# Extenet Systems, Inc.

BAY STATE ROAD/BACK BAY WEST COMMISSION 6/13/21

# Scope of Work:

- Replace existing streetlight and attach a wireless communications antenna at the top of the new pole along with related equipment inside a mounted cabinet. Utilities to be brought underground to the new pole.
- ▶ This replacement will be done in accordance with the Agreement between the Applicant and the City of Boston.

# Locations:

Bay State
NE-MA- Rd./Back
BSTN3N01- Bay West
03127 Commission 147 Bay State Rd. Concrete Pole



147 Bay State Rd. (Existing Conditions)



147 Bay State Rd. (Existing Conditions)



147 Bay State Rd. (Existing Conditions)



**LATITUDE: 42.350344°** LONGITUDE: -71.099920°

Know what's below. Call before you dig. NB+C ENGINEERING SERVICES, LLC.

3030 WARRENVILLE ROAD, SUITE 340

NE-MA-BSTN3N01-03127

TMO ID: NE3265BA 31LAB 147 BAY STATE ROAD BOSTON, MA 02215 SUFFOLK COUNTY

	REVISIONS				
<u>E</u>					
DESIGN RECORD					
S					
SE					
	1	01/29/21	SHROUD REPLACEMENT	CWE	
	0	03/31/20	PRELIMINARY	NSB	
	REV	DATE	DESCRIPTION	BY	

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KRUPAKARAN KOLANDAIVELLI P.F. PROFESSIONAL ENGINEER LIC. #50019

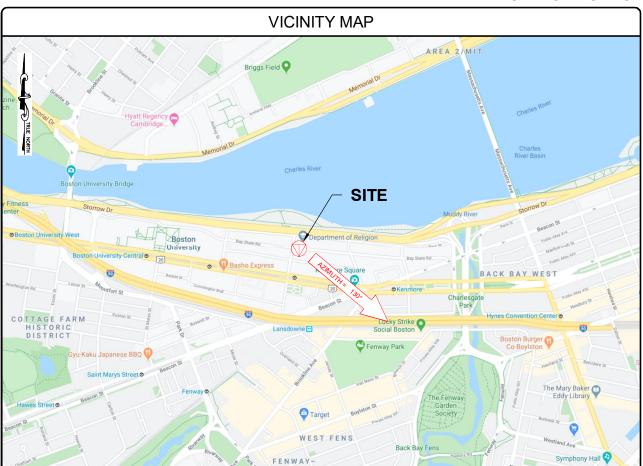
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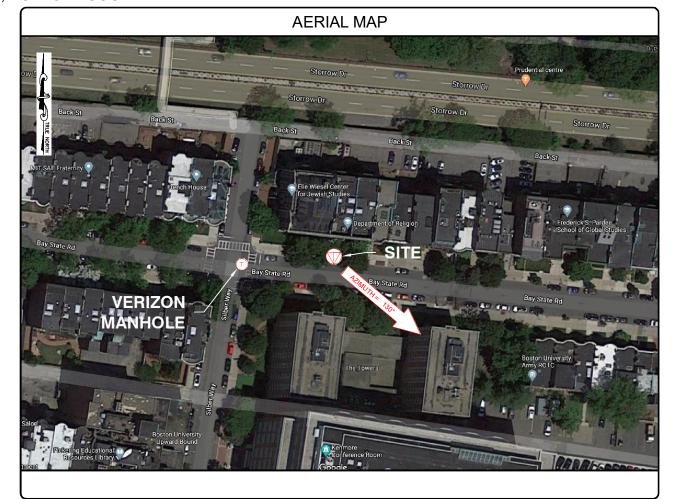
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**NE-MA-BSTN3N01-TMO** NE-MA-BSTN3N01-03127 / NE3265BA\_31LAB

PROPOSED SMALL CELL NODE

147 BAY STATE ROAD, BOSTON, MA 02215 CITY OF BOSTON, SUFFOLK COUNTY





# PROJECT INFORMATION

PROJECT NAME: NE-MA-BSTN3N01-TMO POLE TAG:

