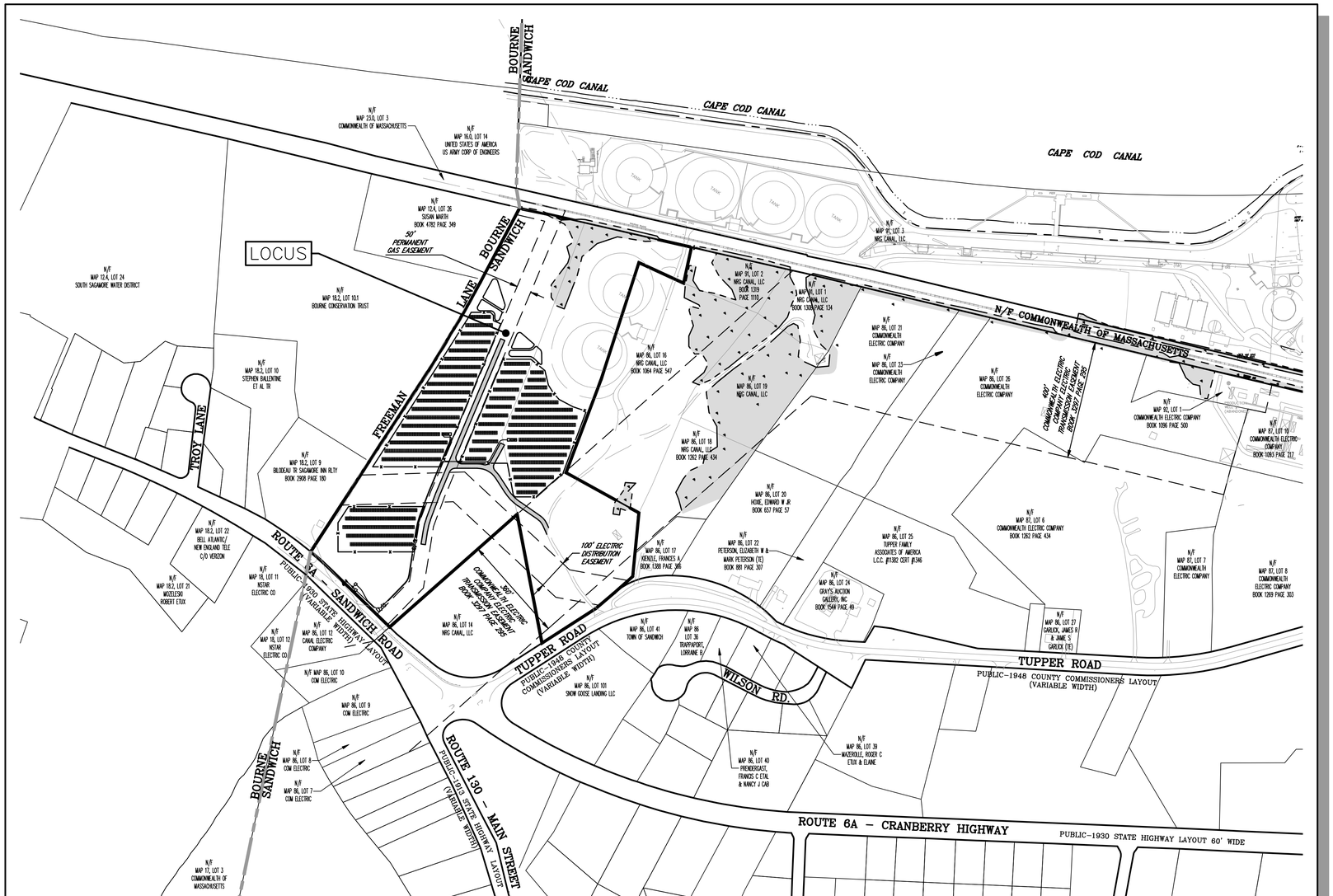
PRELIMINARY SITE PLANS

FOR THE

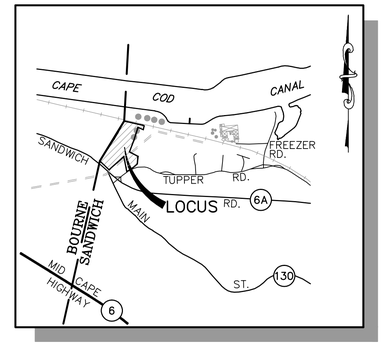
CANAL COMMUNITY SOLAR PROJECT

SANDWICH, MASSACHUSETTS

DATE: OCTOBER 9, 2015



OVERALL LOCATION PLAN
SCALE: 1" = 200'



LOCUS MAP
1" = 2,083'±

INDEX OF PLANS		
SHEET NO.	TITLE	SCALE
1	COVER SHEET	1" = 200'
2	OVERALL EXISTING CONDITIONS PLAN	1" = 100'
3	EXISTING CONDITIONS PLAN	1" = 40'
4	EXISTING CONDITIONS PLAN	1" = 40'
5	EXISTING CONDITIONS PLAN	1" = 40'
6	OVERALL SITE PLAN	1" = 100'
7	SITE VICINITY PLAN	1" = 40'
8	SITE VICINITY PLAN	1" = 40'

OWNER:

NRG CANAL, LLC
211 CARNEGIE CENTER
PRINCETON, NJ 08540

APPLICANT:

