**New Cingular Wireless PCS, LLC**
500 Enterprise Drive
Rocky Hill, Connecticut 06067

**John Lawrence**
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June 9, 2017

Chairman Robert Stein
and Members of the Connecticut Siting Council
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: **Request for Tower Share**
**New Cingular Wireless PCS, LLC ("AT&T") Request for Approval of the Shared Use of an Existing Wireless Facility 383 Middle Street Bristol CT 06010.**
**AT&T site number: CT3461**

Dear Chairman Stein and Members of the Council:

AT&T proposes to share an existing wireless facility located at 383 Middle Street Bristol CT 06010 (the "Facility"). The subject parcel is identified by the City of Bristol as Map 03 Lot 35. The property is owned by Inland Private Capital Corporation and is roughly 36.9+/- acres.

Pursuant to Connecticut General Statues Section 16-50aa (the Statute), AT&T requests a finding from the Connecticut Siting Council that the shared use of this facility is technically, legally, environmentally and economically feasible, will meet safety concerns, will avoid the unnecessary proliferation of towers and is in the public interest. AT&T further requests an order approving the shared use of this Facility.

**Siting Council Jurisdiction Over the Existing Facility**

AT&T is a telecommunication provider licensed by the FCC to provide service in the State of Connecticut, including but not limited to Hartford County. AT&T has entered into an agreement with the owner of this Facility, Bristol Sports Center LeaseCo, LLC, (c/o Inland Continental Property Management Corp) for the location of this proposed equipment on the smokestack so that it may provide telecommunications services to the surrounding community.

Pursuant to Connecticut General Statutes § 16-50aa, the Council may approve the shared use of a telecommunications facility provided that such shared use is technically, legally, environmentally, and economically feasible and meets public safety concerns.

The Facility currently holds Sprint Antennas at the 97' level with equipment attached to and

running down different parts of the existing smokestack at 383 Middle Street. This regulation of the Facility extended not only to the antennas on the roof but also the associated equipment and connections elsewhere on the building and on the site. In essence, the building was legally made as a smokestack however is now primarily the support structure for and part of the Facility as a whole. As such, we understand that AT&T's antennas and equipment at this Facility are also regulated by the Siting Council in this unique circumstance.

The purpose of this request is to use an existing Facility to develop AT&T's wireless broadband network to provide high speed wireless data and to develop wireless service within the State of Connecticut and in this part of Bristol, CT: thus avoiding the need for an additional tower in Bristol. As the Council is aware AT&T is licensed by the Federal Communications Commission ("FCC") to provide multiple technologies, including Global Systems for Mobile Communications ("GSM" or "2G"), Universal Mobile Telecommunications Service ("UMTS" or "3G") and long-term evolution ("4G" or "LTE") services in Hartford County. AT&T is building and enhancing its network to take advantage of its licensed spectrum, and improve its broadband high speed wireless voice and data services. By issuing an order approving AT&T's shared use of this Facility, AT&T will be able to proceed with obtaining a building permit for the proposed installation.

**Existing Facility and Proposed Collocation**

The existing Facility is a 127' smokestack located at 383 Middle Street in Bristol. Sprint is currently located at this Facility. A site plan of the facility is included in the drawings, prepared by Advanced Engineering Group with a last revision date of June 2, 2017 attached hereto.

AT&T intends to install twelve (12) HPA-65R-BUU-H8 panel antennas, twelve (12) Ericsson RRUs and two (2) Surge arrestors mounted on new antenna frames on the existing smokestack. AT&T has leased space for an equipment shelter which will be installed at grade level next to the existing smokestack.

Consistent with the requirements of the Statute, it is feasible for AT&T to collocate at this facility. AT&T is proposing to add new equipment to an existing Facility. Included with this application is a Structural Analysis Report from Advanced Engineering Group with a last revision date of June 2, 2017, which shows that the existing rooftop can support AT&T's proposed equipment.

**The Proposed Facility Will Not Have a Substantial Adverse Environmental Impact**

Pursuant to Statute, the proposal will be environmentally feasible for the following reasons:

- There will be little increase in the visibility of the Facility with the addition of the antennas and associated equipment on the Smokestack.

- There will be no increased impact on air quality because no air pollutants will be generated during normal operation of the facility.

- During construction, the proposed project will generate a small amount of traffic and noise as construction takes place. Upon completion, traffic will be limited to an

average of one trip per month for maintenance and inspections.

- There will be no adverse impact to the health and safety of the surrounding community or workers at the facility due to the addition of AT&T's antennas to the Facility. AT&T has performed an analysis of the radio frequency field emanating from the transmitting antennas on the tower to ensure compliance with the National Council on Radiation Protection and measurements (NCRP) standard for maximum permissible exposure (MPE) adopted by the FCC. The analysis dated June 7, 2017 indicates that AT&T and other antennas on Facility will cumulatively emit 11.65% of the NCRP standard for maximum permissible exposure. The report indicates that maximum level of exposure will be well below the FCC's mandated radio frequency exposure limits. The report is attached hereto and the calculations are below.

| Site Composite MPE% | |
|---|---|
| **Carrier** | **MPE%** |
| **AT&T – Max Sector Value** | **5.18 %** |
| Sprint | 6.47 % |
| **Site Total MPE %:** | **11.65 %** |

*Table 4: All Carrier MPE Contributions*

- AT&T expects to enhance safety in this portion of Bristol by improving wireless telecommunications for local residents and travelers. AT&T continues to develop its network to provide its customers with quality and reliable coverage to comply with their FCC license, the site is a necessary part of AT&T's network development.

- The overall visual impact on the City of Bristol will be decreased with the sharing of a single Facility versus the proliferation in different locations.

- This proposal is designed to provide reliable wireless coverage for this section of Bristol, Connecticut.

**Conclusion:**

For the reasons stated above, the collocation of AT&T's antennas and associated equipment to at this approved Facility would meet all the requirements set forth in the Statute. The proposal is legally, technically, economically and environmentally feasible and meets all public safety concerns. Therefore, AT&T respectfully requests that the Council approve this request for the shared use of this Facility located at 383 Middle Street, Bristol CT.

Respectfully yours,

Tim Whalen
Real Estate Consultant

*CC:* *Mayor Kenneth B. Cockayne, City of Bristol*
*Inland Continental Property Management Corp (Rosa Szyjula)*
*Brian Skinner, Chairman Zoning Commission*
*William Veits, Chairman Planning Commission*
*Guy Morin, Chief Building Official, City of Bristol*

# Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT3461

Bristol Middle Street
383 Middle Street
Bristol, CT  6010

**June 7, 2017**

**Centerline Communications Project Number: 950012-002**

| Site Compliance Summary | |
|---|---|
| Compliance Status: | **COMPLIANT** |
| Site total MPE% of FCC general population allowable limit: | **11.65 %** |

June 7, 2017

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT3461 – Bristol Middle Street**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **383 Middle Street, Bristol, CT**, for the purpose of determining whether the emissions from the Proposed AT&T 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ 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 facility that exposes persons in a nearby residential area.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. 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 performed for the proposed AT&T Wireless antenna facility located at **383 Middle Street, Bristol, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T 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 smoke stack. For this report the sample point is the top of a 6-foot person standing at the base of the smoke stack.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

| Technology | Frequency Band | Channel Count | Transmit Power per Channel (W) |
|---|---|---|---|
| LTE | 850 MHz | 2 | 60 |
| LTE | 2300 MHz (WCS) | 2 | 60 |
| LTE | 700 MHz | 2 | 60 |
| LTE | 1900 MHz (PCS) | 2 | 60 |

*Table 1: Channel Data Table*

The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) 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.

| Sector | Antenna Number | Antenna Make / Model | Antenna Centerline (ft) |
|---|---|---|---|
| A | 1 | CCI HPA-65R-BUU-H8 | 120 |
| A | 2 | CCI HPA-65R-BUU-H8 | 120 |
| B | 1 | CCI HPA-65R-BUU-H8 | 120 |
| B | 2 | CCI HPA-65R-BUU-H8 | 120 |
| C | 1 | CCI HPA-65R-BUU-H8 | 120 |
| C | 2 | CCI HPA-65R-BUU-H8 | 120 |

*Table 2: Antenna Data*

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

## RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

| Antenna ID | Antenna Make / Model | Frequency Bands | Antenna Gain (dBd) | Channel Count | Total TX Power (W) | ERP (W) | MPE % |
|---|---|---|---|---|---|---|---|
| Antenna A1 | CCI HPA-65R-BUU-H8 | 850 MHz / 2300 MHz (WCS) | 14.05 / 15.55 | 4 | 240 | 7,356.23 | 2.68 |
| Antenna A2 | CCI HPA-65R-BUU-H8 | 700 MHz / 1900 MHz (PCS) | 13.15 / 14.95 | 4 | 240 | 6,229.75 | 2.51 |
| | | | | | | Sector A Composite MPE% | **5.18** |
| Antenna B1 | CCI HPA-65R-BUU-H8 | 850 MHz / 2300 MHz (WCS) | 14.05 / 15.55 | 4 | 240 | 7,356.23 | 2.68 |
| Antenna B2 | CCI HPA-65R-BUU-H8 | 700 MHz / 1900 MHz (PCS) | 13.15 / 14.95 | 4 | 240 | 6,229.75 | 2.51 |
| | | | | | | Sector B Composite MPE% | **5.18** |
| Antenna C1 | CCI HPA-65R-BUU-H8 | 850 MHz / 2300 MHz (WCS) | 14.05 / 15.55 | 4 | 240 | 7,356.23 | 2.68 |
| Antenna C2 | CCI HPA-65R-BUU-H8 | 700 MHz / 1900 MHz (PCS) | 13.15 / 14.95 | 4 | 240 | 6,229.75 | 2.51 |
| | | | | | | Sector C Composite MPE% | **5.18** |

*Table 3: AT&T Emissions Levels*

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

| **Site Composite MPE%** | |
|---|---|
| **Carrier** | **MPE%** |
| AT&T – Max Sector Value | **5.18 %** |
| Sprint | 6.47 % |
| **Site Total MPE %:** | **11.65 %** |

*Table 4: All Carrier MPE Contributions*

| | |
|---|---|
| AT&T Sector A Total: | 5.18 % |
| AT&T Sector B Total: | 5.18 % |
| AT&T Sector C Total: | 5.18 % |
| | |
| Site Total: | 11.65 % |

*Table 5: Site MPE Summary*

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

| AT&T _ Frequency Band / Technology (All Sectors) | # Channels | Watts ERP (Per Channel) | Height (feet) | Total Power Density ($\mu W/cm^2$) | Frequency (MHz) | Allowable MPE ($\mu W/cm^2$) | Calculated % MPE |
|---|---|---|---|---|---|---|---|
| AT&T 850 MHz LTE | 2 | 1,524.58 | 120 | 8.43 | 850 MHz | 567 | 1.49% |
| AT&T 2300 MHz (WCS) LTE | 2 | 2,153.53 | 120 | 11.91 | 2300 MHz (WCS) | 1000 | 1.19% |
| AT&T 700 MHz LTE | 2 | 1,239.23 | 120 | 6.86 | 700 MHz | 467 | 1.47% |
| AT&T 1900 MHz (PCS) LTE | 2 | 1,875.65 | 120 | 10.38 | 1900 MHz (PCS) | 1000 | 1.04% |
| | | | | | | **Total:** | **5.18%** |

*Table 6: AT&T Maximum Sector MPE Power Values*

## 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 AT&T 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:

| AT&T Sector | Power Density Value (%) |
|---|---|
| Sector A: | 5.18 % |
| Sector B: | 5.18 % |
| Sector C: | 5.18 % |
| AT&T Maximum Total (per sector): | 5.18 % |
| | |
| Site Total: | 11.65 % |
| | |
| Site Compliance Status: | **COMPLIANT** |

The anticipated composite MPE value for this site assuming all carriers present is **11.65 %** 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.

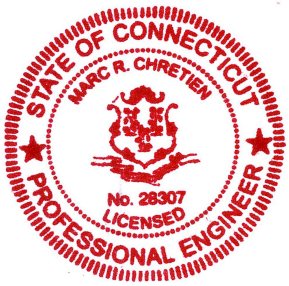
FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100%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

Scott Heffernan
RF Engineering Director
**Centerline Communications, LLC**
95 Ryan Drive, Suite 1
Raynham, MA 02767

ADVANCED
ENGINEERING GROUP, P.C.

500 North Broadway
East Providence, RI 02914
Ph: 401-354-2403
Fax: 401-354-2397

# Structural Design Calculations




**Site No.:** **CT3461 - Bristol Middle Street**
**Client:** **Centerline Communications**
**Date:** **June 2, 2017**

**Advanced Engineering Group**
500 North Broadway
East Providence, RI 02914
Ph: 401-354-2403



**Synopsis:**

The proposed AT&T equipment installation will consist of six (6) 8' antennas (2 per sector), fifteen (15) remote radio heads (RRHs) (5 per sector), and three (3) surge arrestors mounted to the existing steel-framed catwalk assembly located approximately 120' AGL on the 127' radial brick masonry smoke stack.

**Material Properties:**

Unit weight of brick, $\gamma_{brick} := 125 \cdot pcf$

Modulus of rupture of brick, $F_r := 300 \cdot psi$

Allowable tensile stress in bending, $F_t := 7.5 \cdot psi$ (Unreinforced brick, type N mortar)

Ultimate masonry strength, $f'_m := 2400 \cdot psi$

**Chimney Properties:**

The existing stack is a 127' tall radial brick masonry structure. Based on a field investigation by Industrial Communications on 1-29-14, the stack has a 11'-6" dia. base and a 5'10" dia. top. Bottom wall thickness was 24" and top wall thickness was 9". There is currently one antenna array (3 flush-mounted and one MW dish) at 96' AGL. Based on photos taken during the field investigation, the stack appears to be in good condition with minimal mortar and brick loss.

Dimensions:

Stack Height, $H := 127 \cdot ft$

Bottom outside dimension, $D_{bo} := 11.5 \cdot ft$

Bottom inside dimension, $D_{bi} := 7.75ft$

Top inside dimension, $D_{ti} := 4.333 \cdot ft$

Top outside dimension, $D_{to} := 5.833 \cdot ft$

Approx. stack weight, $$W_{stack} := \frac{\left(D_{bo}^2 - D_{bi}^2\right) + \left(D_{to}^2 - D_{ti}^2\right)}{2} \cdot H \cdot \gamma_{brick}$$

$$W_{stack} = 694.03 \cdot kip$$

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East Providence, RI 02914
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**Analysis:**

*Wind load:*

Height, $H = 127\,ft$ AGL

Exposure category, B (ASCE 7-05 Sec 6.5.6.3)

Basic wind velocity, $V := 95$ mph (CSBC Appendix K)

Importance factor, $I := 1$ (category II) (ASCE 7-05 Table 6-1)

Wind directional factor, $K_d := .95$ (ASCE 7-05 Table 6-4)

Exposure coefficient, $K_z := 1.05$ (ASCE 7-05 Table 6-3)

Velocity wind pressure, $q_z := .00256 \cdot V^2 \cdot K_z \cdot K_d \cdot psf$ (ASCE 7-05 6.5.10)

$q_z = 23.05 \cdot psf$

Gust response factor, $G := .85$ (ASCE 7-05 Sec. 6.5.8)

Force coeff., $C_{f\_f} := 1.4$ Flat (ASCE 7-05 Fig. 6-21)

$C_{f\_r} := .85$ Round

(ASCE 7-05 Sec. 6.5.15)

Wind load pressure on stack, $WL_{stack} := q_z \cdot G \cdot C_{f\_r}$

$WL_{stack} = 16.65 \cdot psf$

Wind load pressure on antennas $WL_{ant} := q_z \cdot G \cdot C_{f\_f}$

$WL_{ant} = 27.43 \cdot psf$

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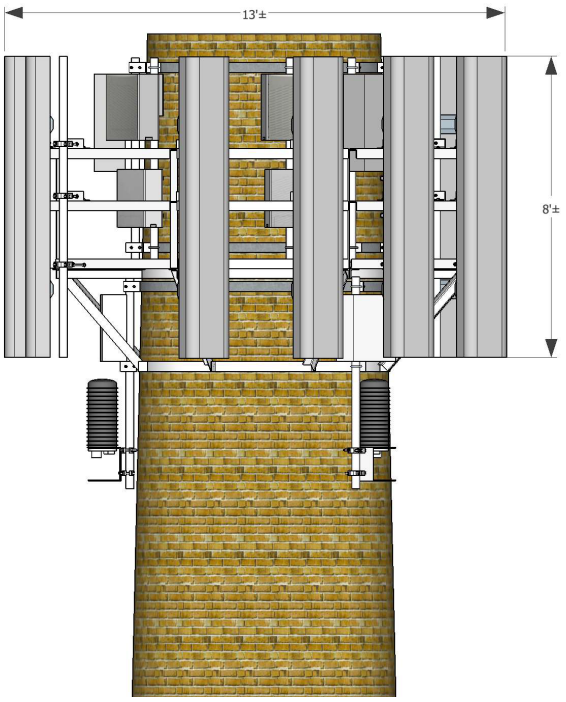
The proposed AT&T installation will be conservatively analyzed as a 13'x8' flat appurtenance. The existing three flush-mounted antennas will be analyzed assuming that two antennas project entirely beyond the profile of the smokestack (the 3rd will be assumed to be within the profile of the stack and not contribute to wind loading).