LOCATION AND DESIGN APPROVED BOSTON PUBLIC WORKS STREET LIGHTING DEPARTMENT

EXTENET PROJECT MANAGER: RICK ANGELINI 3030 WARRENVILLE RD, SUITE 340

ELECTRIC COMPANY: **EVERSOURCE** 

JURISDICTION:

HUB LOCATION:

# **CODE COMPLIANCE**

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE LATEST EDITIONS OF THE FOLLOWING CODES

- 2015 INTERNATIONAL BUILDING CODE (MASSACHUSETTS AMENDED 9TH EDITION)
- 2017 NATIONAL ELECTRICAL CODE NFPA 1-2015 EDITION
- 2015 IFC REFERENCE 527 CMR
- AMERICAN CONCRETE INSTITUTE
- AMERICAN INSTITUTE OF STEEL CONSTRUCTION
- MANUAL OF STEEL CONSTRUCTION 13TH EDITION

- INSTITUTE FOR ELECTRICAL & ELECTRONICS ENGINEER 81
- IEEE C2 NATIONAL ELECTRIC SAFETY CODE LATEST EDITION
- TELECORDIA GR-1275

# DRAWING INDEX

TITLE SHEET

02 NOTES

ANTENNA & EQUIPMENT DETAILS

**ELECTRICAL & GROUNDING DETAILS** 

**FOUNDATION DETAILS & NOTES** 

#### **GENERAL NOTES:**

- 1. THE CONTRACTOR SHALL GIVE ALL NOTICE 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,
- 2. THE ARCHITECT/ENGINEER HAS MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CALITIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND 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 CONSTRUCTION MANAGER OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PEFFORMANCE 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, EXCEPT FOR FIBER OPTIC CABLE AND OTHER MATERIALS IDENTIFIED BY.
- 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.
- 7. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWING/CONTRACT DOCUMENTS.
- 8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTUIRE'S/VENDOR'S SPECIFICATION UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
- 10. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTIONS METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
- 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 TO ORIGINAL OR BETTER CONDITION.
- 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 CONSTRUCTION MANAGER 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 IS RESOLVED BY THE CONSTRUCTION MANAGER.
- 16. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE PROJECT.
- 17. OWNER/CONTRACTOR SHALL CONTACT ONE CALL MINIMUM 72 HOURS PRIOR TO THE START OF CONSTRUCTION FOR LOCATION OF EXISTING UNDERGROUND UTILITIES.
- 18. SUBMITTAL OF BID INDICATES THAT THE CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED UNDER THIS CONTRACT.
- 19. THESE PLANS ARE DIAGRAMMATIC ONLY, FOLLOW AS CLOSELY AS POSSIBLE.
- 20. CONTRACTOR SHALL COORDINATE ALL WORK BETWEEN TRADES AND ALL OTHER SCHEDULING AND PROVISIONARY CIRCUMSTANCES SURROUNDING THE PROJECT.
- 21. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION CONSTRUCTION TOOLS, TRANSPORTATION, ETC., FOR COMPLETE AND FUNCTIONALLY OPERATING SYSTEMS ENERGIZED AND READY FOR USE THROUGHOUT AS INDICATED ON DRAWINGS, AS SPECIFIED HEREIN AND/OR AS OTHERWISE REQUIRED.
- 22. CLEAN PREMISES OF ALL DEBRIS RESULTING FROM WORK AND LEAVE WORK IN A COMPLETE AND UNDAMAGED CONDITION. LEGALLY DISPOSE OF ALL REMOVED, UNUSED AND EXCESS MATERIAL GENERATED BY THE WORK OF THIS CONTRACT. DELIVER ITEMS INDICATED ON THE DRAWINGS TO THE OWNER IN GOOD CONDITION. OBTAIN SIGNED RECEIPT UPON DELIVERY.
- 23. AFTER COMPLETION OF CONSTRUCTION, RED LINED AS-BUILT PLANS SHALL BE PROVIDED TO CONSTRUCTION

