



1280 Route 46 West, Suite 9, Parsippany NJ, 07054

Ms. Melanie Bachman, Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Notice of Exempt Modification Application
1866 River Road

September 28, 2017

Dear Ms. Bachman:

Sprint Spectrum Realty Company, L.P. ("Sprint"), is submitting to the Connecticut Siting Council for a Notice of Exempt Modification for Proposed Modifications to an Existing Telecommunications Facility located at the above-referenced site. Sprint currently maintains 1 existing panel antenna and 2 remote radio units at the 152' level of the rooftop parapet walls and 2 panel antennas and 4 RRU's at the 133' level on the existing smokestack next to the NRG building. Sprint proposes to add 1 panel antenna and 1 remote radio units at 152' parapet location and 2 panel antennas and 2 RRU's at the 133' level on the aforementioned Smokestack.

This modification was initially approved on 7/15/2002 by CT Siting Council and a Middletown Building permit was issued on 9/10/2002. The documents enclosed have been modified where necessary to reflect the current reality of the installations on the Smokestack.

If you have any questions, please feel free to contact me.

Thank you,

By: *Paul F. Sagristano*

Paul F. Sagristano
Cherundolo Consulting
917.841.0247
psagristano@lrvassoc.com



1280 Route 46 West, Suite 9, Parsippany NJ, 07054

Ms. Melanie Bachman
Executive Director
CT Siting Council
10 Franklin Square
New Britain, CT 06051

October 4, 2017

Re: Notice of Exempt Modification –
Existing Sprint Telecommunication Facility
1866 River Road
Middletown, CT 06457

Latitude : N41.5544
Longitude: W72.58083

Dear Ms. Bachman:

Sprint currently maintains 1 existing panel antenna and 2 remote radio units at the 152' centerline level of the rooftop parapet walls and 2 panel antennas and 4 RRU's at the 133' centerline level on the existing smokestack next to the NRG building. Sprint proposes to add 1 panel antenna and 1 remote radio unit at 152' centerline on the parapet location and 2 panel antennas and 2 RRU's at the 133' centerline level on the aforementioned Smokestack. Sprint is performing a new high-performance upgrade for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

The facility noted above was approved building by the City of Middletown on September 26, 2002. A copy of this approval is attached. The original CSC approval for Sprint's Tower Share was September 26, 2002, also attached.

Please accept this letter as notification to the Council, pursuant to R.C.S.A. Section 16-50j-73, for construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter is being sent to Bob Lee the GM of NRG Inc., the property owner and to Hon. Daniel Drew, Mayor of the City of Middletown.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in Sprint's operations at the site. Also included is documentation of the structural sufficiency of the tower with proposed modifications to accommodate the revised antenna configuration.

Existing Facility

The Middletown facility is located at 1866 River Road, Middletown, CT, the Site coordinates are: N41. 5544, W – 72.58083. The facility is owned by NRG Inc., The existing facility consists of a 266’ Smokestack and a 149’ roof parapet. Sprint currently operates wireless communications equipment on a steel platform at the facility and has one antenna and 2 RRU’s mounted on the parapet wall at a centerline of 152’ feet. There are currently 2 antennas and 4 RRU’s mounted on the Smokestack at a centerline of 133’.

Statutory Considerations

The planned modifications to the facility fall within the activities explicitly provided for in R.C.S.A. 16-50j-72(b)(2)

1. The height of the overall structure will be unaffected.
2. The proposed changes will not require an extension of the property boundaries.
3. The proposed additions will not increase the noise level at the existing facility by six decibels or more, or to levels that exceed state and/or local criteria
4. The changes will not increase the calculated “worst case” power density for the combined operations at the site to a level at or above the Federal Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Sprint respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A Section §16-50j-72(b)(2).

Respectfully submitted,

Paul F. Sagristano

Paul F. Sagristano
Charles Cherundolo Consulting
917-841-0247
psagristano@lrvassoc.com

PFS/mtf

Additional Recipients:

City of Middletown – Mayor Daniel Drew – Via Fed Ex

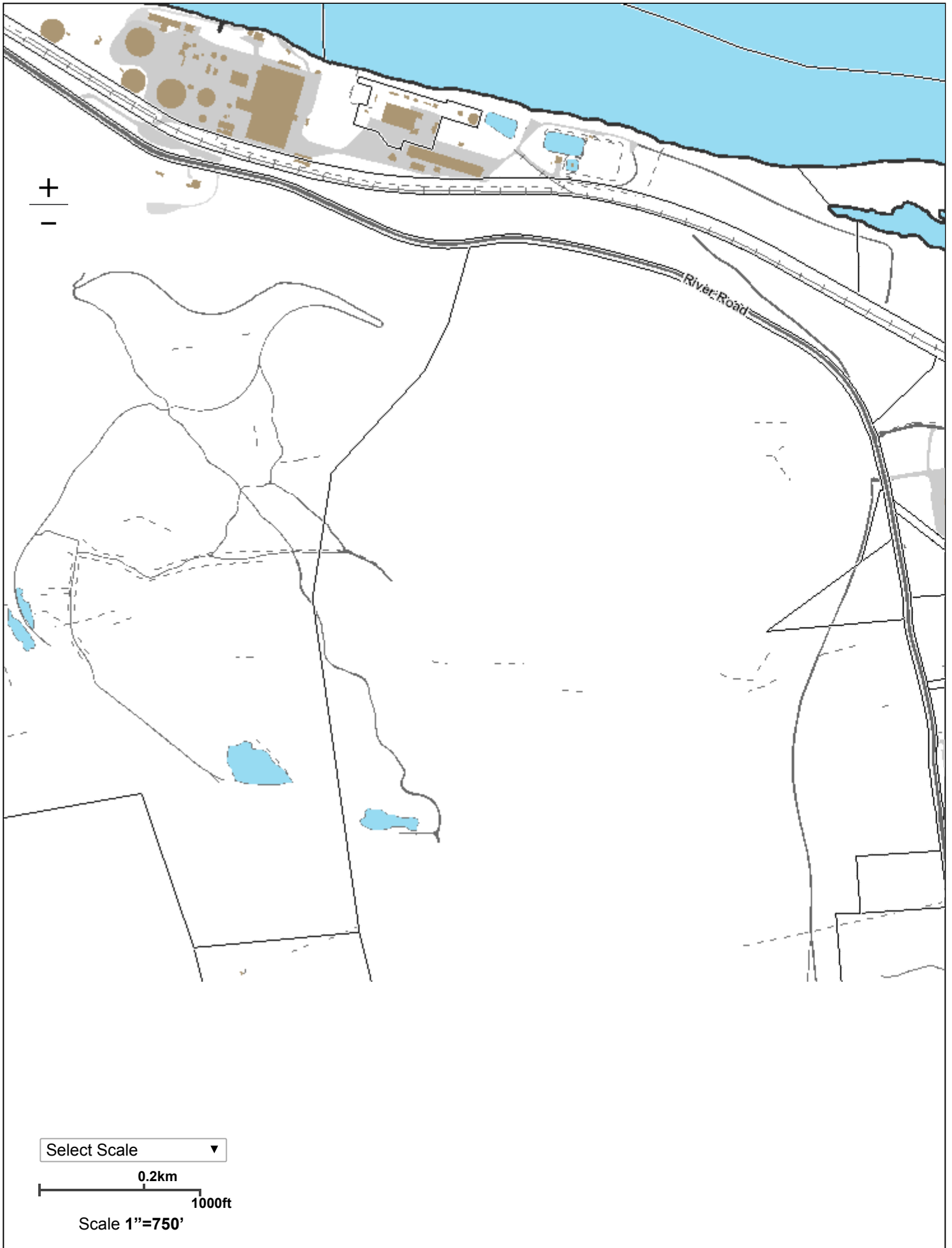
NRG Inc., Bob Lee, GM - Via Fed Ex

City of Middletown – Planning Director – Joe Samolis – Via Fed Ex

Google Maps 1866 River Rd



Map data ©2017 Google United States 200 ft



1866 RIVER RD

Location 1866 RIVER RD

Mblu 51 / 0002 / /

Acct# R15354

Owner THE CONNECTICUT LIGHT
AND POWER

Assessment \$283,500

Appraisal \$404,990

PID 15474

Building Count 1

Current Value

| Appraisal | | | |
|----------------|--------------|------|-----------|
| Valuation Year | Improvements | Land | Total |
| 2013 | \$404,990 | \$0 | \$404,990 |

| Assessment | | | |
|----------------|--------------|------|-----------|
| Valuation Year | Improvements | Land | Total |
| 2013 | \$283,500 | \$0 | \$283,500 |

Owner of Record

Owner THE CONNECTICUT LIGHT AND POWER
Co-Owner COMPANY
Address 107 SELDEN ST
BERLIN, CT 06037

Sale Price \$0
Certificate
Book & Page 1724/ 566
Sale Date 04/01/2011
Instrument 29

Ownership History

| Ownership History | | | | | |
|---------------------------------|------------|-------------|-------------|------------|------------|
| Owner | Sale Price | Certificate | Book & Page | Instrument | Sale Date |
| THE CONNECTICUT LIGHT AND POWER | \$0 | | 1724/ 566 | 29 | 04/01/2011 |
| THE CONNECTICUT LIGHT AND POWER | \$0 | | 1724/ 556 | 29 | 04/01/2011 |
| GENCONN MIDDLETOWN LLC | \$0 | | 1724/ 543 | 29 | 04/01/2011 |
| MIDDLETOWN POWER LLC | \$0 | | 1221/ 673 | 29 | 12/16/1999 |

Building Information

Building 1 : Section 1

Year Built: 2010
Living Area: 9,022
Replacement Cost: \$346,715
Building Percent 98
Good:

**Replacement Cost
Less Depreciation:** \$339,780

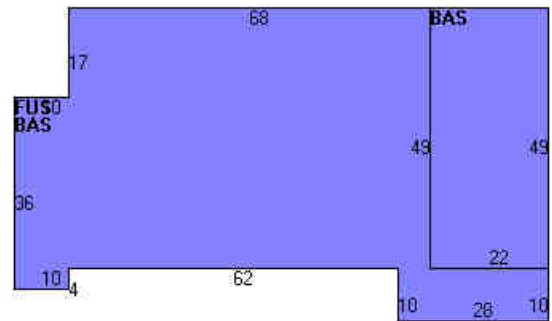
| Building Attributes | |
|---------------------|-----------------|
| Field | Description |
| STYLE | Pre-Eng Mfg |
| MODEL | Industrial |
| Grade | C |
| Stories | 1 |
| Occupancy | 1 |
| Exterior Wall 1 | Pre-finish Metl |
| Exterior Wall 2 | |
| Roof Structure | Gable |
| Roof Cover | Average |
| Interior Wall 1 | Average |
| Interior Wall 2 | |
| Interior Floor 1 | Average |
| Interior Floor 2 | |
| Heating Fuel | Electric |
| Heating Type | Electr Basebrd |
| AC Type | None |
| Bldg Use | Industrial |
| Cov Parking | 0 |
| Uncov Parking | 0 |
| Percent Fin | 100 |
| 1st Floor Use | |
| Heat/AC | Heat/AC Split |
| Frame Type | Steel |
| Baths/Plumbing | Average |
| Ceiling/Walls | Typical |
| Rooms/Prtns | Average |
| Wall Height | 33 |

Building Photo



(<http://images.vgsi.com/photos/MiddletownCTPhotos//\00\02\73>)

Building Layout



| Building Sub-Areas (sq ft) | | | Legend |
|----------------------------|----------------------|------------|-------------|
| Code | Description | Gross Area | Living Area |
| BAS | First Floor | 5,050 | 5,050 |
| FUS | Finished Upper Story | 3,972 | 3,972 |
| | | 9,022 | 9,022 |

Extra Features

| Extra Features | | | | Legend |
|----------------|--------------------|------------|----------|--------|
| Code | Description | Size | Value | Bldg # |
| SPR1 | Sprinklers-Wet | 5050 UNITS | \$3,960 | 1 |
| ELV2 | Elevator - Freight | 2 STOPS | \$61,250 | 1 |

Land

Land Use

Land Line Valuation

| | | | |
|-------------------------------|------------|------------------------|-----|
| Use Code | 301 | Size (Acres) | 0 |
| Description | Industrial | Frontage | 0 |
| Zone | I-3 | Depth | 0 |
| Neighborhood | 3075 | Assessed Value | \$0 |
| Alt Land Appr Category | No | Appraised Value | \$0 |

Outbuildings

| Outbuildings | <u>Legend</u> |
|--------------------------|---------------|
| No Data for Outbuildings | |

Valuation History

| Appraisal | | | |
|----------------|--------------|------|-----------|
| Valuation Year | Improvements | Land | Total |
| 2016 | \$404,990 | \$0 | \$404,990 |
| 2015 | \$404,990 | \$0 | \$404,990 |
| 2014 | \$404,990 | \$0 | \$404,990 |

| Assessment | | | |
|----------------|--------------|------|-----------|
| Valuation Year | Improvements | Land | Total |
| 2016 | \$283,500 | \$0 | \$283,500 |
| 2015 | \$283,500 | \$0 | \$283,500 |
| 2014 | \$283,500 | \$0 | \$283,500 |

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**STATE OF CONNECTICUT****CONNECTICUT SITING COUNCIL**

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@po.state.ct.usWeb Site: www.state.ct.us/csc/index.htm**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

July 15, 2002

Thomas J. Regan, Esq.
Brown Rudnick Berlack Israels LLP
185 Asylum Street, City Place I
Hartford, Connecticut 06103-3402

RE: **PETITION NO. 571** - Sprint Spectrum L.P. petition for a declaratory ruling that no certificate of environmental compatibility and public need is required for the addition of antennas to the existing NRG Energy, Inc. facility located at 1866 River Road, Middletown, Connecticut.

Dear Attorney Regan:

At a public meeting held on July 11, 2002, the Connecticut Siting Council (Council) considered and ruled that this proposal would not have a substantial adverse environmental effect, and pursuant to General Statutes § 16-50k would not require a Certificate of Environmental Compatibility and Public Need.

This decision is under the exclusive jurisdiction of the Council and is not applicable to any other modification or construction. All work is to be implemented as specified in the petition, dated June 24, 2002.

Enclosed for your information is a copy of the staff report on this project.

Very truly yours,

A handwritten signature in black ink, appearing to read "Mortimer A. Galston" followed by a stylized flourish.

Mortimer A. Galston
Chairman

MAG/foc

Enclosure: Staff Report dated July 11, 2002

c: Honorable Domenique S. Thornton, Mayor, City of Middletown



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@po.state.ct.us

Web Site: www.state.ct.us/csc/index.htm

Petition No. 571

Sprint PCS

Middletown, Connecticut

Staff Report

July 11, 2002

On July 10, 2002, Connecticut Siting Council (Council) member Gerald Heffernan and Fred Cunliffe of Council staff met Sprint representatives Thomas Regan, Jeff Gutowski, and Tina Marie Lopez for an inspection of an antenna installation on the roof of the boiler room building of the Middletown Electric Generating facility owned by NRG located at 1866 River Road, Middletown. Sprint proposes to modify the boiler room building for telecommunications use and is petitioning the Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need (Certificate) would be required for the proposed modification.

Sprint proposes to attach a total of 12 antennas, each measuring approximately 60 inches tall by eight inches wide by three inches deep, each supported by an approximately two-inch diameter by 66 inch long pipe extension mounted on the parapet of the boiler room roof. Sprint proposes to install two sectors with antenna centerline radiation at 134 feet above ground level mounted on the east and west side of the boiler room roof. Another sector would be installed on the south boiler room roof with antenna centerline radiation at 153 feet above ground level. Sprint would install power and communications cabinets on a 7-foot by 22-foot steel frame on the northwest corner of the boiler room roof.

The proposed site is an electric generating facility located in a remote area of Middletown along the Connecticut River. The Department of Environmental Protection commented that bald eagles use trees on the shores of the Connecticut River for perching and feeding from December to March; however, Sprint's proposal to install antennas on the generating building would have no effect on the bald eagles. The worst case power density for the proposed telecommunications operations at the site has been calculated to be approximately .05% of the applicable ANSI standard for uncontrolled environments.

Sprint contends that the proposed modification would not adversely affect the environment or ecology; would have no impact on scenic, historic, or recreational values; and therefore, would not require a Certificate.

BRBI BROWN
RUDNICK
BERLACK
ISRAELS LLP

FAX COVER SHEET

Date: July 17, 2002

THIS TRANSMISSION CONSISTS OF THIS COVER SHEET AND



PAGE(S).

ORIGINAL DOCUMENT TO FOLLOW:

YES NO

| DELIVER TO: | COMPANY/FIRM: | FAX NUMBER: | PHONE NUMBER: |
|---------------|---------------|--------------|---------------|
| TINA LOPEZ | SPRINT PCS | 201/684-4070 | 201/684-4072 |
| JEFF GUTOWSKI | SPRINT PCS | 201/684/4070 | 201/684-4078 |

Our facsimile number is: (860)509-6501

From: THOMAS J. REGAN
Phone: 860/509-6522
C/M/A #: 80563/2710/825

 **MESSAGE**

RE Middletown, CT
(CT43XC843)

Attached you will find a copy the Connecticut Siting Council ruling of July 11, 2002 in connection with the referenced matter.

If you do not receive all pages, please call Office Services at (860) 509-6500.

*****CONFIDENTIALITY NOTE*****

The documents accompanying this fax transmission contain information from the law firm of Brown Rudnick Berlack Israels which is confidential or privileged. The information is intended to be for the use of the individual or entity named on this transmission sheet. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of the contents of this faxed information is prohibited. If you have received this fax in error, please notify us by telephone immediately so that we can arrange for the retrieval of the original documents at no cost to you.

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Boston / Dublin / Hartford / London / New York / Providence

CT43XC 843

BUILDING PERMIT

JOB WEATHER CARD

DATE 9/10/2002 PERMIT NO. 27128

APPLICANT McFarland-Johnson, Inc. ADDRESS 400 Bayonet St. Suite 301
for Sprint Spectrum LP NEW LONDON CT. 06320 (CONTRACT LICENSE)

PERMIT TO install Telecom Equipment Roof-top NUMBER OF DWELLING UNITS _____
(TYPE OF IMPROVEMENT) NO. (PROPOSED USE)

AT (LOCATION) 1866 River Road-NRG Energy, Inc. ZONING DISTRICT I-3
(NO.) (STREET)

BETWEEN _____ AND _____
(CROSS STREET) (CROSS STREET)

DIVISION _____ LOT _____ BLOCK _____ LOT SIZE _____

BUILDING IS TO BE _____ FT. WIDE BY _____ FT. LONG BY _____ FT. IN HEIGHT AND SHALL CONFORM IN CONSTRUCTION

TYPE _____ USE GROUP _____ BASEMENT WALLS OR FOUNDATION _____ (TYPE)

MARKS: Roof-top mount of radio cabiner, battery cabinet and antennas.

EA OR VOLUME _____ ESTIMATED COST \$ 60,000.00 PERMIT FEE \$ 614.60
(CUBIC/SQUARE FEET)

OWNER NRG Energy, Inc. BUILDING DEPT. BY [Signature]
ADDRESS 1866 River Road, Middletown, Ct. 06457

THIS PERMIT CONVEYS NO RIGHT TO OCCUPY ANY STREET, ALLEY OR SIDEWALK OR ANY PART THEREOF, EITHER TEMPORARILY OR PERMANENTLY. ENCROACHMENTS ON PUBLIC PROPERTY, NOT SPECIFICALLY PERMITTED UNDER THE BUILDING CODE, MUST BE APPROVED BY THE JURISDICTION. STREET OR ALLEY GRADES AS WELL AS DEPTH AND LOCATION OF PUBLIC SEWERS MAY BE OBTAINED FROM THE DEPARTMENT OF PUBLIC WORKS. THE ISSUANCE OF THIS PERMIT DOES NOT RELEASE THE APPLICANT FROM THE CONDITIONS OF ANY APPLICABLE SUBDIVISION RESTRICTIONS.

MINIMUM OF THREE CALLED INSPECTIONS REQUIRED FOR ALL CONSTRUCTION WORK:
FOUNDATIONS OR FOOTINGS, PRIOR TO COVERING STRUCTURAL MEMBERS (READY FOR LATH OR FINISH COVERING), FINAL INSPECTION BEFORE OCCUPANCY.

APPROVED PLANS MUST BE RETAINED ON JOB AND THIS CARD KEPT POSTED UNTIL FINAL INSPECTION HAS BEEN MADE. WHERE A CERTIFICATE OF OCCUPANCY IS REQUIRED, SUCH BUILDING SHALL NOT BE OCCUPIED UNTIL FINAL INSPECTION HAS BEEN MADE.

WHERE APPLICABLE SEPARATE PERMITS ARE REQUIRED FOR ELECTRICAL, PLUMBING AND MECHANICAL INSTALLATIONS.

POST THIS CARD SO IT IS VISIBLE FROM STREET

| BUILDING INSPECTION APPROVALS | PLUMBING INSPECTION APPROVALS | ELECTRICAL INSPECTION APPROVALS |
|-------------------------------|------------------------------------|---------------------------------|
| 1 | 1 | 1 |
| 2 | 2 | 2 |
| HEATING INSPECTION APPROVALS | REFRIGERATION INSPECTION APPROVALS | |
| 1 | 1 | |
| 2 | 2 | |

WORKER SHALL NOT PROCEED UNTIL THE INSPECTOR HAS APPROVED THE VARIOUS STAGES OF CONSTRUCTION.

PERMIT WILL BECOME NULL AND VOID IF CONSTRUCTION WORK IS NOT STARTED WITHIN SIX MONTHS OF DATE THE PERMIT IS ISSUED AS NOTED ABOVE.

INSPECTIONS INDICATED ON THIS CARD CAN BE ARRANGED FOR BY TELEPHONE OR WRITTEN NOTIFICATION.

CT 43XC 843

BUILDING PERMIT

AMOUNT PAID

APPLICANT COPY
THIS PERMIT NOT VALID UNLESS
PROPERLY RECEIVED BY CASHIER

VALIDATION

27128

DATE 9/10/2002 20 PERMIT NO. 27128
 APPLICANT McFarland-Johnson, Inc. ADDRESS 400 Bayonet St. Suite 301
for Sprint Spectrum LP NEW LONDON, CT. 06320 (CONTR'S LICENSE)
 PERMIT TO Install Telecom Equipment Roof-top NUMBER OF DWELLING UNITS

AT (LOCATION) 1866 River Road-NRG Energy, Inc. ZONING DISTRICT L-3
 (NO.) (STREET)
 BETWEEN (CROSS STREET) AND (CROSS STREET)

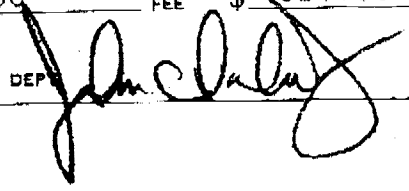
SUBDIVISION LOT BLOCK LOT SIZE

BUILDING IS TO BE FT. WIDE BY FT. LONG BY FT. IN HEIGHT AND SHALL CONFORM IN CONSTRUCTION

TO TYPE USE GROUP BASEMENT WALLS OR FOUNDATION (TYPE)

REMARKS: Roof-top mount of radio cabiner, battery cabinet and antennas.

AREA OR VOLUME (CUBIC/SQUARE FEET) ESTIMATED COST \$ 60,000.00 PERMIT FEE \$ 614.60

OWNER NRG Energy, Inc. BUILDING DEPT BY 
 ADDRESS 1866 River Road, Middletown, CT. 06457

FORM NO. BOCA - BP 1994



RADIO FREQUENCY EMISSIONS ANALYSIS REPORT EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

SPRINT Existing Facility

Site ID: CT43XC843

Portland-NRG Energy
1866 River Road
Middletown, CT 06457

September 15, 2017

EBC Project Number: 6217004057

| Site Compliance Summary | |
|---|------------------|
| Compliance Status: | COMPLIANT |
| Site total MPE% of FCC general population allowable limit: | 3.29 % |



September 15, 2017

SPRINT

Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Emissions Analysis for Site: **CT43XC843 – Portland-NRG Energy**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **1866 River Road, Middletown, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 850 MHz Band is approximately $567 \mu\text{W}/\text{cm}^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **1866 River Road, Middletown, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.
- 2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.
- 3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.
- 4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.



- 6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 7) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antennas used in this modeling are the **RFS APXVSP18-C-A20**, **RFS APXV9ERR18-C-A20** and the **RFS APXVTM14-ALU-120** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antenna mounting height centerlines of the proposed antennas are **152 feet** above ground level (AGL) for **Sector A**, **133 feet** above ground level (AGL) for **Sector B** and **133 feet** above ground level (AGL) for Sector C.
- 10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general population threshold limits.