Equipment Loads:

*Existing/proposed Inventory:*

Proposed Antenna Properties:

Width, $w_{pant} := 14.4 \cdot in$

Depth, $t_{pant} := 7.3 \cdot in$

Length, $l_{pant} := 92.8 \cdot in$

Weight, $W_{pant} := 53 \cdot lb$

Proposed RRUS 11 Properties:

Width, $w_{11} := 19.7 \cdot in$

Depth, $t_{11} := 7.2 \cdot in$

Length, $l_{11} := 17 \cdot in$

Weight, $W_{11} := 51 \cdot lb$

Proposed RRUS 32 Properties:

Width, $w_{32} := 13.3 \cdot in$

Depth, $t_{32} := 9.5 \cdot in$

Length, $l_{32} := 29.9 \cdot in$

Weight, $W_{32} := 77 \cdot lb$

Proposed RRH Ericsson RRUS-12:

Width, $w_{12} := 18.5in$

Depth, $t_{12} := 7.5in$

Height, $l_{12} := 20.4in$

Weight, $W_{12} := 50lb$

Existing Antenna Properties:

Width, $w_{ant} := 12 \cdot in$

Depth, $t_{ant} := 6 \cdot in$

Length, $l_{ant} := 72 \cdot in$

Weight, $W_{ant} := 46 \cdot lb$

Proposed Surge Properties:

Diameter, $w_{ss} := 9.7 \cdot in$

Length, $l_{ss} := 24 \cdot in$

Weight, $W_{ss} := 20 \cdot lb$

**Advanced Engineering Group**
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East Providence, RI 02914
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Weight of proposed AT&T equipment, $P_{att} := 6 \cdot (W_{pant}) + 6 \cdot W_{11} + 6 \cdot W_{12} + 3 \cdot W_{32} + 3 \cdot W_{ss}$

$P_{att} = 1215\,lb$

Approximate weight of steel catwalk, $P_{cw} := 2000 \cdot lb$

Proposed AT&T equipment and catwalk assembly:

Width, $w_{esf\_12} := 13ft$

Height, $h_{esf\_12} := 8 \cdot ft$

Weight, $W_{esf\_12} := P_{att} + P_{cw}$

$W_{esf\_12} = 3215\,lb$

Existing flush-mount antennas:

Width, $w_{fm} := w_{ant} = 1\,ft$

Height, $h_{fm} := l_{ant} = 6\,ft$

Weight, $W_{fm} := 3 \cdot W_{ant} = 138\,lb$

Approx. weight of mounting brackets, cable ladders, and cables, $W_{appurt} := 3500 \cdot lb$

Average diameter of stack, $D_{ave} := \frac{D_{bo} + D_{to}}{2}$

$D_{ave} = 8.67\,ft$

Wind load on stack, $WL_{chim} := H \cdot WL_{stack} \cdot D_{ave}$

$WL_{chim} = 18326.75\,lb$

Wind load on AT&T installation, $WL_{esf\_12} := h_{esf\_12} \cdot w_{esf\_12} \cdot WL_{ant}$

$WL_{esf\_12} = 2852.2\,lb$

Wind load on flush-mounted antennas, $WL_{fm} := 2h_{fm} \cdot w_{fm} \cdot WL_{ant}$

$WL_{fm} = 329.1\,lb$

**Advanced Engineering Group**
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East Providence, RI 02914
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Centerline height of antenna arrays:

$h_1 := 120 \cdot ft$ (6 antennas on catwalk, AT&T)

$h_2 := 96 \cdot ft$ (3 flush-mounted antennas)

Approximate moment at base level due to wind, $M_o := \frac{WL_{chim} \cdot H}{2} + WL_{esf\_12} \cdot (h_1) + WL_{fm} \cdot (h_2)$

$M_o = 1537.61 \cdot ft \cdot kip$

Resisting moment due to self-weight of stack and equipment, $M_r := (W_{stack} + W_{appurt} + W_{esf\_12} + W_{fm}) \cdot \frac{D_{bo}}{2}$

$M_r = 4030.06 \cdot ft \cdot kip$

Factor of safety, $\frac{M_r}{M_o} = 2.62 > 1.5$ **O.K.**

Check stresses:

Section modulus of base of stack, $S := \frac{\pi \cdot D_{bo}^3}{32} - \frac{\pi \cdot D_{bi}^3}{32}$ MOI, $I := \frac{\pi \cdot (D_{bo}^4 - D_{bi}^4)}{64}$

$S = 179042.8 \cdot in^3$ $I = 14130723.49 \cdot in^4$

Area at base of chimney, $A_b := \left( \frac{\pi \cdot D_{bo}^2}{4} - \frac{\pi \cdot D_{bi}^2}{4} \right)$

$A_b = 56.7\, ft^2$

Allowable compressive stress, $F_a := (.2 \cdot f'_m)$

$F_a = 480 \cdot psi$

Allowable tensile stress, $F_t = 7.5 \cdot psi$ (Pg. 264, Ref 1)

Bending stress, $f_b := \frac{M_o}{S}$

$f_b = 103.06 \cdot psi$

Allowable bending stress, $F_b := .33 \cdot f'_m \cdot \frac{1}{2}$

$F_b = 396 \cdot psi$

**Advanced Engineering Group**
500 North Broadway
East Providence, RI 02914
Ph: 401-354-2403



Maximum compressive stress, $f_a := \frac{W_{stack} + W_{appurt} + (W_{esf\_12} + W_{fm})}{A_b}$

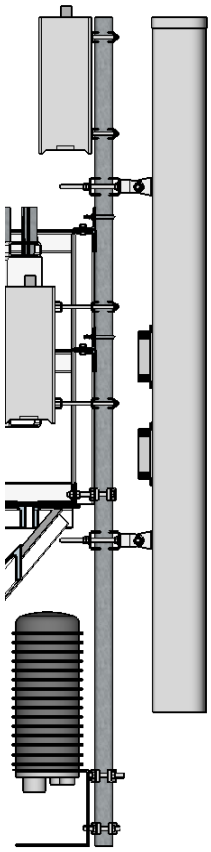
$f_a = 85.85 \cdot psi \quad < \quad F_a = 480 \cdot psi \quad$ o.k.

$$UnityCheck := \begin{cases} \text{"OK"} & \text{if } \frac{f_a}{F_a} + \frac{f_b}{F_b} \le 1 \\ \text{"NG"} & \text{otherwise} \end{cases}$$

UnityCheck = "OK"

Check Catwalk Framing:

Antennnas will be mounted to the top, mid, and bottom rail of the existing catwalk handrail assembly. Attachments will be made using industry-standard rail brackets.



Wind load on antenna, $P_{ant} := \left[l_{pant} \cdot w_{pant} + (w_{11} - w_{pant}) \cdot l_{11}\right] \cdot WL_{ant}$

$P_{ant} = 271.66\,lb$

Wind load on surge, $P_{ss} := l_{ss} \cdot w_{ss} \cdot WL_{ant} = 44.34\,lb$

Wind load per bracket, $P_{brack} := \frac{P_{ant}}{2} = 135.83\,lb$

Moment on pipe, $M := .226 \cdot ft \cdot kip$

(See attached Enercalc output)

Allowable moment, $M_{allow} := 1.245 \cdot ft \cdot kip$

$$MomentCheck := \begin{cases} \text{"OK"} & \text{if } M \le M_{allow} \\ \text{"NG"} & \text{otherwise} \end{cases}$$

MomentCheck = "OK"

**Advanced Engineering Group**
500 North Broadway
East Providence, RI 02914
Ph: 401-354-2403



*Check Rails:*

Top rail governs

Moment on top rail, $M_{rail} := .585 \cdot ft \cdot kip$

Allowable moment, $M_{allow} := 1.176 \cdot ft \cdot kip$

(See attached Enercalc output)

$$MomentCheck := \begin{cases} \text{"OK"} & \text{if } M_{rail} \le M_{allow} \\ \text{"NG"} & \text{otherwise} \end{cases}$$

MomentCheck = "OK"

*Check Verticals*

Height of verticals, $H_v := 3 \cdot ft$

Moment on vertical, $M_{vert} := .858 \cdot ft \cdot kip$

Allowable moment, $M_{allow} := 1.27 \cdot ft \cdot kip$

(See attached Enercalc output)

$$MomentCheck := \begin{cases} \text{"OK"} & \text{if } M_{vert} \le M_{allow} \\ \text{"NG"} & \text{otherwise} \end{cases}$$

MomentCheck = "OK"

**Conclusion:**

Based on the results of the analysis, the existing 127' radial brick masonry smoke stack and steel cat walk assembly located at the above-referenced site is structurally capable of supporting the proposed AT&T equipment. The analysis was conducted in accordance with the Connecticut State Building Code and ASCE 7-05.

References:

1. Amrhein, J.E. (1978), *Reinforced Masonry Engineering Handbook*, Masonry Institute of America, Los Angles, CA
2. American Society of Civil Engineers (2005), Minimum Design Loads for Buildings and Other Structures (7-05), American Society of Civil Engineers, New York, NY
3. Connecticut State Building Code, 2005 Edition.

ADVANCED ENGINEERING GROUP, P.C.
500 North Broadway
East Providence, RI 02914
(401) 354-2403

Project Title: Smoke Stack Platform
Engineer: MRC
Project Descr: AT&T NSB

Project ID: CT3461

Title Block Line 6

Printed: 2 JUN 2017, 4:10PM

# Steel Beam

File = x:\ENER~P21\CT34~HXW.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.3.17

Lic. # : KW-06008463 — Licensee : ADVANCED ENGINEERING GROUP, PC

Description : Top Rail

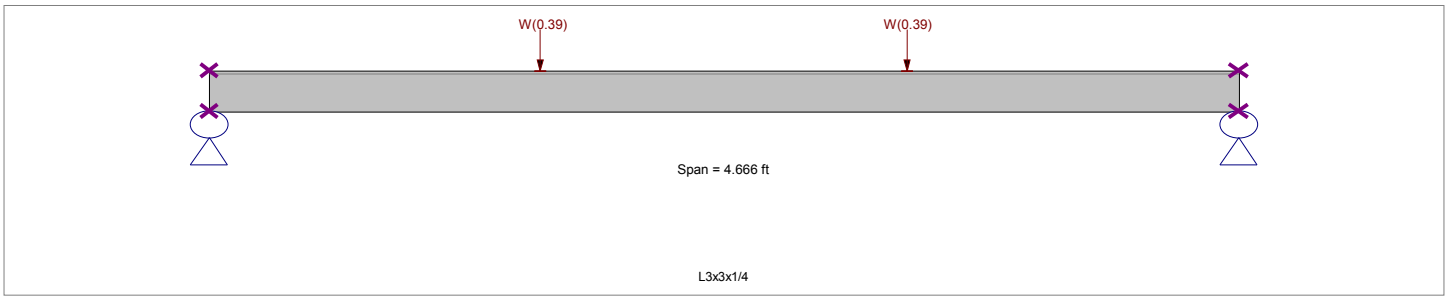
## CODE REFERENCES

Calculations per AISC 360-05, IBC 2006, CBC 2007, ASCE 7-05
Load Combination Set : IBC 2009

## Material Properties

Analysis Method: Allowable Strength Design
Beam Bracing: Completely Unbraced
Bending Axis : Major Axis Bending

Fy : Steel Yield: 36.0 ksi
E: Modulus : 29,000.0 ksi




## Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load(s) for Span Number 1
Point Load : W = 0.390 k @ 1.50 ft, (Pipe Mount)
Point Load : W = 0.390 k @ 3.167 ft, (Pipe Mount)

## DESIGN SUMMARY

**Design OK**

| | | | |
|---|---|---|---|
| Maximum Bending Stress Ratio = | 0.497 : 1 | Maximum Shear Stress Ratio = | 0.040 : 1 |
| Section used for this span | L3x3x1/4 | Section used for this span | L3x3x1/4 |
| Ma : Applied | 0.585 k-ft | Va : Applied | 0.3901 k |
| Mn / Omega : Allowable | 1.176 k-ft | Vn/Omega : Allowable | 9.701 k |
| Load Combination | +D+W | Load Combination | +D+W |
| Location of maximum on span | 1.506 ft | Location of maximum on span | 3.173 ft |
| Span # where maximum occurs | Span # 1 | Span # where maximum occurs | Span # 1 |

Maximum Deflection

| | | | |
|---|---|---|---|
| Max Downward Transient Deflection | 0.067 in | Ratio = | 838 >=360 |
| Max Upward Transient Deflection | 0.000 in | Ratio = | 0 <360 |
| Max Downward Total Deflection | 0.067 in | Ratio = | 838 >=180 |
| Max Upward Total Deflection | 0.000 in | Ratio = | 0 <180 |

## Maximum Forces & Stresses for Load Combinations

| Load Combination / Segment Length | Span # | Max Stress Ratios M | Max Stress Ratios V | Summary of Moment Values Mmax + | Mmax - | Ma Max | Mnx | Mnx/Omega | Cb | Rm | Summary of Shear Values Va Max | VnxVnx/Omega |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D Only | | | | | | | | | | | | |
| Dsgn. L = 4.67 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+L | | | | | | | | | | | | |
| Dsgn. L = 4.67 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+Lr | | | | | | | | | | | | |
| Dsgn. L = 4.67 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+S | | | | | | | | | | | | |
| Dsgn. L = 4.67 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+0.750Lr+0.750L | | | | | | | | | | | | |
| Dsgn. L = 4.67 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+0.750L+0.750S | | | | | | | | | | | | |
| Dsgn. L = 4.67 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+W | | | | | | | | | | | | |
| Dsgn. L = 4.67 ft | 1 | 0.497 | 0.040 | 0.58 | | 0.58 | 1.96 | 1.18 | 1.12 | 1.00 | 0.39 | 16.20 9.70 |
| +D+0.70E | | | | | | | | | | | | |
| Dsgn. L = 4.67 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+0.750Lr+0.750L+0.750W | | | | | | | | | | | | |
| Dsgn. L = 4.67 ft | 1 | 0.373 | 0.030 | 0.44 | | 0.44 | 1.96 | 1.18 | 1.12 | 1.00 | 0.29 | 16.20 9.70 |
| +D+0.750L+0.750S+0.750W | | | | | | | | | | | | |
| Dsgn. L = 4.67 ft | 1 | 0.373 | 0.030 | 0.44 | | 0.44 | 1.96 | 1.18 | 1.12 | 1.00 | 0.29 | 16.20 9.70 |
| +D+0.750Lr+0.750L+0.5250E | | | | | | | | | | | | |
| Dsgn. L = 4.67 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+0.750L+0.750S+0.5250E | | | | | | | | | | | | |

ADVANCED ENGINEERING GROUP, P.C.
500 North Broadway
East Providence, RI 02914
(401) 354-2403

Project Title: Smoke Stack Platform
Engineer: MRC
Project Descr: AT&T NSB

Project ID: CT3461

Title Block Line 6



# Steel Beam

File = x:\ENER~P21\CT34~HXW.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.3.17
Lic. # : KW-06008463
Licensee : ADVANCED ENGINEERING GROUP, PC

Description : Top Rail

| Load Combination / Segment Length | Span # | Max Stress Ratios M | Max Stress Ratios V | Summary of Moment Values Mmax + | Mmax - | Ma Max | Mnx | Mnx/Omega | Cb | Rm | Summary of Shear Values Va Max | VnxVnx/Omega |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dsgn. L = 4.67 ft +0.60D+W | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| Dsgn. L = 4.67 ft +0.60D+0.70E | 1 | 0.497 | 0.040 | 0.58 | | 0.58 | 1.96 | 1.18 | 1.12 | 1.00 | 0.39 | 16.20 9.70 |
| Dsgn. L = 4.67 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |

## Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|---|---|---|---|---|---|---|
| W Only | 1 | 0.0668 | 2.346 | | 0.0000 | 0.000 |

## Vertical Reactions

Support notation : Far left is #1 Values in KIPS

| Load Combination | Support 1 | Support 2 |
|---|---|---|
| Overall MAXimum | 0.390 | 0.390 |
| Overall MINimum | 0.292 | 0.293 |
| D Only | | |
| +D+L | | |
| +D+Lr | | |
| +D+S | | |
| +D+0.750Lr+0.750L | | |
| +D+0.750L+0.750S | | |
| +D+W | 0.390 | 0.390 |
| +D+0.70E | | |
| +D+0.750Lr+0.750L+0.750W | 0.292 | 0.293 |
| +D+0.750L+0.750S+0.750W | 0.292 | 0.293 |
| +D+0.750Lr+0.750L+0.5250E | | |
| +D+0.750L+0.750S+0.5250E | | |
| +0.60D+W | 0.390 | 0.390 |
| +0.60D+0.70E | | |
| D Only | | |
| Lr Only | | |
| L Only | | |
| S Only | | |
| W Only | 0.390 | 0.390 |
| E Only | | |
| H Only | | |

ADVANCED ENGINEERING GROUP, P.C.
500 North Broadway
East Providence, RI 02914
(401) 354-2403

Project Title: Smoke Stack Platform
Engineer: MRC
Project Descr: AT&T NSB

Project ID: CT3461

Title Block Line 6

Printed: 2 JUN 2017, 4:10PM

# Steel Beam

File = x:\ENER~P21\CT34~HXW.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.3.17

Lic. # : KW-06008463
Licensee : ADVANCED ENGINEERING GROUP, PC

Description : Handrail Vertical

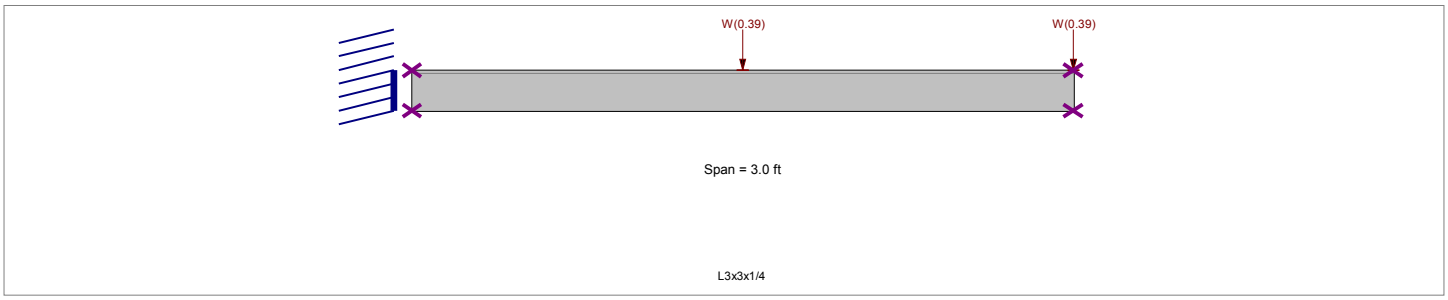
## CODE REFERENCES

Calculations per AISC 360-05, IBC 2006, CBC 2007, ASCE 7-05
Load Combination Set : IBC 2015

## Material Properties

Analysis Method: Allowable Strength Design
Beam Bracing: Completely Unbraced
Bending Axis : Major Axis Bending

Fy : Steel Yield: 36.0 ksi
E: Modulus : 29,000.0 ksi




## Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load(s) for Span Number 1
Point Load : W = 0.390 k @ 3.0 ft, (Antenna)
Point Load : W = 0.390 k @ 1.50 ft, (Antenna)

## DESIGN SUMMARY

**Design OK**

| | | | |
|---|---|---|---|
| Maximum Bending Stress Ratio = | 0.858 : 1 | Maximum Shear Stress Ratio = | 0.048 : 1 |
| Section used for this span | L3x3x1/4 | Section used for this span | L3x3x1/4 |
| Ma : Applied | 1.053 k-ft | Va : Applied | 0.4680 k |
| Mn / Omega : Allowable | 1.227 k-ft | Vn/Omega : Allowable | 9.701 k |
| Load Combination | +D+0.60W+H | Load Combination | +D+0.60W+H |
| Location of maximum on span | 0.000ft | Location of maximum on span | 0.000 ft |
| Span # where maximum occurs | Span # 1 | Span # where maximum occurs | Span # 1 |

Maximum Deflection

| | | | |
|---|---|---|---|
| Max Downward Transient Deflection | 0.223 in | Ratio = | 323 >=240. |
| Max Upward Transient Deflection | 0.000 in | Ratio = | 0 <240.0 |
| Max Downward Total Deflection | 0.134 in | Ratio = | 539 >=180 |
| Max Upward Total Deflection | 0.000 in | Ratio = | 0 <180 |

## Maximum Forces & Stresses for Load Combinations

| Load Combination / Segment Length | Span # | Max Stress Ratios M | Max Stress Ratios V | Summary of Moment Values Mmax + | Mmax - | Ma Max | Mnx | Mnx/Omega | Cb | Rm | Summary of Shear Values Va Max | VnxVnx/Omega |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +D+H | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+L+H | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+Lr+H | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+S+H | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+0.750Lr+0.750L+H | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+0.750L+0.750S+H | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+0.60W+H | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | 0.858 | 0.048 | | -1.05 | 1.05 | 2.05 | 1.23 | 1.00 | 1.00 | 0.47 | 16.20 9.70 |
| +D+0.70E+H | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +D+0.750Lr+0.750L+0.450W+H | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | 0.644 | 0.036 | | -0.79 | 0.79 | 2.05 | 1.23 | 1.00 | 1.00 | 0.35 | 16.20 9.70 |
| +D+0.750L+0.750S+0.450W+H | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | 0.644 | 0.036 | | -0.79 | 0.79 | 2.05 | 1.23 | 1.00 | 1.00 | 0.35 | 16.20 9.70 |
| +D+0.750L+0.750S+0.5250E+H | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 9.70 |
| +0.60D+0.60W+0.60H | | | | | | | | | | | | |