## **ELECTRICAL NOTES:**

- CONTRACTOR SHALL PERFORM ALL VERIFICATIONS, OBSERVATION TESTS, AND EXAMINATION WORK PRIOR ORDERING OF ANY EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOT OF ALL FINDINGS TO THE PROJECT MANAGER LISTING ALL MALFUNCTIONS, FAULTY EQUIPMENT A DISCREPANCIES.
- 2. VERIFY HEIGHTS WITH PROJECT MANAGER PRIOR TO INSTALLATION.
- 3. ALL MATERIALS 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. ELECTRICAL MATERIALS SHALL BE LISTED AND APPROVED BY UNDEWRITER'S LABORATORIES AND SHALL BEAR THE INSPECTION LABEL J'Y WHERE SUBJECT TO SUCH APPROVAL MATERIALS SHALL MEET WITH APPROVAL OF ALL GOVERNING BODIES HAVING JURISDICTION OVER THE CONSTRUCTION. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH ALL CURRENT APPLICABLE STANDARDS ESTABLISHED BY ANSI, NEMA AND NBFU. ALL MATERIALS AND EQUIPMENT SHALL BE APPROVED FOR THEIR INTENDED USE AND LOCATION.
- 4. ALL WORK SHALL COMPLY WITH ALL APPLICABLE GOVERNING STATE, COUNTY AND CITY CODES AND OSHA, NFPA, NEC & ASHRAE REQUIREMENTS.
- ENTIRE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF JOB ACCEPTANCE. ALL WORK, MATERIAL AND EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE, UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE CONTRACTOR.
- 6. PROPERLY SEAL ALL PENETRATIONS. PROVIDE UL LISTED FIRE—STOPS WHERE PENETRATIONS ARE MADE THROUGH FIRE—RATED ASSEMBLIES. WATER—TIGHT USING SILICONE SEALANT.
- ALL CONDUCTORS SHALL BE COPPER. MINIMUM CONDUCTOR SIZE SHALL BE #12 AWG., UNLESS OTHERWISE NOTED. CONDUCTORS SHALL BE TYPE THHW, RATED IN ACCORDANCE WITH NEC 110-14(C).
- 10. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE; ARTICLES 250 & 810 AND THE UTILITY COMPANY STANDARDS.

- 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. LIQUID-TIGHT FLEXIBLE METAL CONDUIT SHALL BE U.L. LISTED AND SHALL BE USED AT FINAL CONNECTIONS TO MECHANICAL EQUIPMENT & RECTIFIERS AND WHERE PERMITTED BY CODE. ALL CONDUIT IN EXCESS OF SIX FEET IN LENGTH SHALL CONTAIN A FULL—SIZE GROUND CONDUCTOR.

- D. CONDUIT RUNS SHALL BE SURFACE MOUNTED ON CEILINGS OR WALLS UNLESS NOTED OTHERWISE. ALL CONDUIT SHALL RUN PARALLEL OR PERPENDICULAR TO WALLS, FLOOR, CEILING, OR BEAMS. VERIFY EXACT ROUTING OF ALL EXPOSED CONDUIT WITH THE PROJECT MANAGER PRIOR TO INSTALLING.
- E. PVC CONDUIT MAY BE PROVIDED ONLY WHERE SHOWN, OR IN UNDERGROUND INSTALLATIONS. PROVIDE UV-RESISTANT CONDUIT WHERE EXPOSED TO THE ATMOSPHERE. PROVIDE GROUND CONDUCTOR IN ALL PVC RUINS; EXCEPT WHERE PERMITTED BY CODE TO OMIT.
- F. UNDERGROUND CONDUIT SHALL BE SCHEDULE 80 PVC CONDUIT AS REQUIRED BY LOCAL JURISDICTION
- 12. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENT ENGRAVED PLASTIC LABELS. BACKGROUND SHALL BE BLACK WITH WHITE LETTERS; EXCEPT AS REQUIRED BY CODE TO FOLLOW A DIFFERENT SCHEME.
- 13. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL. SUBMIT TEST REPORTS TO PROJECT MANAGER, GROUNDING SYSTEM RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY THE PROJECT MANAGER FOR FURTHER INSTRUCTION ON METHODS FOR REDUCING THE RESISTANCE VALUE.
- 14. COORDINATE WITH UTILITY COMPANY FOR CONNECTION OF TEMPORARY AND PERMANENT POWER TO THE SITE. THE TEMPORARY POWER AND ALL HOOKUP COSTS SHALL BE PAID BY THE CONTRACTOR.
- 15. VERIFY ALL EXISTING CIRCUITRY PRIOR TO REMOVAL AND NEW WORK. MAINTAIN POWER TO ALL OTHER AREAS & CIRCUITS NOT SCHEDULED FOR REMOVAL.