SPRINT Site Inventory and Power Data by Antenna

| Sector: | A | Sector: | B | Sector: | C |
|--------------------|--------------------------|--------------------|--------------------------|--------------------|--------------------------|
| Antenna #: | 1 | Antenna #: | 1 | Antenna #: | 1 |
| Make / Model: | RFS APXVSP18-C-A20 | Make / Model: | RFS APXVSP18-C-A20 | Make / Model: | RFS APXV9ERR18-C-A20 |
| Gain: | 13.4 / 15.9 dBd | Gain: | 13.4 / 15.9 dBd | Gain: | 13.4 / 15.9 dBd |
| Height (AGL): | 152 feet | Height (AGL): | 133 feet | Height (AGL): | 133 feet |
| Frequency Bands | 850 MHz / 1900 MHz (PCS) | Frequency Bands | 850 MHz / 1900 MHz (PCS) | Frequency Bands | 850 MHz / 1900 MHz (PCS) |
| Channel Count | 10 | Channel Count | 10 | Channel Count | 10 |
| Total TX Power(W): | 220 Watts | Total TX Power(W): | 220 Watts | Total TX Power(W): | 220 Watts |
| ERP (W): | 7,537.38 | ERP (W): | 7,537.38 | ERP (W): | 5,873.76 |
| Antenna A1 MPE% | 1.44 % | Antenna B1 MPE% | 1.90 % | Antenna C1 MPE% | 1.47 % |
| Antenna #: | 2 | Antenna #: | 2 | Antenna #: | 2 |
| Make / Model: | RFS APXVTM14-ALU-120 | Make / Model: | RFS APXVTM14-ALU-120 | Make / Model: | RFS APXVTM14-ALU-120 |
| Gain: | 15.9 dBd | Gain: | 15.9 dBd | Gain: | 15.9 dBd |
| Height (AGL): | 152 feet | Height (AGL): | 133 feet | Height (AGL): | 133 feet |
| Frequency Bands | 2500 MHz (BRS) | Frequency Bands | 2500 MHz (BRS) | Frequency Bands | 2500 MHz (BRS) |
| Channel Count | 8 | Channel Count | 8 | Channel Count | 8 |
| Total TX Power(W): | 160 Watts | Total TX Power(W): | 160 Watts | Total TX Power(W): | 160 Watts |
| ERP (W): | 6,224.72 | ERP (W): | 6,224.72 | ERP (W): | 6,224.72 |
| Antenna A2 MPE% | 1.05 % | Antenna B2 MPE% | 1.39 % | Antenna C2 MPE% | 1.39 % |

| Site Composite MPE% | |
|-------------------------------|---------------|
| Carrier | MPE% |
| SPRINT – Max per sector | 3.29 % |
| No Additional Carriers Listed | NA |
| Site Total MPE %: | 3.29 % |

| | |
|------------------------|---------------|
| SPRINT Sector A Total: | 2.49 % |
| SPRINT Sector B Total: | 3.29 % |
| SPRINT Sector C Total: | 2.85 % |
| Site Total: | 3.29 % |

| SPRINT _ Max Values per Frequency Band / Technology (Sector B) | # Channels | Watts ERP (Per Channel) | Height (feet) | Total Power Density ($\mu\text{W}/\text{cm}^2$) | Frequency (MHz) | Allowable MPE ($\mu\text{W}/\text{cm}^2$) | Calculated % MPE |
|--|------------|-------------------------|---------------|---|-----------------|---|------------------|
| Sprint 850 MHz CDMA | 1 | 437.55 | 133 | 0.98 | 850 MHz | 567 | 0.17% |
| Sprint 850 MHz LTE | 2 | 437.55 | 133 | 1.95 | 850 MHz | 567 | 0.34% |
| Sprint 1900 MHz (PCS) CDMA | 5 | 622.47 | 133 | 6.94 | 1900 MHz (PCS) | 1000 | 0.69% |
| Sprint 1900 MHz (PCS) LTE | 2 | 1,556.18 | 133 | 6.94 | 1900 MHz (PCS) | 1000 | 0.69% |
| Sprint 2500 MHz (BRS) LTE | 8 | 778.09 | 133 | 13.87 | 2500 MHz (BRS) | 1000 | 1.39% |
| Total:* | | | | | | 3.29% | |

*NOTE: Totals may vary by 0.01% due to summing of remainders



Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

| SPRINT Sector | Power Density Value (%) |
|------------------------------------|-------------------------|
| Sector A: | 2.49 % |
| Sector B: | 3.29 % |
| Sector C: | 2.85 % |
| SPRINT Maximum Total (per sector): | 3.29 % |
| | |
| Site Total: | 3.29 % |
| | |
| Site Compliance Status: | COMPLIANT |

The anticipated composite MPE value for this site assuming all carriers present is **3.29 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.



August 17, 2017

Tom Jupin
Charles Cherundolo Consulting, Inc.
1280 Rt. 46 West
Parsippany, NJ 07054

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583

SUBJECT: STRUCTURAL ASSESSMENT

CARRIER: SPRINT

SITE: PORTLAND-NRG ENERGY (CT43XC843-A)
1866 RIVER ROAD
MIDDLETOWN, MIDDLESEX COUNTY, CONNECTICUT 06457
RAMAKER & ASSOCIATES PROJECT NUMBER: 28743

RESULTS: MOUNT: PASS WITH MODIFICATIONS

Dear Tom Jupin:

Ramaker & Associates, Inc. (RAMAKER) respectfully submits this structural assessment for the above mentioned site. The purpose of this report is to determine the structural integrity of the structure(s) with the proposed loading configurations. Engineering recommendations regarding the analysis results are provided in the following pages.


RAMAKER analyzed the structure(s) using accepted engineering practices. All information contained herein is valid only for the described structure configuration and loading conditions. RAMAKER reserves the right to modify our recommendations should alterations to the structure(s) loading occur.

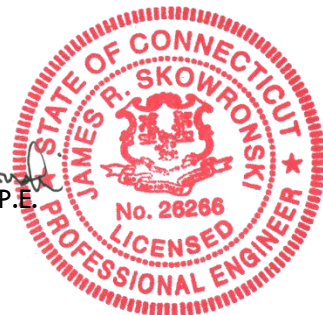
If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.


James M. Alvin
Structural Designer


James R. Skowronski, P.E.
Supervising Engineer



ANALYSIS CRITERIA

| | |
|---------------------------------------|-----------------------------|
| State Building Code | 2016 CT State Building Code |
| Adopted Building Code | 2012 IBC |
| Referenced Standard | TIA-222-G |
| Risk Category | II |
| Ultimate Design Wind Speed, V_{ult} | 130 mph (3 sec. gust) |
| Nominal Design Wind Speed, V_{asd} | 101 mph (3 sec. gust) |
| Design Wind Speed w/ Ice | 50 mph (3 sec. gust) |
| Ice Thickness | 3/4 inch |
| Exposure Category | C |
| Topographic Category | 1 |
| Crest Height | N/A |

SUPPORTING DOCUMENTATION

- Previous structural analysis by Tectonic, project number 6318.43-843, dated 11/20/12
- Previous construction drawings by Tectonic, project number 6318.43-843, dated 12/20/12
- Previous construction drawings by McFarland - Johnson, project number 15805.11, dated 7/21/01
- Construction drawings by RAMAKER, project number 28743
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

MOUNT LOADING

RAMAKER understands that the loading to be used for this analysis will consist of the antennas and equipment configurations as shown in the following chart(s):

| Antenna Mount – Alpha Sector | | | | |
|------------------------------|----------|--------------------------|------------|----------|
| Elevation | Position | Appurtenance | Mount Type | Status |
| 152 | 1 | (1) RFS APXVTM14-ALU-I20 | Pipe Mount | Proposed |
| | | (1) ALU TD-RRH8x20-25 | | |
| | 2 | (1) RFS APXVSP18-C-A20 | Pipe Mount | Existing |
| | -- | (1) ALU RRH1900-4x45 | Unistrut | Existing |
| | | (1) ALU RRH2x50-800 | | |
| | 3 | -- | Pipe Mount | -- |
| | 4 | -- | Pipe Mount | -- |
| 5 | -- | Pipe Mount | -- | |

| Antenna Mount – Beta Sector | | | | |
|-----------------------------|----------|--------------------------|------------|----------|
| Elevation | Position | Appurtenance | Mount Type | Status |
| 133 | 1 | (1) RFS APXVTM14-ALU-I20 | Pipe Mount | Proposed |
| | | (1) ALU TD-RRH8x20-25 | | |
| | 2 | (1) RFS APXVSP18-C-A20 | Pipe Mount | Existing |
| | -- | (1) ALU RRH1900-4x45 | Unistrut | Existing |
| | | (1) ALU RRH2x50-800 | | |
| | 3 | -- | Pipe Mount | -- |
| 4 | -- | Pipe Mount | -- | |

| Antenna Mount – Gamma Sector | | | | |
|------------------------------|----------|--------------------------|------------|----------|
| Elevation | Position | Appurtenance | Mount Type | Status |
| 133 | 1 | -- | Pipe Mount | -- |
| | 2 | -- | Pipe Mount | -- |
| | -- | (1) ALU RRH1900-4x45 | Unistrut | Existing |
| | | (1) ALU RRH2x50-800 | | |
| | 3 | -- | Pipe Mount | -- |
| | 4 | (1) RFS APX9ERR18-C-A20 | Pipe Mount | Existing |
| | 5 | (1) RFS APXVTM14-ALU-I20 | Pipe Mount | Proposed |
| (1) ALU TD-RRH8x20-25 | | | | |

RESULTS

By engineering calculation and inspection, the **proposed and modified** antenna and equipment mounting structure(s) are capable of supporting the proposed loading configurations without causing an overstress condition in the antenna and equipment mounting structure(s). **See attached details for the proposed and modified mounting structures.**

As a result of the proposed antenna configuration, the parapet wall structure will experience a negligible increase in dead and wind loads from what are currently present. Therefore, it is RAMAKER’s assessment that the associated parapet wall structure in each sector will provide adequate support for the proposed loading configurations.

LIMITATIONS

The recommendations contained within this report were developed using the supporting documentation as previously described. All recommendations pertain only to the proposed antenna installation activities as described in this report. RAMAKER assumes no responsibility for failures caused by factors beyond our control. These include but are not limited to the following:

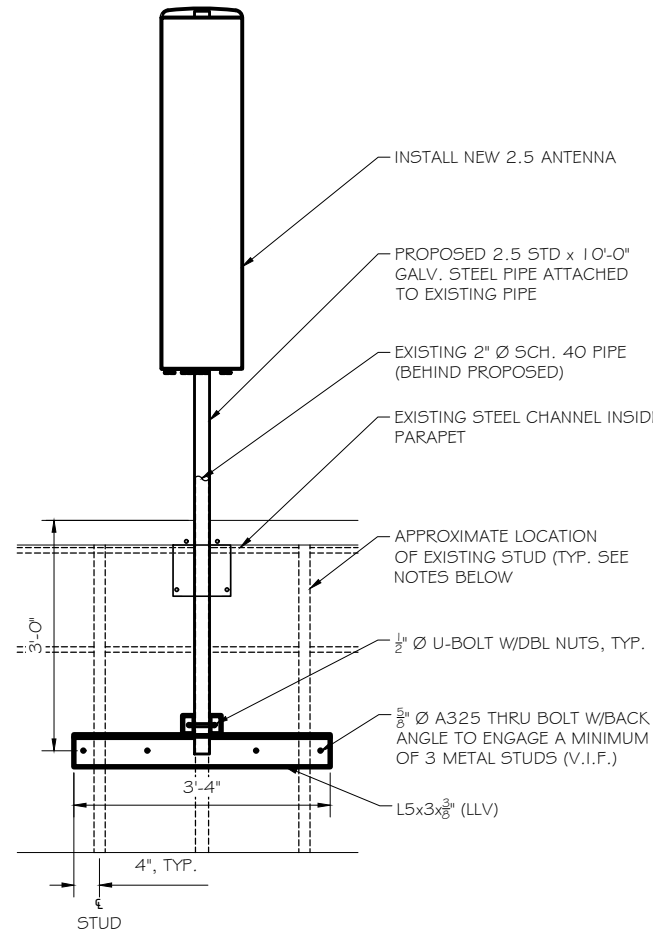
- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- Improper maintenance
- Member grades less than assumed grades show below:

| Assumed Steel Member Grades | |
|------------------------------------|------------------------|
| Angles/Plates/Channels | ASTM A36, 36 ksi |
| Pipes | ASTM A53 Gr. B, 35 ksi |

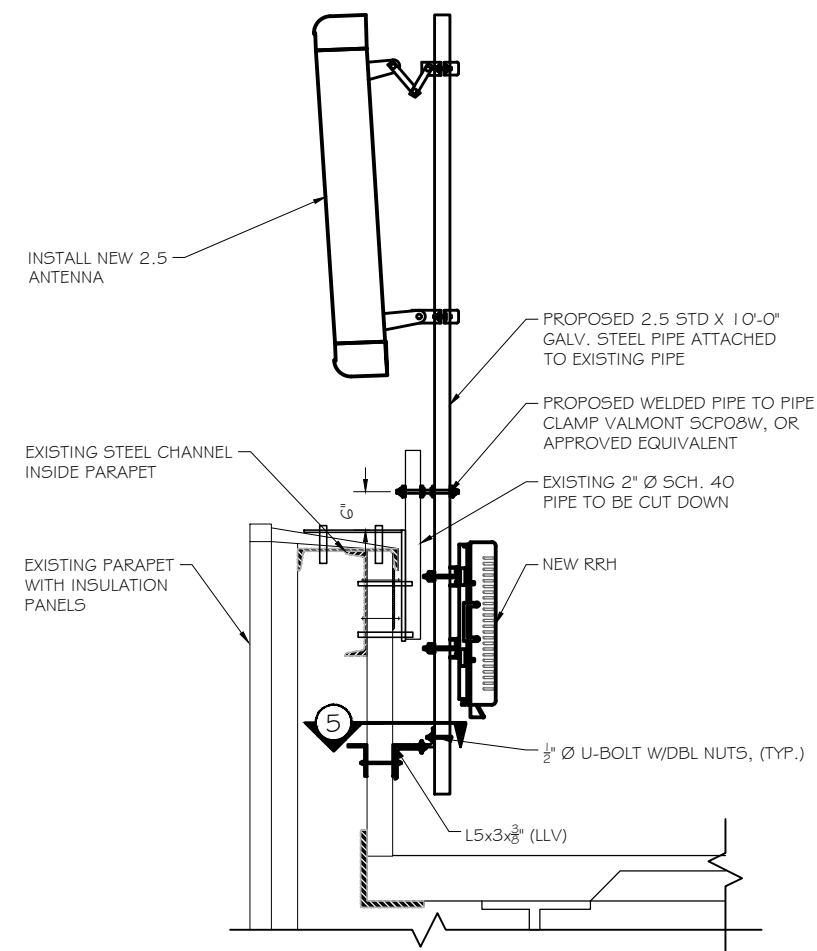
RAMAKER is not responsible for verifying that the loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication and erection deficiencies, this report should be disregarded and RAMAKER should be contacted immediately. RAMAKER is not liable for any representation, recommendation, or conclusion not expressly stated herein.

ATTACHMENTS

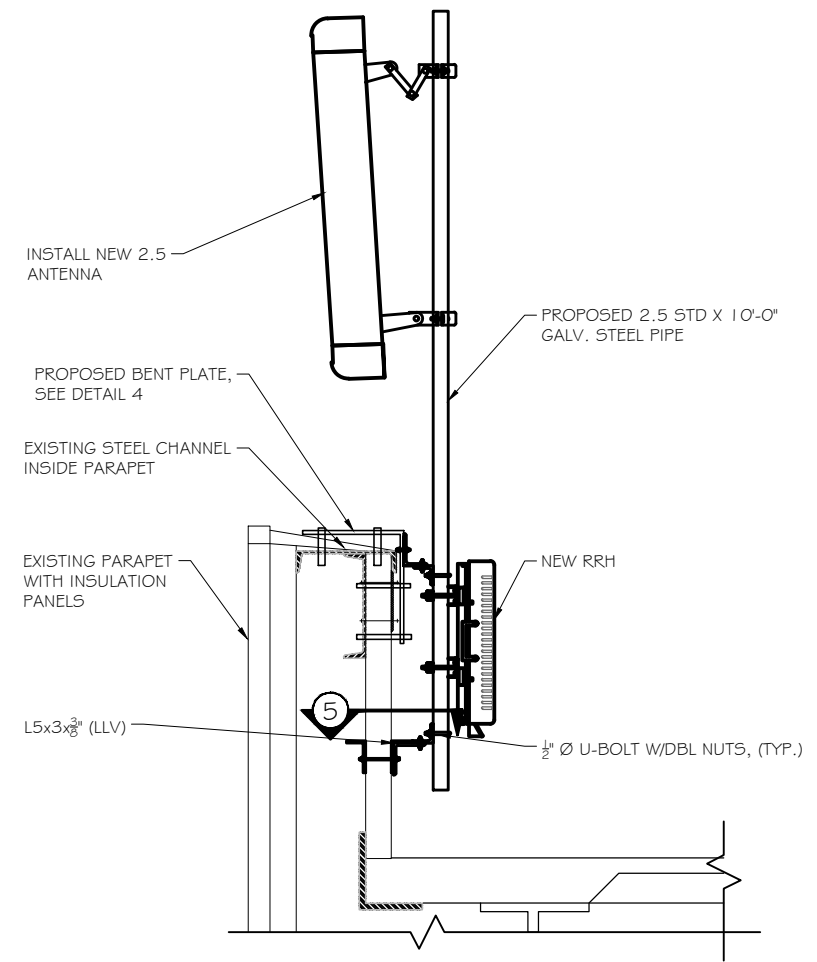
- Mount Details
- Analysis Figures
- Analysis Calculations



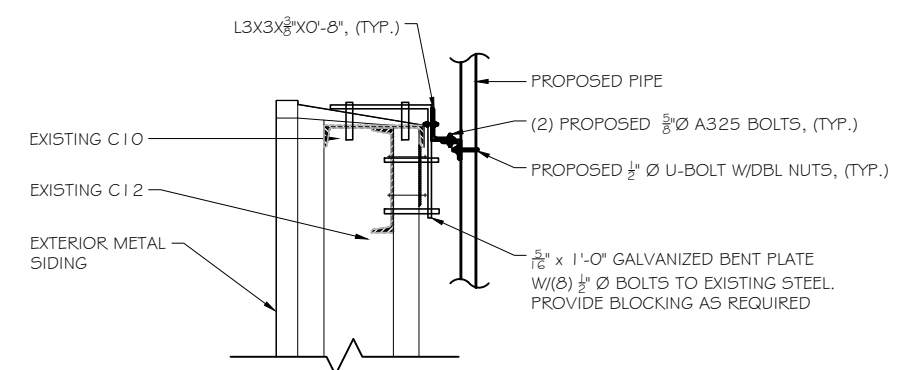
BETA SECTOR MOUNTING DETAIL 1
 SCALE: NTS



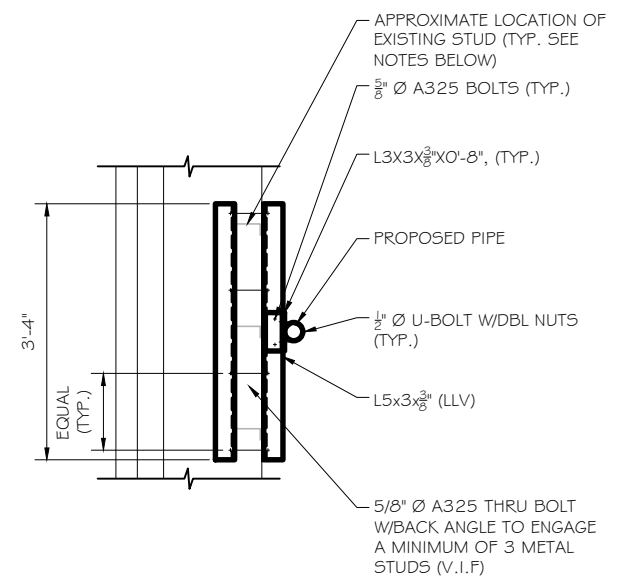
BETA SECTOR MOUNTING DETAIL 2
 SCALE: NTS



ALPHA & GAMMA SECTOR MOUNTING DETAIL 3
 SCALE: NTS



MOUNTING DETAIL 4
 SCALE: NTS



MOUNTING DETAIL 5
 SCALE: NTS



6580 SPRINT PARKWAY
 OVERLAND PARK, KANSAS 66251

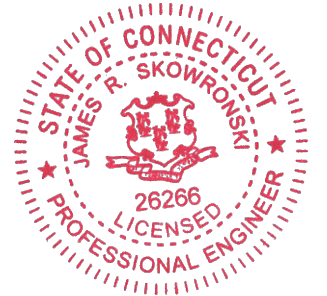


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 www.Ramaker.com

Charles Cherundolo Consulting, Inc.

713 Clover Lane, Moscow, PA 18444
 Phone: 570-840-5084 Fax: 570-842-5592

Certification & Seal:
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.



Signature: *James R. Skowronski* Date: 8/17/2017

| MARK | DATE | DESCRIPTION |
|------|------|-------------|
| | | |
| | | |
| | | |

| | | | |
|-------|-------|--------|------------|
| ISSUE | FINAL | DATE | 08/17/2017 |
| PHASE | | ISSUED | |

PROJECT TITLE:
PORTLAND-NRG ENERGY CT43XC843-A

PROJECT INFORMATION:
 1866 RIVER ROAD
 MIDDLETOWN, CT 06457
 MIDDLESEX COUNTY

SHEET TITLE:
ANTENNA MOUNT DETAILS

SCALE: NONE

| | |
|----------------|-------|
| PROJECT NUMBER | 28743 |
| SHEET NUMBER | A-4 |



N3

MPI

A2



Envelope Only Solution

| |
|----------------------------|
| Ramaker & Associates, Inc. |
| JMA |
| 28743 |

Portland-NRG Energy (CT43XC843-A)

| |
|-------------------------|
| SK - 1 |
| Aug 16, 2017 at 1:35 PM |
| 28743.r3d |



Envelope Only Solution

| | | |
|----------------------------|-----------------------------------|-------------------------|
| Ramaker & Associates, Inc. | Portland-NRG Energy (CT43XC843-A) | SK - 2 |
| JMA | | Aug 16, 2017 at 1:36 PM |
| 28743 | | 28743.r3d |

Wind Load on Antennas TIA-222-G

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

| | | |
|-------------------|----------|--|
| Occupancy: | II | Classification of Structures (Table 2-1) |
| Exposure: | C | Exposure Category |
| V: | 101 mph | Basic Wind Speed (Annex B) |
| z: | 152 ft | Height above ground level to the center of the antenna |
| I: | 1.00 | Importance Factor (Table 2-3) |
| K _z : | 1.38 | Velocity Pressure Coefficient (2.6.5.2) |
| K _{zt} : | 1.00 | Topographic Factor (2.6.6.4) |
| K _d : | 0.95 | Wind Direction Probability Factor (Table 2-2) |
| q _z : | 34.1 psf | Velocity Pressure at Height z |
| G _h : | 1.00 | Strength Design of Appurtenances and their Connections |

Mount & Antenna Wind Loads

| Appurtenance | Height | Width | h/D | Shape | C _a | A _f | Force | Force |
|----------------------|-----------|-----------|------|-------|----------------|----------------|-----------|------------|
| | <i>in</i> | <i>in</i> | | | | <i>sq ft</i> | <i>lb</i> | <i>plf</i> |
| APXVTM14-ALU-I20 | 56.3 | 12.6 | 4.5 | Flat | 1.287 | 4.93 | 216.2 | |
| TD-RRH8x20-25 | 26.1 | 18.6 | 1.4 | Flat | 1.200 | 3.37 | 137.9 | |
| Pipe2-1/2STD x 10 ft | 120.0 | 2.9 | 41.7 | Round | 1.200 | 2.40 | 98.0 | 9.8 |

Wind Load on Antennas TIA-222-G

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

| | | |
|-------------------|----------|--|
| Occupancy: | II | Classification of Structures (Table 2-1) |
| Exposure: | C | Exposure Category |
| V: | 101 mph | Basic Wind Speed (Annex B) |
| z: | 152 ft | Height above ground level to the center of the antenna |
| I: | 1.00 | Importance Factor (Table 2-3) |
| K _z : | 1.38 | Velocity Pressure Coefficient (2.6.5.2) |
| K _{zt} : | 1.00 | Topographic Factor (2.6.6.4) |
| K _d : | 0.95 | Wind Direction Probability Factor (Table 2-2) |
| q _z : | 34.1 psf | Velocity Pressure at Height z |
| G _h : | 1.00 | Strength Design of Appurtenances and their Connections |

Mount & Antenna Wind Loads

| Appurtenance | Height | Depth | h/D | Shape | C _a | A _f | Force | Force |
|----------------------|-----------|-----------|------|-------|----------------|----------------|-----------|------------|
| | <i>in</i> | <i>in</i> | | | | <i>sq ft</i> | <i>lb</i> | <i>plf</i> |
| APXVTM14-ALU-I20 | 56.3 | 6.3 | 8.9 | Flat | 1.465 | 2.46 | 123.0 | |
| TD-RRH8x20-25 | 26.1 | 6.7 | 3.9 | Flat | 1.262 | 1.21 | 52.2 | |
| Pipe2-1/2STD x 10 ft | 120.0 | 2.9 | 41.7 | Round | 1.200 | 2.40 | 98.0 | 9.8 |

Ice Wind Load on Antennas TIA-222-G

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

| | | |
|------------|----------|--|
| Occupancy: | II | Classification of Structures (Table 2-1) |
| Exposure: | C | Exposure Category |
| V_i : | 50 mph | Basic Wind Speed (Annex B) |
| z : | 152 ft | Height above ground level to the center of the antenna |
| I : | 1.00 | Importance Factor (Table 2-3) |
| K_z : | 1.38 | Velocity Pressure Coefficient (2.6.5.2) |
| K_{zt} : | 1.00 | Topographic Factor (2.6.6.4) |
| K_d : | 0.95 | Wind Direction Probability Factor (Table 2-2) |
| q_z : | 8.40 psf | Velocity Pressure at Height z |
| G_h : | 1.00 | Strength Design of Appurtenances and their Connections |
| K_{iz} : | 1.17 | Height Escalation Factor for Ice Thickness |
| t_{iz} : | 1.75 in | Factored Thickness of Radial Glaze Ice at Height z |

Mount & Antenna Ice Wind Loads

| Appurtenance | Height | Width | h/D | Shape | C_a | A_f | Force | Force |
|----------------------|-----------|-----------|------|-------|-------|--------------|-----------|------------|
| | <i>in</i> | <i>in</i> | | | | <i>sq ft</i> | <i>lb</i> | <i>plf</i> |
| APXVTM14-ALU-I20 | 59.8 | 16.1 | 3.7 | Flat | 1.254 | 6.68 | 70.4 | |
| TD-RRH8x20-25 | 29.6 | 22.1 | 1.3 | Flat | 1.200 | 4.54 | 45.8 | |
| Pipe2-1/2STD x 10 ft | 123.5 | 6.4 | 19.4 | Round | 1.075 | 5.46 | 49.4 | 4.8 |

Ice Wind Load on Antennas TIA-222-G

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

| | | |
|------------|----------|--|
| Occupancy: | II | Classification of Structures (Table 2-1) |
| Exposure: | C | Exposure Category |
| V_i : | 50 mph | Basic Wind Speed (Annex B) |
| z : | 152 ft | Height above ground level to the center of the antenna |
| I : | 1.00 | Importance Factor (Table 2-3) |
| K_z : | 1.38 | Velocity Pressure Coefficient (2.6.5.2) |
| K_{zt} : | 1.00 | Topographic Factor (2.6.6.4) |
| K_d : | 0.95 | Wind Direction Probability Factor (Table 2-2) |
| q_z : | 8.40 psf | Velocity Pressure at Height z |
| G_h : | 1.00 | Strength Design of Appurtenances and their Connections |
| K_{iz} : | 1.17 | Height Escalation Factor for Ice Thickness |
| t_{iz} : | 1.75 in | Factored Thickness of Radial Glaze Ice at Height z |