ADVANCED ENGINEERING GROUP, P.C.
500 North Broadway
East Providence, RI 02914
(401) 354-2403

Project Title: Smoke Stack Platform
Engineer: MRC
Project Descr: AT&T NSB
Project ID: CT3461

Title Block Line 6

Printed: 2 JUN 2017, 4:10PM

# Steel Beam

File = x:\ENER~P21\CT34~HXW.EC6


Lic. # : KW-06008463
Licensee : ADVANCED ENGINEERING GROUP, PC

Description : Handrail Vertical

| Load Combination / Segment Length | Span # | Max Stress Ratios M | V | Summary of Moment Values Mmax + | Mmax - | Ma Max | Mnx | Mnx/Omega | Cb | Rm | Summary of Shear Values Va Max | Vnx | Vnx/Omega |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dsgn. L = 3.00 ft | 1 | 0.858 | 0.048 | | -1.05 | 1.05 | 2.05 | 1.23 | 1.00 | 1.00 | 0.47 | 16.20 | 9.70 |
| +0.60D+0.70E+0.60H | | | | | | | | | | | | | |
| Dsgn. L = 3.00 ft | 1 | | 0.000 | | | | 2.05 | 1.23 | 1.00 | 1.00 | -0.00 | 16.20 | 9.70 |

## Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|---|---|---|---|---|---|---|
| W Only | 1 | 0.2227 | 3.000 | | 0.0000 | 0.000 |

## Vertical Reactions

Support notation : Far left is #1 Values in KIPS

| Load Combination | Support 1 | Support 2 |
|---|---|---|
| Overall MAXimum | 0.780 | |
| Overall MINimum | 0.351 | |
| +D+H | | |
| +D+L+H | | |
| +D+Lr+H | | |
| +D+S+H | | |
| +D+0.750Lr+0.750L+H | | |
| +D+0.750L+0.750S+H | | |
| +D+0.60W+H | 0.468 | |
| +D+0.70E+H | | |
| +D+0.750Lr+0.750L+0.450W+H | 0.351 | |
| +D+0.750L+0.750S+0.450W+H | 0.351 | |
| +D+0.750L+0.750S+0.5250E+H | | |
| +0.60D+0.60W+0.60H | 0.468 | |
| +0.60D+0.70E+0.60H | | |
| D Only | | |
| Lr Only | | |
| L Only | | |
| S Only | | |
| W Only | 0.780 | |
| E Only | | |
| H Only | | |

ADVANCED ENGINEERING GROUP, P.C.
500 North Broadway
East Providence, RI 02914
(401) 354-2403

Project Title: Smoke Stack Platform
Engineer: MRC
Project Descr: AT&T NSB

Project ID: CT3461

Title Block Line 6

Printed: 2 JUN 2017, 4:11PM

# Steel Beam

File = x:\ENER~P21\CT34~HXW.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.3.17

Lic. # : KW-06008463
Licensee : ADVANCED ENGINEERING GROUP, PC

Description : Pipe Mount

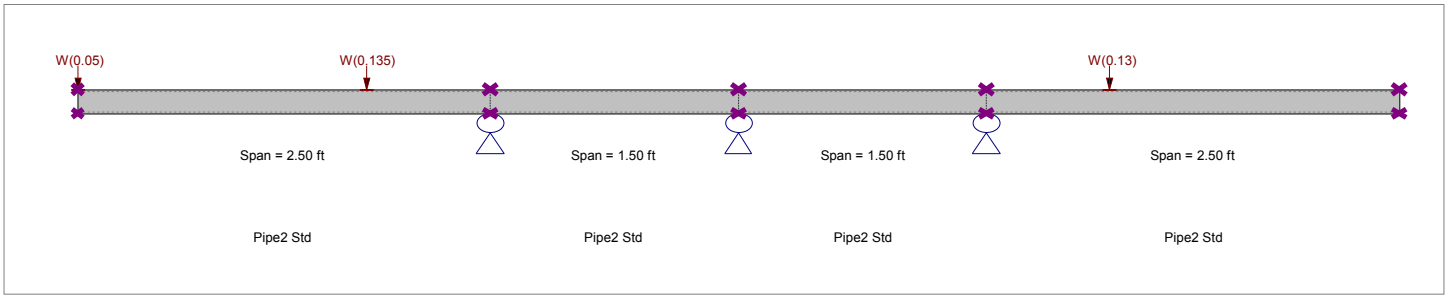
## CODE REFERENCES

Calculations per AISC 360-05, IBC 2006, CBC 2007, ASCE 7-05
Load Combination Set : IBC 2009

## Material Properties

Analysis Method: Allowable Strength Design
Beam Bracing: Completely Unbraced
Bending Axis : Major Axis Bending

Fy : Steel Yield: 35.0 ksi
E: Modulus : 29,000.0 ksi




## Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load(s) for Span Number 1
Point Load : W = 0.1350 k @ 1.750 ft, (Antenna)
Point Load : W = 0.050 k @ 0.0 ft, (Surge)
Load(s) for Span Number 4
Point Load : W = 0.130 k @ 0.750 ft, (Antenna)

## DESIGN SUMMARY

**Design OK**

| | | | |
|---|---|---|---|
| Maximum Bending Stress Ratio = | 0.182 : 1 | Maximum Shear Stress Ratio = | 0.033 : 1 |
| Section used for this span | Pipe2 Std | Section used for this span | Pipe2 Std |
| Ma : Applied | 0.226 k-ft | Va : Applied | 0.2048 k |
| Mn / Omega : Allowable | 1.245 k-ft | Vn/Omega : Allowable | 6.287 k |
| Load Combination | +D+W | Load Combination | +D+W |
| Location of maximum on span | 2.500 ft | Location of maximum on span | 2.500 ft |
| Span # where maximum occurs | Span # 1 | Span # where maximum occurs | Span # 1 |

Maximum Deflection

| | | | |
|---|---|---|---|
| Max Downward Transient Deflection | 0.055 in | Ratio = | 1,089 >=360 |
| Max Upward Transient Deflection | -0.002 in | Ratio = | 8,229 >=360 |
| Max Downward Total Deflection | 0.055 in | Ratio = | 1089 >=180 |
| Max Upward Total Deflection | -0.002 in | Ratio = | 8229 >=180 |

## Maximum Forces & Stresses for Load Combinations

| Load Combination / Segment Length | Span # | Max Stress Ratios M | V | Summary of Moment Values Mmax + | Mmax - | Ma Max | Mnx | Mnx/Omega | Cb | Rm | Summary of Shear Values Va Max | VnxVnx/Omega |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D Only | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| +D+L | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| +D+Lr | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| +D+S | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| +D+0.750Lr+0.750L | | | | | | | | | | | | |

ADVANCED ENGINEERING GROUP, P.C.
500 North Broadway
East Providence, RI 02914
(401) 354-2403

Project Title: Smoke Stack Platform
Engineer: MRC
Project Descr: AT&T NSB

Project ID: CT3461

Title Block Line 6



# Steel Beam

File = x:\ENER~P21\CT34~HXW.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.3.17
Lic. # : KW-06008463
Licensee : ADVANCED ENGINEERING GROUP, PC

Description : Pipe Mount

| Load Combination / Segment Length | Span # | Max Stress Ratios M | Max Stress Ratios V | Summary of Moment Values Mmax + | Mmax - | Ma Max | Mnx | Mnx/Omega | Cb | Rm | Summary of Shear Values Va Max | VnxVnx/Omega |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dsgn. L = 2.50 ft | 1 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| +D+0.750L+0.750S | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| +D+W | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | 0.182 | 0.033 | | -0.23 | 0.23 | 2.08 | 1.25 | 1.00 | 1.00 | 0.20 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | 0.182 | 0.033 | 0.08 | -0.23 | 0.23 | 2.08 | 1.25 | 2.14 | 1.00 | 0.20 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | 0.078 | 0.021 | 0.08 | -0.10 | 0.10 | 2.08 | 1.25 | 2.22 | 1.00 | 0.13 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | 0.078 | 0.021 | | -0.10 | 0.10 | 2.08 | 1.25 | 1.00 | 1.00 | 0.13 | 10.50 6.29 |
| +D+0.70E | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| +D+0.750Lr+0.750L+0.750W | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | 0.136 | 0.024 | | -0.17 | 0.17 | 2.08 | 1.25 | 1.00 | 1.00 | 0.15 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | 0.136 | 0.024 | 0.06 | -0.17 | 0.17 | 2.08 | 1.25 | 2.14 | 1.00 | 0.15 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | 0.059 | 0.016 | 0.06 | -0.07 | 0.07 | 2.08 | 1.25 | 2.22 | 1.00 | 0.10 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | 0.059 | 0.016 | | -0.07 | 0.07 | 2.08 | 1.25 | 1.00 | 1.00 | 0.10 | 10.50 6.29 |
| +D+0.750L+0.750S+0.750W | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | 0.136 | 0.024 | | -0.17 | 0.17 | 2.08 | 1.25 | 1.00 | 1.00 | 0.15 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | 0.136 | 0.024 | 0.06 | -0.17 | 0.17 | 2.08 | 1.25 | 2.14 | 1.00 | 0.15 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | 0.059 | 0.016 | 0.06 | -0.07 | 0.07 | 2.08 | 1.25 | 2.22 | 1.00 | 0.10 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | 0.059 | 0.016 | | -0.07 | 0.07 | 2.08 | 1.25 | 1.00 | 1.00 | 0.10 | 10.50 6.29 |
| +D+0.750Lr+0.750L+0.5250E | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| +D+0.750L+0.750S+0.5250E | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| +0.60D+W | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | 0.182 | 0.033 | | -0.23 | 0.23 | 2.08 | 1.25 | 1.00 | 1.00 | 0.20 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | 0.182 | 0.033 | 0.08 | -0.23 | 0.23 | 2.08 | 1.25 | 2.14 | 1.00 | 0.20 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | 0.078 | 0.021 | 0.08 | -0.10 | 0.10 | 2.08 | 1.25 | 2.22 | 1.00 | 0.13 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | 0.078 | 0.021 | | -0.10 | 0.10 | 2.08 | 1.25 | 1.00 | 1.00 | 0.13 | 10.50 6.29 |
| +0.60D+0.70E | | | | | | | | | | | | |
| Dsgn. L = 2.50 ft | 1 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 2 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 1.50 ft | 3 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |
| Dsgn. L = 2.50 ft | 4 | | 0.000 | | | | 2.08 | 1.25 | 1.00 | 1.00 | -0.00 | 10.50 6.29 |

## Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|---|---|---|---|---|---|---|
| W Only | 1 | 0.0551 | 0.000 | | 0.0000 | 0.000 |
| | 2 | 0.0000 | 0.000 | W Only | -0.0022 | 0.550 |
| W Only | 3 | 0.0002 | 0.250 | W Only | -0.0005 | 1.120 |
| W Only | 4 | 0.0146 | 2.500 | | 0.0000 | 1.120 |

## Vertical Reactions

Support notation : Far left is #1 Values in KIPS

| Load Combination | Support 1 | Support 2 | Support 3 | Support 4 | Support 5 |
|---|---|---|---|---|---|
| Overall MAXimum | | 0.390 | -0.324 | 0.249 | |
| Overall MINimum | | 0.292 | -0.243 | 0.187 | |
| D Only | | | | | |
| +D+L | | | | | |
| +D+Lr | | | | | |
| +D+S | | | | | |
| +D+0.750Lr+0.750L | | | | | |
| +D+0.750L+0.750S | | | | | |
| +D+W | | 0.390 | -0.324 | 0.249 | |

ADVANCED ENGINEERING GROUP, P.C.
500 North Broadway
East Providence, RI 02914
(401) 354-2403

Project Title: Smoke Stack Platform
Engineer: MRC
Project Descr: AT&T NSB

Project ID: CT3461

Title Block Line 6



# Steel Beam

File = x:\ENER~P21\CT34~HXW.EC6
ENERCALC, INC. 1983-2017, Build:6.17.3.17, Ver:6.17.3.17

Lic. # : KW-06008463
Licensee : ADVANCED ENGINEERING GROUP, PC

Description : Pipe Mount

## Vertical Reactions

Support notation : Far left is #1 Values in KIPS

| Load Combination | Support 1 | Support 2 | Support 3 | Support 4 | Support 5 |
|---|---|---|---|---|---|
| +D+0.70E | | | | | |
| +D+0.750Lr+0.750L+0.750W | | 0.292 | -0.243 | 0.187 | |
| +D+0.750L+0.750S+0.750W | | 0.292 | -0.243 | 0.187 | |
| +D+0.750Lr+0.750L+0.5250E | | | | | |
| +D+0.750L+0.750S+0.5250E | | | | | |
| +0.60D+W | | 0.390 | -0.324 | 0.249 | |
| +0.60D+0.70E | | | | | |
| D Only | | | | | |
| Lr Only | | | | | |
| L Only | | | | | |
| S Only | | | | | |
| W Only | | 0.390 | -0.324 | 0.249 | |
| E Only | | | | | |
| H Only | | | | | |

# PHOTO ADDENDUM

FROM EAST

FROM WEST

View

View

EXISTING

EXISTING

# PHOTO ADDENDUM

VACANT AREA

POTENTIAL ANTENNA RADS

Existing COMPOUND

Existing COMPOUND

Proposed Ground Location

Proposed Ground Location

## PROJECT INFORMATION

| | |
|---|---|
| SCOPE OF WORK: | UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS |
| SITE ADDRESS: | 383 MIDDLE STREET<br>BRISTOL, CT 06010 |
| LATITUDE:<br>LONGITUDE: | 41° 39' 37" N<br>72° 54' 36" W |
| JURISDICTION: | NATIONAL, STATE & LOCAL CODES OR ORDINANCES |
| CURRENT USE: | TELECOMMUNICATIONS FACILITY |
| PROPOSED USE: | TELECOMMUNICATIONS FACILITY |
| DESIGN GUIDELINE: | NSB |

# SITE NUMBER: CT3461

# SITE NAME: BRISTOL MIDDLE STREET

383 MIDDLE STREET
BRISTOL, CT 06010
HARTFORD COUNTY

## DRAWING INDEX

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STATE OF CONNECTICUT
MARC R. CHRETIEN
No. 28307
LICENSED
PROFESSIONAL ENGINEER

## LOCUS MAP


DRIVING DIRECTIONS FROM 550 COCHITUATE ROAD, FRAMINGHAM, MA:

1. Head west on Cochituate Rd toward Burr St
2. Turn right onto Burr St
3. Make a U-turn at Leggatt McCall Conn
4. Turn left at the 1st cross street onto Cochituate Rd
5. Use the right lane to take the ramp to I-90 E/Masspike W/Springfield/Boston
6. Keep left at the fork, follow signs for Interstate 90 W/Massachusetts Turnpike/Worchester/Springfield and merge onto I-90 W/Massachusetts Turnpike
7. Merge onto I-90 W/Massachusetts Turnpike
8. Use the right 2 lanes to take exit 9 for I-84 toward US-20/Hartford/New York City
9. Continue onto I-84
10. Keep right to stay on I-84
11. Keep left to stay on I-84
12. Take exit 33 for CT-72 W toward Bristol
13. Continue onto CT-72 W
14. Continue onto Pine St
15. Turn left onto Middle St

## GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CONNECTICUT
CALL BEFORE YOU DIG
CALL TOLL FREE: 800-922-4455

## UNDERGROUND SERVICE ALERT


ADVANCED ENGINEERING GROUP, P.C.
Civil Engineering - Site Development - Surveying - Telecommunications
500 North Broadway Phone: (401) 354-2403
East Providence, RI 02914 Fax: (401) 633-6354

CENTERLINE COMMUNICATIONS
95 RYAN DRIVE, SUITE 1
RAYNHAM, MA 02767

550 COCHITUATE ROAD, SUITE 13,
FRAMINGHAM, MA 01701-4681


SITE NUMBER: CT3461
SITE NAME: BRISTOL MIDDLE STREET
383 MIDDLE STREET
BRISTOL, CT 06010
HARTFORD COUNTY

| NO. | DATE | REVISIONS | BY | CHK |
|---|---|---|---|---|
| 0 | 03/15/17 | ISSUED FOR REVIEW | AAB | MRC |
| 1 | 04/05/17 | REVISION | AAB | MRC |
| 2 | 05/09/17 | REVISION | AAB | MRC |
| 3 | 05/23/17 | REVISION | AAB | MRC |
| 4 | 06/02/17 | REVISION | AAB | MRC |

TITLE SHEET

SHEET NO. T-1

# GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE LESEE/LICENSEE REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.

4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.

5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS / CONTRACT DOCUMENTS.

7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S / VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.

9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY CONSTRUCTION CONTROL SURVEYS, ESTABLISHING AND MAINTAINING ALL LINES AND GRADES REQUIRED TO CONSTRUCT ALL IMPROVEMENTS AS SHOWN HEREIN.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.

12. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.

13. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.

14. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT.

15. THE CONTRACTOR SHALL NOTIFY THE LESEE/LICENSEE REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESEE/LICENSEE REPRESENTATIVE.

16. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.

17. ALL UNDERGROUND UTILITY INFORMATION WAS DETERMINED FROM SURFACE INVESTIGATIONS AND EXISTING PLANS OF RECORD. THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES IN THE FIELD PRIOR TO ANY SITE WORK. CALL THE FOLLOWING FOR ALL PRE-CONSTRUCTION NOTIFICATION 72-HOURS PRIOR TO ANY EXCAVATION ACTIVITY: DIG SAFE SYSTEM (MA, ME, NH, RI, VT): 1-888-344-7233 CALL BEFORE YOU DIG (CT): 1-800-922-4455

18. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CONSTRUCTION CONTROL SURVEYS AND MAINTAINING ALL LINES AND GRADES REQUIRED TO CONSTRUCT ALL IMPROVEMENTS SHOWN HEREIN.

19. ALL DIMENSIONS SHOWN THUS ± ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS WHICH EFFECT THE CONTRACTORS WORK. CONTRACTOR TO VERIFY ALL DIMENSIONS WITH PROJECT OWNER PRIOR TO CONSTRUCTION.

20. NORTH ARROW SHOWN ON PLANS REFERS TO APPROXIMATE TRUE NORTH. PRIOR TO THE START OF CONSTRUCTION, ORDERING OR FABRICATING OF ANTENNA MOUNTS, CONTRACTOR SHALL CONSULT WITH PROJECT OWNER'S RF ENGINEER AND FIELD VERIFY ALL ANTENNA SECTOR LOCATIONS AND ANTENNA AZIMUTHS.

21. THE CONTRACTOR AND OR HIS SUB CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.

22. ANTENNA INSTALLATION SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF RADIO ANTENNAS, TRANSMISSION LINES AND SUPPORT STRUCTURES.

