EXCEED THE CHAIN LINK FENCE MANUFACTURER INSTITUTE (CLFMI) GUIDELINES AND RELATED FEDERAL SPECIFICATIONS FOR SECURITY CHAIN LINK FENCE MATERIALS AND INSTALLATION.
2. ALL FENCE MATERIAL AND COMPONENTS SHALL BE GALVANIZED, UNLESS OTHERWISE NOTED.
3. THIS DETAIL NOT APPLICABLE FOR PRIVACY FENCE OR FENCE WITH SLATS.
4. ADJUSTABLE TRUSS ROD AND BRACE RAIL AT CORNER OR END POSTS ONLY, IF REQUIRED BY CLFMI GUIDELINES.

2 CHAIN LINK FENCING DETAIL

SCALE: NTS

XD_CIVIL_FENCE_7'_CHAIN_LINK_WILDLIFE_GAP.DWG REV.02–22–2016



NOTE:

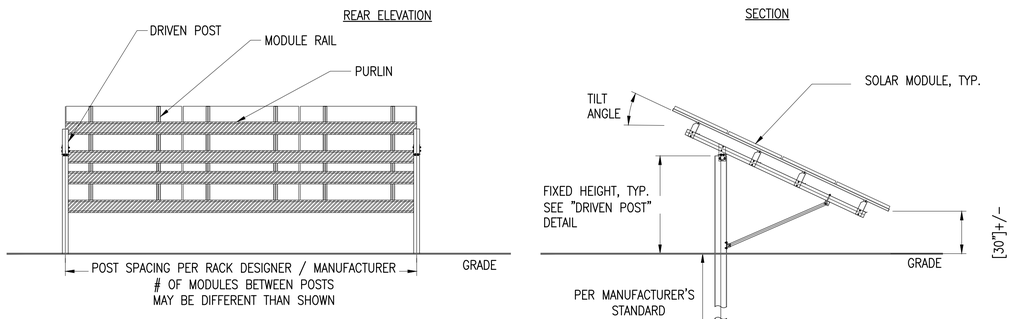
1. DEPTH MAY VARY WITH TRIBUTARY AREA: 2 FT. FOR 100 SF/LF FENCE; 3 FT. FOR 500 SF/LF FENCE, UNLESS POST IS TO BE SET IN PEAT THEN 3 FT. OR DEPTH POSSIBLE BY PUSHING BY HAND SHALL BE REQUIRED.

9 STRAW BALE SILT FENCE

SCALE: NTS

XD_CIVIL_EROSION_STRAW BALE SILT FENCE 2014–6–2

NOTE: THE "RBI" RACKING AND DRIVEN PILE FOUNDATIONS ARE DESIGNED BY RBI , AND WILL BE A SUBMITTAL TO BORREGO. THE INFORMATION SHOWN HERE IS FOR GENERAL REFERENCE ONLY.

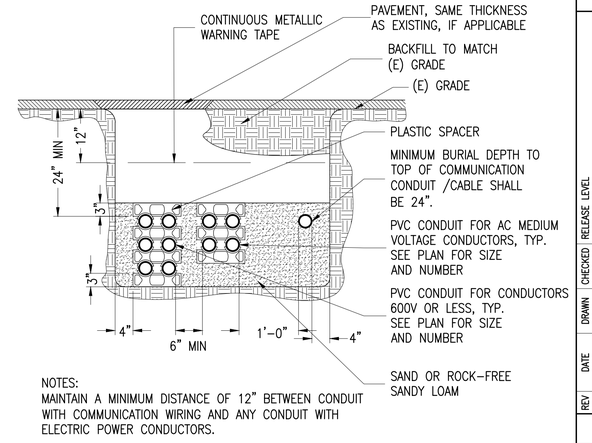


6 RACK SECTION & REAR ELEVATION_4X SINGLE POST

RBI – GM – I

SCALE: NTS

XD_STRUC_RBI_GM–I_RACK SECTION REAR ELEVATION_4X SINGLE POST 2014–6–5



NOTES:
MAINTAIN A MINIMUM DISTANCE OF 12" BETWEEN CONDUIT WITH COMMUNICATION WIRING AND ANY CONDUIT WITH ELECTRIC POWER CONDUCTORS.