Mount & Antenna Ice Wind Loads

| Appurtenance | Height <i>in</i> | Depth <i>in</i> | h/D | Shape | C_a | A_f <i>sq ft</i> | Force <i>lb</i> | Force <i>plf</i> |
|----------------------|---------------------|--------------------|------|-------|-------|-----------------------|--------------------|---------------------|
| APXVTM14-ALU-I20 | 59.8 | 9.8 | 6.1 | Flat | 1.360 | 4.07 | 46.5 | |
| TD-RRH8x20-25 | 29.6 | 10.2 | 2.9 | Flat | 1.218 | 2.10 | 21.4 | |
| Pipe2-1/2STD x 10 ft | 123.5 | 6.4 | 19.4 | Round | 1.075 | 5.46 | 49.4 | 4.8 |

Ice Load on Antennas TIA-222-G

| | | |
|-------------------|---------|--|
| Ice Weight: | 56 pcf | Ice Density |
| t _i : | 0.75 | Design Ice Thickness |
| Occupancy: | II | Classification of Structures (Table 2-1) |
| Exposure: | C | Exposure Category |
| V _i : | 50 mph | Basic Wind Speed (Annex B) |
| z: | 152 ft | Height above ground level to the center of the antenna |
| I: | 1.00 | Importance Factor (Table 2-3) |
| K _{iz} : | 1.17 | Height Escalation Factor for Ice Thickness |
| K _{zt} : | 1.00 | Topographic Factor (2.6.6.4) |
| t _{iz} : | 1.75 in | Factored Thickness of Radial Glaze Ice at Height z |

Platform Grating: **None**

Ice Load: psf

Mount & Antenna Ice Wind Loads

| Appurtenance | Height | Width | Depth | Diam. | Area | Perim. | Ice Weight | |
|----------------------|-----------|-----------|-----------|-----------|--------------|-----------|------------|------------|
| | <i>in</i> | <i>in</i> | <i>in</i> | <i>in</i> | <i>sq in</i> | <i>in</i> | <i>lb</i> | <i>plf</i> |
| APXVTM14-ALU-I20 | 59.8 | 16.1 | 9.8 | 14.09 | 86.93 | 44.79 | 158.6 | |
| TD-RRH8x20-25 | 29.6 | 22.1 | 10.2 | 19.77 | 118.13 | 57.59 | 99.9 | |
| Pipe2-1/2STD x 10 ft | 123.5 | 6.4 | 6.4 | 2.88 | 25.38 | 14.52 | 98.7 | 9.9 |



Hot Rolled Steel Properties

| | Label | E [ksi] | G [ksi] | Nu | Therm (\1... | Density[k/ft... | Yield[ksi] | Ry | Fu[ksi] | Rt |
|---|----------------|---------|---------|----|--------------|-----------------|------------|-----|---------|-----|
| 1 | A36 Gr.36 | 29000 | 11154 | .3 | .65 | .49 | 36 | 1.5 | 58 | 1.2 |
| 2 | A572 Gr.50 | 29000 | 11154 | .3 | .65 | .49 | 50 | 1.1 | 65 | 1.1 |
| 3 | A992 | 29000 | 11154 | .3 | .65 | .49 | 50 | 1.1 | 65 | 1.1 |
| 4 | A500 Gr.B RND | 29000 | 11154 | .3 | .65 | .527 | 42 | 1.4 | 58 | 1.3 |
| 5 | A500 Gr.B Rect | 29000 | 11154 | .3 | .65 | .527 | 46 | 1.4 | 58 | 1.3 |
| 6 | A53 Gr.B | 29000 | 11154 | .3 | .65 | .49 | 35 | 1.6 | 60 | 1.2 |
| 7 | A1085 | 29000 | 11154 | .3 | .65 | .49 | 50 | 1.4 | 65 | 1.3 |

Hot Rolled Steel Section Sets

| | Label | Shape | Type | Design List | Material | Design R... | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|---|----------|----------|------|-------------|----------|-------------|---------|-----------|-----------|---------|
| 1 | PIPE_2.5 | PIPE_2.5 | Beam | Pipe | A53 Gr.B | Typical | 1.61 | 1.45 | 1.45 | 2.89 |

Member Primary Data

| | Label | I Joint | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material | Design Rules |
|---|-------|---------|---------|---------|-------------|---------------|------|-------------|----------|--------------|
| 1 | MP1 | N1 | N3 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | Typical |

Basic Load Cases

| | BLC Description | Category | X Gravity | Y Gravity | Z Gravity | Joint | Point | Distributed Area(Mem... | Surface(Pl... |
|----|------------------------|----------|-----------|-----------|-----------|-------|-------|-------------------------|---------------|
| 1 | Dead Load | None | | -1 | | | 3 | | |
| 2 | Antenna Wind 0 | None | | | | | 6 | | |
| 3 | Antenna Wind 30 | None | | | | | 6 | | |
| 4 | Antenna Wind 45 | None | | | | | 6 | | |
| 5 | Antenna Wind 60 | None | | | | | 6 | | |
| 6 | Antenna Wind 90 | None | | | | | 6 | | |
| 7 | Antenna Wind 120 | None | | | | | 6 | | |
| 8 | Antenna Wind 135 | None | | | | | 6 | | |
| 9 | Antenna Wind 150 | None | | | | | 6 | | |
| 10 | Antenna Wind 180 | None | | | | | 6 | | |
| 11 | Antenna Wind 210 | None | | | | | 6 | | |
| 12 | Antenna Wind 225 | None | | | | | 6 | | |
| 13 | Antenna Wind 240 | None | | | | | 6 | | |
| 14 | Antenna Wind 270 | None | | | | | 6 | | |
| 15 | Antenna Wind 300 | None | | | | | 6 | | |
| 16 | Antenna Wind 315 | None | | | | | 6 | | |
| 17 | Antenna Wind 330 | None | | | | | 6 | | |
| 18 | Antenna Ice Dead Load | None | | | | | 3 | | |
| 19 | Antenna Wind w/Ice 0 | None | | | | | 6 | | |
| 20 | Antenna Wind w/Ice 30 | None | | | | | 6 | | |
| 21 | Antenna Wind w/Ice 45 | None | | | | | 6 | | |
| 22 | Antenna Wind w/Ice 60 | None | | | | | 6 | | |
| 23 | Antenna Wind w/Ice 90 | None | | | | | 6 | | |
| 24 | Antenna Wind w/Ice 120 | None | | | | | 6 | | |
| 25 | Antenna Wind w/Ice 135 | None | | | | | 6 | | |
| 26 | Antenna Wind w/Ice 150 | None | | | | | 6 | | |
| 27 | Antenna Wind w/Ice 180 | None | | | | | 6 | | |
| 28 | Antenna Wind w/Ice 210 | None | | | | | 6 | | |
| 29 | Antenna Wind w/Ice 225 | None | | | | | 6 | | |
| 30 | Antenna Wind w/Ice 240 | None | | | | | 6 | | |
| 31 | Antenna Wind w/Ice 270 | None | | | | | 6 | | |
| 32 | Antenna Wind w/Ice 300 | None | | | | | 6 | | |
| 33 | Antenna Wind w/Ice 315 | None | | | | | 6 | | |



Basic Load Cases (Continued)

| | BLC Description | Category | X Gravity | Y Gravity | Z Gravity | Joint | Point | Distributed Area(Mem...Surface(PI... | | |
|----|------------------------|----------|-----------|-----------|-----------|-------|-------|--------------------------------------|--|--|
| 34 | Antenna Wind w/Ice 330 | None | | | | | 6 | | | |
| 35 | Member Wind 0 | None | | | | | | 2 | | |
| 36 | Member Wind 30 | None | | | | | | 2 | | |
| 37 | Member Wind 45 | None | | | | | | 2 | | |
| 38 | Member Wind 60 | None | | | | | | 2 | | |
| 39 | Member Wind 90 | None | | | | | | 2 | | |
| 40 | Member Wind 120 | None | | | | | | 2 | | |
| 41 | Member Wind 135 | None | | | | | | 2 | | |
| 42 | Member Wind 150 | None | | | | | | 2 | | |
| 43 | Member Wind 180 | None | | | | | | 2 | | |
| 44 | Member Wind 210 | None | | | | | | 2 | | |
| 45 | Member Wind 225 | None | | | | | | 2 | | |
| 46 | Member Wind 240 | None | | | | | | 2 | | |
| 47 | Member Wind 270 | None | | | | | | 2 | | |
| 48 | Member Wind 300 | None | | | | | | 2 | | |
| 49 | Member Wind 315 | None | | | | | | 2 | | |
| 50 | Member Wind 330 | None | | | | | | 2 | | |
| 51 | Member Ice Dead Load | None | | | | | | 1 | | |
| 52 | Member Wind w/Ice 0 | None | | | | | | 2 | | |
| 53 | Member Wind w/Ice 30 | None | | | | | | 2 | | |
| 54 | Member Wind w/Ice 45 | None | | | | | | 2 | | |
| 55 | Member Wind w/Ice 60 | None | | | | | | 2 | | |
| 56 | Member Wind w/Ice 90 | None | | | | | | 2 | | |
| 57 | Member Wind w/Ice 120 | None | | | | | | 2 | | |
| 58 | Member Wind w/Ice 135 | None | | | | | | 2 | | |
| 59 | Member Wind w/Ice 150 | None | | | | | | 2 | | |
| 60 | Member Wind w/Ice 180 | None | | | | | | 2 | | |
| 61 | Member Wind w/Ice 210 | None | | | | | | 2 | | |
| 62 | Member Wind w/Ice 225 | None | | | | | | 2 | | |
| 63 | Member Wind w/Ice 240 | None | | | | | | 2 | | |
| 64 | Member Wind w/Ice 270 | None | | | | | | 2 | | |
| 65 | Member Wind w/Ice 300 | None | | | | | | 2 | | |
| 66 | Member Wind w/Ice 315 | None | | | | | | 2 | | |
| 67 | Member Wind w/Ice 330 | None | | | | | | 2 | | |
| 68 | Live Load - Area | None | | | | | | | | |
| 69 | Live Load - Point 1 | None | | | | | | | | |
| 70 | Live Load - Point 2 | None | | | | | | | | |
| 71 | Live Load - Point 3 | None | | | | | | | | |
| 72 | Railing Dist. LL z | None | | | | | | | | |
| 73 | Railing Dist. LL x | None | | | | | | | | |
| 74 | Railing Point LL z | None | | | | | | | | |
| 75 | Railing Point LL x | None | | | | | | | | |

Load Combinations

| | Description | So...P... | S... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... |
|----|-----------------------|-----------|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 1 | 1.4D | Yes | Y | 1 | 1.4 | | | | | | | | | | |
| 2 | 0.9D + 1.6 (0-Wind) | Yes | Y | 1 | .9 | 2 | 1.6 | 35 | 1.6 | | | | | | |
| 3 | 0.9D + 1.6 (30-Wind) | Yes | Y | 1 | .9 | 3 | 1.6 | 36 | 1.6 | | | | | | |
| 4 | 0.9D + 1.6 (45-Wind) | Yes | Y | 1 | .9 | 4 | 1.6 | 37 | 1.6 | | | | | | |
| 5 | 0.9D + 1.6 (60-Wind) | Yes | Y | 1 | .9 | 5 | 1.6 | 38 | 1.6 | | | | | | |
| 6 | 0.9D + 1.6 (90-Wind) | Yes | Y | 1 | .9 | 6 | 1.6 | 39 | 1.6 | | | | | | |
| 7 | 0.9D + 1.6 (120-Wi... | Yes | Y | 1 | .9 | 7 | 1.6 | 40 | 1.6 | | | | | | |
| 8 | 0.9D + 1.6 (135-Wi... | Yes | Y | 1 | .9 | 8 | 1.6 | 41 | 1.6 | | | | | | |
| 9 | 0.9D + 1.6 (150-Wi... | Yes | Y | 1 | .9 | 9 | 1.6 | 42 | 1.6 | | | | | | |
| 10 | 0.9D + 1.6 (180-Wi... | Yes | Y | 1 | .9 | 10 | 1.6 | 43 | 1.6 | | | | | | |



Load Combinations (Continued)

| Description | So... | P... | S... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... |
|-----------------------------|-------|------|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 11 0.9D + 1.6 (210-Wi... | Yes | Y | | 1 | .9 | 11 | 1.6 | 44 | 1.6 | | | | |
| 12 0.9D + 1.6 (225-Wi... | Yes | Y | | 1 | .9 | 12 | 1.6 | 45 | 1.6 | | | | |
| 13 0.9D + 1.6 (240-Wi... | Yes | Y | | 1 | .9 | 13 | 1.6 | 46 | 1.6 | | | | |
| 14 0.9D + 1.6 (270-Wi... | Yes | Y | | 1 | .9 | 14 | 1.6 | 47 | 1.6 | | | | |
| 15 0.9D + 1.6 (300-Wi... | Yes | Y | | 1 | .9 | 15 | 1.6 | 48 | 1.6 | | | | |
| 16 0.9D + 1.6 (315-Wi... | Yes | Y | | 1 | .9 | 16 | 1.6 | 49 | 1.6 | | | | |
| 17 0.9D + 1.6 (330-Wi... | Yes | Y | | 1 | .9 | 17 | 1.6 | 50 | 1.6 | | | | |
| 18 1.2D + 1.6 (0-Wind) | Yes | Y | | 1 | 1.2 | 2 | 1.6 | 35 | 1.6 | | | | |
| 19 1.2D + 1.6 (30-Wind) | Yes | Y | | 1 | 1.2 | 3 | 1.6 | 36 | 1.6 | | | | |
| 20 1.2D + 1.6 (45-Wind) | Yes | Y | | 1 | 1.2 | 4 | 1.6 | 37 | 1.6 | | | | |
| 21 1.2D + 1.6 (60-Wind) | Yes | Y | | 1 | 1.2 | 5 | 1.6 | 38 | 1.6 | | | | |
| 22 1.2D + 1.6 (90-Wind) | Yes | Y | | 1 | 1.2 | 6 | 1.6 | 39 | 1.6 | | | | |
| 23 1.2D + 1.6 (120-Wi... | Yes | Y | | 1 | 1.2 | 7 | 1.6 | 40 | 1.6 | | | | |
| 24 1.2D + 1.6 (135-Wi... | Yes | Y | | 1 | 1.2 | 8 | 1.6 | 41 | 1.6 | | | | |
| 25 1.2D + 1.6 (150-Wi... | Yes | Y | | 1 | 1.2 | 9 | 1.6 | 42 | 1.6 | | | | |
| 26 1.2D + 1.6 (180-Wi... | Yes | Y | | 1 | 1.2 | 10 | 1.6 | 43 | 1.6 | | | | |
| 27 1.2D + 1.6 (210-Wi... | Yes | Y | | 1 | 1.2 | 11 | 1.6 | 44 | 1.6 | | | | |
| 28 1.2D + 1.6 (225-Wi... | Yes | Y | | 1 | 1.2 | 12 | 1.6 | 45 | 1.6 | | | | |
| 29 1.2D + 1.6 (240-Wi... | Yes | Y | | 1 | 1.2 | 13 | 1.6 | 46 | 1.6 | | | | |
| 30 1.2D + 1.6 (270-Wi... | Yes | Y | | 1 | 1.2 | 14 | 1.6 | 47 | 1.6 | | | | |
| 31 1.2D + 1.6 (300-Wi... | Yes | Y | | 1 | 1.2 | 15 | 1.6 | 48 | 1.6 | | | | |
| 32 1.2D + 1.6 (315-Wi... | Yes | Y | | 1 | 1.2 | 16 | 1.6 | 49 | 1.6 | | | | |
| 33 1.2D + 1.6 (330-Wi... | Yes | Y | | 1 | 1.2 | 17 | 1.6 | 50 | 1.6 | | | | |
| 34 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 19 | 1 | 52 | 1 |
| 35 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 20 | 1 | 53 | 1 |
| 36 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 21 | 1 | 54 | 1 |
| 37 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 22 | 1 | 55 | 1 |
| 38 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 23 | 1 | 56 | 1 |
| 39 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 24 | 1 | 57 | 1 |
| 40 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 25 | 1 | 58 | 1 |
| 41 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 26 | 1 | 59 | 1 |
| 42 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 27 | 1 | 60 | 1 |
| 43 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 28 | 1 | 61 | 1 |
| 44 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 29 | 1 | 62 | 1 |
| 45 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 30 | 1 | 63 | 1 |
| 46 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 31 | 1 | 64 | 1 |
| 47 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 32 | 1 | 65 | 1 |
| 48 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 33 | 1 | 66 | 1 |
| 49 1.2D + 1.0Di + 1.0 (...) | Yes | Y | | 1 | 1.2 | 18 | 1 | 51 | 1 | 34 | 1 | 67 | 1 |
| 50 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 68 | 1.5 | 72 | 1.5 | | | | |
| 51 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 68 | 1.5 | 73 | 1.5 | | | | |
| 52 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 68 | 1.5 | 74 | 1.5 | | | | |
| 53 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 68 | 1.5 | 75 | 1.5 | | | | |
| 54 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 69 | 1.5 | 72 | 1.5 | | | | |
| 55 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 69 | 1.5 | 73 | 1.5 | | | | |
| 56 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 69 | 1.5 | 74 | 1.5 | | | | |
| 57 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 69 | 1.5 | 75 | 1.5 | | | | |
| 58 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 70 | 1.5 | 72 | 1.5 | | | | |
| 59 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 70 | 1.5 | 73 | 1.5 | | | | |
| 60 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 70 | 1.5 | 74 | 1.5 | | | | |
| 61 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 70 | 1.5 | 75 | 1.5 | | | | |
| 62 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 71 | 1.5 | 72 | 1.5 | | | | |
| 63 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 71 | 1.5 | 73 | 1.5 | | | | |
| 64 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 71 | 1.5 | 74 | 1.5 | | | | |
| 65 1.0D + 1.5LL + 1.5 ... | Yes | Y | | 1 | 1 | 71 | 1.5 | 75 | 1.5 | | | | |
| 66 Serviceability (0-Wi... | Yes | Y | | 1 | 1 | 2 | .318 | 35 | .318 | | | | |
| 67 Serviceability (30-... | Yes | Y | | 1 | 1 | 3 | .318 | 36 | .318 | | | | |



Load Combinations (Continued)

| Description | So... | P... | S... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... | BLC Fac... |
|-------------|-------------------------|------|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 68 | Serviceability (45-... | Yes | Y | 1 | 1 | 4 | .318 | 37 | .318 | | | | |
| 69 | Serviceability (60-... | Yes | Y | 1 | 1 | 5 | .318 | 38 | .318 | | | | |
| 70 | Serviceability (90-... | Yes | Y | 1 | 1 | 6 | .318 | 39 | .318 | | | | |
| 71 | Serviceability (120-... | Yes | Y | 1 | 1 | 7 | .318 | 40 | .318 | | | | |
| 72 | Serviceability (135-... | Yes | Y | 1 | 1 | 8 | .318 | 41 | .318 | | | | |
| 73 | Serviceability (150-... | Yes | Y | 1 | 1 | 9 | .318 | 42 | .318 | | | | |
| 74 | Serviceability (180-... | Yes | Y | 1 | 1 | 10 | .318 | 43 | .318 | | | | |
| 75 | Serviceability (210-... | Yes | Y | 1 | 1 | 11 | .318 | 44 | .318 | | | | |
| 76 | Serviceability (225-... | Yes | Y | 1 | 1 | 12 | .318 | 45 | .318 | | | | |
| 77 | Serviceability (240-... | Yes | Y | 1 | 1 | 13 | .318 | 46 | .318 | | | | |
| 78 | Serviceability (270-... | Yes | Y | 1 | 1 | 14 | .318 | 47 | .318 | | | | |
| 79 | Serviceability (300-... | Yes | Y | 1 | 1 | 15 | .318 | 48 | .318 | | | | |
| 80 | Serviceability (315-... | Yes | Y | 1 | 1 | 16 | .318 | 49 | .318 | | | | |
| 81 | Serviceability (330-... | Yes | Y | 1 | 1 | 17 | .318 | 50 | .318 | | | | |
| 82 | *** ASD Load Com... | | Y | | | | | | | | | | |
| 83 | 1.0D + 1.0(0-Wind) | | Y | 1 | 1 | 2 | 1 | 35 | 1 | | | | |
| 84 | 1.0D + 1.0(30-Wind) | | Y | 1 | 1 | 3 | 1 | 36 | 1 | | | | |
| 85 | 1.0D + 1.0(45-Wind) | | Y | 1 | 1 | 4 | 1 | 37 | 1 | | | | |
| 86 | 1.0D + 1.0(60-Wind) | | Y | 1 | 1 | 5 | 1 | 38 | 1 | | | | |
| 87 | 1.0D + 1.0(90-Wind) | | Y | 1 | 1 | 6 | 1 | 39 | 1 | | | | |
| 88 | 1.0D + 1.0(120-Wi... | | Y | 1 | 1 | 7 | 1 | 40 | 1 | | | | |
| 89 | 1.0D + 1.0(135-Wi... | | Y | 1 | 1 | 8 | 1 | 41 | 1 | | | | |
| 90 | 1.0D + 1.0(150-Wi... | | Y | 1 | 1 | 9 | 1 | 42 | 1 | | | | |
| 91 | 1.0D + 1.0(180-Wi... | | Y | 1 | 1 | 10 | 1 | 43 | 1 | | | | |
| 92 | 1.0D + 1.0(210-Wi... | | Y | 1 | 1 | 11 | 1 | 44 | 1 | | | | |
| 93 | 1.0D + 1.0(225-Wi... | | Y | 1 | 1 | 12 | 1 | 45 | 1 | | | | |
| 94 | 1.0D + 1.0(240-Wi... | | Y | 1 | 1 | 13 | 1 | 46 | 1 | | | | |
| 95 | 1.0D + 1.0(270-Wi... | | Y | 1 | 1 | 14 | 1 | 47 | 1 | | | | |
| 96 | 1.0D + 1.0(300-Wi... | | Y | 1 | 1 | 15 | 1 | 48 | 1 | | | | |
| 97 | 1.0D + 1.0(315-Wi... | | Y | 1 | 1 | 16 | 1 | 49 | 1 | | | | |
| 98 | 1.0D + 1.0(330-Wi... | | Y | 1 | 1 | 17 | 1 | 50 | 1 | | | | |

Envelope Joint Reactions

| Joint | X [lb] | LC | Y [lb] | LC | Z [lb] | LC | MX [lb-ft] | LC | MY [lb-ft] | LC | MZ [lb-ft] | LC |
|-------|---------|-----|-----------|----|---------|----|------------|----|------------|----|------------|----|
| 1 | N1 | max | 775.282 | 22 | 64.283 | 34 | 1165.278 | 26 | 0 | 1 | 0 | 1 |
| 2 | | min | -775.282 | 30 | 22.076 | 2 | -1165.278 | 18 | 0 | 1 | 0 | 1 |
| 3 | N2 | max | 1212.409 | 30 | 517.562 | 34 | 1888.626 | 18 | 0 | 1 | 0 | 1 |
| 4 | | min | -1212.409 | 22 | 146.391 | 2 | -1888.626 | 26 | 0 | 1 | 0 | 1 |
| 5 | Totals: | max | 440.531 | 13 | 581.845 | 34 | 723.348 | 2 | | | | |
| 6 | | min | -440.531 | 5 | 168.466 | 2 | -723.348 | 10 | | | | |

Envelope AISC 14th(360-10): LRFD Steel Code Checks

| Member | Shape | Code Check | Loc[ft] | LC | Shear Check | Loc..... | L..phi*Pn.. | phi*Pn.. | phi*M... | phi*M..... | Eqn | | | |
|--------|-------|------------|---------|-------|-------------|----------|-------------|----------|----------|------------|---------|---------|---|-------|
| 1 | MP1 | PIPE_2.5 | .680 | 1.979 | 18 | .093 | 1.9... | 18 | 22373.. | 50715 | 3596.25 | 3596.25 | 1 | H1-1b |



PROJECT: DO MACRO UPGRADE
 SITE NAME: PORTLAND-NRG ENERGY
 SITE CASCADE: CT43XC843-A
 SITE ADDRESS: 1866 RIVER ROAD
 MIDDLETOWN, CT 06457
 SITE TYPE: ± 130'-0" & ± 149'-0"
 ROOFTOP



6580 SPRINT PARKWAY
 OVERLAND PARK, KANSAS 66251

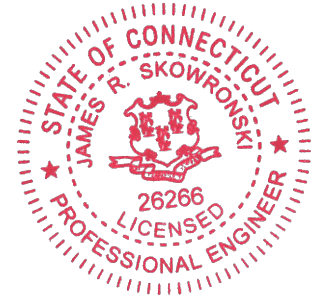


855 Community Drive, Sauk City, WI 53583
 Phone: 608-643-4100 Fax: 608-643-7999
 www.Ramaker.com

Charles Cherundolo Consulting, Inc.

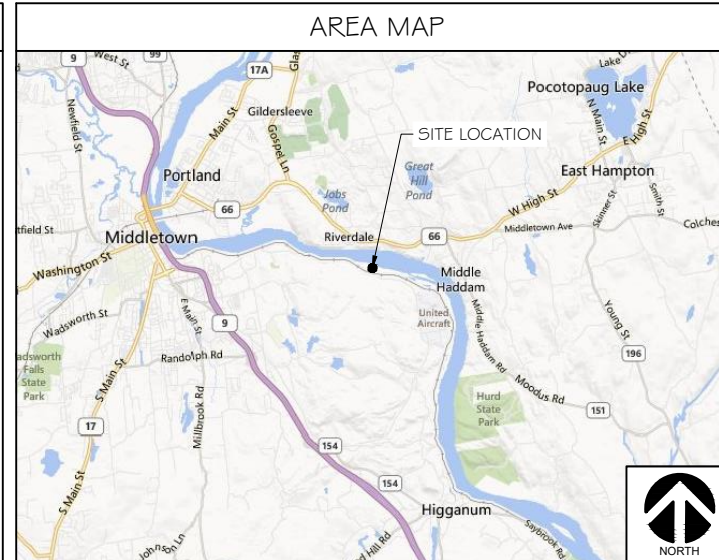
713 Clover Lane, Moscow, PA 18444
 Phone: 570-840-5084 Fax: 570-842-5592

Certification & Seal:
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.