23. COAXIAL CABLE CONNECTORS AND TRANSMITTER EQUIPMENT SHALL BE PROVIDED BY THE PROJECT OWNER AND IS NOT INCLUDED IN THESE CONSTRUCTION DOCUMENTS. A SCHEDULE OF PROJECT OWNER SUPPLIED MATERIALS IS ATTACHED TO THE BID DOCUMENTS (SEE EXHIBIT 3). ALL OTHER HARDWARE TO BE PROVIDED BY THE CONTRACTOR. CONNECTION HARDWARE SHALL BE STAINLESS STEEL.

24. WHEN "PAINT TO MATCH" IS SPECIFIED FOR ANTENNA CONCEALMENT, PAINT PRODUCT FOR ANTENNA RADOME SHALL BE SHERWIN WILLIAMS COROTHANE II. SURFACE PREPARATION AND APPLICATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND PROJECT OWNER'S GUIDELINE'S.

25. COORDINATION, LAYOUT, AND FURNISHING OF CONDUIT, CABLE AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

26. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.

27. ALL (E)ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY ENGINEERS. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW.

28. ALL (E)INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF UTILITY COMPANY ENGINEERING. THE AREAS OF THE PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE EQUIPMENT, DRIVEWAY OR

29. GRAVEL, SHALL BE GRADED TO A UNIFORM SLOPE, FERTILIZED, SEEDED AND COVERED WITH MULCH UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL ESTABLISH AND MAINTAIN SOIL EROSION AND SEDIMENTATION CONTROLS AT ALL TIMES

30. DURING CONSTRUCTION. PER FCC MANDATE, ENHANCED EMERGENCY (E911) SERVICE IS REQUIRED TO MEET NATIONWIDE STANDARDS

31. FOR WIRELESS COMMUNICATIONS SYSTEMS. PROJECT OWNER'S IMPLEMENTATION REQUIRES DEPLOYMENT OF EQUIPMENT AND ANTENNAS GENERALLY DEPICTED ON THIS PLAN, ATTACHED TO OR MOUNTED IN CLOSE PROXIMITY TO THE BTS RADIO CABINETS. PROJECT OWNER RESERVES THE RIGHT TO MAKE REASONABLE MODIFICATIONS TO E911 EQUIPMENT AND LOCATION AS TECHNOLOGY EVOLVES TO MEET REQUIRED SPECIFICATIONS.

32. APPLICABLE BUILDING CODES:
SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:

2009 INTERNATIONAL BUILDING CODE
2005 CT STATE BUILDING CODE
ELECTRICAL CODE: NEC 2014
LIGHTING CODE: NEC 2014

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL

ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

# ELECTRICAL AND GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.

2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.

3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.

4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.

5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.

6. BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.

7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION.

8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.

9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE AND GREENLEE CONDUIT MEASURING TAPE IN EACH INSTALLED TELCO CONDUIT.

10. WHERE CONDUIT BETWEEN BTS AND PROJECT OWNER CELL SITE PPC AND BETWEEN BTS AND PROJECT OWNER CELL SITE TELCO SERVICE CABINET ARE UNDERGROUND USE PVC, SCHEDULE 40 CONDUIT. ABOVE THE GROUND PORTION OF THESE CONDUITS SHALL BE PVC CONDUIT.

11. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.

12. PPC SUPPLIED BY PROJECT OWNER.

13. GROUNDING SHALL COMPLY WITH NEC ART. 250. ADDITIONALLY, GROUNDING, BONDING AND LIGHTNING PROTECTION SHALL BE DONE IN ACCORDANCE WITH "AT&T BTS SITE GROUNDING STANDARDS".

14. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.

15. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.

16. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.

17. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.

18. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.

19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.

20. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.

21. CONTRACTOR SHALL PROVIDE AND INSTALL OMNI DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALLS OVER EACH GROUND ROD AND BONDING POINT BETWEEN EXISTING TOWER/ (E) MONOPOLE GROUNDING RING AND EQUIPMENT GROUNDING RING.

22. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION. 5 OHMS MAXIMUM RESISTANCE REQUIRED.

23.CONTRACTOR SHALL CONDUCT ANTENNA, COAX, AND LNA RETURN-LOSS AND DISTANCE- TO-FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.

STATE OF CONNECTICUT
MARC R. CHRETIEN
No. 28307
LICENSED
PROFESSIONAL ENGINEER

# ABBREVIATIONS

| | | | | | |
|---|---|---|---|---|---|
| AGL | ABOVE GRADE LEVEL | G.C. | GENERAL CONTRACTOR | RF | RADIO FREQUENCY |
| AWG | AMERICAN WIRE GAUGE | MGB | MASTER GROUND BUS | | |
| BCW | BARE COPPER WIRE | MIN | MINIMUM | TBD | TO BE DETERMINED |
| BTS | BASE TRANSCEIVER STATION | (P) | PROPOSED/NEW | TBR | TO BE REMOVED |
| (E) | EXISTING | N.T.S. | NOT TO SCALE | TBRR | TO BE REMOVED AND REPLACED |
| EG | EQUIPMENT GROUND | REF | REFERENCE | | |
| EGR | EQUIPMENT GROUND RING | REQ | REQUIRED | TYP | TYPICAL |
| (F) | FUTURE | | | | |


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95 RYAN DRIVE, SUITE 1
RAYNHAM, MA 02767


**SITE NUMBER: CT3461**
**SITE NAME: BRISTOL MIDDLE STREET**
383 MIDDLE STREET
BRISTOL, CT 06010
HARTFORD COUNTY


at&t
550 COCHITUATE ROAD, SUITE 13,
FRAMINGHAM, MA 01701-4681


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GENERAL NOTES

SHEET NO. GN-1

HALF SIZE PRINT

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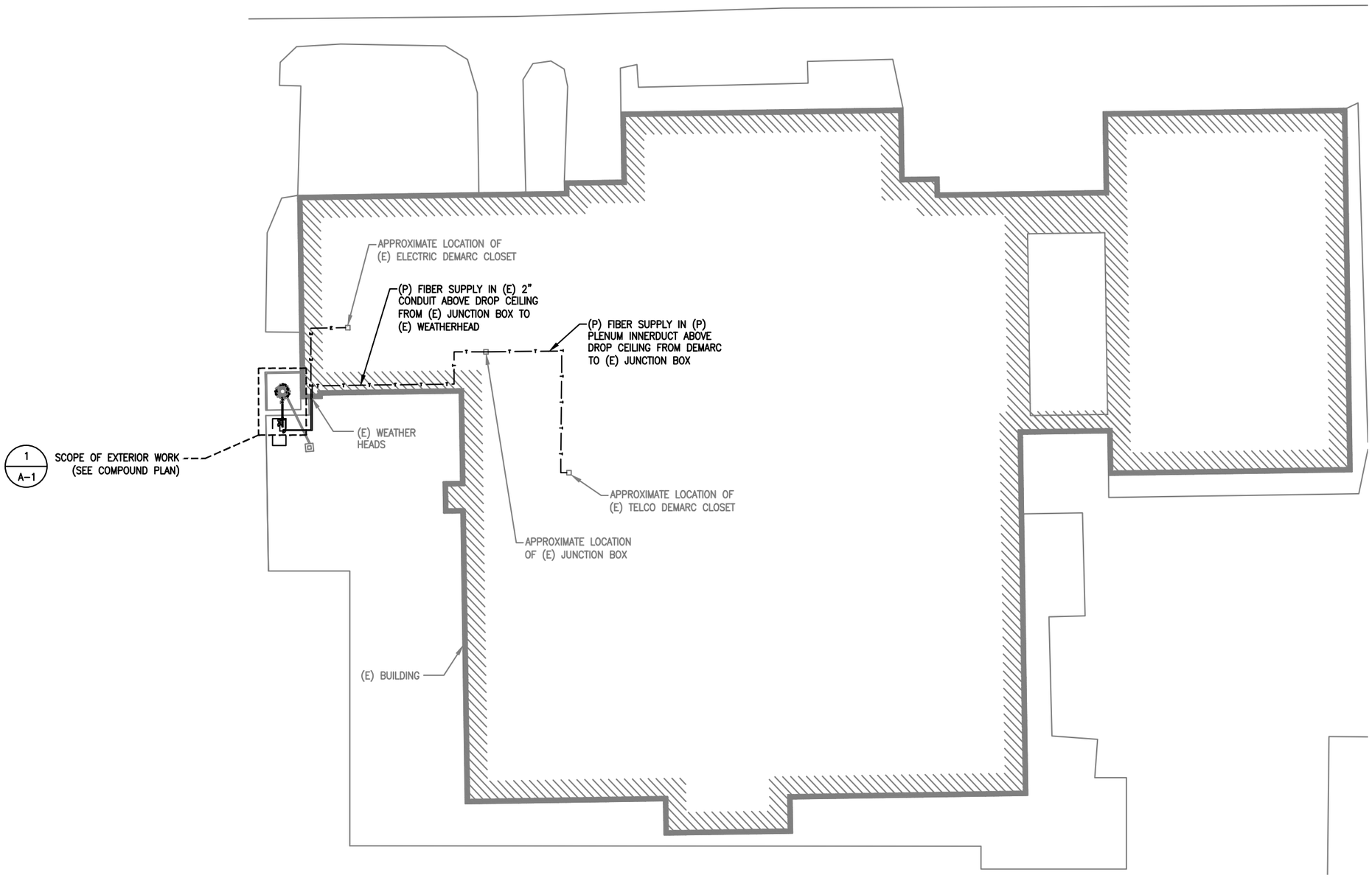


1 / C-1 KEY PLAN

SCALE: 1/64"=1'-0"

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KEY PLAN

SHEET NO. C-1

HALF SIZE PRINT
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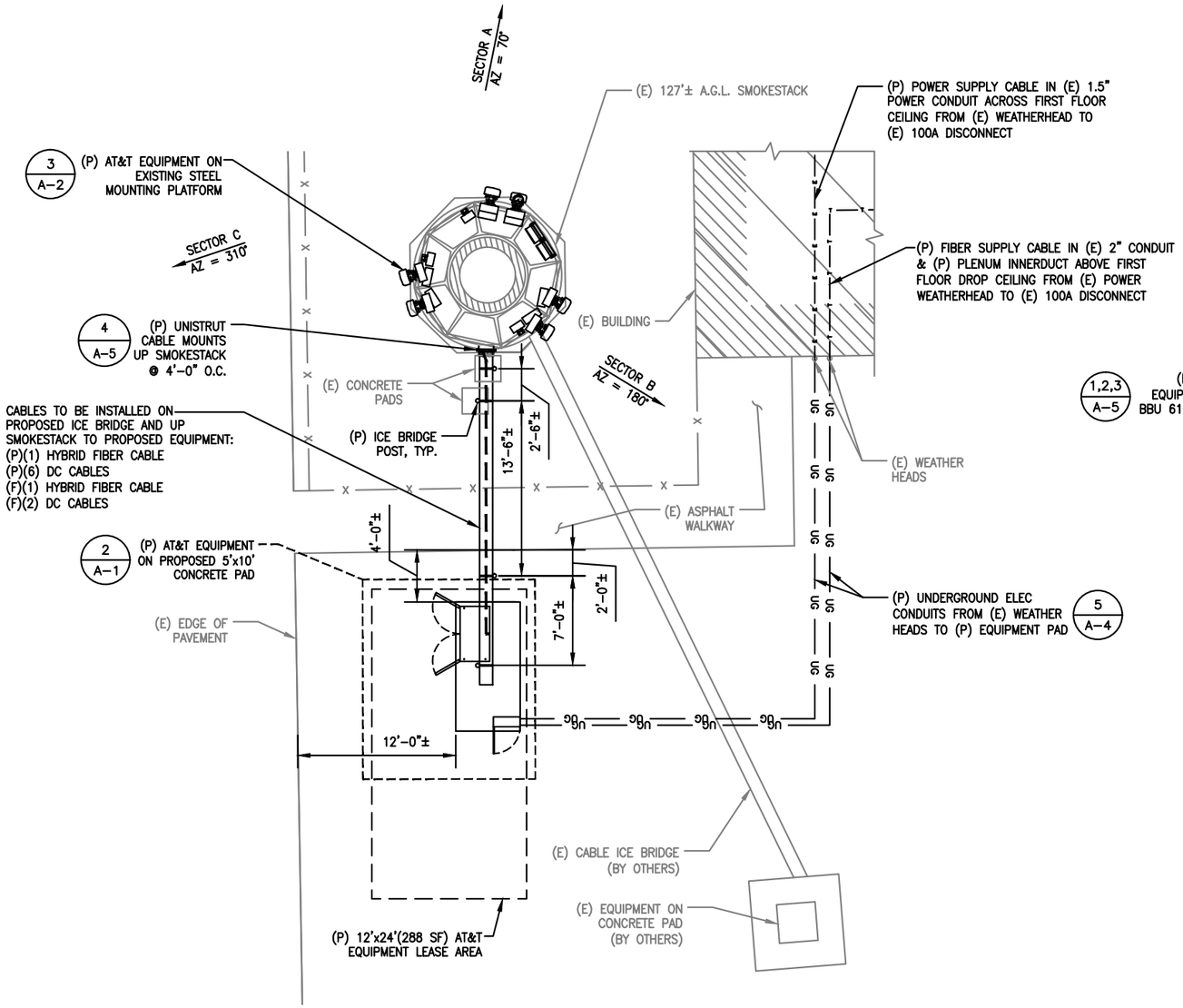
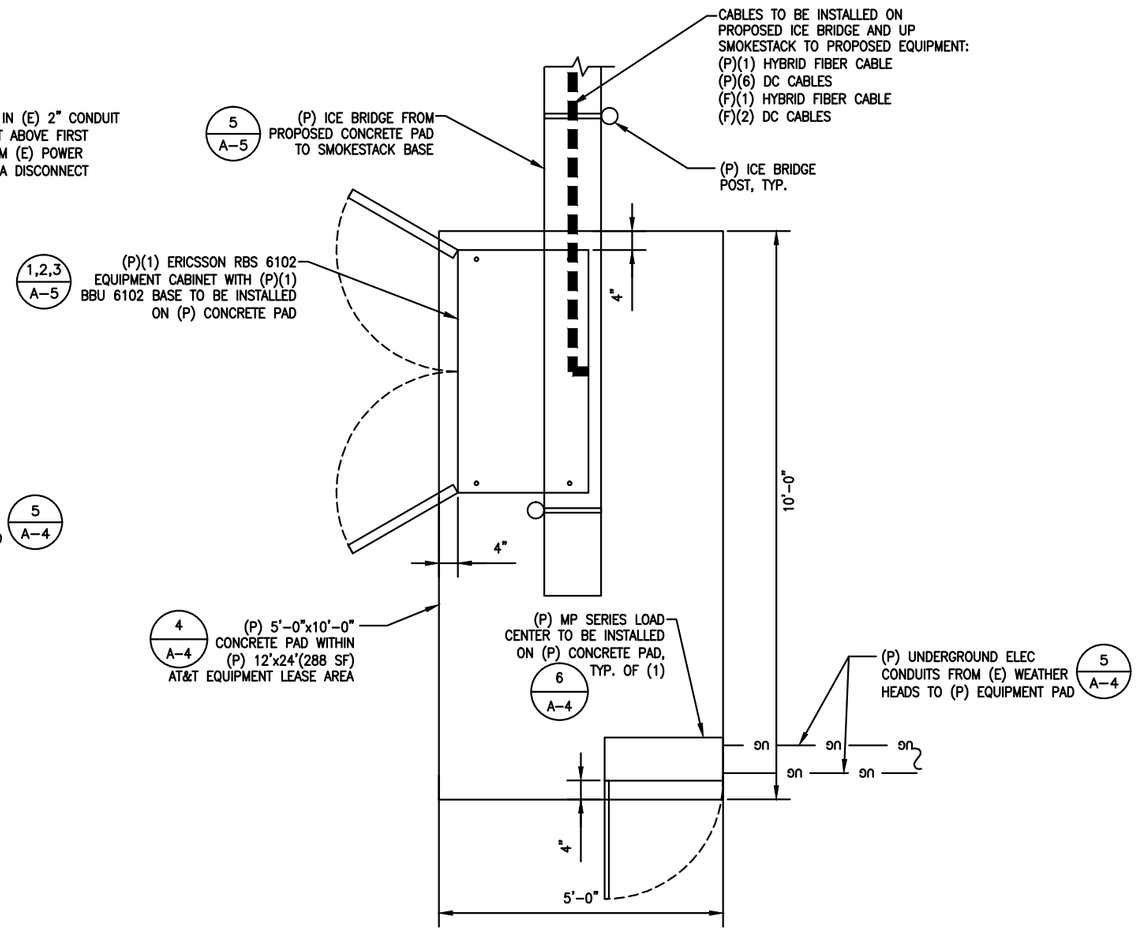



NORTH 1 A–1 COMPOUND PLAN
SCALE: 1"=10'–0"




NORTH 2 A–1 EQUIPMENT PLAN
SCALE: 3/4"=1'–0"

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COMPOUND AND EQUIPMENT PLANS