NRG RENEW CANAL 1, LLC
9 FREEZER ROAD
SANDWICH, MA 02563

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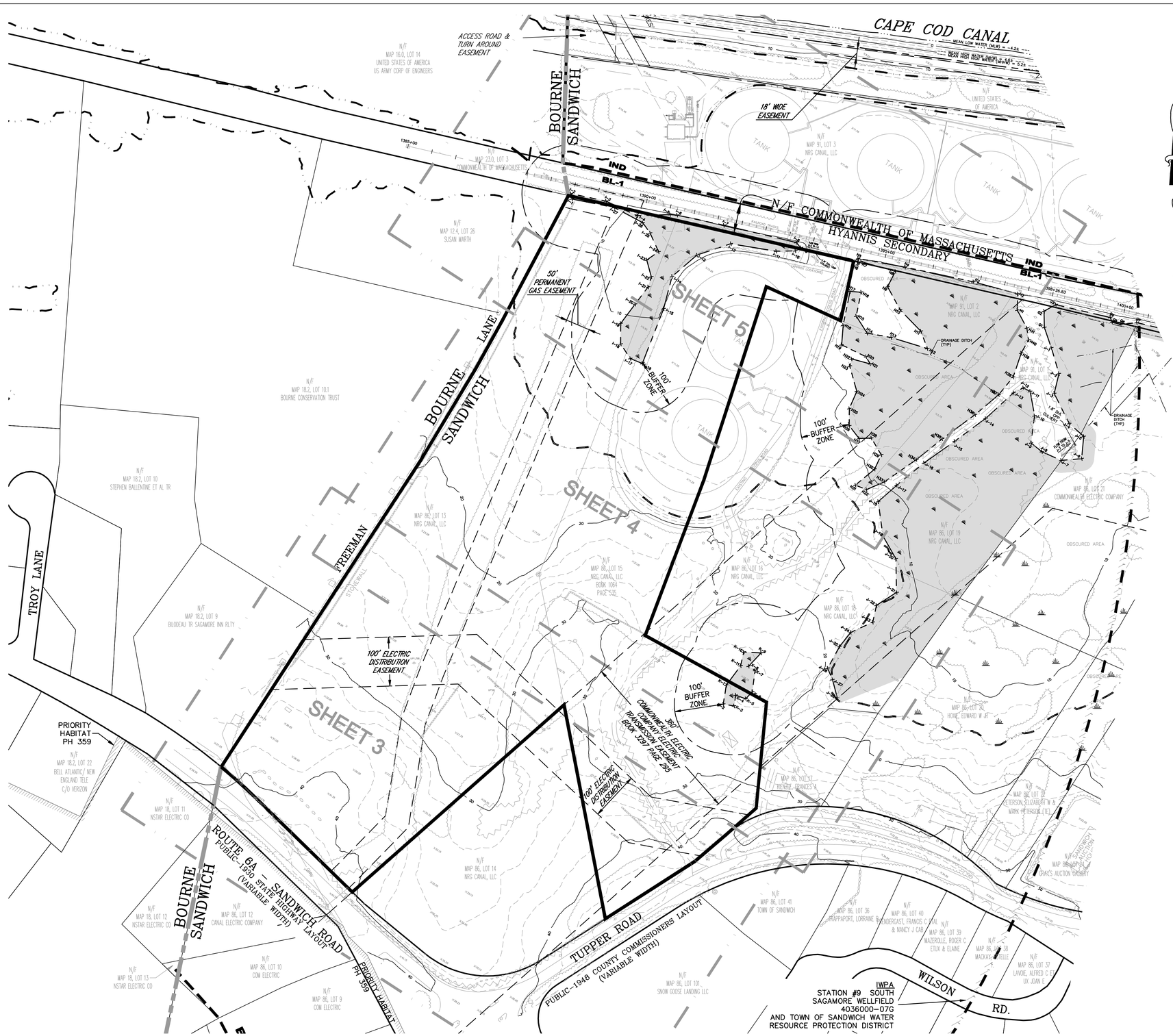
ENGINEER:

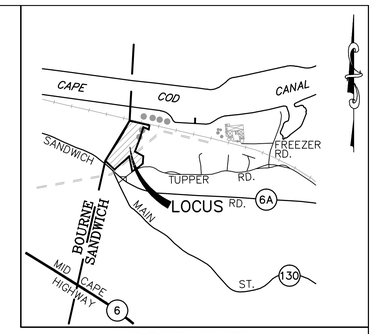
Atlantic® DESIGN ENGINEERS, INC.
P.O. Box 1051, Sandwich, MA 02563 (508) 888 – 9282

FILE: 2796.01–PRELIM

Sheet	of
1	8

JOB NUMBER
2796.01





LOCUS MAP
1" = 2,083'±

LEGEND

- EXISTING CONTOUR LINE
- EDGE OF BORDERING VEGETATED WETLANDS W/WETLAND FLAG BASED UPON A FIELD DELINEATION
- 100' BUFFER ZONE
- EDGE OF WATER PER MASSGIS
- TOP OF COASTAL BANK
- 100' TOP OF COASTAL BANK BUFFER
- IWPA AND TOWN OF SANDWICH WATER RESOURCE PROTECTION DISTRICT
- NHESP PRIOIRTY HABITAT OF RARE SPECIES
- FEMA FLOOD ZONE
- ZONING LINE
- EX. EASEMENT
- EX. UTILITY POLE
- EX. CHAIN LINK FENCE
- EX. POST AND RAIL FENCE
- EX. GUARD RAIL
- EX. STONE WALL
- EX. TREE LINE
- EX. PREVIOUSLY CLEARED/PARTIALLY OVERGROWN AREA
- EX. GUY WIRE ANCHOR
- EX. UTILITY POLE
- EX. CATCHBASIN
- EX. BENCHMARK
- EX. TREE
- EX. TRANSMISSION TOWER
- EX. LIGHT
- EX. MANHOLE
- EX. SIGN
- EX. POST
- EX. CONTROL STATION
- EX. SWAMP
- EX. BOUND
- EX. SPOT ELEVATION
- EX. HYDRANT
- EX. WATER GATE
- EX. DIRT ROAD