James R. Skowronski
 Signature: Date: 8/17/2017

| SITE INFORMATION |
|--|
| PROPERTY OWNER: MIDDLETOWN POWER LLC 1221 NICOLLET MALL, SUITE 700 MINNEAPOLIS, MN |
| SITE ADDRESS: 1866 RIVER ROAD MIDDLETOWN, CT 06457 MIDDLESEX COUNTY |
| GEOGRAPHIC COORDINATES: LATITUDE: 41° 33' 15.84" (41.5544) LONGITUDE: 72° 34' 50.988" (72.58083) |
| ZONING JURISDICTION: CITY OF MIDDLETOWN |
| ZONING DISTRICT: I-3 INDUSTRIAL |
| POWER COMPANY: CONNECTICUT LIGHT & POWER PH.: (888) 783-6617 |
| AAV PROVIDER: AT&T PH.: (888) 944-0447 |
| SPRINT CONSTRUCTION MANAGER: NAME: MIKE DELIA PHONE: (781) 316-6348 E-MAIL: michael.delia@sprint.com |
| EQUIPMENT SUPPLIER: ALCATEL-LUCENT 600-700 MOUNTAIN AVENUE MURRAY HILL, NJ 07974 PH.: (908) 508-8080 |
| SITE ACQUISITION: CHARLES CHERUNDOLO CONSULTING, INC. 1280 RT. 46 WEST PARSIPPANY, NJ 07054 CONTACT: TOM JUPIN, PMP, PROJECT MANAGER CELL: (973) 819-9033 EMAIL: tom.jupin@cherundoloconsulting.com |
| PLANS PREPARED BY: RAMAKER & ASSOCIATES, INC. CONTACT: KEITH BOHNSACK, PROJECT MANAGER PH.: (608) 643-4100 EMAIL: kbohnsack@ramaker.com |



| PROJECT DESCRIPTION |
|--|
| <ul style="list-style-type: none"> INSTALL NEW 2.5 EQUIPMENT IN EXISTING BTS CABINET *(1) RECTIFIER SHELF AND (3) RECTIFIERS *(1) BASE BAND UNIT INSTALL NEW BATTERY STRING(S) IN EXISTING BATTERY CABINET INSTALL (3) PANEL ANTENNAS INSTALL (3) RRH'S ON ROOFTOP INSTALL (3) FIBER CABLES INSTALL (27) ANTENNA / RRH JUMPERS |

| APPLICABLE CODES |
|---|
| * ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES. |
| 1. INTERNATIONAL BUILDING CODE 2. ANSI/TIA-222 STRUCTURAL STANDARD FOR ANTENNA STRUCTURES 3. NFPA 780 - LIGHTNING PROTECTION CODE 4. NATIONAL ELECTRIC CODE |



| SHEET INDEX | | | |
|-------------|------------------------------------|------|-----------|
| SHT NO: | SHEET TITLE: | REV: | ENGINEER: |
| T-1 | TITLE SHEET | - | JRS |
| SP-1 | SPRINT SPECIFICATIONS | - | JRS |
| SP-2 | SPRINT SPECIFICATIONS | - | JRS |
| SP-3 | SPRINT SPECIFICATIONS | - | JRS |
| A-1 | SITE PLAN | - | JRS |
| A-2 | EQUIPMENT PLAN | - | JRS |
| A-3 | BUILDING ELEVATION | - | JRS |
| A-4 | ANTENNA MOUNT DETAILS | - | JRS |
| A-5 | RF DATA SHEET | - | JRS |
| A-6 | FIBER PLUMBING DIAGRAM | - | JRS |
| A-7 | CABLE COLOR CODING | - | JRS |
| A-8 | ANTENNA & HYBRID CABLE DETAILS | - | JRS |
| A-9 | EQUIPMENT DETAILS | - | JRS |
| E-1 | EQUIPMENT UTILITY & GROUNDING PLAN | - | JRS |
| E-2 | GROUNDING DETAILS | - | JRS |
| E-3 | DC POWER DETAILS & PANEL SCHEDULES | - | JRS |

| MARK | DATE | DESCRIPTION |
|---|-------|------------------------|
| ISSUE | FINAL | DATE ISSUED 08/17/2017 |
| PROJECT TITLE: | | |
| PORTLAND-NRG ENERGY CT43XC843-A | | |
| PROJECT INFORMATION: 1866 RIVER ROAD MIDDLETOWN, CT 06457 MIDDLESEX COUNTY | | |
| SHEET TITLE: TITLE SHEET | | |
| SCALE: NONE | | |
| PROJECT NUMBER | 28743 | |
| SHEET NUMBER | T-1 | |

SECTION 01 100 - SCOPE OF WORK

THE WORK:
THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE CONSTRUCTION DRAWINGS AND ASSOCIATED OUTLINE SPECIFICATIONS AND THE SITE SPECIFIC WORK ORDER, DESCRIBE THE WORK TO BE PERFORMED BY THIS CONSTRUCTION CONTRACTOR (SUPPLIER).

RELATED DOCUMENTS:

- A. THE REQUIREMENTS OF EACH SECTION OF THIS SPECIFICATION APPLY TO ALL SECTIONS, INDIVIDUALLY AND COLLECTIVELY.
- B. RELATED DOCUMENTS: THE CONTRACTOR SHALL COMPLY WITH THE MOST CURRENT VERSION OF THE FOLLOWING SUPPLEMENTAL REQUIREMENTS FOR INSTALLATION AND TESTING.
 - 1. EN-2012-001: (FIBER OPTIC, DC CABLE, AND DC CIRCUIT BREAKER TAGGING STANDARDS)
 - 2. TS-0200 - (TRANSMISSION ANTENNA LINE ACCEPTANCE STANDARDS)
 - 3. EL-0568: (FIBER TESTING POLICY)
 - 4. NP-312-201: (EXTERIOR GROUNDING SYSTEM TESTING)
 - 5. NP-760-500: ETHERNET, MICROWAVE, TESTING AND ACCEPTANCE

PRECEDENCE:

SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

NATIONALLY RECOGNIZED CODES AND STANDARDS:

- THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
- A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
 - B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
 - C. GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY -GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
 - D. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE - "NEC") AND NFPA 101 (LIFE SAFETY CODE).
 - E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
 - F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
 - G. AMERICAN CONCRETE INSTITUTE (ACI)
 - H. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
 - I. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
 - J. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
 - K. PORTLAND CEMENT ASSOCIATION (PCA)
 - L. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
 - M. BRICK INDUSTRY ASSOCIATION (BIA)
 - N. AMERICAN WELDING SOCIETY (AWS)
 - O. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
 - P. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
 - Q. DOOR AND HARDWARE INSTITUTE (DHI)
 - R. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
 - 5. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

DEFINITIONS:

- A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
- B. COMPANY: "SPRINT"; SPRINT NEXTEL CORPORATION AND ITS OPERATING ENTITIES.
- C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E", THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
- D. CONTRACTOR: CONSTRUCTION CONTRACTOR, SUPPLIER, CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
- E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.
- F. CONSTRUCTION MANAGER - ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT.

SITE FAMILIARITY:

CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.

POINT OF CONTACT:

COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.

ON-SITE SUPERVISION:

THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

DRAWINGS REQUIRED AT JOBSITE:

- THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
- A. THE JOBSITE DRAWINGS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.
 - B. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

USE OF JOB SITE:

THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

UTILITY SERVICES:

WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

PERMITS/FEEES:

WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

CONTRACTOR:

CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

CONTRACTOR WILL UTILIZE ITS BEST EFFORTS TO WORK WITH SPRINT ELECTRONIC PROJECT MANAGEMENT SYSTEMS. CONTRACTOR UNDERSTANDS THAT SUFFICIENT INTERNET ACCESS, EQUIVALENT TO "BROADBAND" OR BETTER, IS REQUIRED TO TIMELY AND EFFECTIVELY UTILIZE SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS AND AGREES TO MAINTAIN APPROPRIATE CONNECTIONS FOR CONTRACTOR'S STAFF AND OFFICES THAT ARE COMPATIBLE WITH SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS

TEMPORARY UTILITIES AND FACILITIES:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSOR'S OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

ACCESS TO WORK:

THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND THE AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

DIMENSIONS:

VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

EXISTING CONDITIONS:

NOTIFY THE SPRINT CONSTRUCTION MANAGER OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT

FURNISHED MATERIALS:

COMPANY FURNISHED MATERIALS AND EQUIPMENT TO BE INSTALLED BY THE CONTRACTOR (OFC) IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.

RECEIPT OF MATERIAL AND EQUIPMENT:

A. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:

- 1. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
- 2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
- 3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.

- B. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
- C. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
- D. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

DELIVERABLES:

- A. COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.
- B. IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.

SECTION 01 300 - CELL SITE CONSTRUCTION

NOTICE TO PROCEED:

- A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S ISSUANCE OF THE WORK ORDER.
- B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT WITH AN OPERATIONAL WIRELESS FACILITY.

GENERAL REQUIREMENTS FOR CONSTRUCTION:

- A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.
- B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.
- C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
 - 1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
 - 2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.
- D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

FUNCTIONAL REQUIREMENTS:

- A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. CONTRACTOR SHALL TAKE ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.
- B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.
- C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES
- D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 - 1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
 - 2. PREPARE GROUND SITES; PROVIDE DE-GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
 - 3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND BACKHAUL (FIBER, COPPER, OR MICROWAVE).
 - 4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
 - 5. INSTALL ABOVE GROUND GROUNDING SYSTEMS, CONDUIT AND BOXES.
 - 6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
 - 7. INSTALL "H-FRAMES", CABINETS AND PADS AND PLATFORMS AS INDICATED.
 - 8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
 - 9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.

- 10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
- 11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
- 12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
- 13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
- 14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER.
- 15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
- 16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
- 17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
- 18. CONDUCT ALL REQUIRED TESTS AND INSPECTIONS
- 19. PERFORM, DOCUMENT, AND CLOSE OUT ALL JURISDICTIONAL PERMITTING REQUIREMENTS AND ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
- 20. PERFORM ALL ADDITIONAL WORK AS IDENTIFIED IN SCOPE OF SERVICES ATTACHED TO THE SUPPLIER AGREEMENT FOR THIS PROJECT. THIS WORK MAY INCLUDE COMMISSIONING, INTEGRATION, SPECIAL WAREHOUSING, REVERSE LOGISTICS ACTIVITIES, ETC. PERFORM COMMISSIONING AND INTEGRATION ACTIVITIES PER APPLICABLE MOPS.

DELIVERABLES:

- A. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED TEST REPORTS AND DOCUMENTATION INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
 - 1. PRODUCT SPECIFICATIONS FOR MATERIALS OR SPECIAL CONSTRUCTION IF REQUESTED BY SPRINT
 - 2. ACTUALIZE ALL CONSTRUCTION RELATED MILESTONES IN SITERRA AND COMPLETE ALL ON-LINE FORMS AND COMPLETE DOCUMENT UP-LOADS. UPLOAD ALL REQUIRED CLOSEOUT DOCUMENTS AND FINAL SITE PHOTOS
 - 3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT LEFT ON SITE INSIDE BASE OF MAIN RF CABINET IN A PROTECTIVE POUCH.
 - 4. ALL REQUIRED TEST REPORTS.
 - 5. REQUIRED CLOSEOUT DOCUMENTATION INCLUDING BUT NOT LIMITED TO:
 - a. ALL JURISDICTIONAL PERMITTING AND OCCUPANCY INFORMATION
 - b. PDF SCAN OF REDLINES PRODUCED IN THE FIELD
 - c. ELECTRONIC AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS
 - d. LIEN WAIVERS
 - e. FINAL PAYMENT APPLICATION
 - f. REQUIRED FINAL CONSTRUCTION PHOTOS
 - g. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
 - h. LISTS OF SUBCONTRACTORS
- B. PROVIDE ADDITIONAL DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.
 - 1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
 - 2. PROJECT PROGRESS REPORTS.
 - 3. PRE-CONSTRUCTION MEETING NOTES.

SECTION 01 400 - TESTS, INSPECTIONS, SUBMITTALS, AND PROJECT CLOSEOUT

TESTS AND INSPECTIONS:

- A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
- B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 - 1. COAX SWEEPS AND FIBER TESTS PER TS-0200 (CURRENT VERSION) ANTENNA LINE ACCEPTANCE STANDARDS
 - 2. POST CONSTRUCTION HEIGHT VERIFICATION, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
 - 3. CONCRETE BREAK TESTS
 - 4. SITE RESISTANCE TO EARTH TEST
 - 5. STRUCTURAL BACKFILL COMPACTION TESTS
 - 6. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
 - 7. ADDITIONAL TESTING AS REQUIRED ELSEWHERE IN THIS SPECIFICATION.

SUBMITTALS:

- A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.
- B. UPLOAD THE FOLLOWING TO SITERRA AS APPLICABLE INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 - 1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
 - 2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
 - 3. CHEMICAL GROUNDING SYSTEM
 - 4. REINFORCEMENT CERTIFICATIONS
 - 5. STRUCTURAL BACKFILL TEST RESULTS
 - 6. SWEEP AND FIBER TESTS
 - 7. ANTENNA AZIMUTH AND DOWN-TILT VERIFICATION
 - 8. POST CONSTRUCTION HEIGHT VERIFICATION
 - 9. ADDITIONAL SUBMITTALS MAY BE REQUIRED FOR SPECIAL CONSTRUCTION OR MINOR MATERIALS
- C. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

TESTING BY THIRD PARTY AGENCY:

- A. EMPLOY AN AGENCY OF ENGINEERS AND SCIENTISTS WHO IS REGULARLY ENGAGED IN FIELD AND LABORATORY TESTING AND ANALYSIS. AGENCY SHALL HAVE BEEN IN BUSINESS A MINIMUM OF FIVE YEARS, AND BE LICENSED AS PROFESSIONAL ENGINEERS IN THE STATE WHERE THE PROJECT IS LOCATED. AGENCY IS SUBJECT TO APPROVAL BY COMPANY.
 - 1. AGENCY MUST HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
 - 2. AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
 - 3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASHTO, AND OTHER METHODS IS NEEDED.
- B. REQUIRED THIRD PARTY TESTS:
 - 1. SITE RESISTANCE TO EARTH TEST PER NP-31 2-201
 - 2. CONCRETE CYLINDER BREAK TESTS FOR TOWER PIER AND ANCHORS PER NATIONALLY RECOGNIZED STANDARDS
 - 3. STRUCTURAL SOILS COMPACTION TESTS PER NATIONALLY RECOGNIZED STANDARDS
 - 4. REBAR PLACEMENT VERIFICATION WITH REPORT
 - 5. TESTING TENSION STUDY FOR ROCK ANCHORS
 - 6. ALL THIRD PARTY TESTS AS REQUIRED BY LOCAL JURISDICTION
- C. REQUIRED TESTS BY CONTRACTOR
 - 1. COAX SWEEP TESTS PER SPRINT STANDARD TS-0200
 - 2. FIBER TESTS PER SPRINT STANDARD EL-0568
 - 3. MICROWAVE LINK TESTS PER NP-760-500
 - 4. ANTENNA AZIMUTHS AND DOWN TILT USING ELECTRONIC ALIGNMENT TOOL PER ANTENNA INSTALLATION SPECIFICATION HEREIN.



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Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.



Signature: *James R. Skowronski* Date: 8/17/2017

| MARK | DATE | DESCRIPTION |
|-------------|-------|------------------------|
| ISSUE PHASE | FINAL | DATE ISSUED 08/17/2017 |

PROJECT TITLE:
PORTLAND-NRG ENERGY CT43XC843-A

PROJECT INFORMATION:
1866 RIVER ROAD
MIDDLETOWN, CT 06457
MIDDLESEX COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

| | |
|----------------|-------|
| PROJECT NUMBER | 28743 |
| SHEET NUMBER | SP-1 |

5. POST CONSTRUCTION HEIGHT VERIFICATION AS REQUIRED HERewith IN THE TOWER INSTALLATION SPECIFICATIONS.
 6. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED HERewith IN THE ASPHALT PAVING SPECIFICATIONS.
 7. FIELD QUALITY CONTROL TESTING AS SPECIFIED HERewith IN THE CONCRETE PAVING SPECIFICATIONS.
 8. TESTING REQUIRED HERewith UNDER SPECIFICATIONS FOR AGGREGATE BASE FOR ROADWAYS
 9. ALL OTHER TESTS REQUIRED BY LOCAL JURISDICTION
- D. INSPECTIONS BY COMPANY: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN INSPECTION ACTIVITIES, FINAL ACCEPTANCE / PUNCH WALK REVIEW, AND/OR AS A RESULT OF TESTING
- E. SPRINT RESERVES THE RIGHT TO INSPECT THE CONSTRUCTION SITE AT ANY TIME VIA SITE WALKS AND/OR PHOTO REVIEWS. CONTRACTOR SHALL GIVE SPRINT 24 HOURS NOTICE PRIOR TO THE COMMENCEMENT OF THE FOLLOWING CONSTRUCTION ACTIVITIES AND PHOTOGRAPHS OF THE IN-PROGRESS WORK.
1. GROUNDING SYSTEM AND BURIED UTILITIES INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
 2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
 3. COMPACTION OF BACKFILL MATERIALS, AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS, ASPHALT PAVING, AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
 4. PRE AND POST CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES. PRIOR TO CONSTRUCTION ACTIVITIES AND AFTER CONSTRUCTION IS COMPLETE, PROVIDE PHOTOGRAPHIC DOCUMENTATION OF ROOF, FLASHINGS, AND PARAPETS, BOTH BEFORE AND AFTER CONSTRUCTION IS COMPLETE.
 5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
 6. TOWER TOP AND INACCESSIBLE EQUIPMENT (RRUS, ANTENNAS, AND CABLING): PROVIDE PHOTOS OF THE BACKS OF ALL ANTENNAS, RRUS, COMBINERS, FILTERS, FIBER AND DC CABLING, CABLE COLOR CODING, EQUIPMENT GROUNDING AND CONNECTOR WATER PROOFING INCLUDING NAME PLATE AND SERIAL NUMBER FOR ALL SERIALIZED EQUIPMENT.

- PROJECT CLOSEOUT:
- A. FINAL ACCEPTANCE PUNCH WALK AND INSPECTION: AS IDENTIFIED IN THE SCOPE OF SERVICES, SPRINT WILL CONDUCT A FINAL PUNCH WALK OR FINAL DESK TOP PHOTO REVIEW (SITE MODIFICATIONS). PUNCH WALKS MUST BE SCHEDULED IN ADVANCE AS REQUIRED. AT THE PUNCH WALK / REVIEW, SPRINT MAY IDENTIFY CRITICAL DEFICIENCIES WHICH MUST BE CORRECTED PRIOR TO PUTTING SITE ON AIR. MINOR DEFICIENCIES MUST BE CORRECTED WITHIN 30 DAYS EXCEPT AS OTHERWISE REQUIRED. VERIFICATIONS OF CORRECTIONS MAY BE MADE BY COMPANY DURING A REPEAT SITE WALK OR DESK TOP PHOTO REVIEW AT COMPANY'S SOLE DISCRETION.
- B. CLOSEOUT DOCUMENTATION: ALL CLOSEOUT DOCUMENTATION AND PHOTOGRAPHS SHALL BE UPLOADED PRIOR TO FINAL ACCEPTANCE. SPRINT WILL REVIEW CLOSEOUT DOCUMENTATION FOR PRESENCE AND CONTENT. CLOSEOUT DOCUMENTATION SHALL INCLUDE BUT IS NOT LIMITED TO THE FOLLOWING AS APPLICABLE:
1. COAX SWEEP TESTS:
 2. FIBER TESTS:
 3. JURISDICTION FINAL INSPECTION DOCUMENTATION
 4. REINFORCEMENT CERTIFICATION (MILL CERTIFICATION)
 5. CONCRETE MIX DESIGN AND PRODUCT DATA (TOWER FOUNDATION)
 6. LIEN WAIVERS AND RELEASES.
 7. POST -CONSTRUCTION HEIGHT VERIFICATION
 8. JURISDICTION CERTIFICATE OF OCCUPANCY
 9. ELECTRONIC ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
 10. STRUCTURAL BACKFILL TEST RESULTS (IF APPLICABLE)
 11. CELL SITE UTILITY SETUP
 12. AS-BUILT REDLINE CONSTRUCTION DRAWINGS (PDF SCAN OF FIELD MARKS)
 13. AS-BUILT CONSTRUCTION DRAWINGS IN DWG AND PDF FORMATS
 14. LIST OF SUB CONTRACTORS
 15. APPROVED PERMITTING DOCUMENTS
 16. FINAL SITE PHOTOS UP-LOADED TO SITERRA. INCLUDE THE FOLLOWING AS APPLICABLE:
 - a. TOWER, ANTENNAS, RRUS, AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX/CABLE LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNAS; PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING - TOP AND BOTTOM; PHOTOS OF COAX GROUNDING--TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
 - b. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
 - c. SITE LAYOUT - PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
 - d. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.

- PROJECT PHOTOGRAPHS:
- A. PROVIDE PROJECT CLOSEOUT GENERAL ARRANGEMENT PHOTOS OF ALL NEW WORK. THE FOLLOWING LIST REPRESENTS MINIMUM REQUIREMENTS AND MINIMUM QUANTITY. ADDITIONAL PHOTOS MAY BE REQUIRED TO ADEQUATELY DOCUMENT THE WORK.
1. ASR AND RF MPE SIGNAGE (IF NOT IN PLACE, SUPPLIER NOTIFIES EMS FIELD REPRESENTATIVE)
 2. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR)
 3. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR) CLOSE UP SHOWING WEATHERPROOFING AND GROUNDING (AS REQUIRED). CLOSE-UP OF BACK SIDE OF EACH PERMANENT RRU SHOWING SERIAL NUMBER/BAR CODE.
 4. VIEW (1 EACH SECTOR) ALONG THE AZIMUTH AND TILT OF THE ANTENNAS
 5. TOP OF TOWER FROM GROUND, 1 EACH SECTOR
 6. MAINLINE HYBRID CABLE ROUTE DOWN TOWER SHOWING FASTENERS AND SUPPORT
 7. MAINLINE/HYBRID CABLE ROUTE ALONG ICE BRIDGE OR IN CABLE TRAY SHOWING FASTENERS AND SUPPORT
 8. GROUND MOUNTED RRU RACKS (FRONT AND BACK)
 9. FRONT, SIDE AND BACK ELEVATIONS OF ALL GROUND CABINETS
 10. VIEW OF COMPOUND FROM A DISTANCE
 11. VIEW OF EACH GROUND CABINET (POWER, RF, FIBER SPOOL, PPC POWER, PPC TELCO WITH DOOR OPEN)
 12. BACKHAUL FIBER MEET-ME-POINT AND CONDUIT ROUTE (MICROWAVE INSTALLATION IF NOT FIBER)
 13. AAV NETWORK INTERFACE DEVICE OR MICROWAVE RADIO INSTALLATION

DEFICIENCY CORRECTIONS:
 CONTRACTOR IS RESPONSIBLE FOR ALL CORRECTIONS TO DEFICIENCIES IDENTIFIED THROUGH TESTING, REVIEW OF SUBMITTALS, INSPECTIONS AND CLOSEOUT REVIEWS.

SECTION 01 500 - PROJECT REPORTING

WEEKLY REPORTS:
 A. CONTRACTOR SHALL REPORT TO SPRINT AT MINIMUM ON A WEEKLY BASIS VIA SITERRA BY UPDATING ALL APPLICABLE POST END KEEPING MILESTONES WITH ACTUAL AND FORECASTED COMPLETION DATES.
 B. ADDITIONAL REQUIREMENTS FOR REPORTING MAY BE IDENTIFIED ELSEWHERE OR REQUIRED BY THE SCOPE OF SERVICES OR SPRINTS LOCAL MARKET CONSTRUCTION MANAGER. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

PROJECT CONFERENCE CALLS:
 SPRINT MAY HOLD PERIODIC PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.

FINAL PROJECT ACCEPTANCE: PRIOR TO SPRINTS FINAL PROJECT ACCEPTANCE. ALL REQUIRED MILESTONE ACTUALS MUST BE UPDATED IN SITERRA AND ALL REQUIRED REPORTING TASKS MUST BE COMPLETE.

SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO UNITS AND CABLE INSTALLATION

SUMMARY:
 THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRUS, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRUS:
 THE NUMBER AND TYPE OF ANTENNAS AND RRUS TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

HYBRID CABLE:
 HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTORS:
 FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 1 2-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRUS AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE, MIN. LENGTH FOR JUMPER SHALL BE 10'-0".

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:
 INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:
 THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. ANTENNA HEIGHT, AZIMUTH, AND FEED ORIENTATION INFORMATION SHALL BE A DESIGNATED ON THE CONSTRUCTION DRAWINGS.

A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.

B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE DRAWINGS.

HYBRID CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST, AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAN THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADIUS.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE INSTALLED INSIDE MONOPOLE WITH CABLE SUPPORT GRIPS AS REQUIRED BY THE MANUFACTURER.
2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
 - a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH AT 18" O.C. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.
 - b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.
3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
4. CABLE INSTALLATION:
 - a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.
 - b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
 - c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM BEND RADIUS.
5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 (CURRENT VERSION).
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER & COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.

1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
2. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF-AMALGAMATING TAPE.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRED BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURER'S INSTALLATION AND START-UP REQUIREMENTS.

DC CIRCUIT BREAKER LABELING

A. NEW DC CIRCUIT IS REQUIRED IN MMBS CABINET SHALL BE CLEARLY IDENTIFIED AS TO RRU BEING SERVICED.

SECTION 26 100 - BASIC ELECTRICAL REQUIREMENTS

SUMMARY:
 THIS SECTION SPECIFIES BASIC ELECTRICAL REQUIREMENTS FOR SYSTEMS AND COMPONENTS

QUALITY ASSURANCE:

A. ALL EQUIPMENT FURNISHED UNDER DIVISION 26 SHALL CARRY UL LABELS AND LISTINGS WHERE SUCH LABELS AND LISTINGS ARE AVAILABLE IN THE INDUSTRY.

B. MANUFACTURERS OF EQUIPMENT SHALL HAVE A MINIMUM OF THREE YEARS EXPERIENCE WITH THEIR EQUIPMENT INSTALLED AND OPERATING IN THE FIELD IN A USE SIMILAR TO THE PROPOSED USE FOR THIS PROJECT.

C. MATERIALS AND EQUIPMENT: ALL MATERIALS AND EQUIPMENT SPECIFIED IN DIVISION 26 OF THE SAME TYPE SHALL BE OF THE SAME MANUFACTURER AND SHALL BE NEW, OF THE BEST QUALITY AND DESIGN, AND FREE FROM DEFECTS.