SHEET NO. A-1

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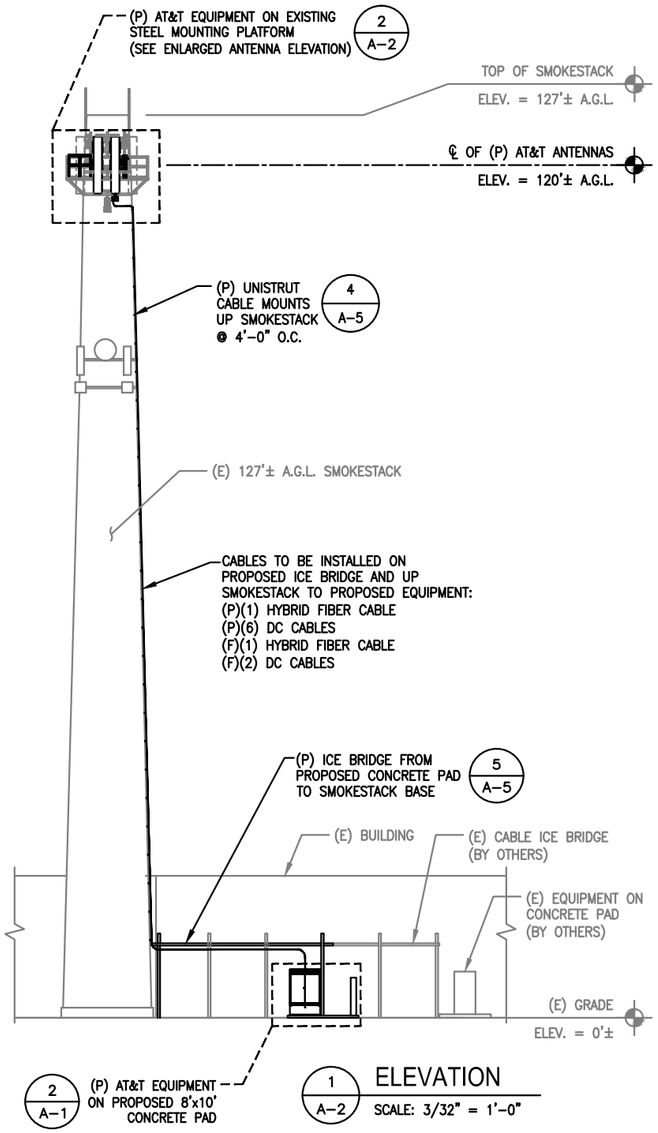
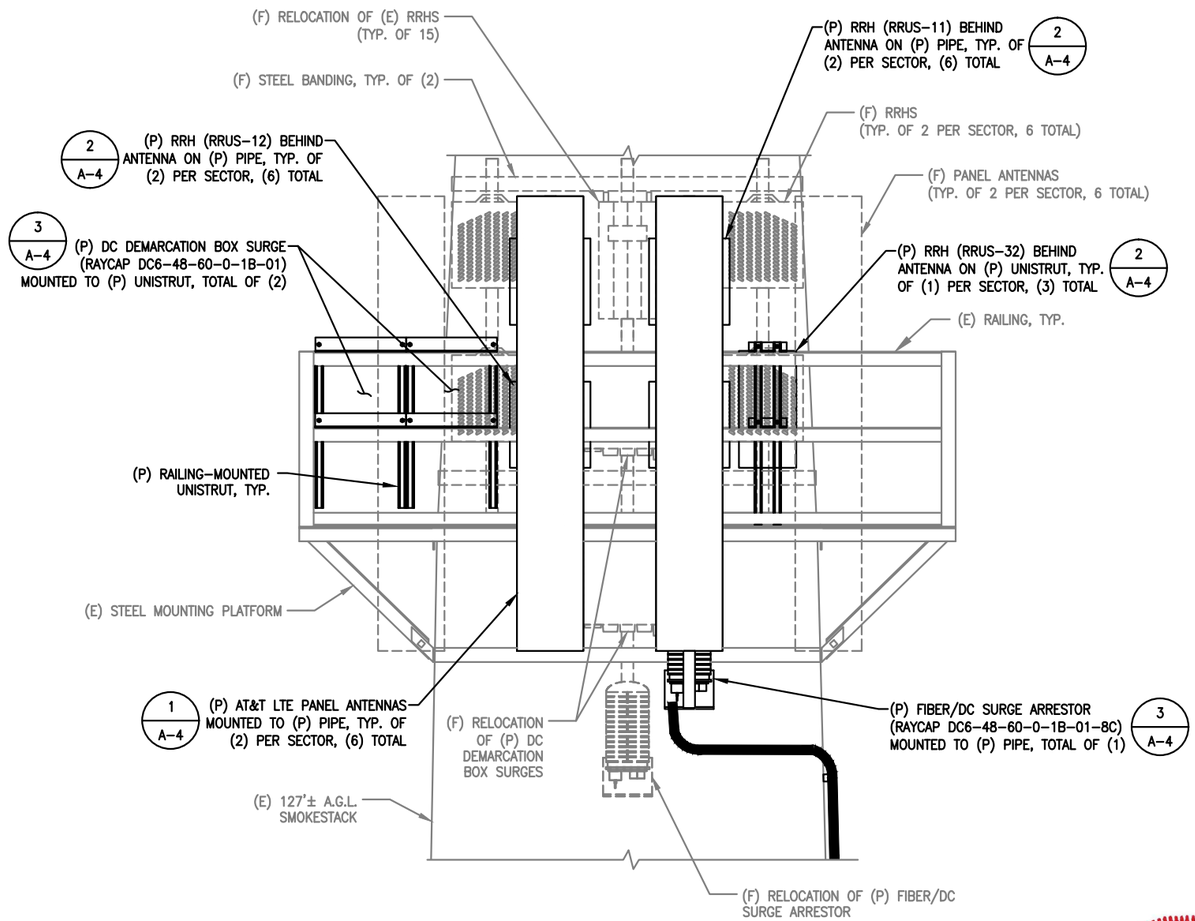



1/A-2 ELEVATION
SCALE: 3/32" = 1'-0"

NOTE:
PROPOSED REMOTE RADIO HEADS AND SURGES TO BE RELOCATED FROM HANDRAIL-MOUNTED PIPES TO FUTURE STEEL BAND MOUNTS SUBSEQUENT TO INSTALLATION OF FUTURE ANTENNAS.




2/A-2 ENLARGED ANTENNA ELEVATION
SCALE: 1/4" = 1'-0"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ELEVATIONS

SHEET NO. A-2

HALF SIZE PRINT
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NOTE:
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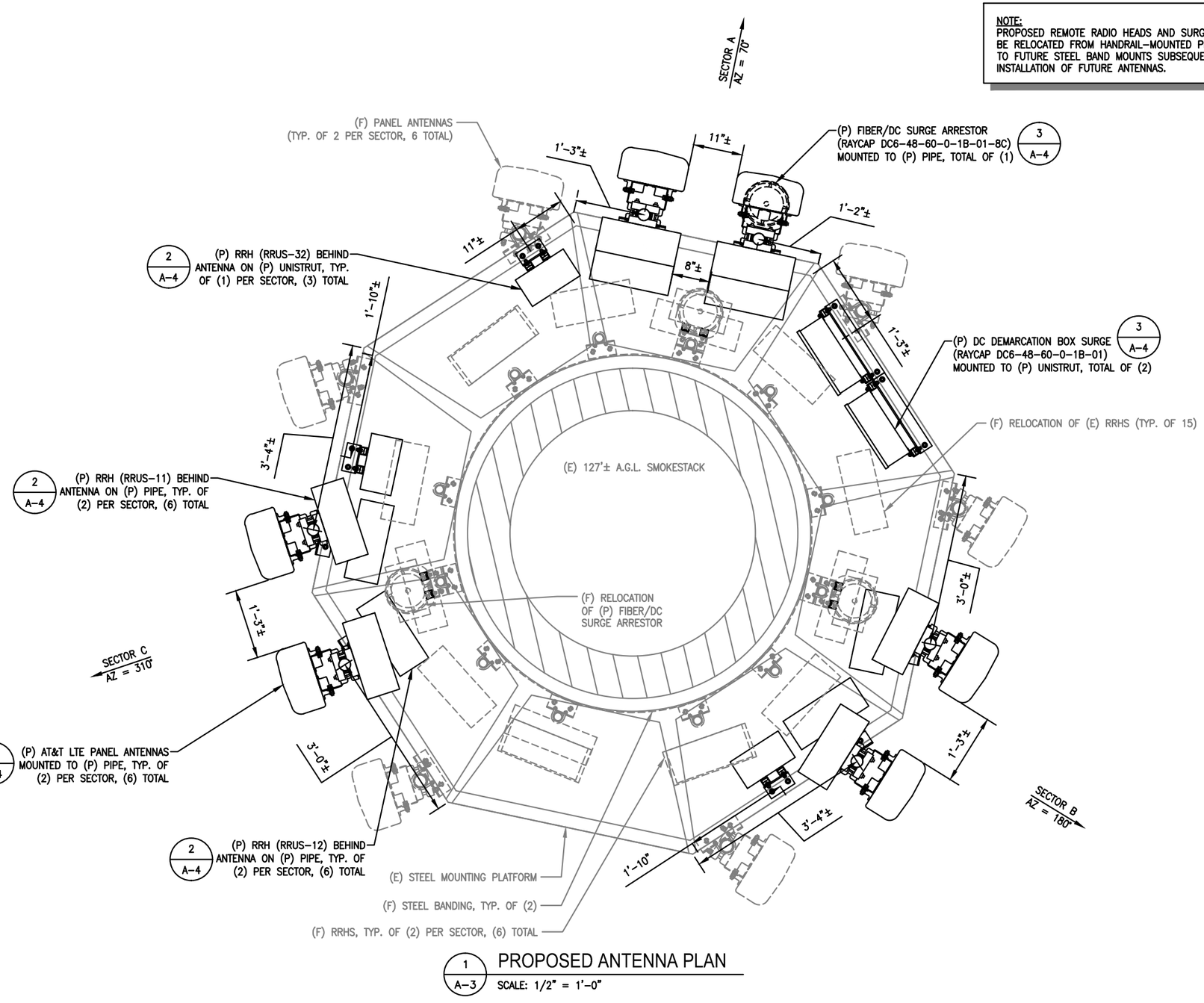


1 / A-3 PROPOSED ANTENNA PLAN
SCALE: 1/2" = 1'-0"

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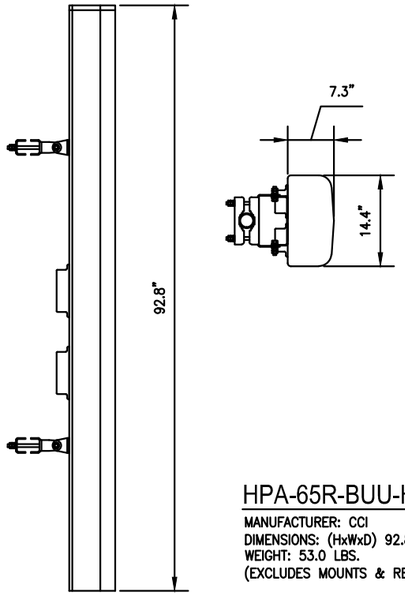
ANTENNA PLAN

SHEET NO. A-3

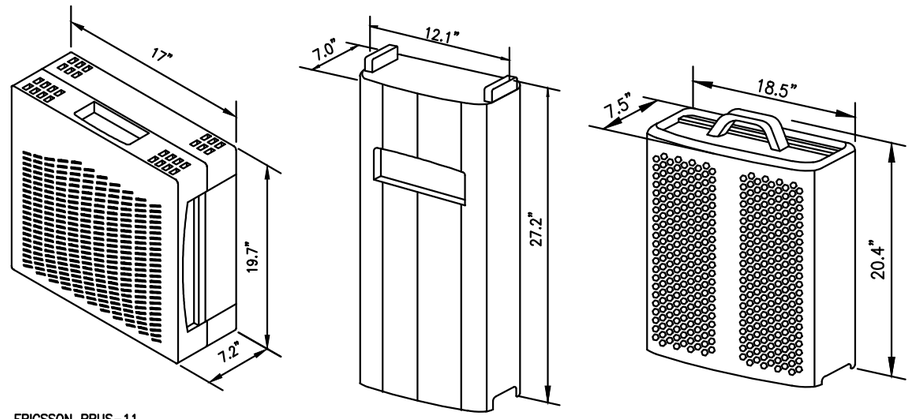



HPA-65R-BUU-H8

MANUFACTURER: CCI
DIMENSIONS: (HxWxD) 92.8"x14.4"x7.3"
WEIGHT: 53.0 LBS.
(EXCLUDES MOUNTS & RET SYSTEM)

1 / A-4 ANTENNA DETAILS

SCALE: N.T.S.




ERICSSON RRUS-11
-DIMENSIONS (H x W x D):
19.7" x 17.0" x 7.2" (INCLUDES SUNSHIELD)
-WEIGHT: 50 LBS
-CLIMATE: -40°C TO +55°C
(SELF CONVECTION SILENT, NO FANS, IP55)
-POWER CONSUMPTION: 200 WATTS (TYP.)

ERICSSON RRUS-32 B2
-DIMENSIONS (H x W x D):
27.2" x 12.1" x 7.0"
-WEIGHT: 53 LBS

ERICSSON RRUS-12
-DIMENSIONS (H x W x D):
20.4" x 18.5" x 7.5"
(INCLUDES SUNSHIELD)
-WEIGHT: 50 LBS

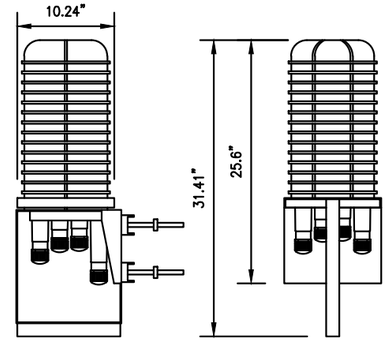
NOTES:
RRU CAN ONLY BE PAINTED ON SOLAR SHIELD.

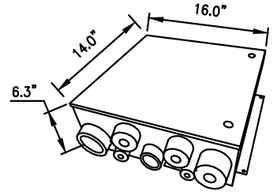
2 / A-4 REMOTE RADIO HEAD (RRH) DETAILS

SCALE: N.T.S.

RAYCAP DC6-48-60-0-1B-01-8c

NUMBER OF RADIOS PROTECTED: 6
SUPPRESSION CONNECTION METHOD: COMPRESSION LUG, #2-#14 AWG
COPPER, #2-#12 ALUMINUM
ENVIRONMENTAL RATING: IP 68, 7M 72HRS
WEIGHT: 26.2 LBS

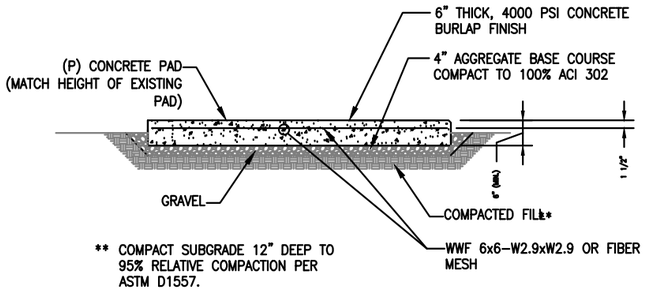



DC SURGE SUPPRESSOR
RAYCAP MODEL#
DC6-48-60-0-1B-01-0-1B-01

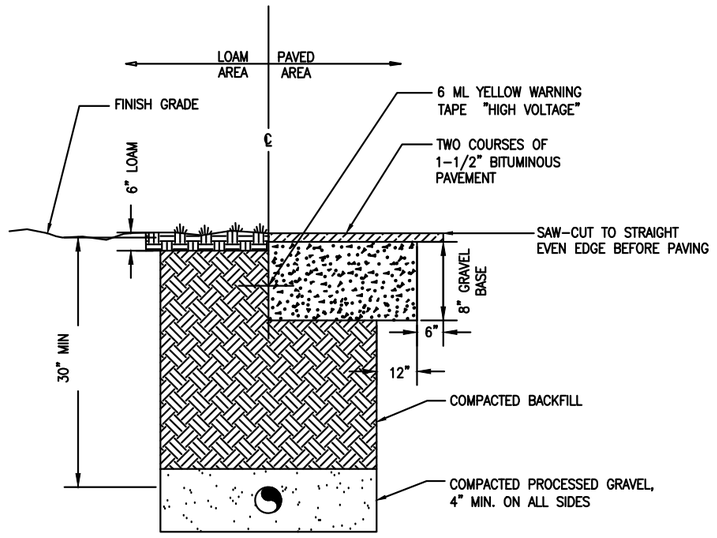
3 / A-4 SURGE ARRESTOR DETAILS

SCALE: N.T.S.



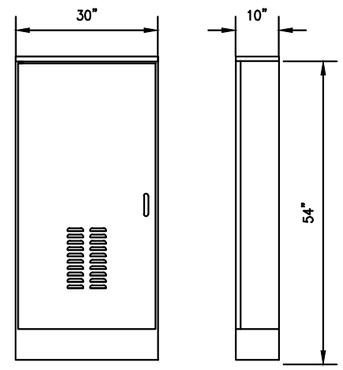

4 / A-4 CONCRETE PAD DETAIL

SCALE: N.T.S.




5 / A-4 BURIED CONDUIT DETAIL

SCALE: N.T.S.




PPC CABINET
DIMENSIONS (H x W x D): 54" x 30" x 10"

6 / A-4 MP SERIES LOAD CENTER DETAIL

SCALE: N.T.S.

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DETAILS

SHEET NO. A-4

RBS 6102 OUTDOOR DIMENSIONS

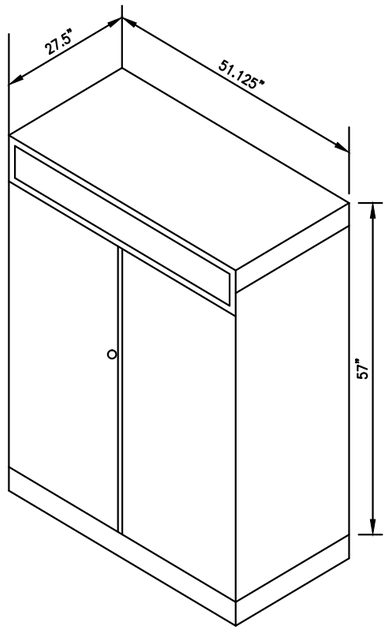
| CABINET | DEPTH x WIDTH x HEIGHT |
|---|---|
| OUTDOOR RBS 6102 | 27.5" x 51.125" x 57" |

RBS 6102 OUTDOOR WEIGHT

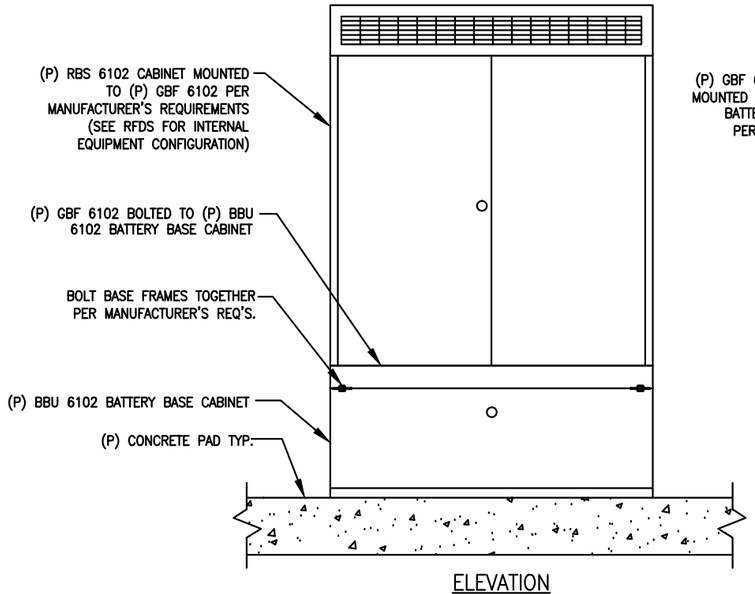
| CABINET | APPROX. MAX WEIGHT | MAX. FLOOR LOADING |
|---|---|---|
| OUTDOOR RBS 6102 | 1028 LBS. | |

RBS 6102 MINIMUM CLEARANCE

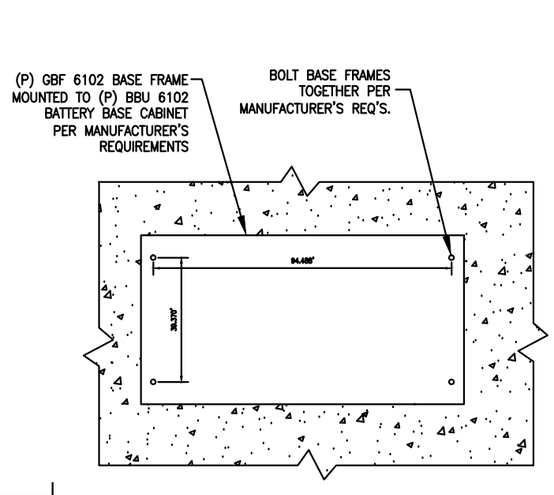
| DIRECTION | MINIMUM CLEARANCE |
|---|---|
| CABINET REAR | 8" |
| CABINET SIDES | 4" |
| ABOVE THE CABINET | 20" |
| IN FRONT OF THE CABINET | 28" |