GENERAL NOTES:

1. OWNERS OF RECORD:
   ATTN: TAX DEPARTMENT
   NRG CANAL, LLC
   211 CARNEGIE CENTER
   PRINCETON, NJ 08540
2. LOCUS IS COMPRISED OF:
   MAP 86 LOT 13 (±11.75 ACRES) AND 15 (±8.84 ACRES).
3. PROPERTY LINES AND EXISTING CONDITIONS FROM PLANS ENTITLED LAND TITLE SURVEY PREPARED BY SURVEYING AND MAPPING CONSULTANTS, DATED SEPTEMBER 15, 1998 AND SUPPLEMENTED BY ATLANTIC DESIGN ENGINEERS, INC. IN 2015.
4. THE WETLAND RESOURCE AREAS SHOWN HEREON ARE BASED UPON A FIELD DELINEATION AND FIELD LOCATION BY TRC ENVIRONMENTAL CORP, AND CONFIRMED BY ATLANTIC DESIGN ENGINEERS, INC. IN MAY, 2015.
5. THE PROPERTY LIES MOSTLY WITHIN ZONE X, OTHER AREAS, AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN (NAVD88) AND PARTIALLY WITHIN FLOOD ZONE AE14, BASED UPON A REVIEW OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBER 25001C0319J, DATED JULY 16, 2014.
6. THE PROPERTY LIES WITHIN AN INTERIM WELLHEAD PROTECTION AREA (IWPA) (STATION #9, SOUTH SAGAMORE WELLFIELD 4036000-07G) BASED UPON A REVIEW OF THE MASSACHUSETTS GEOGRAPHIC INFORMATION SYSTEM.
7. THE PROPERTY IS NOT LOCATED WITHIN A ZONE II BASED UPON A REVIEW OF THE MASSACHUSETTS GEOGRAPHIC INFORMATION SYSTEM.
8. HORIZONTAL COORDINATES BASED ON NAD 27 PER SURVEYING AND MAPPING CONSULTANTS AND EXISTING CONTOURS ARE BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
9. THE PROPERTY LIES WITHIN THE TOWN OF SANDWICH WATER RESOURCE PROTECTION DISTRICT, AND DOES NOT LIE WITHIN SURFACE WATER PROTECTION DISTRICT, BASED UPON A REVIEW OF THE TOWN OF SANDWICH ZONING MAP, DATED MAY 2013.
10. THE PROPERTY DOES NOT LIE WITHIN AN ESTIMATED HABITAT OF RARE WILDLIFE AND A PRIORITY HABITAT OF RARE SPECIES BASED UPON A REVIEW OF THE NATURAL HERITAGE AND ENDANGERED SPECIES PROGRAM MAPS OBSERVED ON THE MASSACHUSETTS GEOGRAPHIC INFORMATION SYSTEM.
11. THE PROPERTY DOES NOT LIE WITHIN AN AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC) BASED UPON A REVIEW OF THE MASSACHUSETTS GEOGRAPHIC INFORMATION SYSTEM.
12. MEAN LOW WATER AND MEAN HIGH WATER ELEVATIONS ARE BASED UPON "TIDAL FLOOD PROFILES, NEW ENGLAND COASTLINE" PREPARED BY THE HYDRAULICS AND WATER QUALITY SECTION, NEW ENGLAND DIVISION, U.S. ARMY CORPS OF ENGINEERS, DATED SEPTEMBER 1988.

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Atlantic® DESIGN ENGINEERS, INC.
P.O. Box 1051, Sandwich, MA 02563 (508) 888 – 9282

Designed by :
Drawn by :
Checked by :
Survey chk. by :
Approved by :