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:

1. ALLIED TUBE AND CONDUIT.
2. B-LINE SYSTEM.
3. UNISTRUT DIVERSIFIED PRODUCTS.
4. THOMAS & BETTS.

B. FASTENERS: TYPES, MATERIALS, AND CONSTRUCTION FEATURES AS FOLLOWS:

1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL, DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
3. FASTEN BY MEANS OF WOOD SCREWS ON WOOD.
4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
5. CONCRETE INSERTS OR EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS ON STEEL.
7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.



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Certification & Seal:
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.



Signature: *James R. Skowronski* Date: 8/17/2017

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| MARK | DATE | DESCRIPTION |
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| ISSUE | FINAL | DATE ISSUED 08/17/2017 |

PROJECT TITLE:

PORTLAND-NRG ENERGY CT43XC843-A

PROJECT INFORMATION:
 1866 RIVER ROAD
 MIDDLETOWN, CT 06457
 MIDDLESEX COUNTY

SHEET TITLE:

SPRINT SPECIFICATIONS

SCALE: NONE

| | |
|----------------|-------|
| PROJECT NUMBER | 28743 |
| SHEET NUMBER | SP-2 |

SUPPORTING DEVICES:

- A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.
- B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.
- C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:
 - 1. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.
 - 2. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

- A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.
- B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

- A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR UNDERGROUND RUNS. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED - SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.
- B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.
- C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.
- D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.
- E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6- FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRED BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.
- F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

- A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED. HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.
- B. CABLE TERMINATION FITTINGS FOR CONDUIT
 - 1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL BY ROXTEC.
 - 2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO - CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.
- C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS. CROUSE-HINDS WAB SERIES OR EQUAL.
- D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKET COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.
- E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM:

- A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM TO THE EXTENT INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS EXCEPT AS OTHERWISE NOTED.
- B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO-OX.
- C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

- A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

- A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
- B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.



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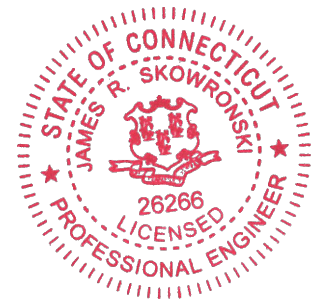


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Certification & Seal:
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James R. Skowronski
 Signature: _____ Date: 8/17/2017

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| MARK | DATE | DESCRIPTION |
| ISSUE | FINAL | DATE ISSUED 08/17/2017 |

PROJECT TITLE:
**PORTLAND-NRG ENERGY
 CT43XC843-A**

PROJECT INFORMATION:
 1866 RIVER ROAD
 MIDDLETOWN, CT 06457
 MIDDLESEX COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

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| PROJECT NUMBER | 28743 |
| SHEET NUMBER | SP-3 |



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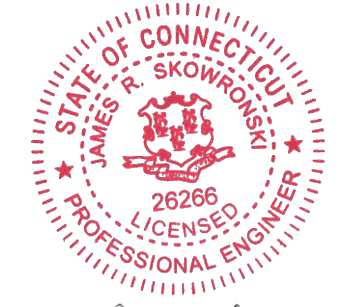


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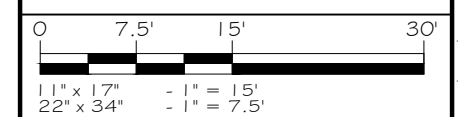
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ISSUE PHASE: FINAL DATE ISSUED: 08/17/2017

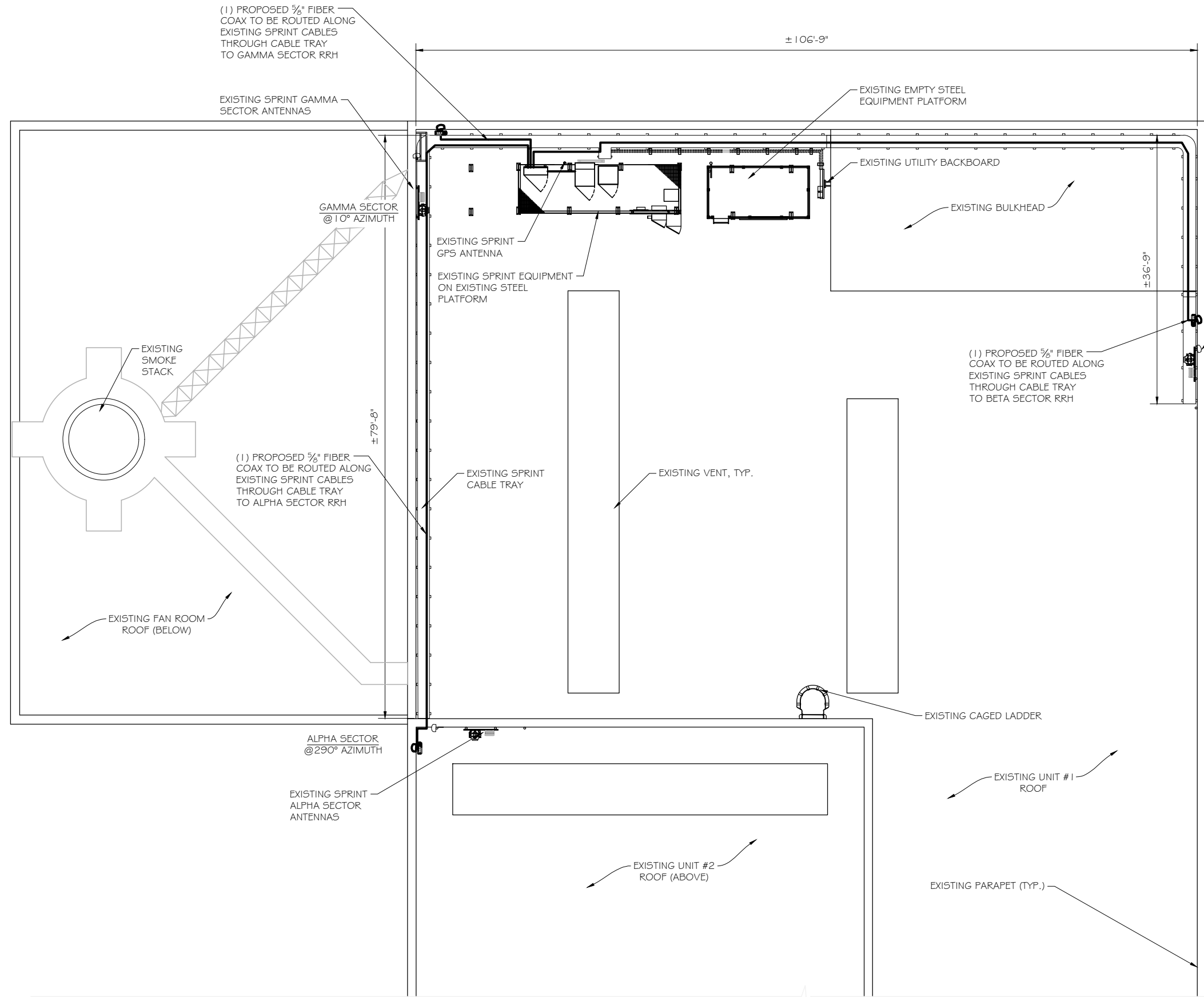
PROJECT TITLE:
**PORTLAND-NRG ENERGY
 CT43XC843-A**

PROJECT INFORMATION:
 1866 RIVER ROAD
 MIDDLETOWN, CT 06457
 MIDDLESEX COUNTY

SHEET TITLE:
SITE PLAN



PROJECT NUMBER: 28743
 SHEET NUMBER: A-1



SITE PLAN
 SCALE: 1" = 15'

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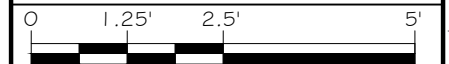
James R. Skowronski
 Signature: _____ Date: 8/17/2017

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| ISSUE | FINAL | DATE ISSUED 08/17/2017 |

PROJECT TITLE:
PORTLAND-NRG ENERGY
CT43XC843-A

PROJECT INFORMATION:
 1866 RIVER ROAD
 MIDDLETOWN, CT 06457
 MIDDLESEX COUNTY

SHEET TITLE:
EQUIPMENT PLAN



| | |
|----------------|--------------|
| 11" x 17" | - 1" = 2.5' |
| 22" x 34" | - 1" = 1.25' |
| PROJECT NUMBER | 28743 |
| SHEET NUMBER | A-2 |

(1) PROPOSED 3/8" FIBER COAX TO BE ROUTED ALONG EXISTING SPRINT CABLES THROUGH CABLE TRAY TO GAMMA SECTOR RRH

(1) PROPOSED 3/8" FIBER COAX TO BE ROUTED ALONG EXISTING SPRINT CABLES THROUGH CABLE TRAY TO BETA SECTOR RRH

(1) PROPOSED 3/8" FIBER COAX TO BE ROUTED ALONG EXISTING SPRINT CABLES THROUGH CABLE TRAY TO ALPHA SECTOR RRH

EXISTING SPRINT CABLE TRAY

EXISTING SPRINT GPS ANTENNA

CONTRACTOR TO INSTALL CONNECTION KIT FROM EXISTING 9927 MM-BTS TO EXISTING FIBER DISTRIBUTION BOX

FIBER DISTRIBUTION BOX

EXISTING 9927 MM-BTS CABINET

EXISTING BATTERY CABINET

INSTALL NEW 2.5 EQUIPMENT INCLUDING BASE BAND UNIT AND RECTIFIERS, IN EXISTING MM-BTS CABINET

EXISTING TRANSFORMER

EXISTING SPRINT EQUIPMENT PLATFORM

FIBER

POWER

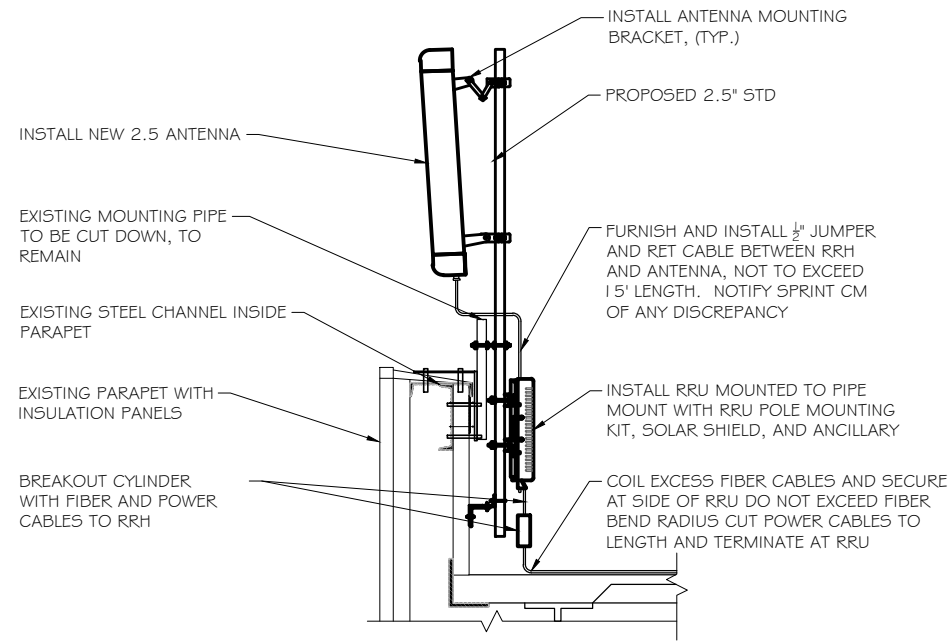
POWER

TELCO

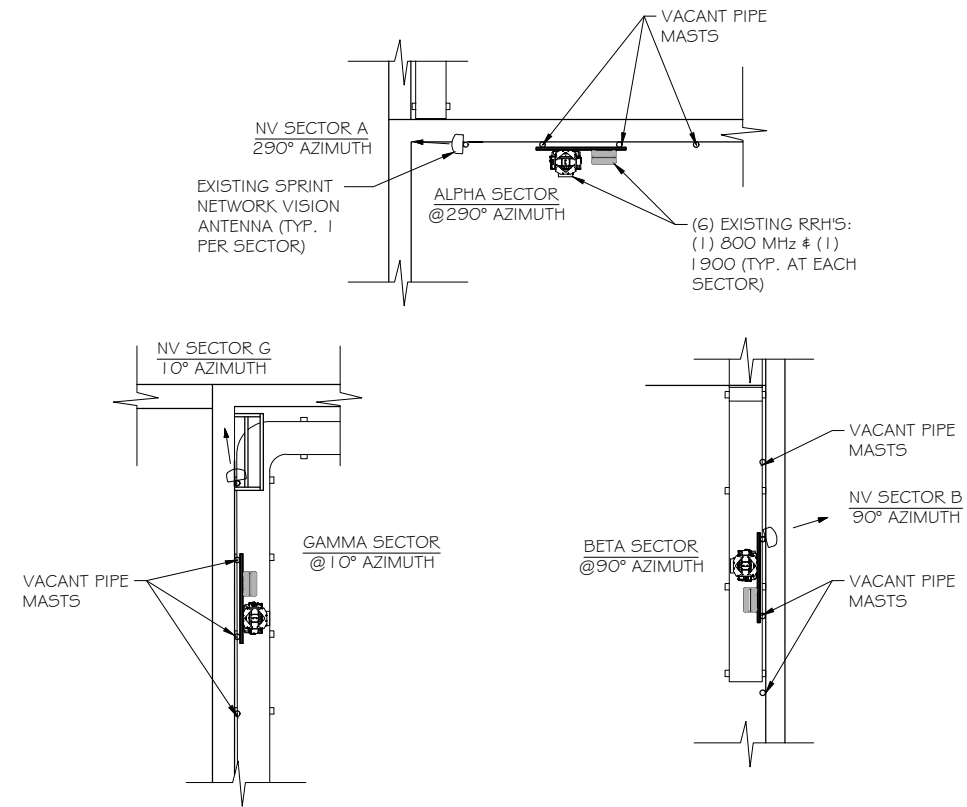
EXISTING SPRINT PPC POWER ENCLOSURE

EQUIPMENT PLAN
 SCALE: 1" = 2.5'

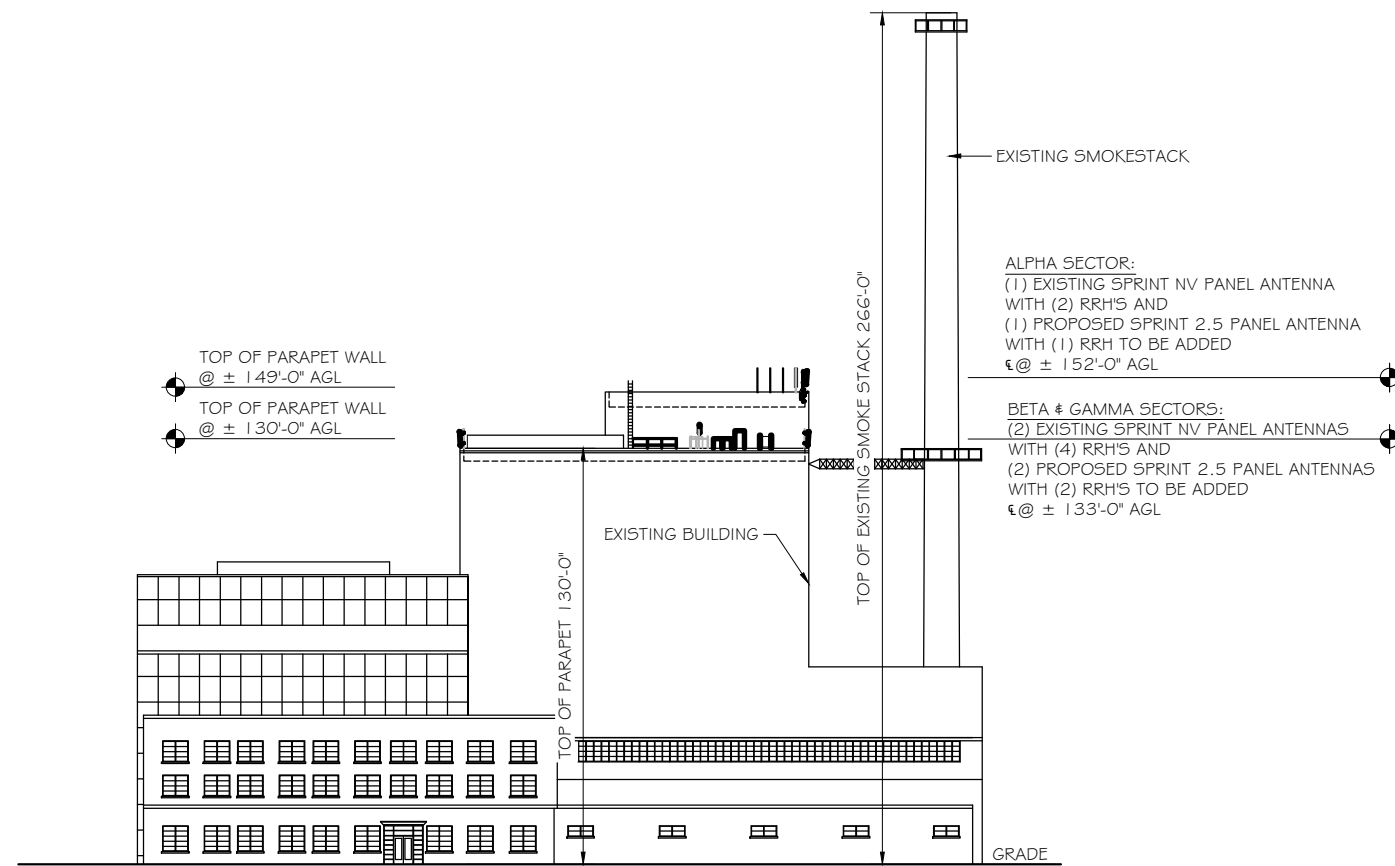




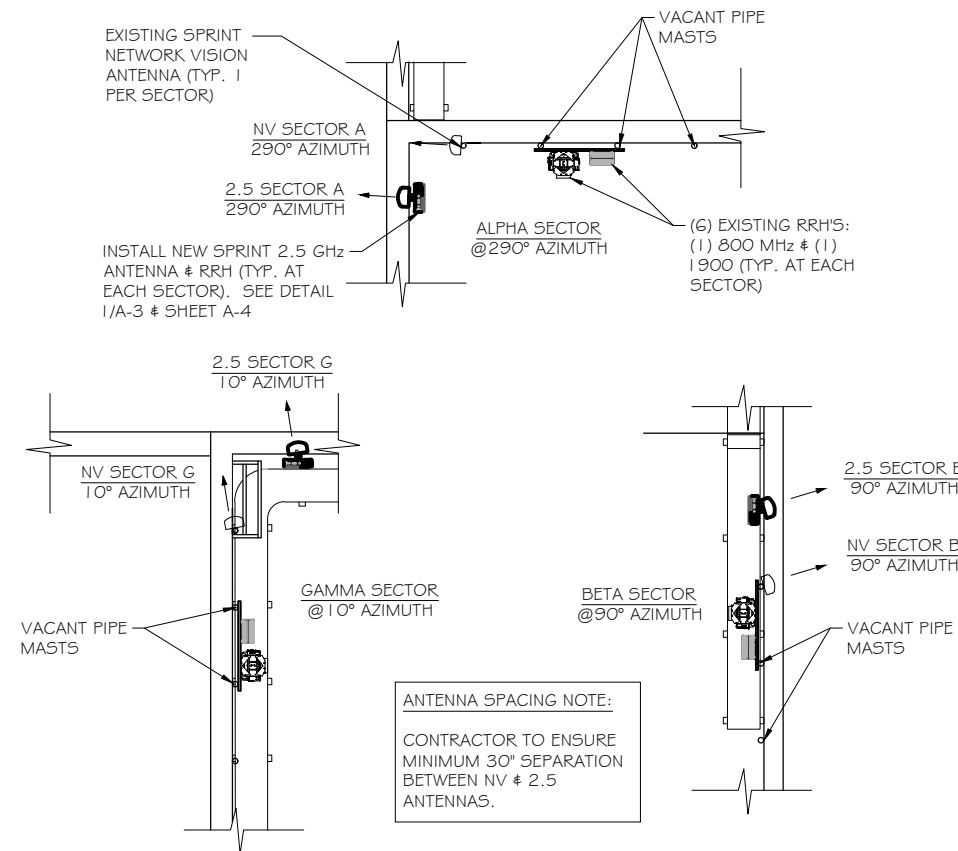
ANTENNA & RRH MOUNTING DETAILS
 SCALE: NTS



EXISTING ANTENNA ARRAY
 SCALE: NTS



BUILDING ELEVATION
 SCALE: 1" = 60'



ANTENNA SPACING NOTE:
 CONTRACTOR TO ENSURE MINIMUM 30' SEPARATION BETWEEN NV & 2.5 ANTENNAS.

PROPOSED ANTENNA ARRAY
 SCALE: NTS



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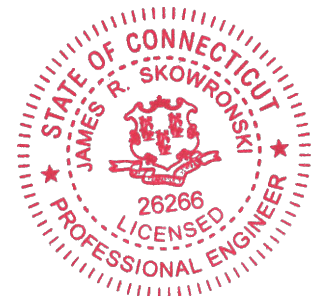


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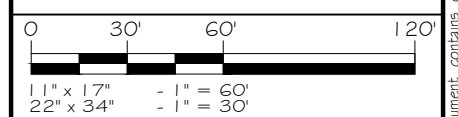
Signature: *James R. Skowronski* Date: 8/17/2017

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| ISSUE | FINAL | DATE ISSUED 08/17/2017 |

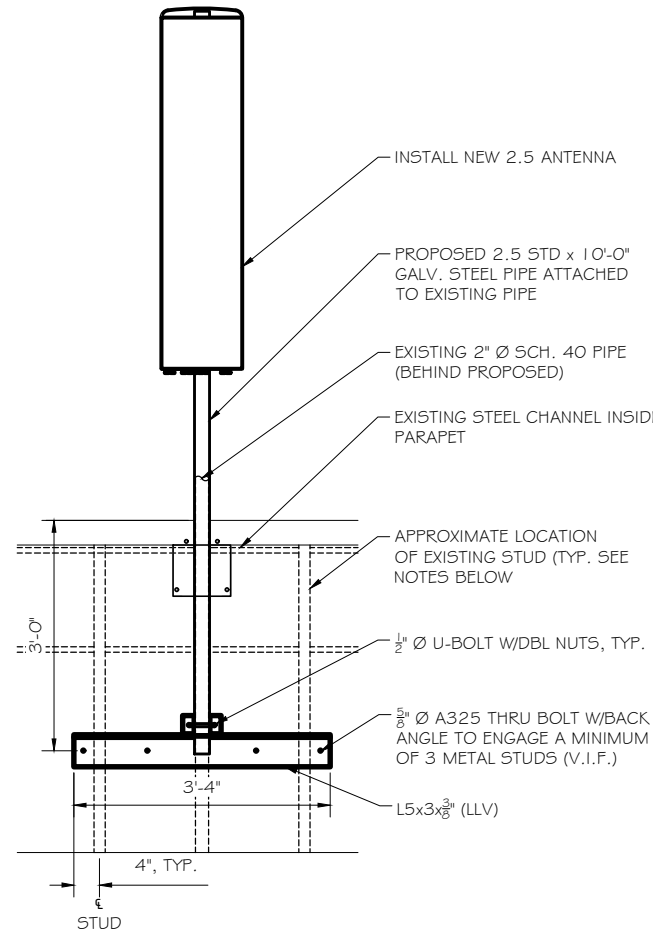
PROJECT TITLE:
PORTLAND-NRG ENERGY CT43XC843-A

PROJECT INFORMATION:
 1866 RIVER ROAD
 MIDDLETOWN, CT 06457
 MIDDLESEX COUNTY

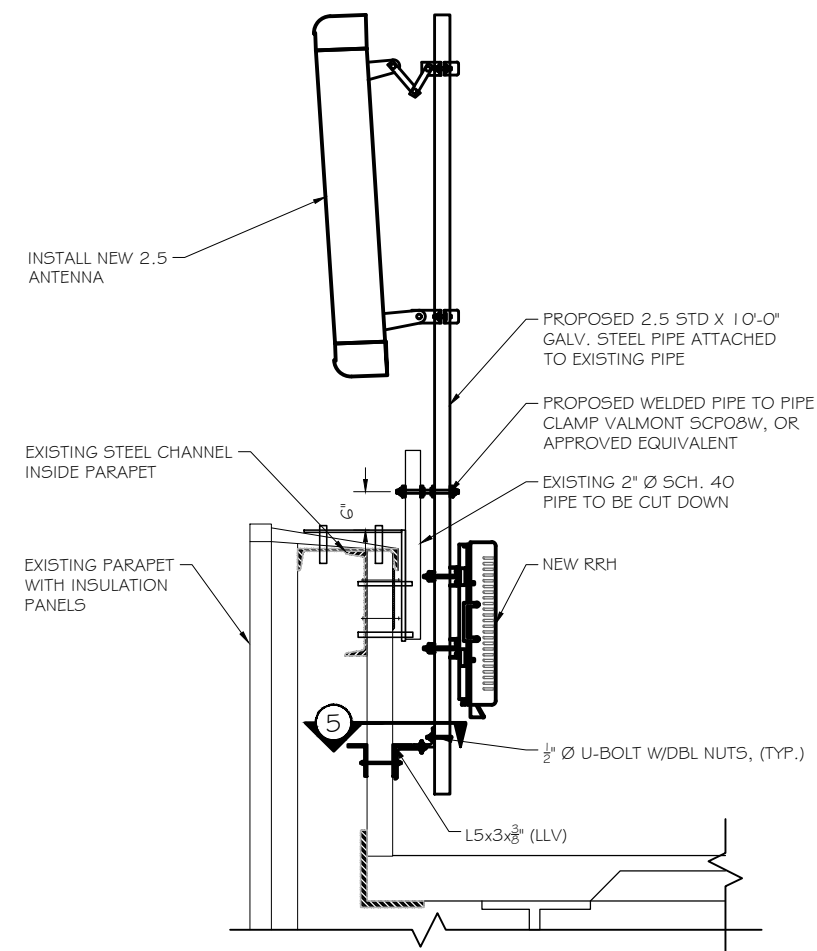
SHEET TITLE:
BUILDING ELEVATIONS & ANTENNA DETAILS