1 A–5 RBS 6102 CABINET
SCALE: N.T.S.




ELEVATION




PLAN

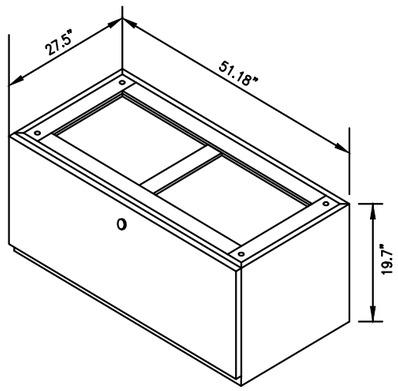
3 A–5 RBS 6102 MOUNTING DETAIL
SCALE: 1"=2'–0"

BBU 6102 OUTDOOR DIMENSIONS

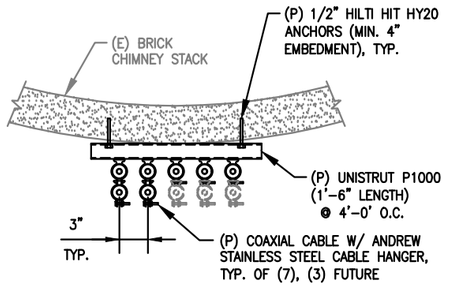
| CABINET | DEPTH x WIDTH x HEIGHT |
|---|---|
| OUTDOOR RBS 6102 | 27.5" x 51.18" x 19.7" |

BBU 6102 MINIMUM CLEARANCE

| DIRECTION | MINIMUM CLEARANCE |
|---|---|
| CABINET REAR | 8" |
| CABINET SIDES | 4" |
| ABOVE THE CABINET | 20" |
| IN FRONT OF THE CABINET | 28" |

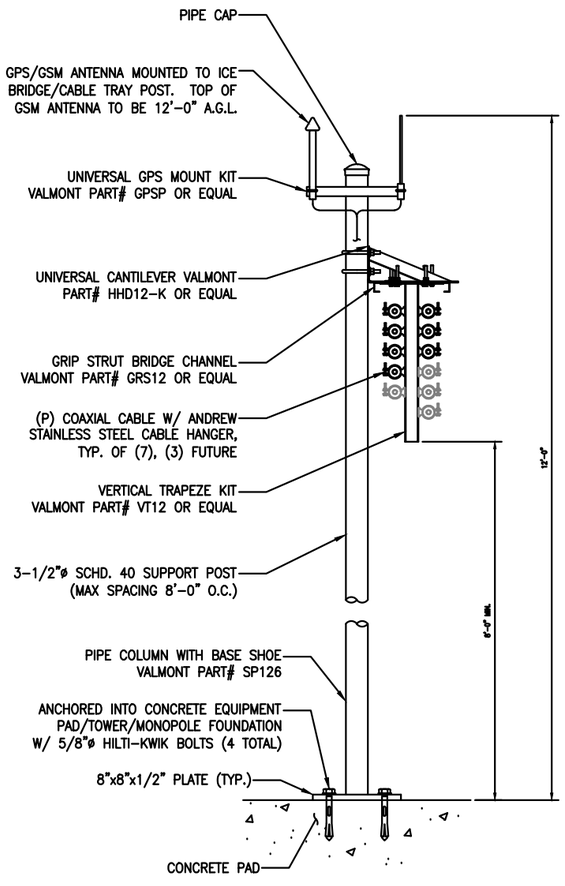



2 A–5 BBU 6102 CABINET
SCALE: N.T.S.




4 A–5 CABLE SUPPORT DETAIL
SCALE: N.T.S.




5 A–5 ICE BRIDGE DETAIL
SCALE: N.T.S.

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DETAILS

SHEET NO. A-5

# RF SYSTEM SCHEDULE & B.O.M.

| RRH INFORMATION | | | | | ANTENNA INFORMATION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MAKE | MODEL | (P) QTY | (F) QTY | SECTOR | MAKE | MODEL | FEED | AZIMUTH | RAD CTR (AGL) | FIBER/POWER LENGTH | FEEDERS | MECHANICAL DOWNTILT |
| ALPHA | ERICSSON | RRUS-11 | 2 | 1 | IA | CCI | HPA-65R-BUU-H8 (F) | BOTTOM | 70° | 120± | 150± | FIBER/DC POWER | 0° |
| | ERICSSON | RRUS-12 | 2 | 0 | IIA | CCI | HPA-65R-BUU-H8 (F) | BOTTOM | 70° | 120± | 150± | FIBER/DC POWER | 0° |
| | ERICSSON | RRUS-32 | 1 | 0 | IIIA | CCI | HPA-65R-BUU-H8 (P) | BOTTOM | 70° | 120± | 150± | FIBER/DC POWER | 0° |
| | ERICSSON | RRUS-E2 | 0 | 1 | IVA | CCI | HPA-65R-BUU-H8 (P) | BOTTOM | 70° | 120± | 150± | FIBER/DC POWER | 0° |
| | | | | | | | | | | | | | |
| BETA | ERICSSON | RRUS-11 | 2 | 1 | IB | CCI | HPA-65R-BUU-H8 (F) | BOTTOM | 180° | 120± | 150± | FIBER/DC POWER | 0° |
| | ERICSSON | RRUS-12 | 2 | 1 | IIB | CCI | HPA-65R-BUU-H8 (F) | BOTTOM | 180° | 120± | 150± | FIBER/DC POWER | 0° |
| | ERICSSON | RRUS-32 | 1 | 0 | IIIB | CCI | HPA-65R-BUU-H8 (P) | BOTTOM | 180° | 120± | 150± | FIBER/DC POWER | 0° |
| | ERICSSON | RRUS-E2 | 0 | 1 | IVB | CCI | HPA-65R-BUU-H8 (P) | BOTTOM | 180° | 120± | 150± | FIBER/DC POWER | 0° |
| | | | | | | | | | | | | | |
| GAMMA | ERICSSON | RRUS-11 | 2 | 1 | IC | CCI | HPA-65R-BUU-H8 (F) | BOTTOM | 310° | 120± | 150± | FIBER/DC POWER | 0° |
| | ERICSSON | RRUS-12 | 2 | 0 | IIC | CCI | HPA-65R-BUU-H8 (F) | BOTTOM | 310° | 120± | 150± | FIBER/DC POWER | 0° |
| | ERICSSON | RRUS-32 | 1 | 0 | IIIC | CCI | HPA-65R-BUU-H8 (P) | BOTTOM | 310° | 120± | 150± | FIBER/DC POWER | 0° |
| | ERICSSON | RRUS-E2 | 0 | 1 | IVC | CCI | HPA-65R-BUU-H8 (P) | BOTTOM | 310° | 120± | 150± | FIBER/DC POWER | 0° |
| | | | | | | | | | | | | | |

* CONTRACTOR TO VERIFY FINAL RFDS AND CABLE LENGTHS PRIOR TO CONSTRUCTION

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CENTERLINE COMMUNICATIONS
95 RYAN DRIVE, SUITE 1
RAYNHAM, MA 02767


**SITE NUMBER: CT3461**
**SITE NAME: BRISTOL MIDDLE STREET**
383 MIDDLE STREET
BRISTOL, CT 06010
HARTFORD COUNTY


at&t
550 COCHITUATE ROAD, SUITE 13,
FRAMINGHAM, MA 01701-4681


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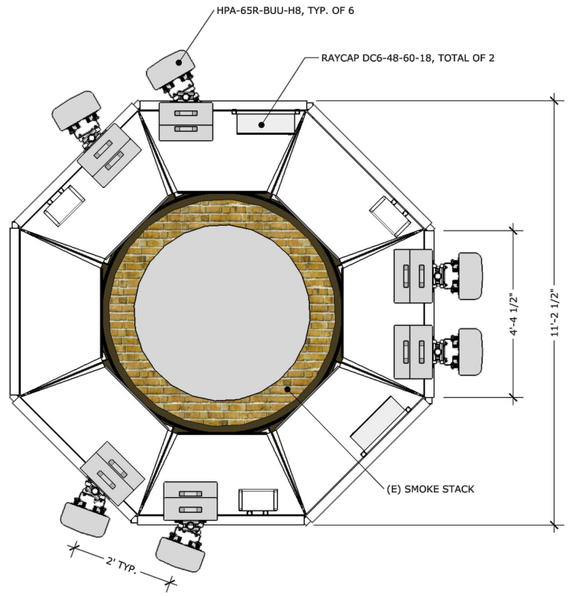
| | | | | |

RF SYSTEM SCHEDULE & B.O.M.

SHEET NO. A-6

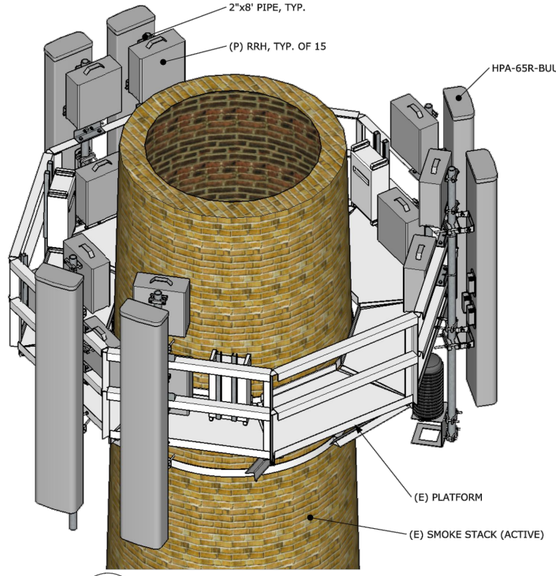
HALF SIZE PRINT

THIS DRAWING IS SCALEABLE AT HALF THE NOTED SCALE




1 S-1 PLAN

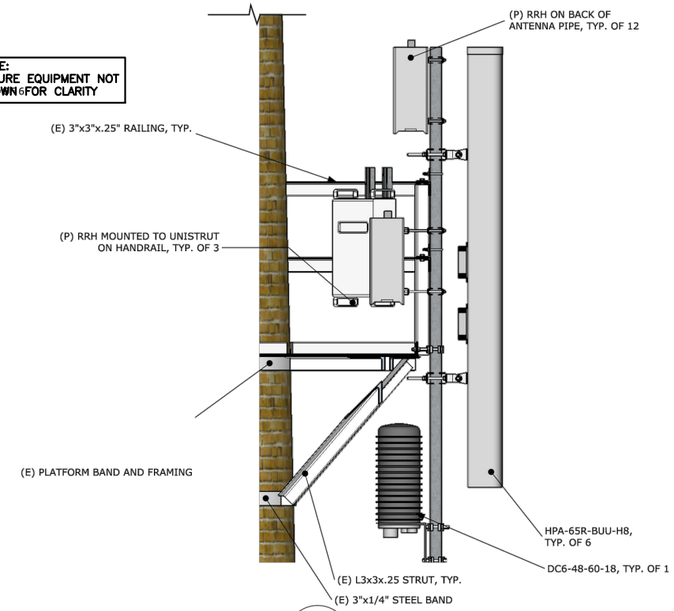
Scale: 1/2"=1'-0"




2 S-1 ISOMETRIC

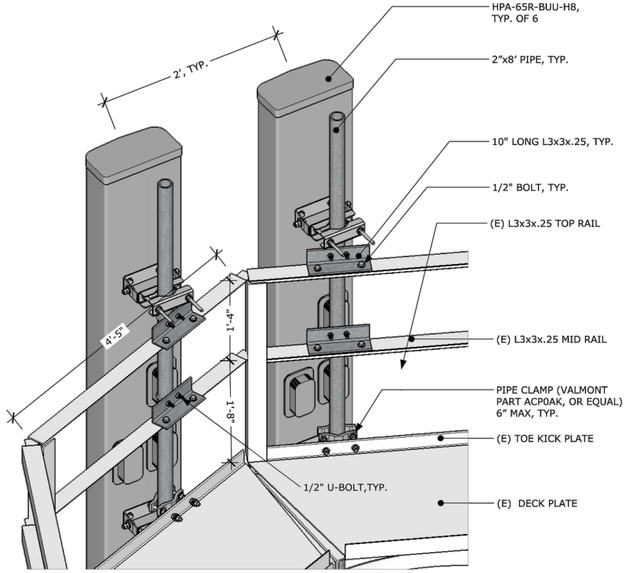
Scale: NTS

NOTE:
FUTURE EQUIPMENT NOT SHOWN FOR CLARITY



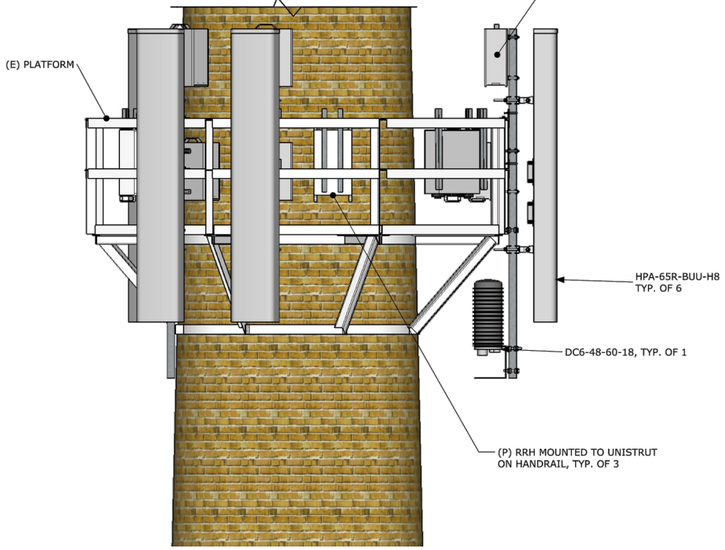

3 S-1 SECTION

Scale: 1/2"=1'-0"




4 S-1 MOUNT DETAIL

Scale: NTS




5 S-1 ELEVATION

Scale: 1/2"=1-0"

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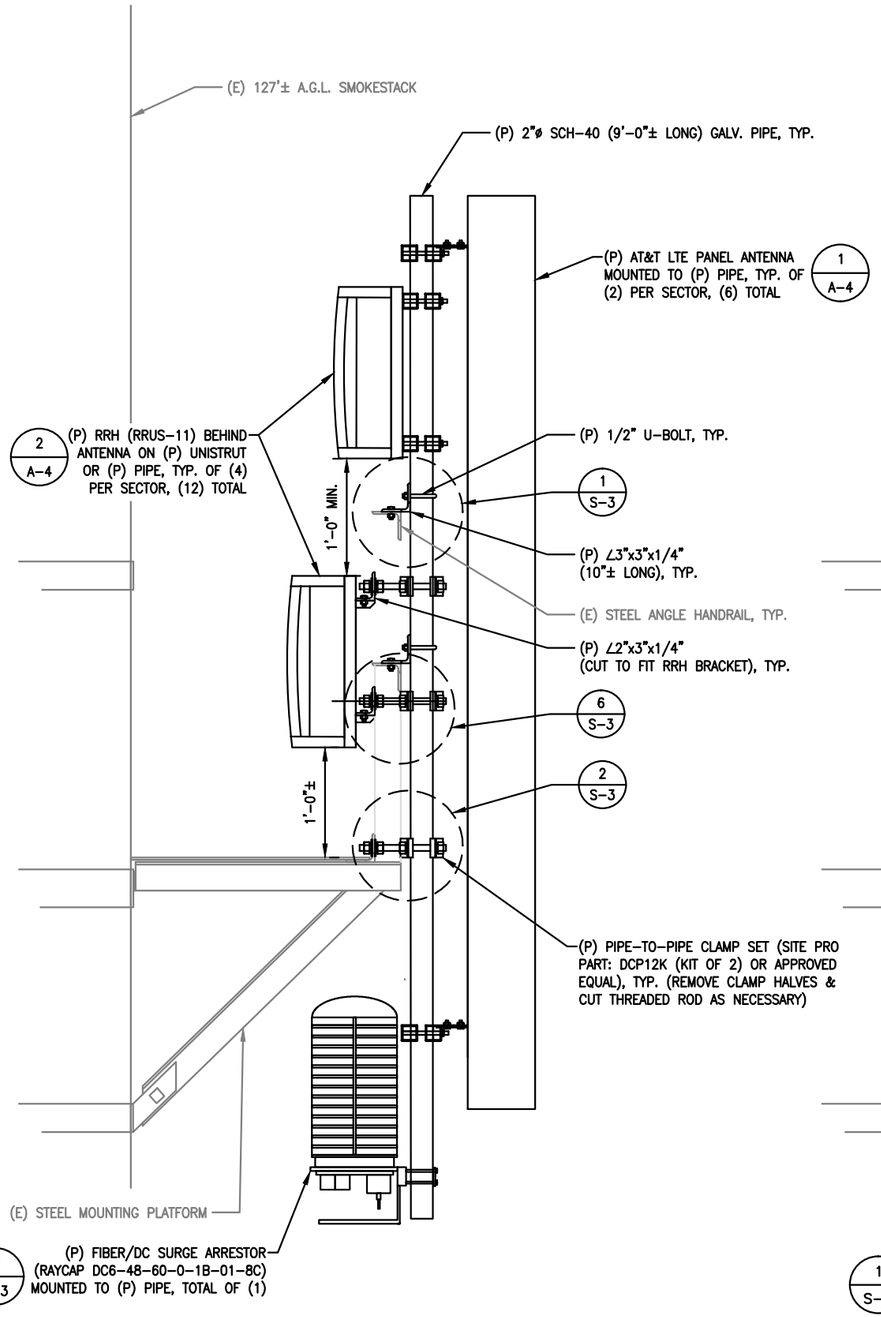
| | | | | |