3 TYPICAL TRENCH

SCALE: NTS

2014–1–6

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BORREGO SOLAR
55 TECHNOLOGY DRIVE, SUITE 102
LOWELL, MA 01851
PHONE: (888) 898–6273
FAX: (888) 843–6778
WWW.BORREGOSOLAR.COM

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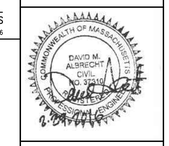

SITE USE PLANS
2798.82 kW SOLAR ENERGY SYSTEM
0 SOUTH ACTON ROAD REAR STOW, MA 01775
127 STOW STREET ACTON, MA 01720

PROJECT NUMBER: 905–0693

REV	DATE	DRAWN	CHECKED	RELEASE LEVEL
	2/29/16	FR	DA	SUBMISSIONS TO ACTON/STOW

SCALES STATED ON DRAWINGS ARE VALID ONLY WHEN PLOTTED ARCH D 24" X 36"

C-5.0
CIVIL DETAILS

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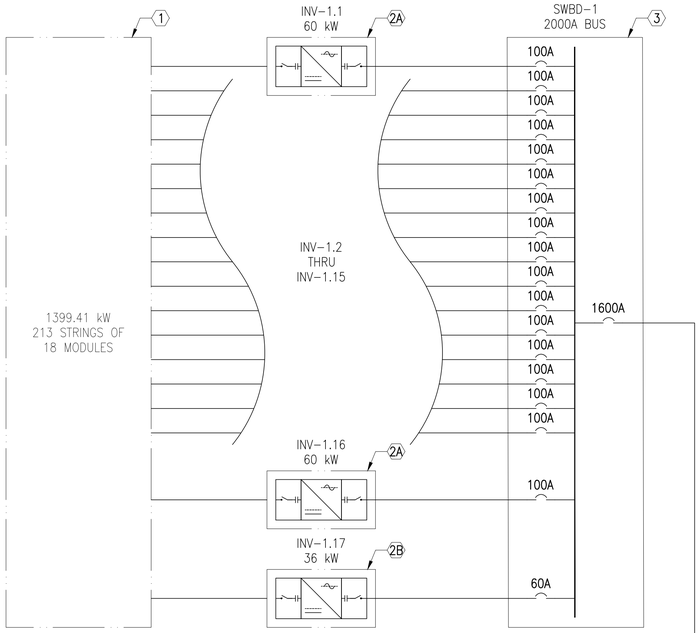
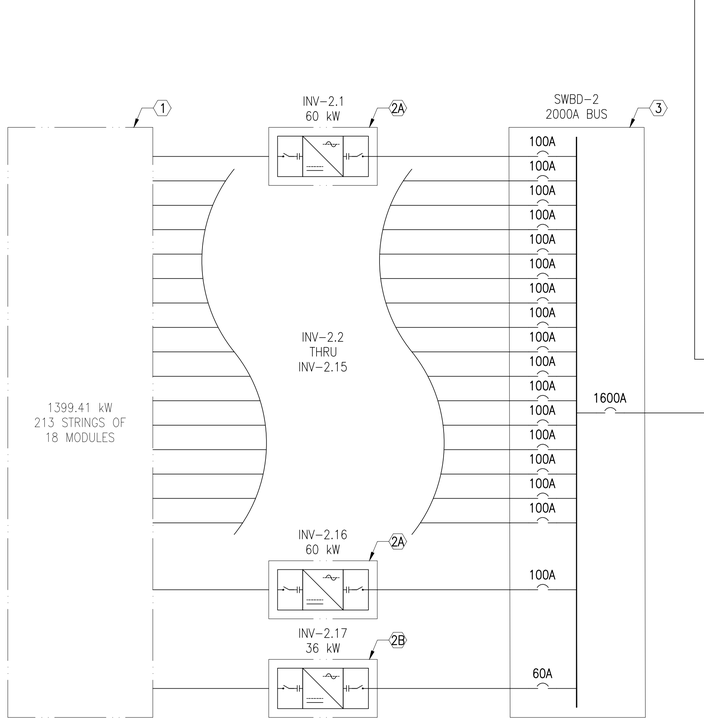
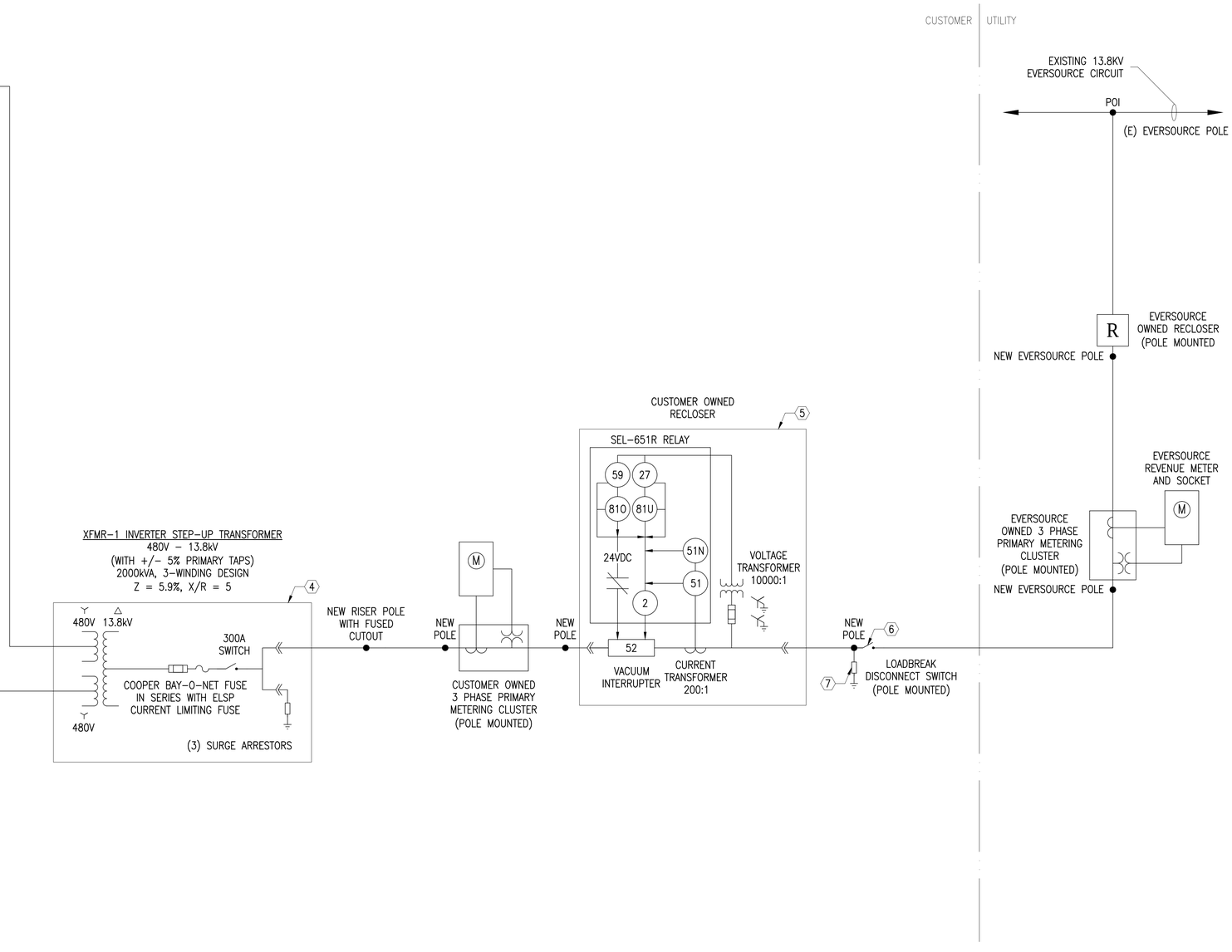
ELECTRICAL EQUIPMENT SCHEDULE