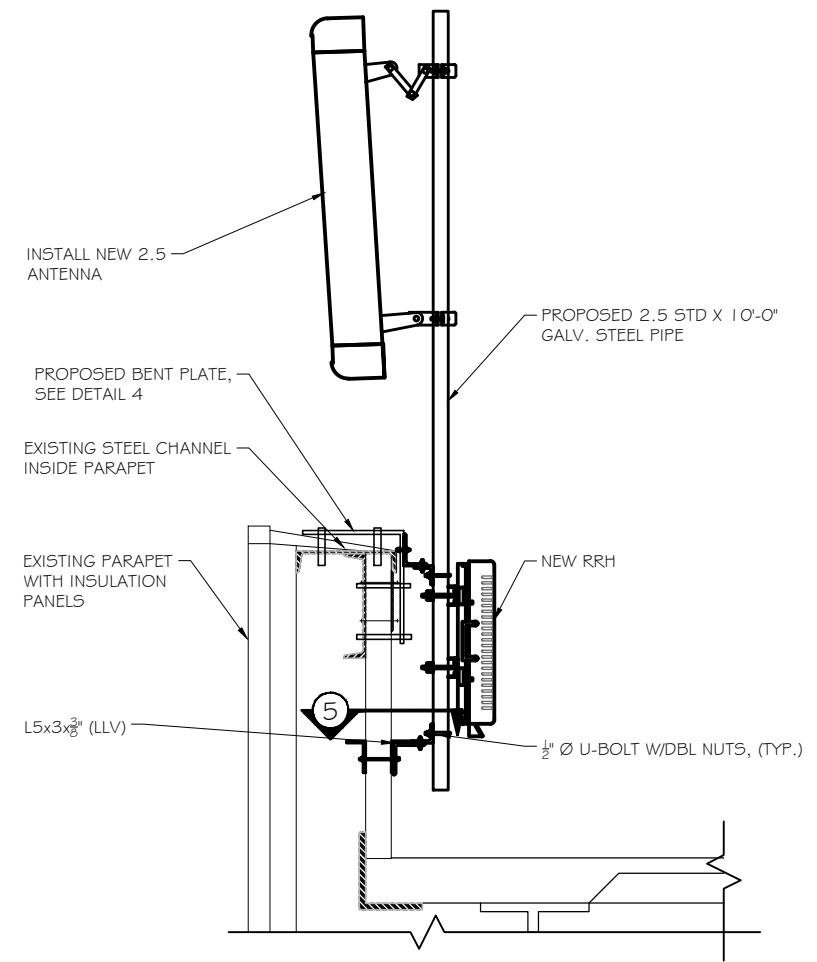
PROJECT NUMBER: 28743
 SHEET NUMBER: A-3



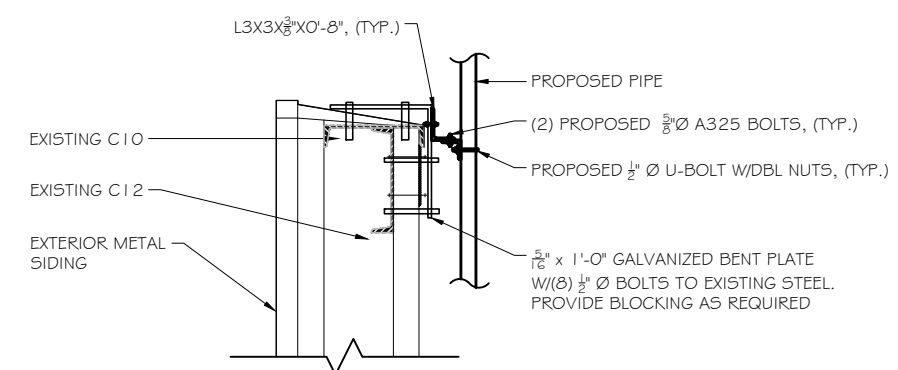
BETA SECTOR MOUNTING DETAIL 1
 SCALE: NTS



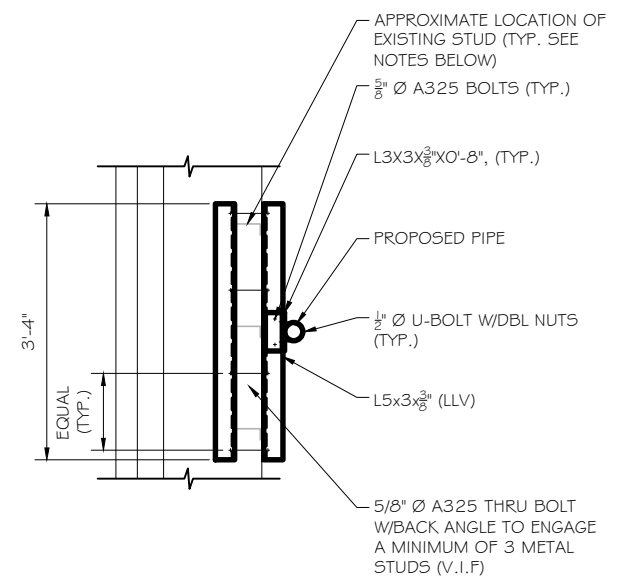
BETA SECTOR MOUNTING DETAIL 2
 SCALE: NTS



ALPHA & GAMMA SECTOR MOUNTING DETAIL 3
 SCALE: NTS



MOUNTING DETAIL 4
 SCALE: NTS



MOUNTING DETAIL 5
 SCALE: NTS



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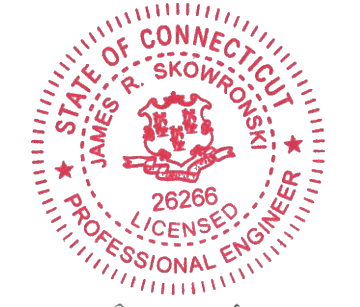


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PROJECT INFORMATION:
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 MIDDLESEX COUNTY

SHEET TITLE:
ANTENNA MOUNT DETAILS

SCALE: NONE

PROJECT NUMBER: 28743
 SHEET NUMBER: A-4



RFDS Sheet

General Site Information

| | |
|----------------|----------------------|
| Site ID | CT43XC843 |
| Market | Northern Connecticut |
| Region | Northeast |
| MLA | N/A |
| Structure Type | rooftop |
| BTS Type | |

| | |
|------------------|----------------|
| Equipment Vendor | Alcatel-Lucent |
| Latitude | 41.5544 |
| Longitude | -72.58083 |
| LL SITE ID | N/A |

| | |
|-------------|--|
| Solution ID | |
|-------------|--|

| | |
|---------------------------|----------------|
| Siterra SR Equipment type | |
| Equipment Vendor | Alcatel-Lucent |

| | |
|--|-----|
| Incremental Power Draw needed by added Equipment | N/A |
|--|-----|

Base Equipment

| | |
|-------------|-------------|
| BBU Kit | ALU BBU Kit |
| BBU Kit Qty | 1 |

| | |
|----------------------|------|
| Top Hat | None |
| Top Hat Qty | N/A |
| Top Hat Dimensions | N/A |
| Top Hat Weight (lbs) | N/A |

| | |
|---------------------------|------|
| Growth Cabinet | None |
| Growth Cabinet Qty | N/A |
| Growth Cabinet Dimensions | N/A |
| Growth Cabinet Weight | N/A |

RF Path Information

| | |
|-----------------------------------|--|
| RRH | TD-RRH&x20-25 |
| RRH Qty | 3 |
| RRH Dimensions | 26.1"x18.6"x6.7" |
| RRH Weight. lbs. | 70 |
| RRH Mount Weight. lbs. | 10 |
| Power and Fiber Cable | ALU FIBER ONLY |
| Cable Qty | 3 |
| Weight per foot. lbs. | 0.242 |
| Diameter. Inches. | 0.73 |
| Length Ft. | A: 125' B: 125' G: 45' (calculated as antenna height plus 20%) |
| Coax Jumper | TBD |
| Coax Jumper Qty | 27 |
| Coax Jumper Length. Feet. | 8 |
| Coax Jumper Weight | 1.7 |
| Coax Jumper Diameter. Inches | 0.5 |
| AISG Cable | COMMSCOPE ATCB-B01-006 |
| AISG Cable Qty | 3 |
| AISG Diameter. Inches. | 0.315 |
| AISG Cable length. | 8' |
| Weight of entire AISG cable. lbs. | 1.3 |

Antenna Sector Information

| | Sector 1 | Sector 2 | Sector 3 |
|-----------------------------------|----------------------|----------------------|----------------------|
| Antenna make/model | RFS APXVTM14-ALU-I20 | RFS APXVTM14-ALU-I20 | RFS APXVTM14-ALU-I20 |
| Antenna qty | 1 | 1 | 1 |
| Antenna Dimensions. Inches | 56.3"x12.6"x6.3" | 56.3"x12.6"x6.3" | 56.3"x12.6"x6.3" |
| Antenna Weight. lbs | 55.12 | 55.12 | 55.12 |
| Antenna Mounting Kit Weight. lbs. | 11.5 | 11.5 | 11.5 |
| CL Height | 152 | 133 | 133 |
| Antenna Azimuth | 290 | 90 | 10 |
| Antenna Mechanical Downtilt | 0 | 0 | 0 |
| Antenna etilt | -2 | -2 | -2 |

*RFDS SHEET WAS GENERATED BY RAMAKER & ASSOCIATES FROM PLAN OF RECORD (POR) PROVIDED BY SPRINT. CONTRACTOR SHALL VERIFY AND OBTAIN FINAL RFDS FROM SPRINT CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.



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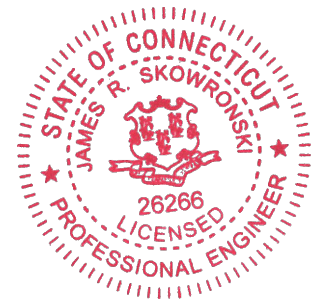


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James R. Skowronski 8/17/2017
 Signature: Date:

NOTES:

- GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND C/L HEIGHT AND MECHANICAL DOWNTILT. IF DIFFERENT THAN CALLED OUT BELOW, HALT ANTENNA WORK FOR ONE HOUR, CALL SPRINT RF ENGINEER (OR MANAGER IF RF ENGINEER DOES NOT ANSWER, BUT STILL LEAVE A MESSAGE TO RF ENGINEER) USING CONTACT INFORMATION ABOVE FOR FURTHER INSTRUCTIONS. IF SPRINT DOES NOT RESPOND WITHIN ONE HOUR, PLACE 2.5GHZ ANTENNA AT SAME C/L HEIGHT AS 1.9GHZ ANTENNA AND EMAIL CORRECT C/L HEIGHT AND AZIMUTH TO SPRINT RF ENGINEER. UPDATE AS-BUILT DRAWING WITH CORRECT C/L HEIGHT. ALSO EMAIL CORRECT 1.9GHZ AND 800MHZ ANTENNA C/L HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.
- AISG TESTS TO VERIFY OPERATION IS TO BE PERFORMED AFTER FINAL INSTALLATION OF ANTENNAS AND AISG CABLES HAVE BEEN CONNECTED. VERIFY OPERATION OF ALL EXISTING SPRINT AISG EQUIPMENT INCLUDING 800MHZ, 1.9GHZ AND 2.5GHZ. TEST TO INCLUDE COMPLETE DOWNTILT, AZIMUTH (IF APPLICABLE) AND BEAMWIDTH SWINGS (IF APPLICABLE). DOCUMENT AISG TEST RESULTS IN COAX SWEEP TEST SPREADSHEET.
- GENERAL CONTRACTOR MUST ENSURE THAT NO OBJECT IS LOCATED WITHIN 45 DEGREES OF LEFT AND RIGHT OF FRONT OF ANTENNA OR 7 DEGREES UP AND DOWN FROM CENTER OF ANTENNA. IF THIS IS NOT POSSIBLE, CONTACT RF ENGINEER FOR FURTHER INSTRUCTION. IN ADDITION, 2.5GHZ ANTENNA IS NOT TO BE PLACED IN FRONT OF ANY OTHER ANTENNA USING THE SAME 45 DEGREE RULE. THIS INCLUDES SPRINT AND NON-SPRINT ANTENNAS.
- 2.5GHZ ANTENNA MUST BE AT LEAST 6" FROM 1.9GHZ ANTENNA, 30" FROM 800MHZ ANTENNA AND 30" FROM DUAL BAND 1.9GHZ AND 800MHZ ANTENNA.
- GENERAL CONTRACTOR IS REQUIRED TO USE A DIGITAL ALIGNMENT TOOL TO SET AZIMUTH, ROLL AND DOWNTILT. AZIMUTH ACCURACY IS TO BE WITHIN 1 DEGREE. DOWNTILT AND ROLL (LEFT TO RIGHT TILT) IS TO BE WITHIN 0.1 DEGREES. IF FOR SOME REASON THIS ACCURACY CANNOT BE ACHIEVED, UPDATE AS-BUILT DRAWINGS AND EMAIL SPRINT RF ENGINEER WITH AS-BUILT SETTINGS. USE 3Z RF ALIGNMENT TOOL OR EQUIVALENT TOOL.

| MARK | DATE | DESCRIPTION |
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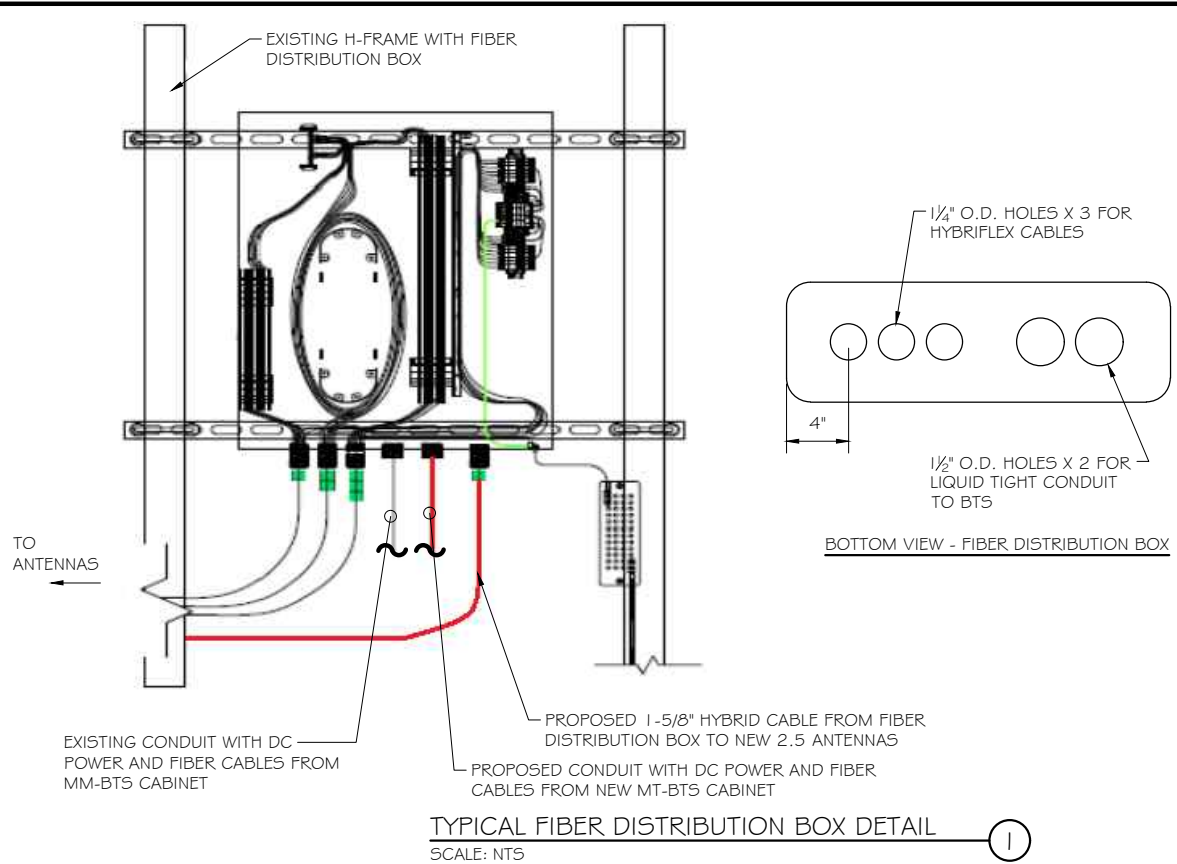
PROJECT TITLE:
**PORTLAND-NRG ENERGY
 CT43XC843-A**

PROJECT INFORMATION:
 1866 RIVER ROAD
 MIDDLETOWN, CT 06457
 MIDDLESEX COUNTY

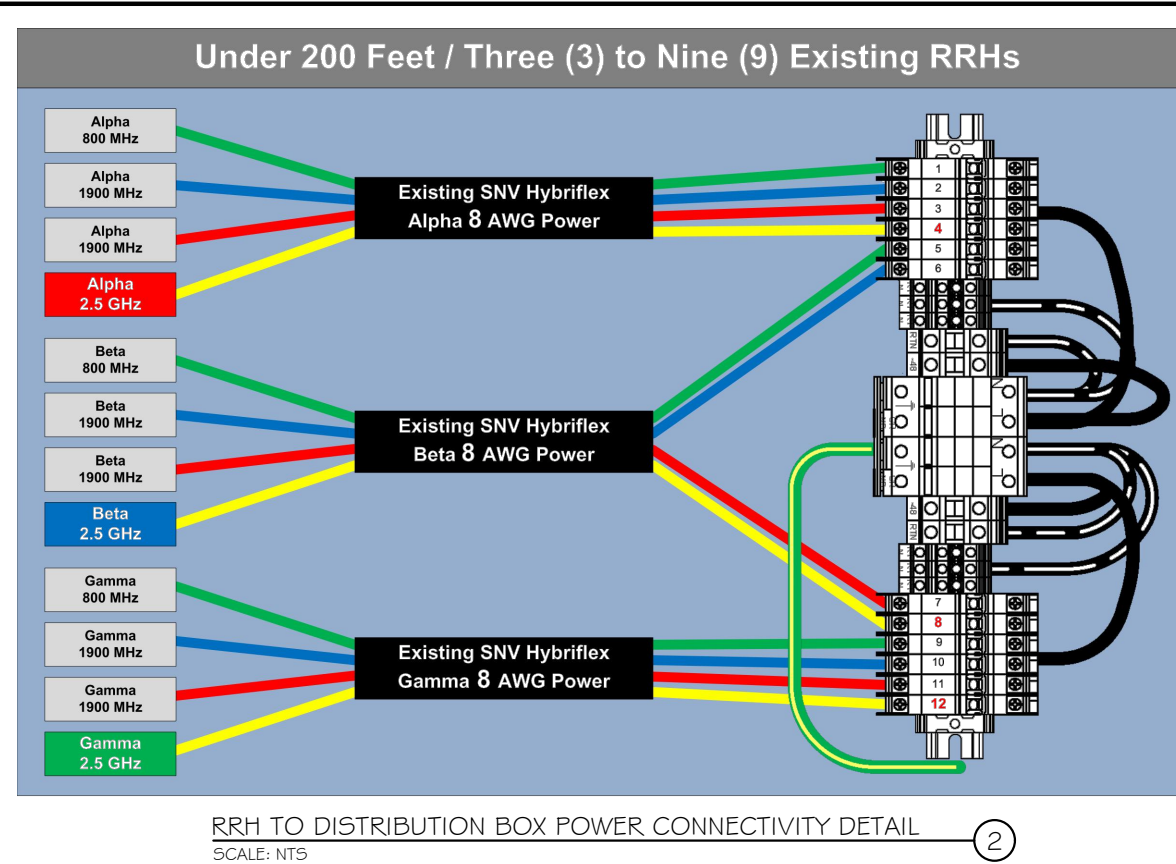
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RF DATA SHEET

SCALE: NONE

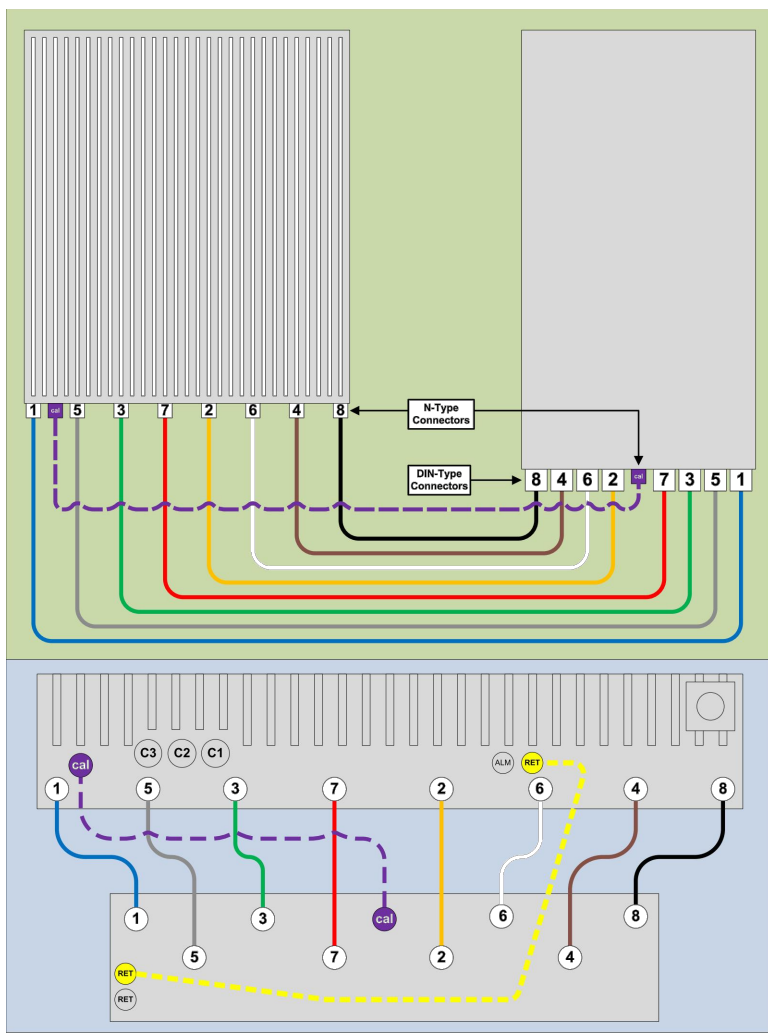
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 SHEET NUMBER: A-5



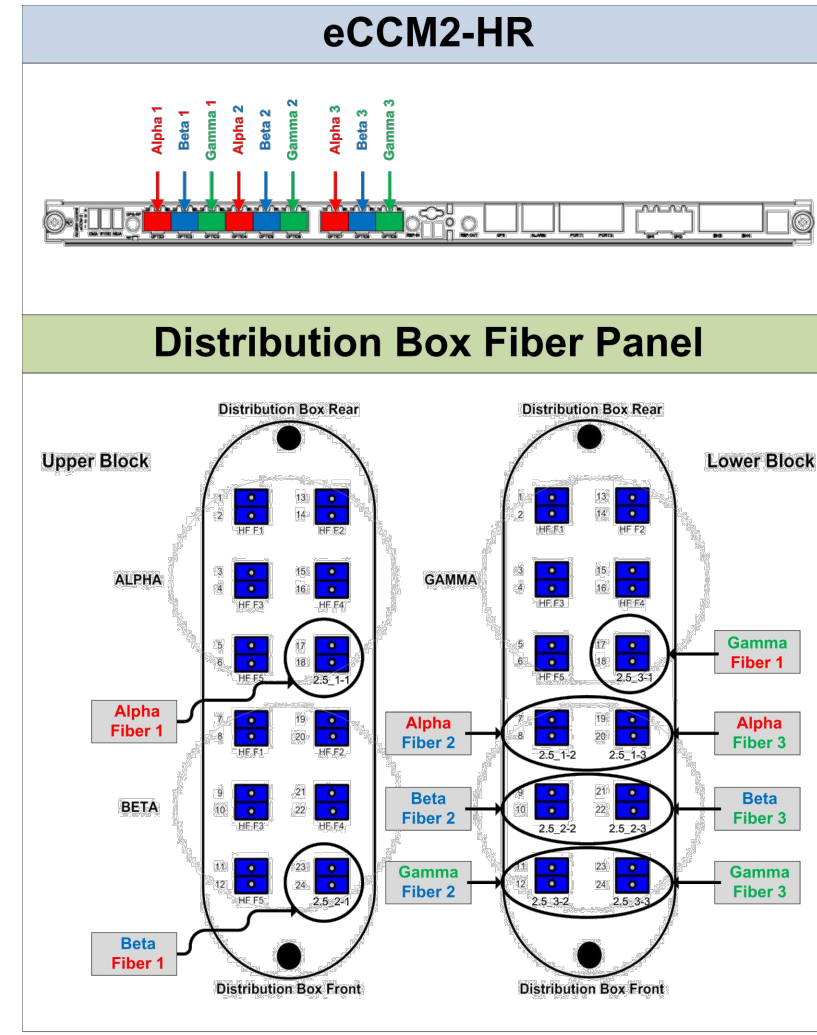
TYPICAL FIBER DISTRIBUTION BOX DETAIL
 SCALE: NTS



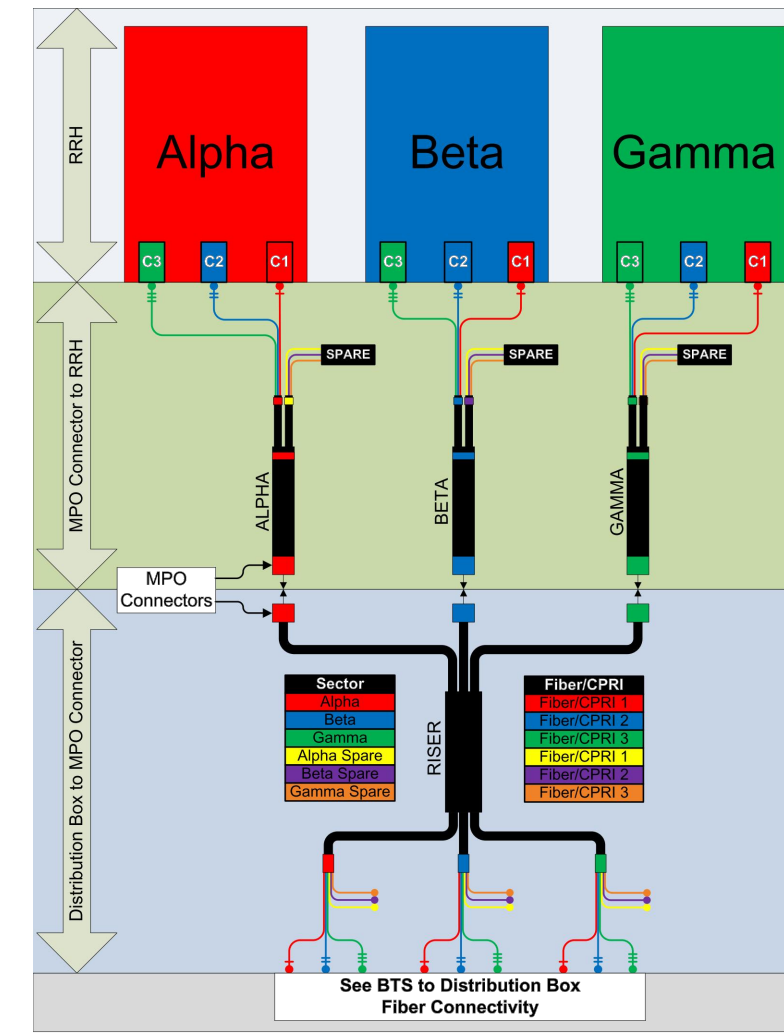
RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL
 SCALE: NTS