SCALE
SCALE 1" = 100'
0 25 50 100 200

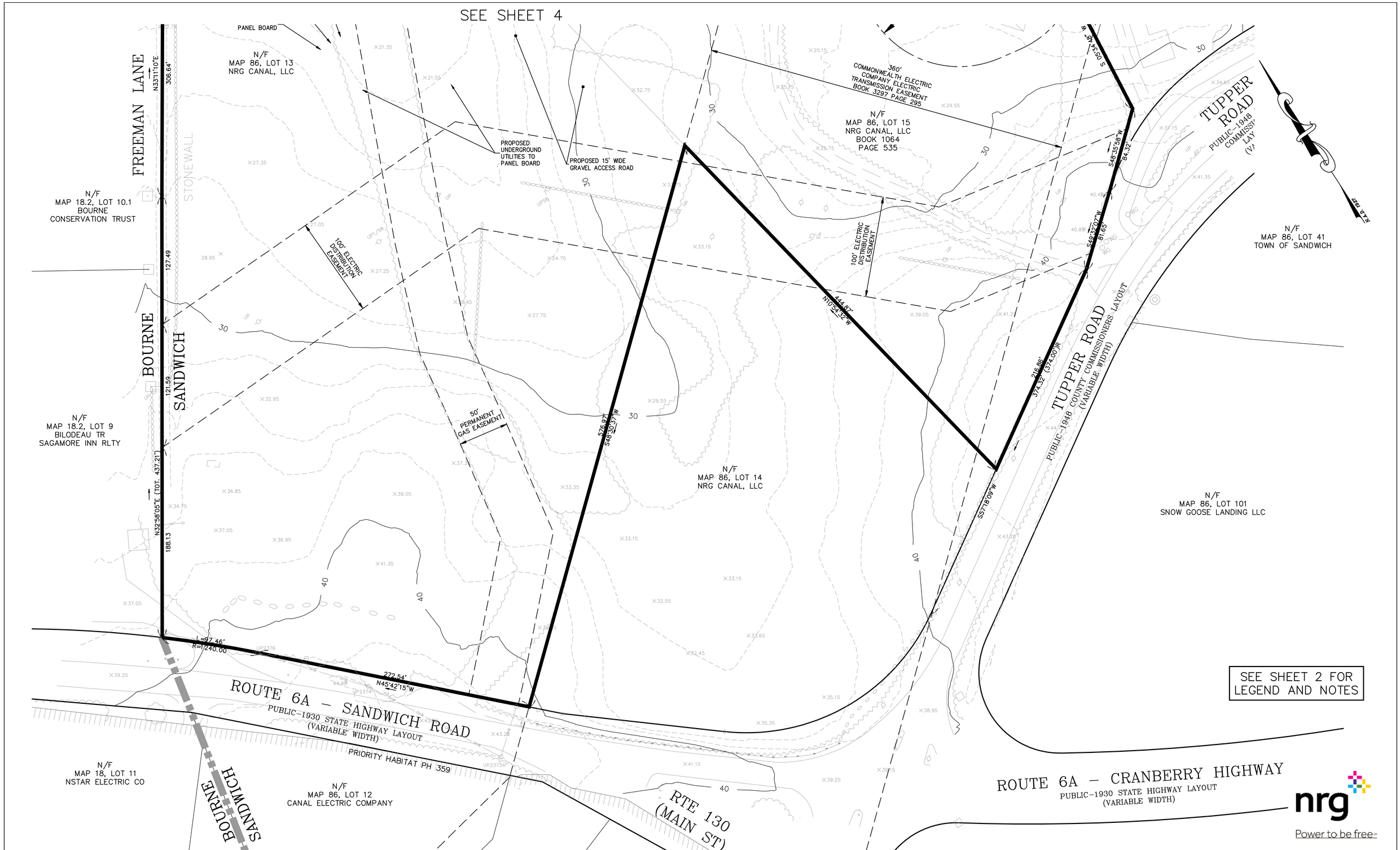
DATE

NO.	BY	DATE	REVISION

APPLICANT:
NRG RENEW CANAL 1, LLC
9 FREEZER ROAD
SANDWICH, MA 02563

OVERALL EXISTING CONDITIONS PLAN
FOR
CANAL COMMUNITY SOLAR PROJECT
SANDWICH, MASSACHUSETTS 02563
OCTOBER 9, 2015

Sheet 2 of 8
JOB NUMBER 2796.01



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SCALE
SCALE 1" = 40'
0 10 20 40 80