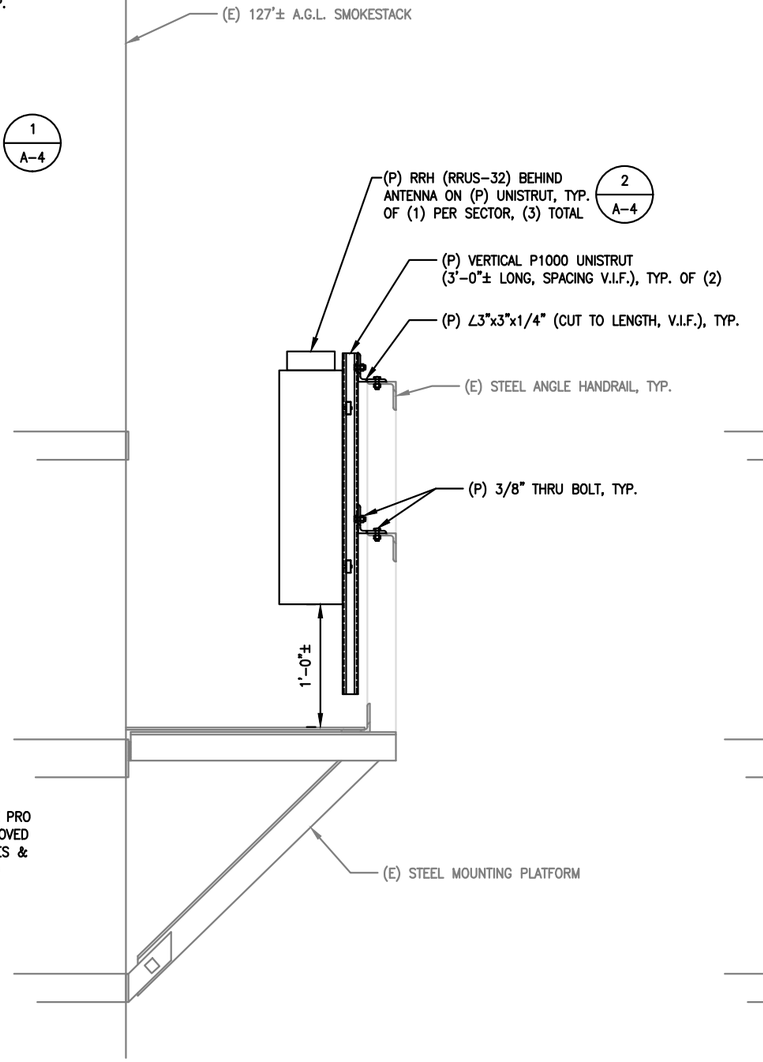
STRUCTURAL DETAILS

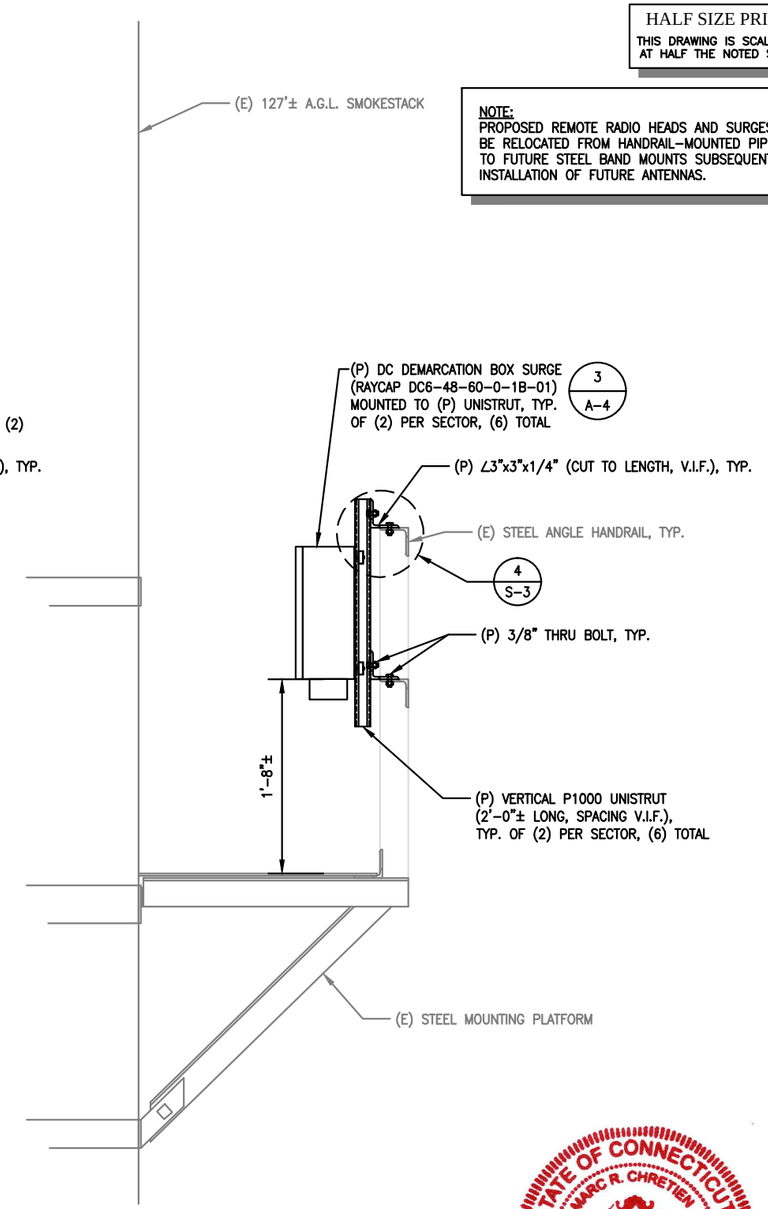
SHEET NO. S-1

HALF SIZE PRINT
THIS DRAWING IS SCALEABLE AT HALF THE NOTED SCALE

NOTE:
PROPOSED REMOTE RADIO HEADS AND SURGES TO BE RELOCATED FROM HANDRAIL-MOUNTED PIPES TO FUTURE STEEL BAND MOUNTS SUBSEQUENT TO INSTALLATION OF FUTURE ANTENNAS.




1 S-2 TYPICAL MOUNTING DETAILS
SCALE: 1-1/2" = 1'-0"

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STRUCTURAL DETAILS

SHEET NO. S-2

HALF SIZE PRINT
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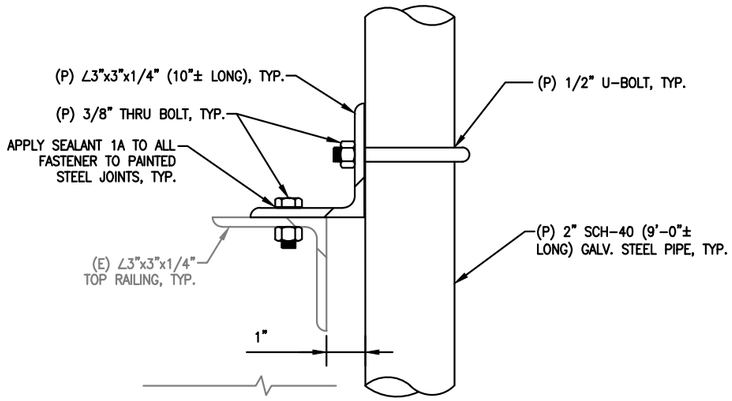
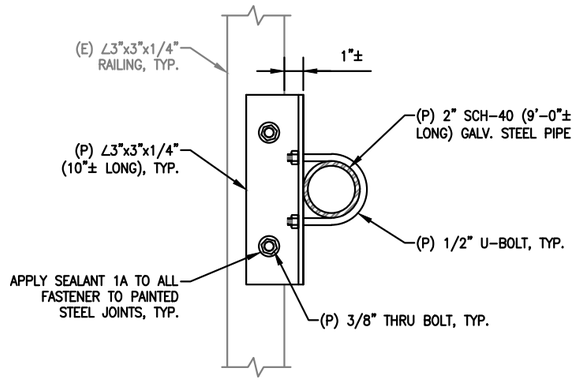
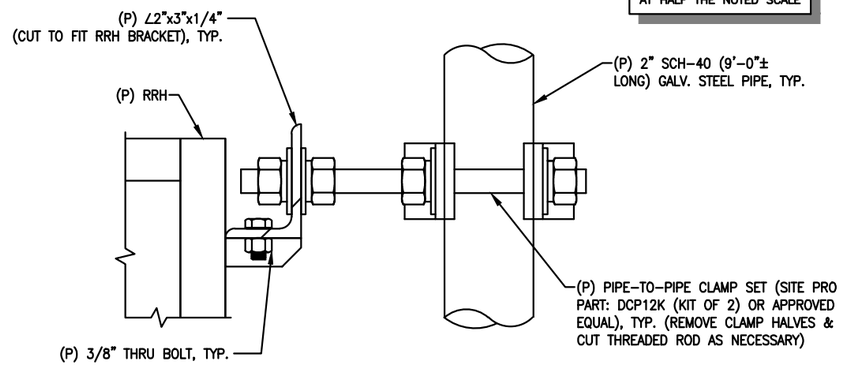


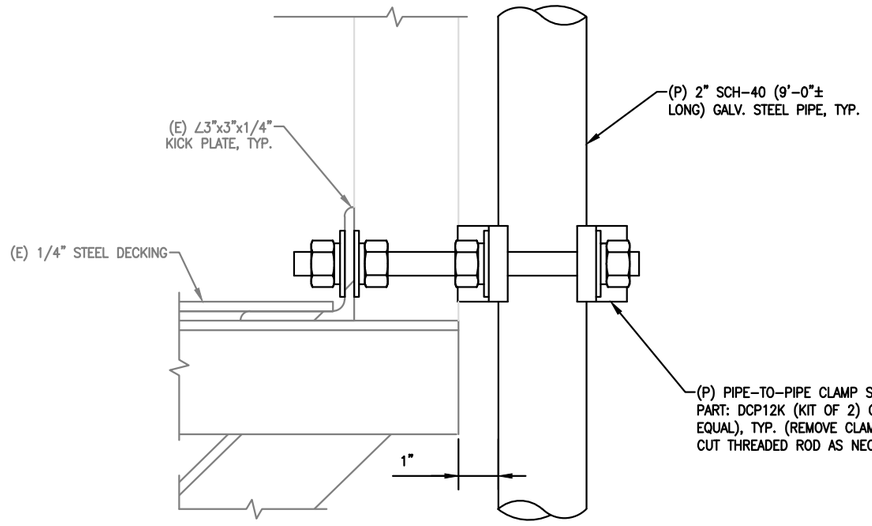

1 / S-3 RAILING DETAIL
SCALE: 6"=1'-0"



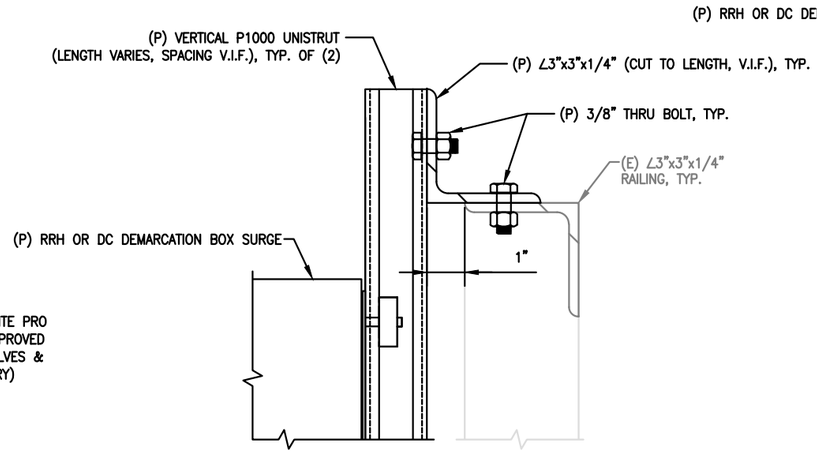

3 / S-3 PIPE MOUNT DETAIL
SCALE: 3"=1'-0"



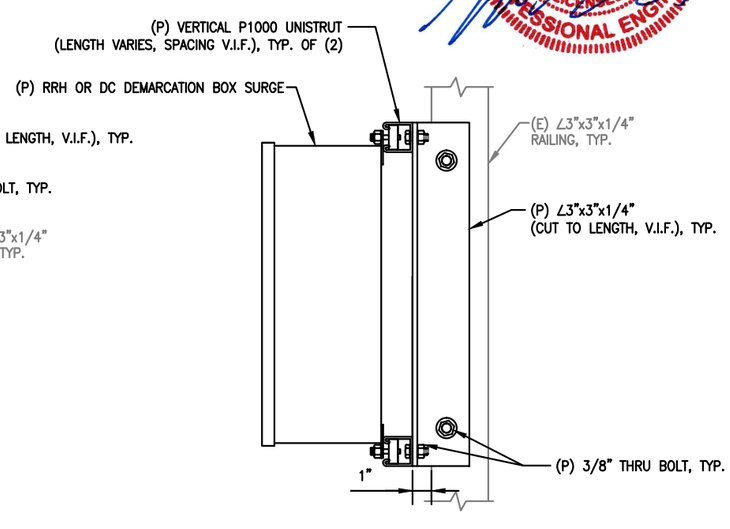

6 / S-3 RRH TO PIPE MOUNT DETAIL
SCALE: 3"=1'-0"




2 / S-3 TOE KICK DETAIL
SCALE: 6"=1'-0"




4 / S-3 RRH & SURGE MOUNT RAILING DETAIL
SCALE: 3"=1'-0"




5 / S-3 RRH & SURGE MOUNT PLAN DETAIL
SCALE: 3"=1'-0"

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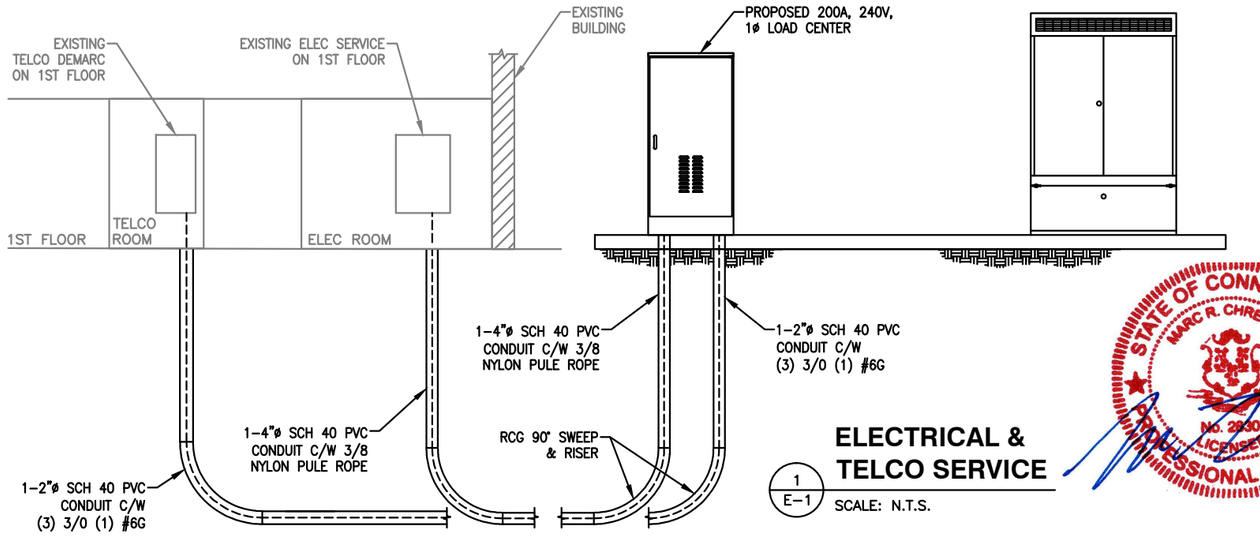
STRUCTURAL DETAILS

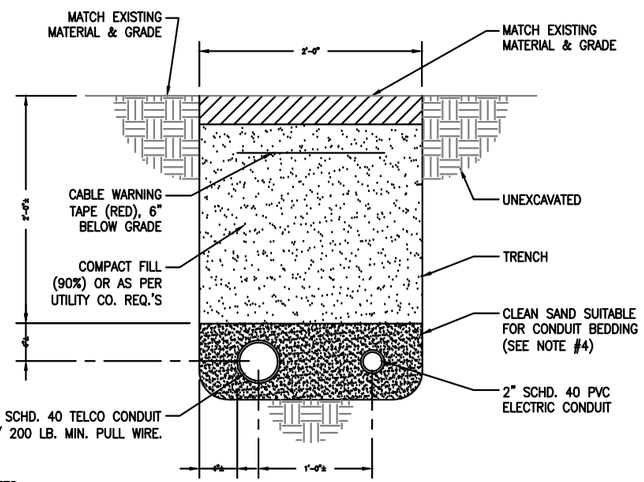
SHEET NO. S-3




**ELECTRICAL & TELCO SERVICE**

1 / E-1

SCALE: N.T.S.




NOTES:

1. IF FREE OF ORGANIC OR OTHER DELETERIOUS MATERIAL, EXCAVATED MATERIAL MAY BE USED FOR BACKFILL
2. IF NOT, PROVIDE CLEAN MATERIAL & COMPACT IN 8' LIFTS. REMOVE ANY LARGE ROCKS PRIOR TO BACKFILLING. CONTRACTOR TO VERIFY LOCATION OF EXISTING U/G UTILITIES PRIOR TO DIGGING.
3. IF CURRENT AS-BUILT DRAWINGS ARE NOT AVAILABLE CONTRACTOR SHALL HAND DIG U/G TRENCHING.
4. ENCASE CONDUIT IN CONCRETE WHEN TRENCHING UNDER ROADS/DRIVEWAYS.

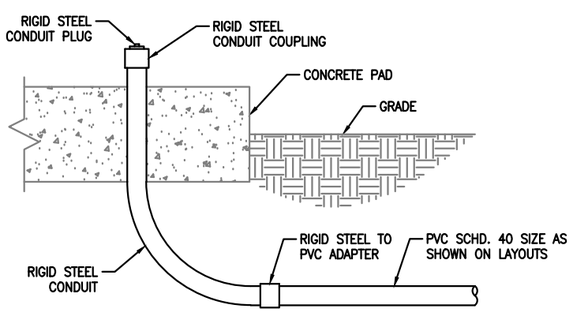
**ELECTRIC & TELEPHONE/FIBER JOINT SERVICE TRENCH CONDUIT**

2 / E-1

SCALE: N.T.S.

## ELECTRICAL AND TELEPHONE GENERAL NOTES

1. FOLLOWING COMPLETION OF WORK, PROVIDE OWNER WITH AS-BUILT DRAWINGS SHOWING TELEPHONE AND ELECTRIC LOCATIONS.
2. WORK SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE, NEC 2008.
3. COORDINATE WITH UTILITY AND LOCAL ELECTRICAL INSPECTOR FOR FINAL POWER CONNECTION.
4. UTILITY WILL SUPPLY METER. COORDINATE WITH UTILITY FOR METER TYPE AND INTERCONNECTION.
5. ALL EXISTING UNDERGROUND LINES ON SITE TO BE LOCATED PRIOR TO CONSTRUCTION. CALL 1-888-DIG-SAFE PRIOR TO CONSTRUCTION.
6. SEAL ALL SERVICE ENTRANCES INTO SHELTER FOLLOWING INSTALLATION.
7. SEE PAGE G-1 FOR GENERAL GROUNDING NOTES.
8. COORDINATE WITH LOCAL TELEPHONE COMPANY FOR ALL ROUTING AND DESIGN.
9. CONTRACTOR TO VERIFY CONTROL WIRING SIZE WITH GENERATOR MANUFACTURER PRIOR TO CONSTRUCTION.




**UNDERGROUND CONDUIT STUB UP DETAIL**

3 / E-1

SCALE: N.T.S.

## GENERAL ELECTRICAL NOTES

1. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH ALL GOVERNING STATE, COUNTY AND LOCAL CODES, O.S.H.A.. NEC 2008, NFPA P70, AT&T MOBILITY SPECIFICATIONS. AND THE SPECIFICATIONS DETAILED IN THESE PLANS.

2. SUBMITTAL OF BID INDICATES CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED UNDER THIS CONTRACT.

3. CONTRACTOR SHALL PERFORM ALL VERIFICATION, OBSERVATION, TESTS. AND EXAMINATION WORK PRIOR TO THE ORDERING OF THE ELECTRICAL EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE PROJECT MANAGER LISTING ALL MALFUNCTIONS. FAULTY EQUIPMENT. AND DISCREPANCIES.