8T8R DETAIL
 SCALE: NTS



BTS TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL
 SCALE: NTS



RRH TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL
 SCALE: NTS



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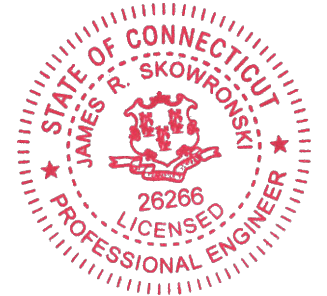


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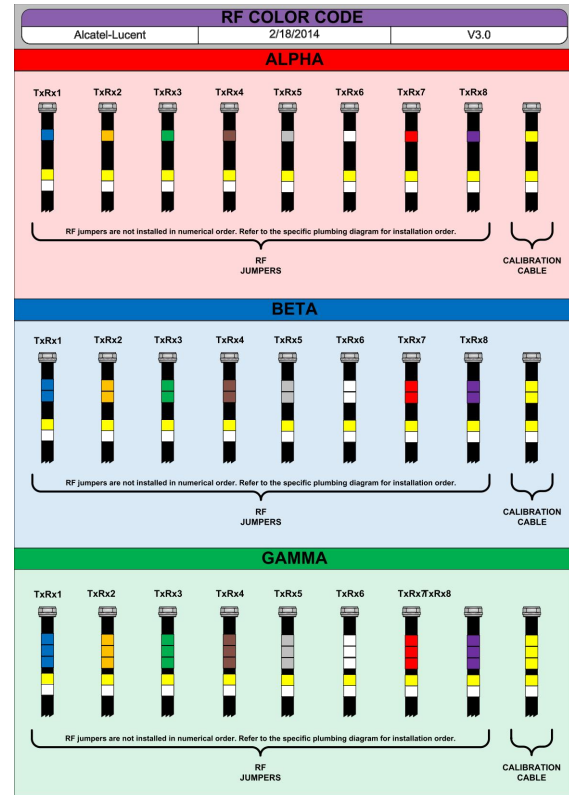
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 CT43XC843-A

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 1866 RIVER ROAD
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SHEET TITLE:
 FIBER PLUMBING DIAGRAM

SCALE: NONE

PROJECT NUMBER: 28743
 SHEET NUMBER: A-6



SECTOR COLOR CODING AND BANDING
 SCALE: NTS

2.5 Coaxial Cable Color Code (Radio#1)

| Sector | Cable | Start at Connector Side | Wrap2 | Wrap3 | Wrap4 | Wrap5 |
|---------|-------------------|-------------------------|--------|--------|--------|-------|
| 1 Alpha | 1 | Blue | | | Yellow | White |
| 1 | 2 | Orange | | | Yellow | White |
| 1 | 3 | Green | | | Yellow | White |
| 1 | 4 | Brown | | | Yellow | White |
| 1 | 5 | Slate | | | Yellow | White |
| 1 | 6 | White | | | Yellow | White |
| 1 | 7 | Red | | | Yellow | White |
| 1 | 8 | Violet | | | Yellow | White |
| 1 | Calibration Cable | Yellow | | | Yellow | White |
| 2 Beta | 1 | Blue | Blue | | Yellow | White |
| 2 | 2 | Orange | Orange | | Yellow | White |
| 2 | 3 | Green | Green | | Yellow | White |
| 2 | 4 | Brown | Brown | | Yellow | White |
| 2 | 5 | Slate | Slate | | Yellow | White |
| 2 | 6 | White | White | | Yellow | White |
| 2 | 7 | Red | Red | | Yellow | White |
| 2 | 8 | Violet | Violet | | Yellow | White |
| 2 | Calibration Cable | Yellow | Yellow | | Yellow | White |
| 3 Gamma | 1 | Blue | Blue | Blue | Yellow | White |
| 3 | 2 | Orange | Orange | Orange | Yellow | White |
| 3 | 3 | Green | Green | Green | Yellow | White |
| 3 | 4 | Brown | Brown | Brown | Yellow | White |
| 3 | 5 | Slate | Slate | Slate | Yellow | White |
| 3 | 6 | White | White | White | Yellow | White |
| 3 | 7 | Red | Red | Red | Yellow | White |
| 3 | 8 | Violet | Violet | Violet | Yellow | White |
| 3 | Calibration Cable | Yellow | Yellow | Yellow | Yellow | White |

2.5 Coaxial Cable Color Code (Radio#2)

| Sector | Cable | Start at Connector Side | Wrap2 | Wrap3 | Wrap4 | Wrap5 |
|---------|-------------------|-------------------------|--------|--------|--------|--------|
| 1 Alpha | 1 | Blue | | | Yellow | Violet |
| 1 | 2 | Orange | | | Yellow | Violet |
| 1 | 3 | Green | | | Yellow | Violet |
| 1 | 4 | Brown | | | Yellow | Violet |
| 1 | 5 | Slate | | | Yellow | Violet |
| 1 | 6 | White | | | Yellow | Violet |
| 1 | 7 | Red | | | Yellow | Violet |
| 1 | 8 | Violet | | | Yellow | Violet |
| 1 | Calibration Cable | Yellow | | | Yellow | Violet |
| 2 Beta | 1 | Blue | Blue | | Yellow | Violet |
| 2 | 2 | Orange | Orange | | Yellow | Violet |
| 2 | 3 | Green | Green | | Yellow | Violet |
| 2 | 4 | Brown | Brown | | Yellow | Violet |
| 2 | 5 | Slate | Slate | | Yellow | Violet |
| 2 | 6 | White | White | | Yellow | Violet |
| 2 | 7 | Red | Red | | Yellow | Violet |
| 2 | 8 | Violet | Violet | | Yellow | Violet |
| 2 | Calibration Cable | Yellow | Yellow | | Yellow | Violet |
| 3 Gamma | 1 | Blue | Blue | Blue | Yellow | Violet |
| 3 | 2 | Orange | Orange | Orange | Yellow | Violet |
| 3 | 3 | Green | Green | Green | Yellow | Violet |
| 3 | 4 | Brown | Brown | Brown | Yellow | Violet |
| 3 | 5 | Slate | Slate | Slate | Yellow | Violet |
| 3 | 6 | White | White | White | Yellow | Violet |
| 3 | 7 | Red | Red | Red | Yellow | Violet |
| 3 | 8 | Violet | Violet | Violet | Yellow | Violet |
| 3 | Calibration Cable | Yellow | Yellow | Yellow | Yellow | Violet |

2.5 COAXIAL CABLE COLOR CODE
 SCALE: NTS

CABLE MARKING NOTES

- ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.
- THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM THE END CONNECTOR, WEATHERPROOFING, OR BREAKOUT UNIT. THERE SHALL BE 1" SPACE BETWEEN EACH RING.
- A 2" GAP SHALL SEPARATE THE CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.
- THE 2" COLORED TAPE(S) SHALL BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.
- SITES WITH MORE THAN FOUR (4) SECTORS WILL REQUIRE ADDITIONAL RINGS FOR EACH SECTOR, FOLLOWING THE PATTERN. HIGH CAPACITY SITES WILL USE THE SECOND CABLE IDENTIFIED BY BLUE BANDS OF TAPE
- HYBRID FIBER CABLE SHALL BE SECTOR IDENTIFIED INSIDE THE CABINET ON FREQUENCY BUNDLES, ON THE SEALTITE, ON THE MAIN LINE UPON EXIT OF SEALTITE, AND BEFORE AND AFTER THE BREAKOUT UNIT (MEDUSA), AS WELL AS BEFORE AND AFTER ANY ENTRANCE OR EXIT.
- HFC "MAIN TRUNK" WILL NOT BE MARKED WITH THE FREQUENCY CODES, AS IT CONTAINS ALL FREQUENCIES.
- INDIVIDUAL POWER PAIRS AND FIBER BUNDLES SHALL BE LABELED WITH BOTH THE CABLE AND FREQUENCY.



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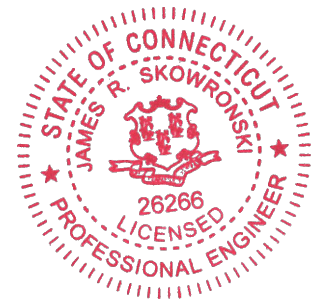


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 CT43XC843-A**

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 1866 RIVER ROAD
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 MIDDLESEX COUNTY

SHEET TITLE:
CABLE COLOR CODING

SCALE: NONE

PROJECT NUMBER: 28743
 SHEET NUMBER: A-7

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HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE
 MANUF:RFS

| CABLE | LENGTH | DC CONDUCTOR | CABLE DIAMETER |
|-------------|----------|------------------|----------------|
| *Fiber Only | Varies | Use NV Hybriflex | 5/8" |
| Hybriflex | <200' | 8 AWG | 1-1/4" |
| Hybriflex | 225-300' | 6 AWG | 1-1/4" |
| Hybriflex | 325-375' | 4 AWG | 1-1/4" |

RFS HYBRIFLEX RISER CABLE SCHEDULE

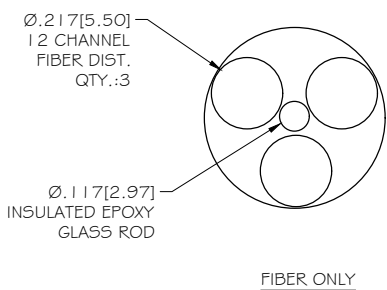
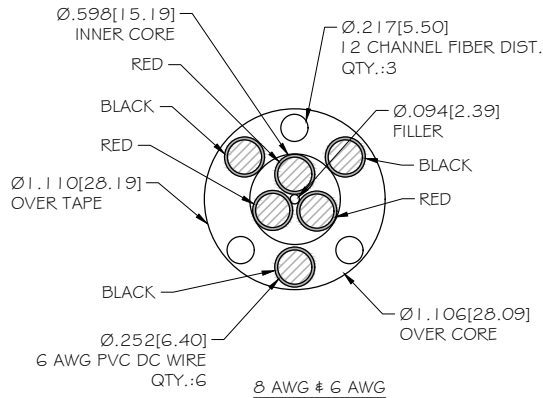
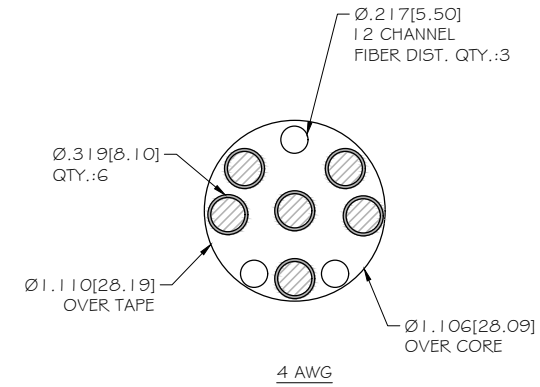
| FIBER ONLY (EXISTING DC POWER) | Hybrid cable | |
|--------------------------------|---|--------|
| MN-HB058-M12-050F | 12x multi-mode fiber pairs, Top:Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50 ft | 50 ft |
| MN-HB058-M12-075F | | 75 ft |
| MN-HB058-M12-100F | | 100 ft |
| *MN-HB058-M12-125F | | 125 ft |
| MN-HB058-M12-150F | | 150 ft |
| MN-HB058-M12-175F | | 175 ft |
| MN-HB058-M12-200F | | 200 ft |
| 8 AWG Power | Hybrid cable | |
| MN-HB114-08U3M12-050F | 3x 8 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors. 1 1/4 cable, 50 ft | 50 ft |
| MN-HB114-08U3M12-075F | | 75 ft |
| MN-HB114-08U3M12-100F | | 100 ft |
| MN-HB114-08U3M12-125F | | 125 ft |
| MN-HB114-08U3M12-150F | | 150 ft |
| MN-HB114-08U3M12-175F | | 175 ft |
| MN-HB114-08U3M12-200F | | 200 ft |
| 6 AWG Power | Hybrid cable | |
| MN-HB114-13U3M12-225F | 3x 6 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors. 1 1/4 cable, 225 ft | 225 ft |
| MN-HB114-13U3M12-250F | | 250 ft |
| MN-HB114-13U3M12-275F | | 275 ft |
| MN-HB114-13U3M12-300F | | 300 ft |
| 4 AWG Power | Hybrid cable | |
| MN-HB114-21U3M12-325F | 3x 4 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors. 1 1/4 cable, 325 ft | 325 ft |
| MN-HB114-21U3M12-350F | | 350 ft |
| MN-HB114-21U3M12-375F | | 375 ft |

RFS HYBRIFLEX JUMPER CABLE SCHEDULE

| FIBER ONLY | Hybrid Jumper cable | |
|---|--|-------|
| MN-HBF012-M3-5F1 | 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable | 5 ft |
| MN-HBF012-M3-10F1 | | 10 ft |
| *MN-HBF012-M3-15F1 | | 15 ft |
| SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY | | |
| 8 AWG POWER | Hybrid Jumper cable | |
| MN-HBF058-08U1M3-5F1 | 5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 5/8 cable | 5 ft |
| MN-HBF058-08U1M3-10F1 | | 10 ft |
| MN-HBF058-08U1M3-15F1 | | 15 ft |
| SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY | | |
| 6 AWG POWER | Hybrid Jumper cable | |
| MN-HBF058-13U1M3-5F1 | 5 ft, 1x 6 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 5/8 cable | 5 ft |
| MN-HBF058-13U1M3-10F1 | | 10 ft |
| MN-HBF058-13U1M3-15F1 | | 15 ft |
| SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY | | |
| 4 AWG POWER | Hybrid Jumper cable | |
| MN-HBF078-21U1M3-5F1 | 5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 7/8 cable | 5 ft |
| MN-HBF078-21U1M3-10F1 | | 10 ft |
| MN-HBF078-21U1M3-15F1 | | 15 ft |
| SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY | | |

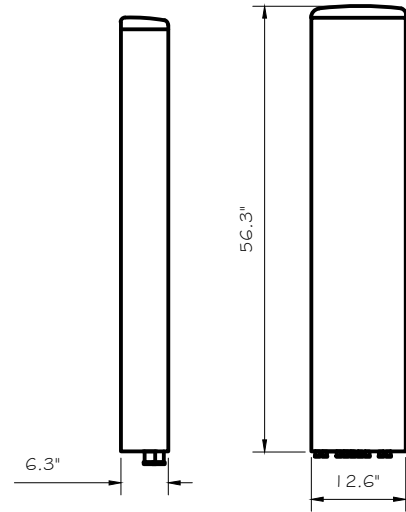
*NOTE: SPRINT CM TO CONFIRM HYBRID/FIBER RISER CABLE # HYBRID/FIBER JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.

FIBER CABLE CROSS SECTION & DATA
 SCALE: NTS

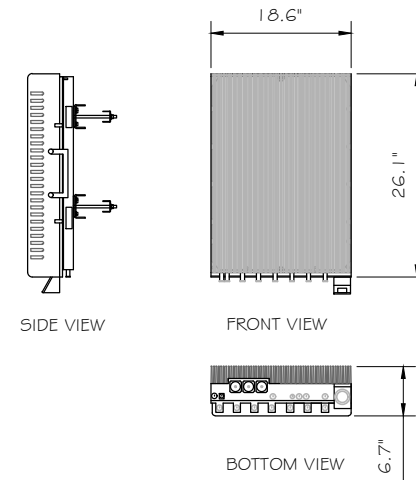


RFS: APXVTM | 4-ALU- | 20

DIMENSIONS, HxWxD: 56.3" x 12.6" x 6.3"
 WEIGHT, WITHOUT PRE-MOUNTED BRACKETS: 55.12 lbs.
 CONNECTOR: (9) XX" MINI-DIN FEMALE/BOTTOM



2.5 ANTENNA DETAIL
 SCALE: NTS



ALCATEL-LUCENT: TD-RRH8x20-25
 HxWxD = (26.1" x 18.6" x 6.7")
 WEIGHT = 70 lbs.

2.5 RRH DETAIL
 SCALE: NTS



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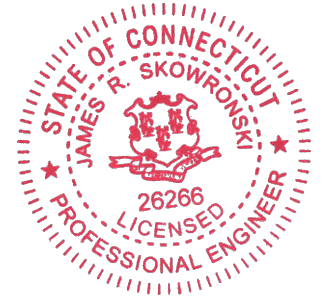


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Certification & Seal:
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.



Signature: *James R. Skowronski* Date: 8/17/2017

| MARK | DATE | DESCRIPTION |
|-------|-------|------------------------|
| ISSUE | FINAL | DATE ISSUED 08/17/2017 |

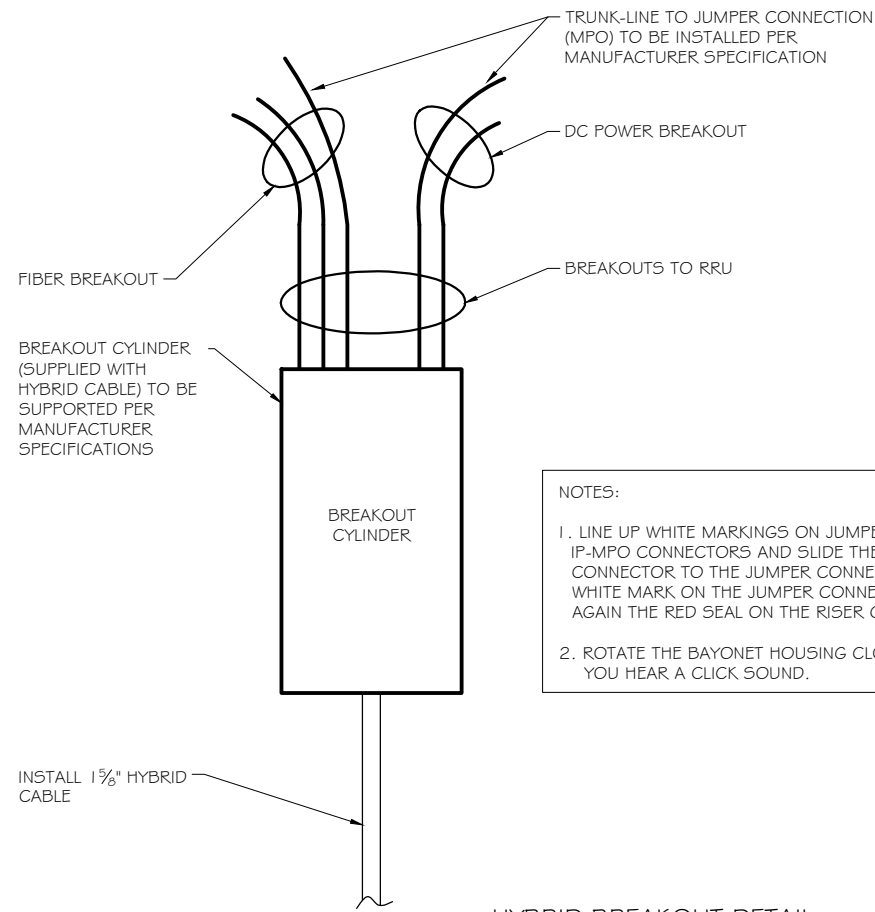
PROJECT TITLE:
**PORTLAND-NRG ENERGY
 CT43XC843-A**

PROJECT INFORMATION:
 1866 RIVER ROAD
 MIDDLETOWN, CT 06457
 MIDDLESEX COUNTY

SHEET TITLE:
**ANTENNA & HYBRID CABLE
 DETAILS**

SCALE: NONE

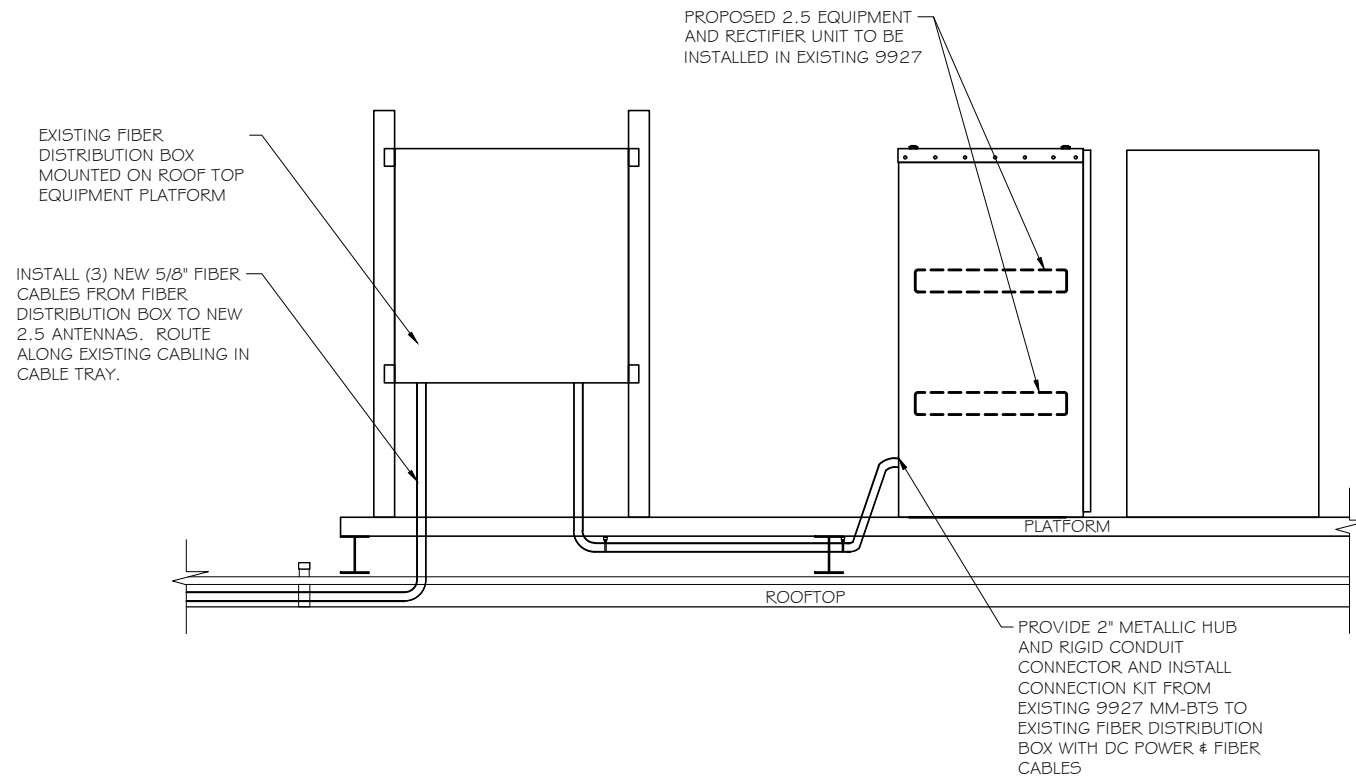
PROJECT NUMBER: 28743
 SHEET NUMBER: A-8



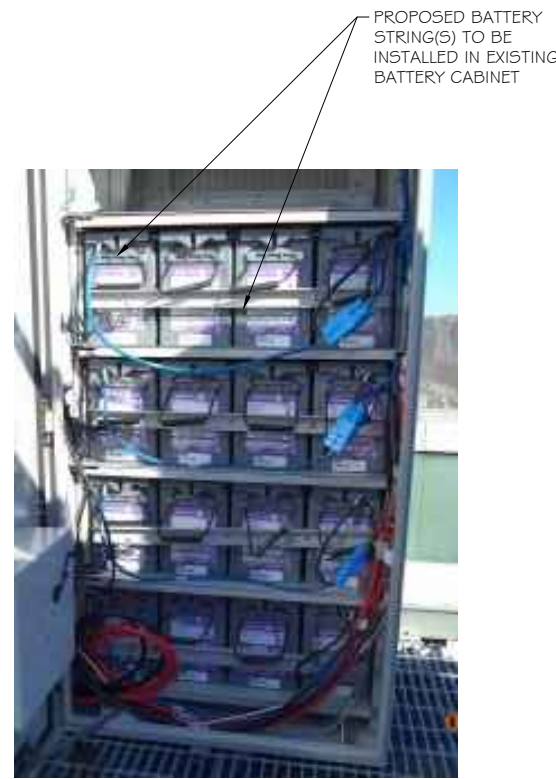
NOTES:

1. LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTORS AND SLIDE THE RISER CONNECTOR TO THE JUMPER CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAIN THE RED SEAL ON THE RISER CONNECTOR.
2. ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL YOU HEAR A CLICK SOUND.