DATE

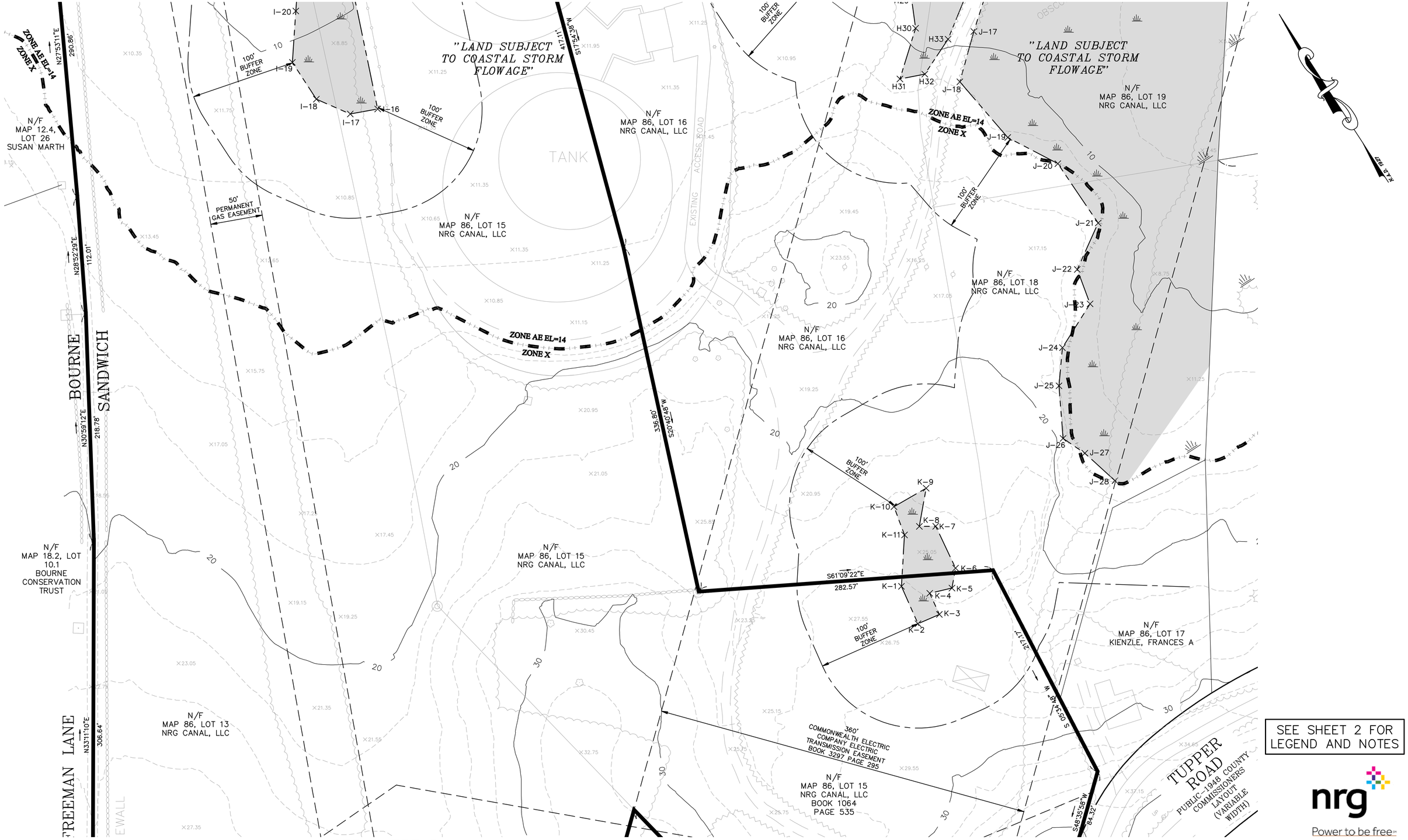
NO.	BY	DATE	REVISION

APPLICANT:
NRG RENEW CANAL 1, LLC
9 FREEZER ROAD
SANDWICH, MA 02563

EXISTING CONDITIONS PLAN
FOR
CANAL COMMUNITY SOLAR PROJECT
SANDWICH, MASSACHUSETTS 02563
OCTOBER 9, 2015

Sheet 3 of 8
JOB NUMBER 2796.01

SEE SHEET 5



SEE SHEET 3

SEE SHEET 2 FOR
LEGEND AND NOTES

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DATE

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9 FREEZER ROAD
SANDWICH, MA 02563

EXISTING CONDITIONS PLAN
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SANDWICH, MASSACHUSETTS 02563
OCTOBER 9, 2015

Sheet 4 of 8
JOB NUMBER 2796.01

CAPE COD CANAL

ZONE AE EL=14
ZONE X

100' BUFFER ZONE TO TOP OF COASTAL BANK

"LAND SUBJECT TO COASTAL STORM FLOWAGE"

N/F
MAP 91, LOT 3
NRG CANAL, LLC

TANK

IND
BL-1

100' BUFFER ZONE

1395+00

352.88'
N77°04'13"W
352.88'

N/F
MAP 91, LOT 2
NRG CANAL, LLC

DRAINAGE DITCH (TYP)

OBSCURED AREA

N/F COMMONWEALTH OF MASSACHUSETTS
HYANNIS SECONDARY
RAILROAD TRACKS

FLOW FROM I-7 TO I-9

1.8' DIA. CMP CULVERT

(APPROX LOCATIONS)

1390+00

597.28'

N/F
MAP 16.0, LOT 14
UNITED STATES OF AMERICA
US ARMY CORP OF ENGINEERS

BOURNE
SANDWICH
TOWN LINE

35.14'

50' PERMANENT GAS EASEMENT

N/F
MAP 86, LOT 13
NRG CANAL, LLC

N/F
MAP 86, LOT 15
NRG CANAL, LLC

166.57'
N66°22'42"W

EXISTING ACCESS ROAD

100' BUFFER ZONE

"LAND SUBJECT TO COASTAL STORM FLOWAGE"

S17°54'38"W
471.11'

S32°28'24"W
424.74'

N27°53'11"E
290.86'

377.0'
(REAR YARD SETBACK TO PL)