REF. #	QTY.	DESCRIPTION	FURNISHED BY
1	7668	LG ELECTRONICS LG365N2W-B3 MODULE	BORREGO
2A	32	SUNGROW SG60KU-M	BORREGO
2B	2	SUNGROW SG36KU	BORREGO
3	2	2000A SWITCHBOARD, 480V, 3PH, NEMA 3R, 3W, (16) 100A 3P BREAKERS, (1) 60A 3P BREAKER, 25KAIC MIN, 1600A MAIN BREAKER	BORREGO
4	1	2000kVA TRANSFORMER, 13.8kV DELTA PRIMARY, 480V UNGROUNDED WYE SECONDARY (WITH +/- 5% PRIMARY TAPS), 3 PHASE, IMPEDANCE 5.9%, ELBOW SURGE ARRESTORS INCLUDED	BORREGO
5	1	POLE MOUNTED RECLOSER SWITCH WITH INTEGRATED SEL-651R MULTIFUNCTION RELAYING. PT'S AND CT'S WITH 24VDC SUPPLY AND 8 HOUR BATTERY BACK-UP	BORREGO
6	1	17 kV MAX, 600A, LOAD BREAK DISCONNECT SWITCH, POLE MOUNTED, GANG OPERATED, LOCKABLE	SUB-CONTRACTOR
7	3	POLE TOP SURGE ARRESTER, COOPER VARISTER TYPE EVOLUTION, DISTRIBUTION CLASS, MOV ARRESTER RATING 12kV, 10.2kV MCOV	SUB-CONTRACTOR







ELECTRICAL SINGLE LINE DIAGRAM

SCALE: NTS

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LOWELL, MA 01851
PHONE: (888) 898-6273
FAX: (888) 843-6778
WWW.BORREGOSOLAR.COM

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COMMONWEALTH OF MASSACHUSETTS
DAVID M. ALBRECHT
CIVIL
NO. 32310
REGISTERED PROFESSIONAL ENGINEER
2/29/2016

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E-0.0
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