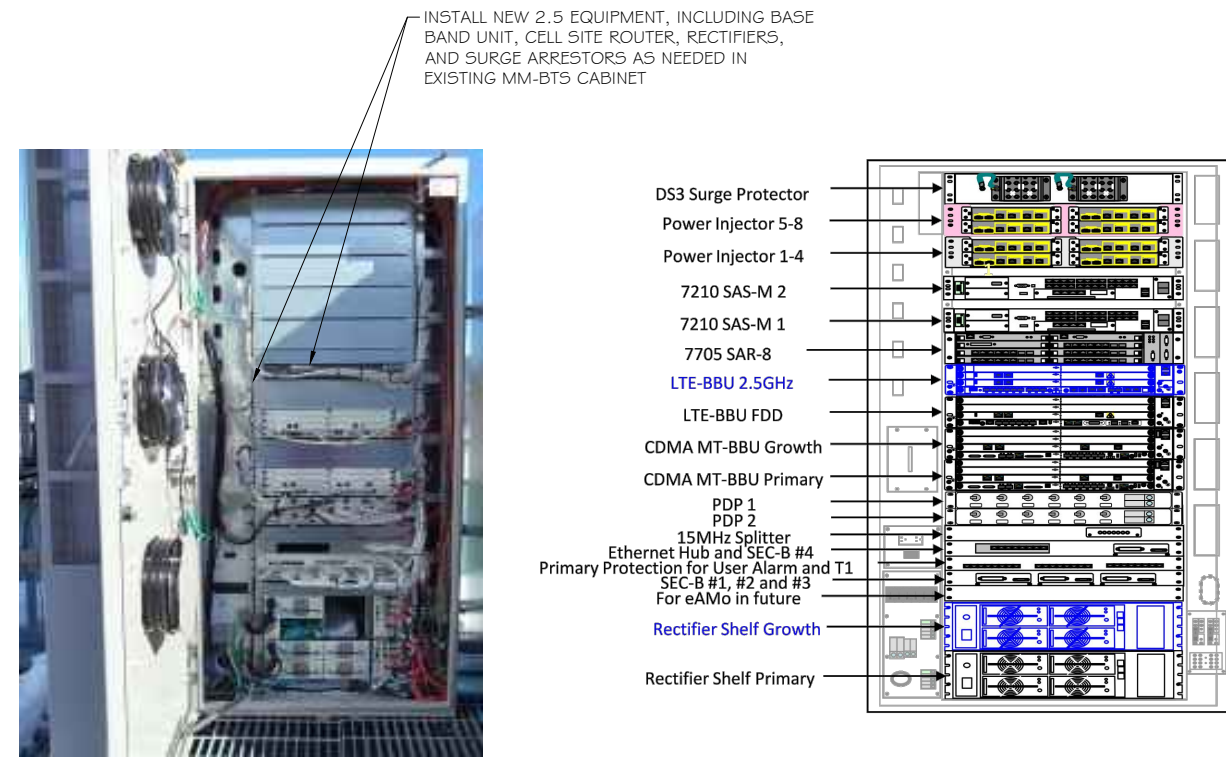
HYBRID BREAKOUT DETAIL ①
 SCALE: NTS



CABLE ROUTE FROM CABINET ②
 SCALE: NTS



EXISTING BBU CABINET ③
 SCALE: NTS



EXISTING MMBS CABINET ④
 SCALE: NTS



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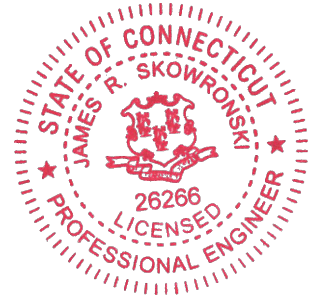


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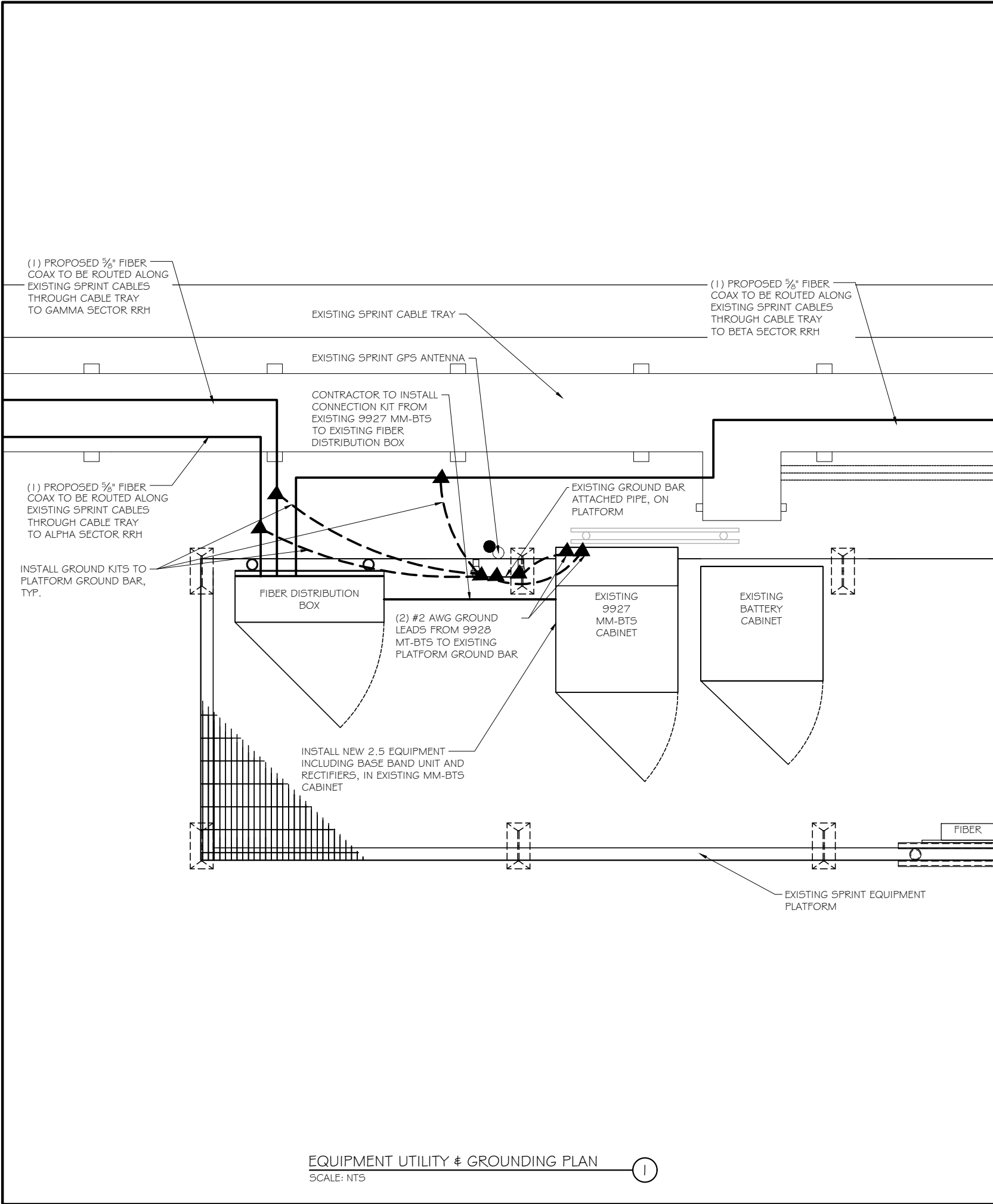
PROJECT TITLE:
**PORTLAND-NRG ENERGY
 CT43XC843-A**

PROJECT INFORMATION:
 1866 RIVER ROAD
 MIDDLETOWN, CT 06457
 MIDDLESEX COUNTY

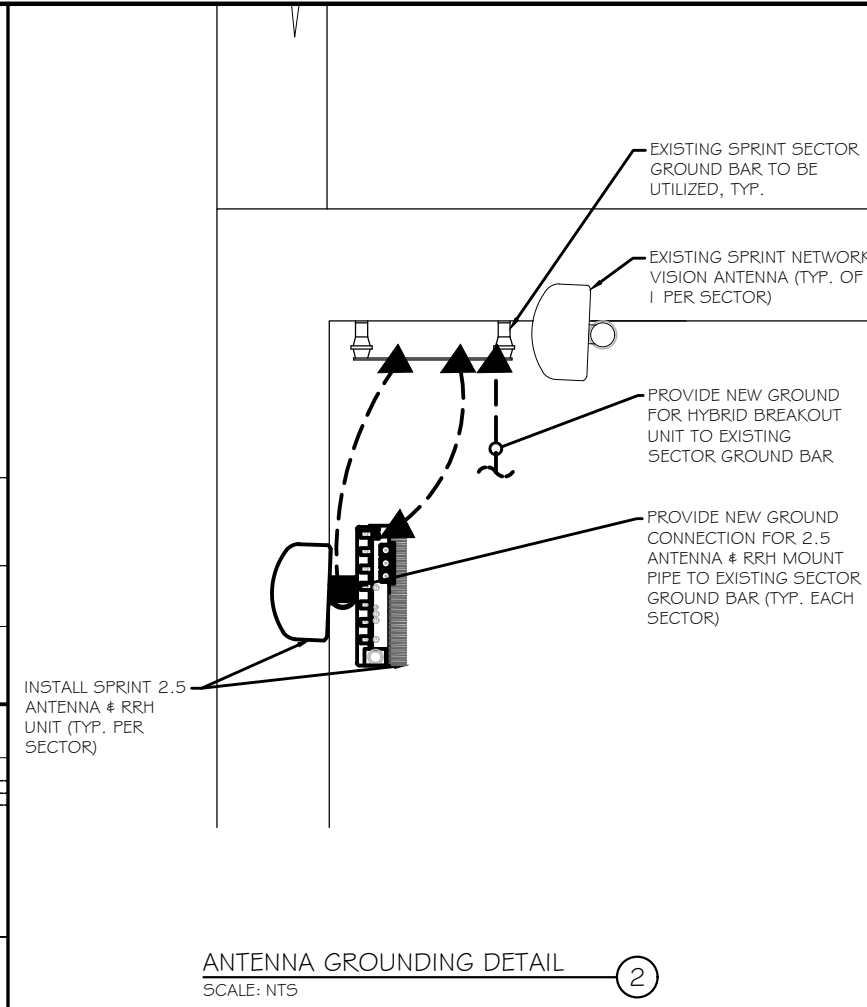
SHEET TITLE:
EQUIPMENT DETAILS

SCALE: NONE

PROJECT NUMBER: 28743
 SHEET NUMBER: A-9



EQUIPMENT UTILITY & GROUNDING PLAN
 SCALE: NTS



GROUNDING NOTES:

- CONTRACTOR TO ENSURE PROPER SEQUENCING OF GROUNDING AND UNDERGROUND CONDUIT INSTALLATION TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM AND/OR DAMAGE TO THE CONDUIT.
- ALL EXTERIOR GROUND CONDUCTORS SHALL BE #2 AWG SOLID TINNED COPPER UNLESS NOTED OTHERWISE.
- ALL GROUND CONNECTIONS BELOW GRADE SHALL BE EXOTHERMIC (CADWELD).
- ALL GROUND CONNECTIONS ABOVE GRADE AND/OR INTERIOR SHALL BE COMPRESSION TYPE, TWO-HOLE LUGS OR DOUBLE-CRIMP "C" TAPS.
- CONTACT AREAS WHERE CONNECTIONS ARE MADE SHALL BE PREPARED TO A BARE BRIGHT FINISH AND COATED WITH AN ANTI-OXIDATION MATERIAL BEFORE CONNECTIONS ARE MADE.
- MAXIMUM RESISTANCE OF THE COMPLETED GROUND SYSTEM SHALL NOT EXCEED 5 OHMS.
- WHERE GROUNDING CONNECTIONS ARE MADE TO PAINTED METAL SURFACES, PAINT SHALL BE REMOVED TO BARE METAL TO ENSURE PROPER CONTACT AND RESTORED/PAINTED TO ORIGINAL FINISH.
- GROUND DEPTH SHALL BE 30" MINIMUM BELOW FINISHED GRADE, OR 6" BELOW FROST LINE, WHICHEVER IS GREATER.

| LEGEND: | |
|-------------|-----------------------|
| --- | EXISTING GROUND CABLE |
| --- | PROPOSED GROUND CABLE |
| ▲ | MECHANICAL CONNECTION |
| ■ | EXOTHERMIC CONNECTION |
| —E—E—E—E—E— | PROPOSED ELECTRIC |



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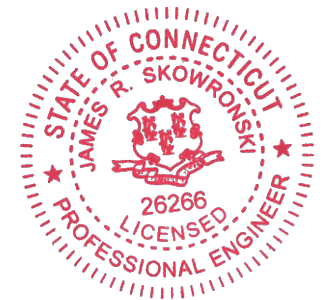


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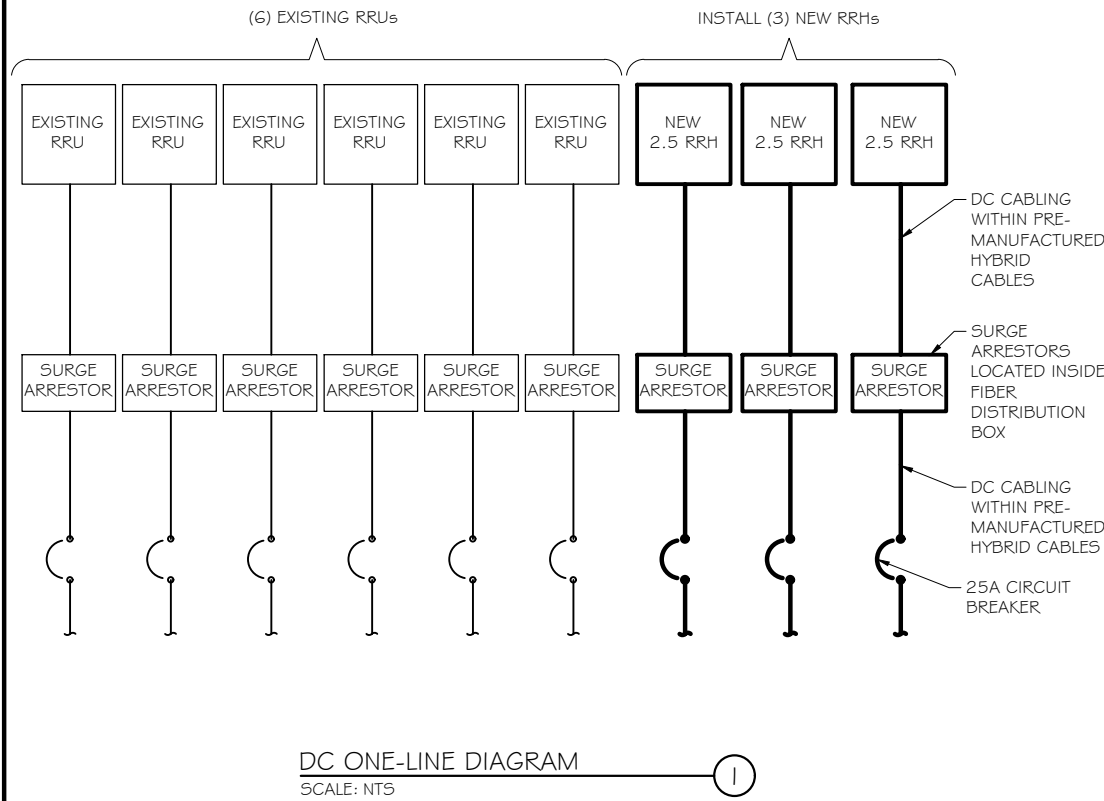
PROJECT TITLE:
**PORTLAND-NRG ENERGY
 CT43XC843-A**

PROJECT INFORMATION:
 1866 RIVER ROAD
 MIDDLETOWN, CT 06457
 MIDDLESEX COUNTY

SHEET TITLE:
**EQUIPMENT UTILITY &
 GROUNDING PLAN**

SCALE: NONE

| | |
|----------------|-------|
| PROJECT NUMBER | 28743 |
| SHEET NUMBER | E-1 |



A/C PANEL SCHEDULE

| | | | | | |
|-----------------|-----------|---------------|----------|-------------------|-----|
| VOLTAGE: | 240V/1 20 | PANEL STATUS: | EXISTING | N TO GROUND BOND: | YES |
| MAIN BREAKER: | 200 AMP | MODEL NUMBER: | TBD | INTERNAL TVSS: | YES |
| MOUNT: | ROOFTOP | PHASE: | 1 | WIRE: | 3 |
| ENCLOSURE TYPE: | NEMA 3R | BUSS RATING: | 200 AMP | GROUND BAR: | YES |
| | | NEUTRAL BAR: | YES | | |

| CKT | DESCRIPTION | BREAKER AMPS | BREAKER POLES | BREAKER STATUS | PHASE A VA | PHASE B VA | BREAKER STATUS | BREAKER POLES | BREAKER AMPS | DESCRIPTION | CKT |
|-----|----------------|--------------|---------------|----------------|------------|------------|----------------|---------------|--------------|----------------|-----|
| 1 | MBTS | 100 | 2 | ON | ■ | ■ | ON | 2 | 60 | SURGE ARRESTOR | 7 |
| 2 | | | | | ■ | ■ | | | | | 8 |
| 3 | SPARE | 100 | 2 | OFF | ■ | ■ | - | - | - | BLANK (UNUSED) | 9 |
| 4 | | | | | ■ | ■ | - | - | - | BLANK (UNUSED) | 10 |
| 5 | BLANK (UNUSED) | - | - | - | ■ | ■ | ON | 1 | 15 | TELCO GFI | 11 |
| 6 | UNLABELED | 10 | 1 | ON | ■ | ■ | - | - | - | BLANK (UNUSED) | 12 |

AC PANEL SCHEDULE
 SCALE: NTS

Sprint

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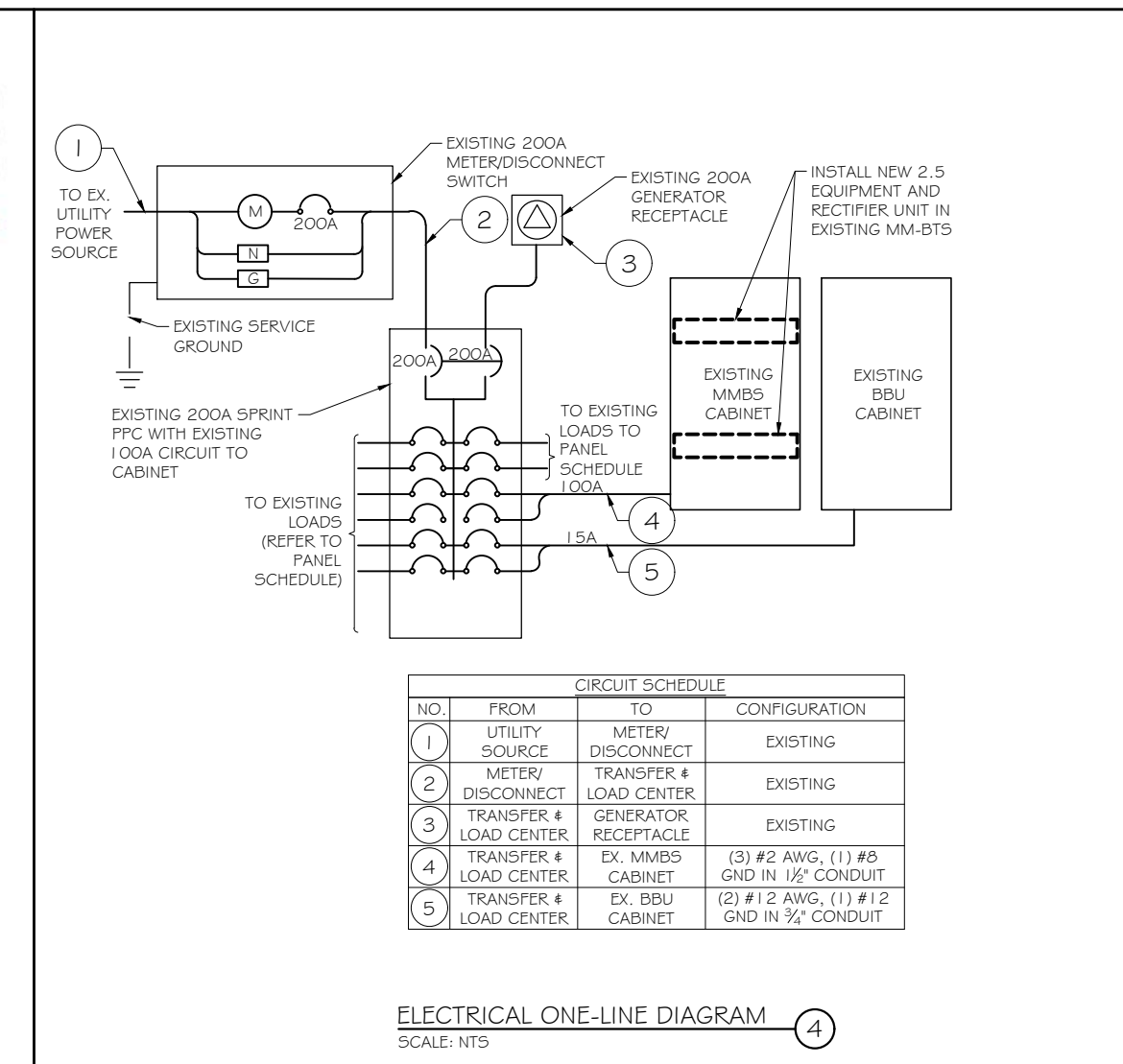
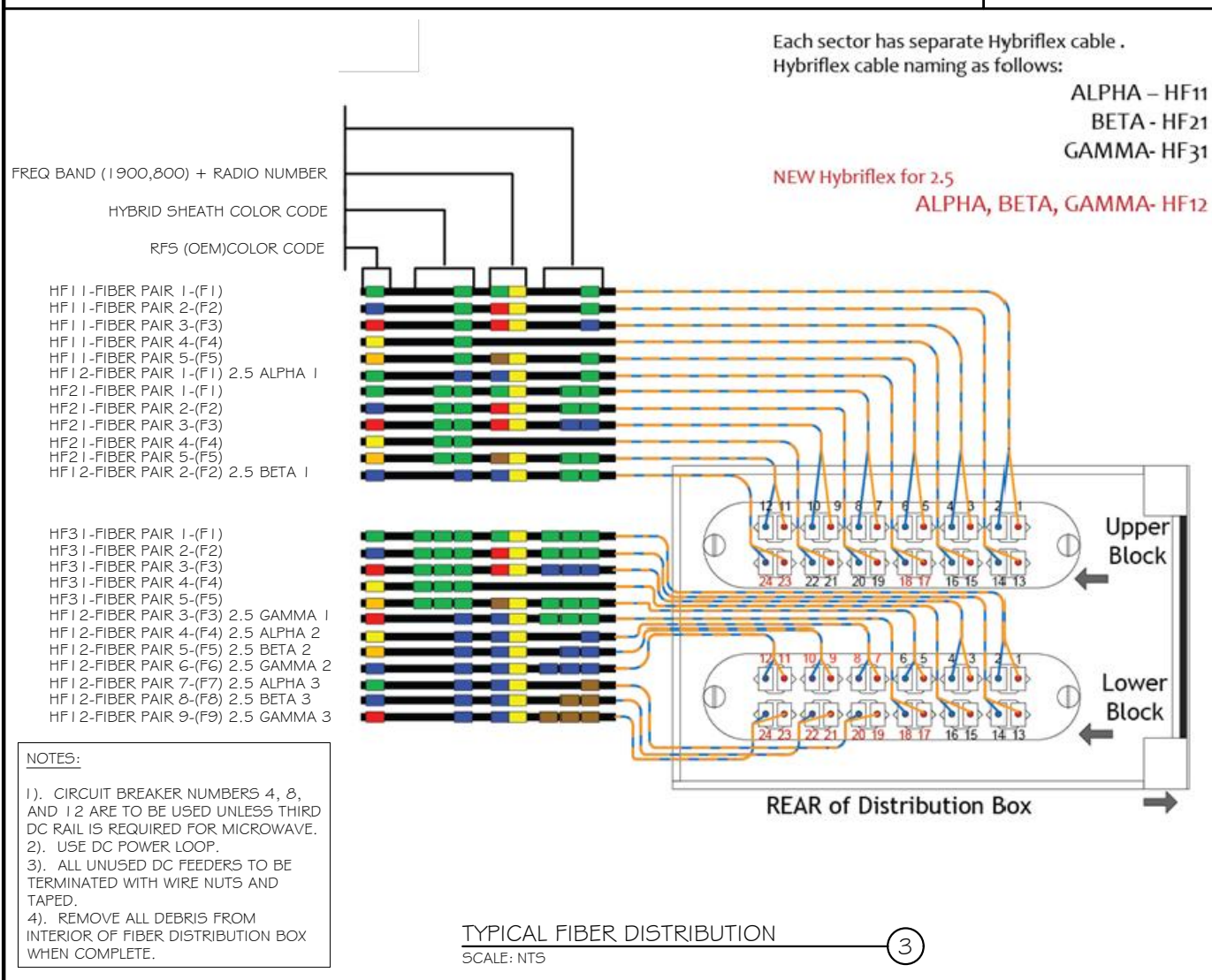
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STATE OF CONNECTICUT
 JAMES R. SKOWRONSKI
 26266
 LICENSED PROFESSIONAL ENGINEER

Signature: *James R. Skowronski* Date: 8/17/2017



| | | |
|---|-------|------------------------|
| MARK | DATE | DESCRIPTION |
| ISSUE | FINAL | DATE ISSUED 08/17/2017 |
| PROJECT TITLE: PORTLAND-NRG ENERGY CT43XC843-A | | |
| PROJECT INFORMATION: 1866 RIVER ROAD MIDDLETOWN, CT 06457 MIDDLESEX COUNTY | | |
| SHEET TITLE: DC POWER DETAILS & PANEL SCHEDULES | | |
| SCALE: NONE | | |
| PROJECT NUMBER | 28743 | |
| SHEET NUMBER | E-3 | |



October 6,2017

Dear Customer:

The following is the proof-of-delivery for tracking number **770408945372**.

Delivery Information:

| | | | |
|--------------------------|---------------------------|---------------------------|-------------------------|
| Status: | Delivered | Delivered to: | Receptionist/Front Desk |
| Signed for by: | D.TOMASI | Delivery location: | MIDDLETOWN, CT |
| Service type: | FedEx Express Saver | Delivery date: | Oct 6, 2017 09:55 |
| Special Handling: | Deliver Weekday | | |
| | Direct Signature Required | | |

Signature image is available. In order to view image and detailed information, the shipper or payor account number of the shipment must be provided.

Shipping Information:

| | | | |
|-------------------------|--------------|-------------------|----------------|
| Tracking number: | 770408945372 | Ship date: | Oct 3, 2017 |
| | | Weight: | 0.5 lbs/0.2 kg |

Recipient:
MIDDLETOWN, CT US

Shipper:
OLD LYME, CT US

Reference

CT43XC843 - CSC to P&Z

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October 6,2017

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Shipping Information:

| | | | |
|-------------------------|--------------|-------------------|----------------|
| Tracking number: | 770408945372 | Ship date: | Oct 3, 2017 |
| | | Weight: | 0.5 lbs/0.2 kg |

Recipient:
MIDDLETOWN, CT US

Shipper:
OLD LYME, CT US

Reference

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