N/F
MAP 12.4,
LOT 26
SUSAN MARTH

N/F
MAP 86, LOT 16
NRG CANAL, LLC

ACCESS ROAD

ZONE AE EL=14
ZONE X

SEE SHEET 4

SEE SHEET 2 FOR LEGEND AND NOTES

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DATE

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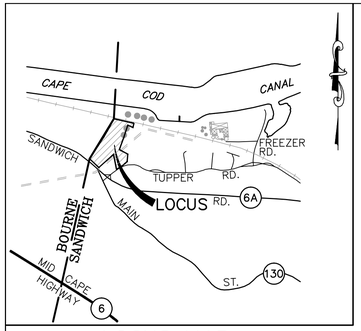
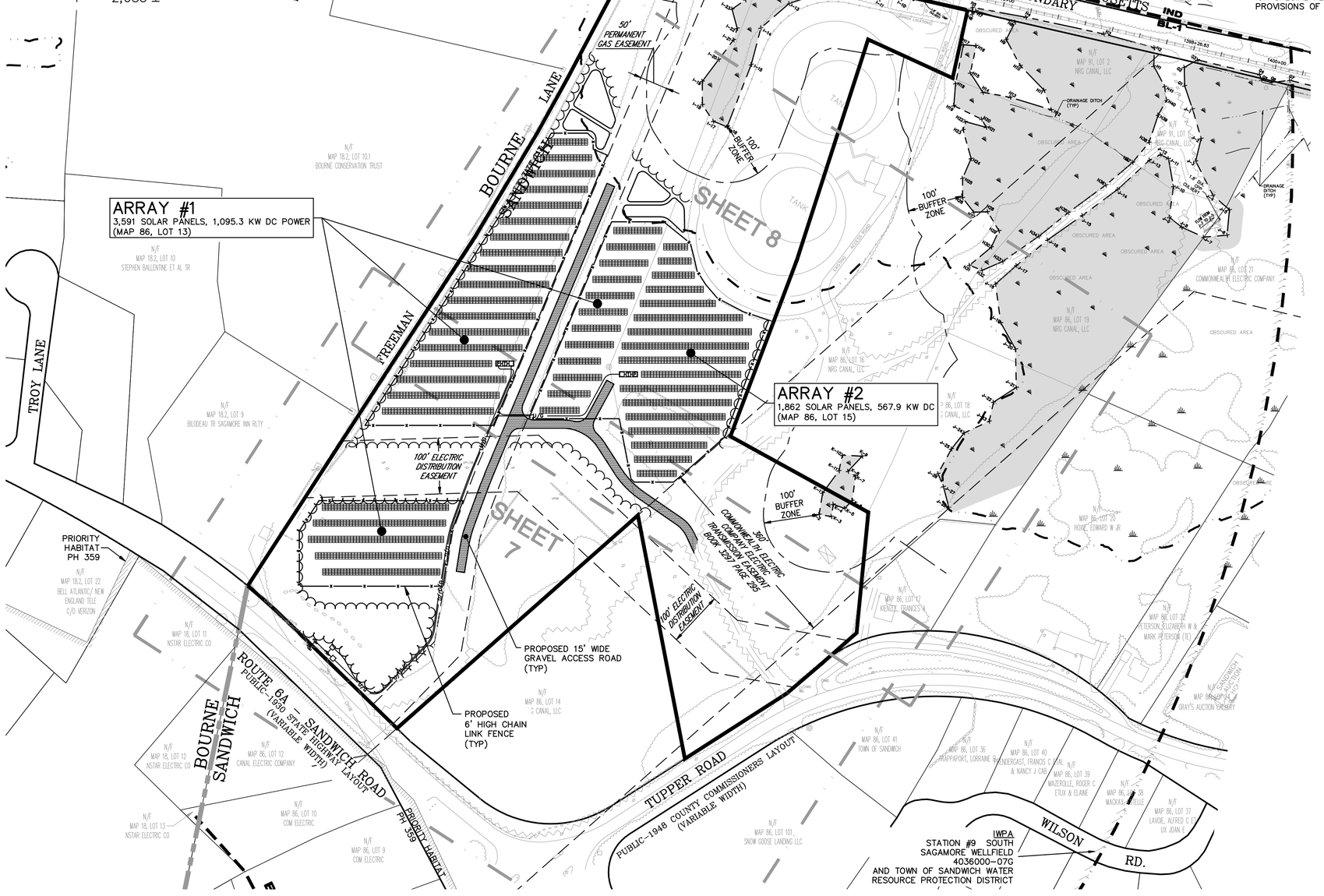
APPLICANT:
NRG RENEW CANAL 1, LLC
9 FREEZER ROAD
SANDWICH, MA 02563

EXISTING CONDITIONS PLAN
FOR
CANAL COMMUNITY SOLAR PROJECT
SANDWICH, MASSACHUSETTS 02563
OCTOBER 9, 2015

Sheet 5 of 8
JOB NUMBER 2796.01



LOCUS MAP
1" = 2,083'±



ZONING REQUIREMENTS

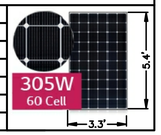
(BL–1) BUSINESS DISTRICT

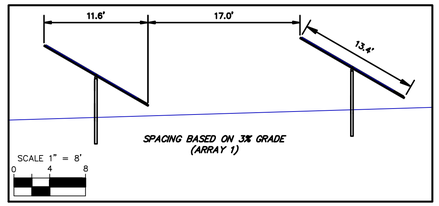
ZONING COMPLIANCE– ZONING BYLAWS MAY 2014.	REQUIRED	PROVIDED
SECTION 2600: INTENSITY OF USE SCHEDULE		
MINIMUM LOT SIZE:	20,000 S.F. (87,120 S.F.*)	896,630 S.F./20.58 ACRES ***
MINIMUM LOT FRONTAGE:	125'	298.51' **
FRONT SETBACK:	30' ****	103.8'
SIDE/REAR SETBACK:	0'	17.6' (SIDE)/377.0' (REAR)
MAXIMUM LOT COVERAGE:	NONE	±0.00002% (BASED ON I–BEAM PILE SUPPORTS)
MAX. BUILDING HEIGHT:	35'	8'±
MAX. SHAPE FACTOR:	22	22
SECTION 3510: LANDSCAPING AND SCREENING		
NOT LESS THAN 30% OF LOT AREA SHALL BE RETAINED IN A VEGETATED CONDITION:	min 30%	38.3%
SECTION 5000: WATER PROTECTION DISTRICT		
EXCAVATION LIMITED TO A DEPTH OF 10 FEET ABOVE THE HISTORICAL HIGH GROUND WATER:	min 10'	> 10'
5 PARTS PER MILLION NITRATE LIMIT:	5 ppm	< 1 ppm

* WITHIN WATER RESOURCE OVERLAY DISTRICT.
** REDUCED TO 60% OF REQUIRED 125' FOR A LOT WITH FRONTAGE ON CURVE RADIUS 120' OR LESS.
*** MINIMUM LOT SIZE SHALL BE 15 ACRES FOR LARGE SCALE GROUND MOUNTED SOLAR FACILITIES IN R–2 DISTRICT.
**** ON SPECIAL PERMIT FROM THE BOARD OF APPEALS, FRONT YARD SETBACK MA BE REDUCED TO A LITTLE AS ZERO, NOTWITHSTANDING ANY OTHER PROVISIONS OF THE BYLAW.