4. THESE PLANS ARE DIAGRAMMATIC ONLY, FOLLOW AS CLOSELY AS POSSIBLE. CONTRACTOR SHALL ENSURE THAT ACCESS TO EQUIPMENT IS MAINTAINED IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS AND ALL APPLICABLE CODES.

5. EACH CONDUCTOR OF EVERY SYSTEM SHALL BE PERMANENTLY TAGGED IN EACH PANELBOARD, PULLBOX. J--BOX, SWITCH BOX, ETC.. IN COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).

6. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION. ETC., FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM, ENERGIZED THROUGHOUT AND AS INDICATED ON DRAWINGS. AS SPECIFIED HEREIN AND/OR AS OTHERWISE REQUIRED.

7. ALL MATER1ALS AND EQUIPMENT SHALL BE NEW AND IN PERFECT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE AND OF THE SAME MANUFACTURER THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT. MATERIALS SHALL BE LISTED AND APPROVED BY UNDERWRITER'S LABORATORY AND SHALL BEAR THE INSPECTION LABEL 'J' WHERE SUBJECT TO SUCH APPROVAL MATERIALS SHALL MEET WITH APPROVAL OF ALL GOVERNING BODIES NAN1NG JURISDICTION. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH APPLICABLE STANDARDS ESTABLISHED BY ANSI. NEMA, IEEE, AND NFPA.

8. ALL CONDUIT INSTALLED MAY BE SURFACE MOUNTED UNLESS OTHERWISE NOTED.

9. COMPLETE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF JOB ACCEPTANCE BY OWNER. ANY WORK, MATERIAL OR EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE. UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE CONTRACTOR.

10. ALL "CONDUIT ONLY" (CO.) INSTALLATIONS SHALL HAVE A 3/8" PULL WIRE OR ROPE.

11. CONTRACTOR SHALL PROVIDE AT&T MOBILITY MANAGER WITH ONE SET OF COMPLETE ELECTRICAL 'AS INSTALLED' DRAWINGS AT THE COMPLETION OF THE JOB, SHOWING ACTUAL DIMENSIONS, ROISINGS, AND CIRCUITS,

12. ALL BROCHURES. OPERATING MANUALS. CATALOGS, SHOP DRAWINGS. ETC. SHALL BE TURNED OVER TO OWNER AT JOB COMPLETION.

13. POWER WIRE AND CABLE CONDUCTORS SHALL BE COPPER #12 AWG MINIMUM UNLESS SPECIFICALLY NOTED OTHERWISE ON DRAWINGS. CONDUCTORS #10 AWG AND SMALLER SHALL BE SOLID.

14. ALL CONDUCTORS LARGER THAN 110 AWG SHALL BE STRANDED COPPER WITH THWN 600V INSULATION. UNLESS NOTED OTHERWISE.

15. ALL MATING SURFACES OF GROUND CONNECTIONS SHALL BE CLEANED SMOOTH AND COATED WITH ANTIOXIDANT PRIOR TO ATTACHMENT,

16. ALL GROUND CONNECTIONS BELOW GRADE MUST BE EXOTHERMICALLY WELDED (CAD WELD OR APPROVED EQUAL)

17. ALL EXTERIOR GROUNDING CONDUCTORS SHALL BE 2 AND SOLID TINNED BARE COPPER WIRE UNLESS NOTED OTHERWISE.

18. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING RATING NOT LESS THE MAXIMUM SHORT CIRCUIT CURRENT TO WHICH THEY MAY BE SUBJECTED, AND A MINIMUM OF 10,000 A.I.C. COORDINATE SHORT CIRCUIT REQUIREMENTS WITH LOCAL UTILITY COMPANY.

19. CONTRACTOR SHALL PATCH. REPAIR. AND PAINT ANY AREA THAT HAS BEEN DAMAGED IN THE COURSE OF THE ELECTRICAL WORK.

20. IN DRILLING HOLES INTO CONCRETE WHETHER FOR FASTENING OR ANCHORING PURPOSES, OR PENETRATIONS THROUGH THE FLOOR FOR CONDUIT RUNS, M PIPE RUNS, ETC., IT MUST BE CLEARLY UNDERSTOOD THAT TENDONS AND/OR REINFORCING STEEL WILL NOT BE DRILLED INTO, CUT OR DAMAGED UNDER ANY CIRCUMSTANCES.

21. LOCATION OF TENDONS AND/OR REINFORCING STEEL ARE NOT DEFINITELY KNOWN AND, THEREFORE, MUST BE SEARCHED FOR BY APPROPRIATE METHODS AND EQUIPMENT VIA X-RAY OR OTHER DEVICES THAT CAN ACCURATELY LOCATE THE REINFORCING AND/OR STEEL TENDONS.

22. PENETRATIONS IN FIRE RATED WALLS SHALL BE SEALED IN ACCORDANCE WITH ALL APPLICABLE CODES.

23. ALL MATERIALS SHALL BE U.L. LISTED

24. CONDUIT:
a. RIGID CONDUIT SHALL BE U.L LABEL GALVANIZED ZINC COATED WITH ZINC INTERIOR AND SHALL BE USED WHEN INSTALLED IN OR UNDER CONCRETE SLABS, IN CONTACT WITH THE EARTH, UNDER PUBLIC ROADWAYS. IN MASONRY WALLS OR EXPOSED ON BUILDING EXTERIOR. RIGID CONDUIT IN CONTACT WITH EARTH SHALL BE 1/2 LAPPED WRAPPED WITH HUNTS WRAP PROCESS NO. 3.
b. ELECTRICAL METALLIC TUBING SHALL HAVE U.L LABEL FITTINGS SHALL BE GLAND RING COMPRESSION TYPE EMT SHALL BE USED ONLY FOR INTERIOR RUNS.
c. FLEXIBLE METALLIC CONDUIT SHALL NAVE U.L LISTED LABEL AND MAY BE USED WHERE PERMITTED BY CODE. FITTINGS SHALL BE 'JAKE' OR 'SQUEEZE' TYPE, SEAL TIGHT FLEXIBLE CONDUIT. ALL CONDUIT SHALL NAVE FULL SIZE GROUND WIRE
d. CONDUIT RUNS MAY BE SURFACE MOUNTED IN CEILINGS OR WALLS UNLESS INDICATED OTHERWISE. CONDUIT SHALL RUN PARALLEL OR AT RIGHT ANGLES TO CEILING, FLOOR OR BEAMS. VERIFY EXACT ROUTING OF ALL EXPOSED CONDUIT WITH ENGINEER PRIOR TO INSTALLING.

25. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENT ENGRAVED PLASTIC LABELS.

26. CONTRACTOR SHALL COORDINATE THE ELECTRICAL SERVICE ATTN AT&T MOBILITY' AND LOCAL UTILITY.

27. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY NEC AND ALL APPLICABLE CODES.

28. GROUNDING SYSTEM RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY THE OWNER FOR FURTHER INSTRUCTION ON METHODS FOR REDUCING THE RESISTANCE VALUE. CONTRACTOR SHALL SUBMIT TO THE PROJECT MANAGER ALL TEST REPORTS AND ONE COMPLETE SET OF PRINTS SHOWING 'INSTALLED WORK'.

29. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL SUBMIT TEST REPORTS TO PROJECT MANAGER. CLEAN PREMISES OF ALL DEBRIS RESULTING FROM WORK AND LEAVE WORK IN A COMPLETE AND UNDAMAGED CONDITION.

30. ALL EXPOSED GROUND WIRES ROUTED ALONG THE SIDE OF EQUIPMENT SHELTERS OR ROUTED OVER CONCRETE FOUNDATIONS OR OTHER EXISTING STRUCTURES SHALL BE INSTALLED IN PROPERLY ANCHORED 3/4"ø (MIN.) PVC CONDUIT.

31. CONTRACTOR SHALL NOT DISTURB EXISTING GROUNDING SYSTEM. ANY DAMAGE SHALL BE REPAIRED IMMEDIATELY AT NO ADDITIONAL COST.

32. ALL ELEMENTS OF ICE BRIDGE AND AT&T MOBILITY UTILITY BACKBOARD MUST BE BONDED AND JUMPERED TO GROUNDED COMPONENTS OF THESE SYSTEMS.

33. ALL INTERIOR CABLES AND WIRING SHALL BE NEATLY ROUTED IN OVERHEAD LADDER RACK AND FASTENED TO LADDER RACK.

34. ALL GROUNDING CONDUCTORS SHALL BE ROUTED DOWNWARDS FROM POINT OF ORIGIN TO TERMINATION POINT (GROUND BAR, GROUND RING, ETC.

35. GROUNDING CONDUCTORS SHALL NOT REVERSE DIRECTION (EXCEPT HALO & BURIED GROUND RINGS). OTHER EXCEPTIONS NEED TO BE APPROVED BY AT&T MOBILITY CONSTRUCTION MANAGER PRIOR TO INSTALLATION.

36. GROUNDING CONDUCTORS SHALL HAVE A MINIMUM BENDING RADIUS OF 8".

37. ALL CONNECTIONS TO GROUND PLATES SHALL BE CAD WELDED TO THE CENTER OF THE PLATE. ALL DETAILS SHOWING CONNECTIONS TO GROUND RODS ARE ALSO VALID FOR SIMILAR CONNECTIONS TO GROUND PLATES.

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**SITE NUMBER: CT3461**

**SITE NAME: BRISTOL MIDDLE STREET**

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| NO. | DATE | REVISIONS | BY | CHK |
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| | | | | |

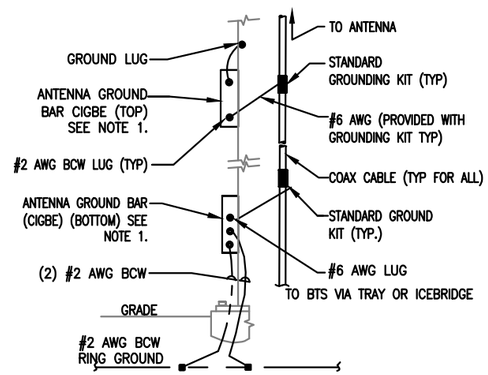
**ELECTRICAL DETAILS AND ONE LINE DIAGRAM**

SHEET NO. **E-1**

CIRCUIT BREAKER
ELECTRIC BOX
ELECTRICAL CONDUIT
EXOTHERMIC CONNECTION (CADWELD) TO GROUND RING AND COMPRESSION TO GROUND HALO
DISCONNECT SWITH
GROUND ROD
GROUND ROD WITH ACCESS
MECHANICAL GROUND CONN.
GROUND ACCESS WELL
G — GROUNDING WIRE
GENERATOR
FUSE
GROUND BUS BAR
REVISION
TELEPHONE BOX
UTILITY METER
XIT GROUND ROD

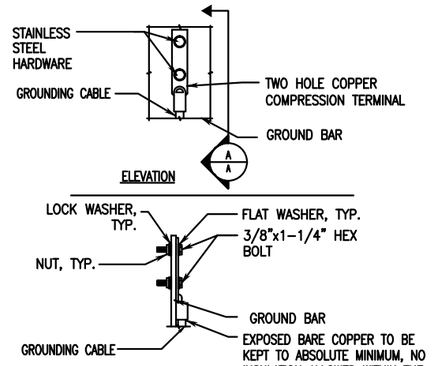
| | |
|---|---|
| ACCA | ANTENNA CABLE COVER ASSEMBLY |
| AWG | AMERICAN WIRE GAUGE |
| BTCW | BARE TINNED COPPER WIRE |
| C | CONDUIT |
| CIGBE | COAX INSULATED GROUND BAR EXTERNAL |
| CO | CONDUIT ONLY |
| DWG | DRAWING |
| EGB | EXTERNAL GROUND BAR |
| EMT | ELECTRICAL METALLIC TUBING |
| (E) | EXISTING |
| (F) | FUTURE |
| GEN | GENERATOR |
| GFI | GROUND FAULT CIRCUIT INTERRUPTER |
| GND | GROUND |
| GPS | GLOBAL POSITIONING SYSTEM |
| GR | GROWTH |
| IGR | INTERIOR GROUND RING (HALO) |
| MIGB | MASTER ISOLATED GROUND BAR |
| (P) | PROPOSED, NEW (PROVIDE AND INSTALL UNLESS NOTED OTHERWISE) |
| PCS | PERSONAL COMMUNICATION SERVICE |
| PPC | POWER PROTECTION CABINET |
| PRC | PRIMARY RADIO CABINET |
| PVC | POLYVINYL CHLORIDE CONDUIT |
| RGS | RIGID GALVANIZED STEEL |
| RWY | RACEWAY |
| S.L.D. | SINGLE LINE DIAGRAM |
| TEL | TELEPHONE |
| TYP. | TYPICAL |
| WP | WEATHERPROOF EQUIPMENT |

1 G-1 ELEC. / GROUNDING LEGEND
SCALE: N.T.S.



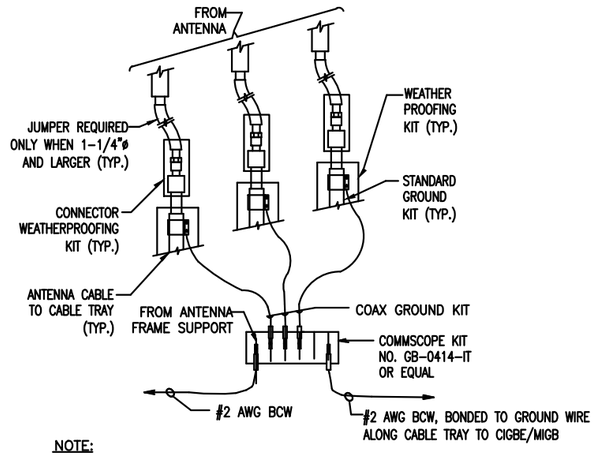

NOTE:
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER. ANTENNA LOCATION AND CONNECTION ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

2 G-1 TYP. ANTENNA CABLE GROUNDING
SCALE: N.T.S.



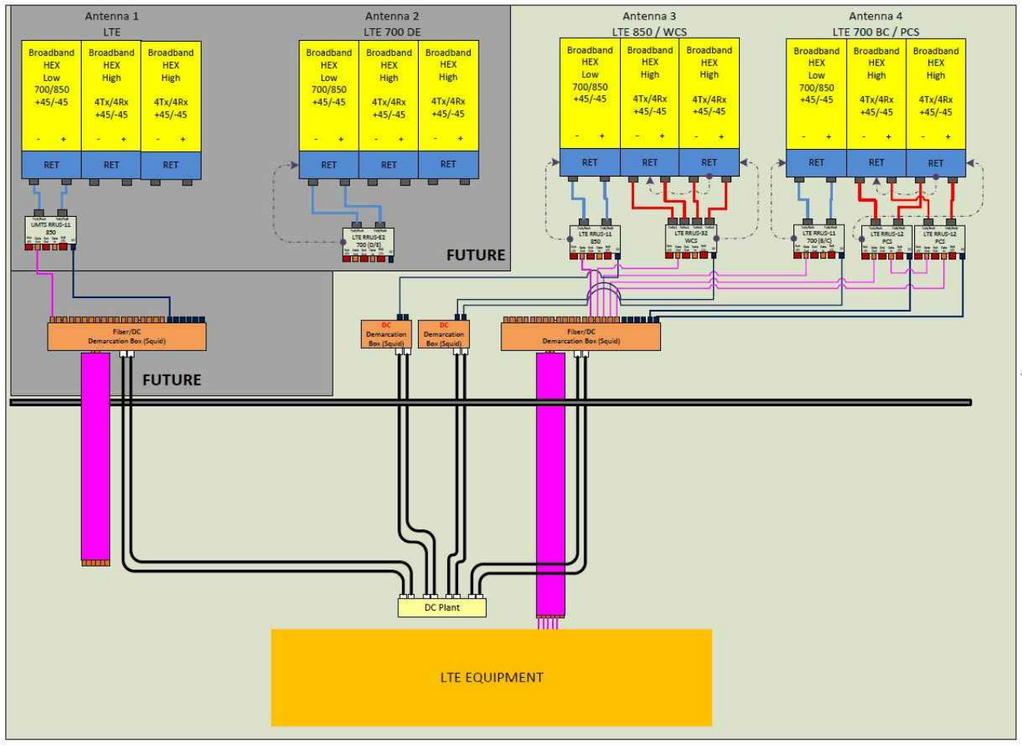

NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.
4. ALL GROUND LUGS MUST BE HEAT SHRUNK AT WIRE/LUG CONNECTION

3 G-1 TYP. GROUND BAR CONNECTION
SCALE: N.T.S.



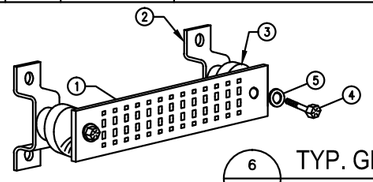

NOTE:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

4 G-1 TYP. GROUND WIRE TO GROUND BAR CONN.
SCALE: N.T.S.

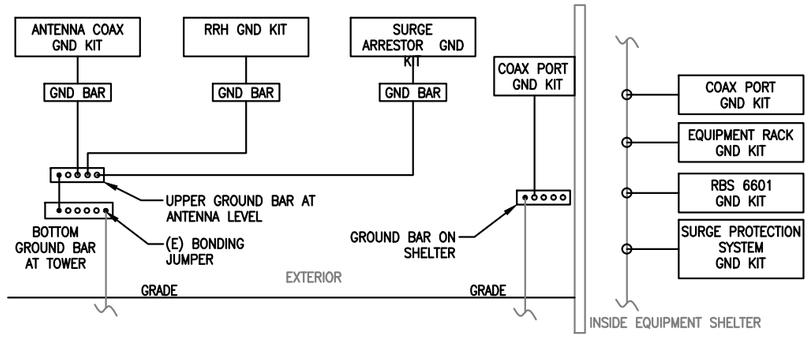



5 G-1 ONE LINE PLUMBING DIAGRAM
SCALE: N.T.S.

| WIRELESS SOLUTIONS INC. | | | |
|---|---|---|---|
| NO. | REQ. | PART NO. | DESCRIPTION |
| 1 | 1 | HLGB-0420-IS | SOLID GND. BAR (20"x4"x1/4") |
| 2 | 2 | ——— | WALL MTG. BRKT. |
| 3 | 2 | ——— | INSULATORS |
| 4 | 4 | ——— | 5/8"-11x1" H.H.C.S. |
| 5 | 4 | ——— | 5/8 LOCKWASHER |




6 G-1 TYP. GROUND BAR CONN.
SCALE: N.T.S.




7 G-1 ONE LINE GROUNDING DIAGRAM
SCALE: N.T.S.

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" – SURGE PRODUCERS

CABLE ENTRY PORTS (HATCH PLATES) (#2)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
+24V POWER SUPPLY RETURN BAR (#2)
-48V POWER SUPPLY RETURN BAR (#2)
RECTIFIER FRAMES.

SECTION "A" – SURGE ABSORBERS

INTERIOR GROUND RING (#2)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
BUILDING STEEL (IF AVAILABLE) (#2)

GROUNDING NOTES:
ALL GROUNDING SHALL BE DONE IN ACCORDANCE WITH THE AT&T MOBILITY GROUNDING GUIDE.

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**GROUNDING DETAILS AND ONE LINE DIAGRAM**

SHEET NO. **G-1**