ARRAY 1

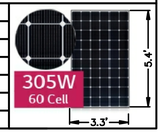
PV Modules	305 Watt LG Modules
Model	LG305N1C–B3 60
Dimensions	64.6" x 39.4" x 1.38"
Cell Count	60 Cell
Array Tilt	30°
Module Count	3,591 Panels
System Output	1,095.3 KW DC

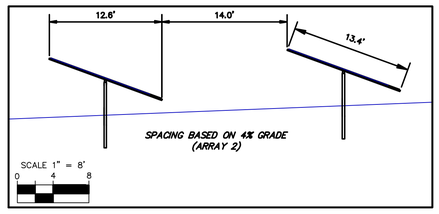




ARRAY 2

PV Modules	305 Watt LG Modules
Model	LG305N1C–B3 60
Dimensions	64.6" x 39.4" x 1.38"
Cell Count	60 Cell
Array Tilt	20°
Module Count	1,862 Panels
System Output	567.9 KW DC





GENERAL NOTES:

1) FINAL ARRAY LAYOUT MAY CHANGE BASED ON INVERTER LOCATIONS, ACCESS AND DRAINAGE DESIGN, SHADING ASSESSMENTS AND PERMITTING PROCESS.
2) THE ARRAY 1 RACKING SYSTEM HAS BEEN DESIGNED FOR A 30° MODULE ANGLE FOR A BALANCE OF OPTIMUM SOLAR RADIATION AND ROW SPACING.
3) PANEL LAYOUTS ASSUME THE FOLLOWING EQUIPMENT SPECIFICATIONS:
   A) ARRAY 1 – 305 WATT 60 CELL MODULES USING A 30° RACKING TILT
   B) ARRAY 2 – 305 WATT 60 CELL MODULES AND USING A 20° RACKING TILT
   RACK SPACING AND PANEL TILT FOR ARRAY HAS BEEN OPTIMIZED TO SITE A 596KW± ARRAY AND HAS NOT BEEN OPTIMIZED FOR ZERO SEASONAL RACK TO RACK SHADING
4) THE CURRENT LAYOUT WILL BE REVISED TO REFLECT UPDATED PANEL MODELS, IF DIFFERENT, DURING THE EQUIPMENT PROCUREMENT PROCESS.

MonoX NeON

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LEGEND

- EXISTING CONTOUR LINE
- EDGE OF BORDERING VEGETATED WETLANDS W/WETLAND FLAG BASED UPON A FIELD DELINEATION
- 100' BUFFER ZONE
- EDGE OF WATER PER MASSGIS
- TOP OF COASTAL BANK
- 100' TOP OF COASTAL BANK BUFFER
- IWPA AND TOWN OF SANDWICH WATER RESOURCE PROTECTION DISTRICT
- NHESP PRIOIRTY HABITAT OF RARE SPECIES
- ZONE X / AE EL=14 — FEMA FLOOD ZONE
- ZONING LINE
- EX. EASEMENT
- EX. UTILITY POLE
- EX. CHAIN LINK FENCE
- EX. POST AND RAIL FENCE
- EX. GUARD RAIL
- EX. STONE WALL
- EX. TREE LINE
- EX. PREVIOUSLY CLEARED/PARTIALLY OVERGROWN AREA
- EX. GUY WIRE ANCHOR
- EX. UTILITY POLE
- EX. CATCHBASIN
- EX. BENCHMARK
- EX. TREE
- EX. TRANSMISSION TOWER
- EX. LIGHT
- EX. MANHOLE
- EX. SIGN
- EX. POST
- EX. CONTROL STATION
- EX. SWAMP
- EX. BOUND
- EX. SPOT ELEVATION
- EX. HYDRANT
- EX. WATER GATE
- EX. DIRT ROAD
- PR. GRAVEL ACCESS ROAD
- PR. TREE LINE
- PR. UTILITY POLE
- PR. UNDERGROUND 22.8 kV THREE–PHASE CIRCUIT
- PR. NET METER CABINET
- PR. PANEL BOARD
- PR. PAD MOUNTED TRANSFORMER

FILE: 2796.01–PRELIM

Atlantic® DESIGN ENGINEERS, INC.
P.O. Box 1051, Sandwich, MA 02563 (508) 888 – 9282

Designed by :
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Checked by :
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Approved by :

SCALE
SCALE 1" = 100'
0 25 50 100 200

DATE

NO.	BY	DATE	REVISION

APPLICANT:
NRG RENEW CANAL 1, LLC
9 FREEZER ROAD
SANDWICH, MA 02563

OVERALL SITE DEVELOPMENT PLAN
FOR
CANAL COMMUNITY SOLAR PROJECT
SANDWICH, MASSACHUSETTS 02563
OCTOBER 9, 2015

Sheet 6 of 8
JOB NUMBER 2796.01

SEE SHEET 8

FREEMAN LANE

BOURNE SANDWICH

PROPOSED PAD MOUNT TRANSFORMER

PROPOSED PANEL BOARD

PROPOSED ARRAY #1 LOAD BREAK DISCONNECT

PROPOSED UNDERGROUND UTILITIES TO PANEL BOARD

PROPOSED 15' WIDE GRAVEL ACCESS ROAD

ARRAY #2
1,862 SOLAR PANELS,
567.9 KW DC
(MAP 86, LOT 15)

ARRAY #1
3,591 SOLAR PANELS,
1,095.3 KW DC POWER
(MAP 86, LOT 13)

360' COMMONWEALTH ELECTRIC COMPANY ELECTRIC TRANSMISSION EASEMENT BOOK 3297 PAGE 295

100' ELECTRIC DISTRIBUTION EASEMENT

50' PERMANENT GAS EASEMENT

SHADING CLEARING

PROPOSED 6' HIGH CHAIN LINK FENCE (TYP)

PROPOSED ARRAY #1 NET METER CABINET

PROPOSED ARRAY #2 NET METER CABINET

PROPOSED EVERSOURCE DISCONNECT UTILITY POLE

PROPOSED EVERSOURCE RECLOSER UTILITY POLE

EXISTING EVERSOURCE UTILITY POLE

PROPOSED EVERSOURCE UTILITY POLE

EXISTING EVERSOURCE UTILITY POLE

EXISTING EVERSOURCE 22.8 kV THREE PHASE OVERHEAD DISTRIBUTION CIRCUIT (4-81A-349)

N/F
MAP 18.2, LOT 10.1
BOURNE
CONSERVATION TRUST

N/F
MAP 18.2, LOT 9
BILODEAU TR
SAGAMORE INN RLTY

N/F
MAP 18, LOT 11
NSTAR ELECTRIC CO

N/F
MAP 86, LOT 12
CANAL ELECTRIC COMPANY

N/F
MAP 86, LOT 14
NRG CANAL, LLC

N/F
MAP 86, LOT 41
TOWN OF SANDWICH

N/F
MAP 86, LOT 101
SNOW GOOSE LANDING LLC

TUPPER ROAD
PUBLIC-1948 COUNTY COMMISSIONERS LAYOUT
(VARIABLE WIDTH)

ROUTE 6A – SANDWICH ROAD
PUBLIC-1930 STATE HIGHWAY LAYOUT
(VARIABLE WIDTH)

ROUTE 6A – CRANBERRY HIGHWAY
PUBLIC-1930 STATE HIGHWAY LAYOUT
(VARIABLE WIDTH)

RTE 130 (MAIN ST)

PRIORITY HABITAT PH 359

SEE SHEET 6 FOR LEGEND AND NOTES

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0 10 20 40 80

DATE

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9 FREEZER ROAD
SANDWICH, MA 02563

SITE VICINITY PLAN
FOR
CANAL COMMUNITY SOLAR PROJECT
SANDWICH, MASSACHUSETTS 02563
OCTOBER 9, 2015

Sheet 7 of 8
JOB NUMBER 2796.01

ARRAY #1
3,591 SOLAR PANELS,
1,095.3 KW DC POWER
(MAP 86, LOT 13)

ARRAY #2
1,862 SOLAR PANELS,
567.9 KW DC
(MAP 86, LOT 15)

N/F
MAP 12.4,
LOT 26
SUSAN MARTH

N/F
MAP 18.2, LOT
10.1
BOURNE
CONSERVATION
TRUST

N/F
MAP 86, LOT 16
NRG CANAL, LLC

N/F
MAP 86, LOT 19
NRG CANAL, LLC

N/F
MAP 86, LOT 18
NRG CANAL, LLC

N/F
MAP 86, LOT 17
KIENZLE, FRANCES A

"LAND SUBJECT TO COASTAL STORM FLOWAGE"

TANK

BIO-RETENTION BASIN

FOREBAY

50' PERMANENT GAS EASEMENT

100' BUFFER ZONE

ZONE AE EL=14
ZONE X

PROPOSED 6' HIGH CHAIN LINK FENCE (TYP)

PROPOSED 15' WIDE GRAVEL ACCESS ROAD

PROPOSED PAD MOUNT TRANSFORMER

PROPOSED PANEL BOARD

PROPOSED ARRAY #1 LOAD BREAK DISCONNECT

PROPOSED ARRAY #2 LOAD BREAK DISCONNECT

PROPOSED UNDERGROUND UTILITIES TO PANEL BOARD

EXISTING ACCESS ROAD

360' COMMONWEALTH ELECTRIC COMPANY ELECTRIC TRANSMISSION EASEMENT BOOK 3297 PAGE 295

BOURNE SANDWICH

FREEMAN LANE

TUPPER ROAD
PUBLIC-1948 COUNTY COMMISSIONERS LAYOUT (VARIABLE WIDTH)

N27°53'11"E 290.86'
(REAR YARD SETBACK TO PL) 377.0'
N28°52'29"E 112.01'
N30°59'12"E 218.78'
N33°11'10"E 306.64'
S17°54'38"W 417.11'
N 84°04'02" W 1387.36'
S61°09'22"E 282.57'
N 89°54'48" W 271.17'
S 05°05'12" W 84.32'

SEE SHEET 7

SEE SHEET 6 FOR LEGEND AND NOTES

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SCALE
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0 10 20 40 80

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SITE VICINITY PLAN
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Sheet 8 of 8
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