#### **GROUNDING NOTES:**

- 1. GROUNDING SHALL COMPLY WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE.
- 2. ALL GROUNDING DEVICES SHALL BE U.L. APPROVED OR LISTED FOR THEIR INTENDED USE.
- 3. ALL WIRES SHALL BE AWG THHN/THWN COPPER UNLESS NOTED OTHERWISE.
- GROUNDING CONNECTIONS TO GROUND RODS, GROUND RING WIRE, TOWER BASE AND FENCE POSTS SHALL BE EXCHERNIC ("CADWELDS") UNLESS NOTED OTHERWISE. CLEAN SURFACES TO SHINY METAL. WHERE GROUND WIRES ARE CADWELDED TO GALVANIZED SURFACES, SPRAY CADWELD WITH GALVANIZING PAINT.
- GROUNDING CONNECTIONS TO GROUND BARS ARE TO BE TWO-HOLE BRASS MECHANICAL CONNECTORS WITH STAINLESS STEEL HARDWARE (INCLUDING SCREW SET) CLEAN GROUND BAR TO SHINY METAL. AFTER MECHANICAL CONNECTION, TREAT WITH PROTECTIVE ANTIOXIDANT COATING.
- 6. GROUND COAXIAL CABLE SHIELDS AT BOTH ENDS WITH MANUFACTURER'S GROUNDING KITS.
- 7. ROUTE GROUNDING CONDUCTORS THE SHORTEST AND STRAIGHTEST PATH POSSIBLE. BEND GROUNDING LEADS WITH A MINIMUM 12" RADIUS.
- 8. INSTALL #2 AWG GREEN-INSULATED STRANDED WIRE FOR ABOVE GRADE GROUNDING AND #2 TINNED SOLID COPPER WIRE FOR BELOW GRADE GROUNDING UNLESS OTHERWISE NOTED.
- 9. REFER TO GROUNDING PLAN FOR GROUND BAR LOCATIONS. GROUNDING CONNECTIONS SHALL BE EXOTHERMIC TYPE ("CADWELDS") TO ANTENNA MOUNTS AND GROUND RING. REMAINING GROUNDING CONNECTIONS SHALL BE COMPRESSION FITTINGS. CONNECTIONS TO GROUND BARS SHALL BE MODE WITH TWO-LIE LUGS.
- 10. THE GROUND ELECTRODE SYSTEM SHALL CONSIST OF DRIVEN GROUND RODS POSITION ACCORDING TO GROUNDING PLAN. THE GROUND RODS SHALL BE 5/8"x10"-0" COPPER CLAD STEEL INTERCONNECTED WITH #2 TINNED SOLID COPPER WIRE BURIED 36" BELOW GRADE. BURY GROUND RODS A MAXIMUM OF 15' APART, AND A MINIMUM OF 6' APART.
- 11. IF ROCK IS ENCOUNTERED GROUND RODS SHALL BE PLACED AT AN OBLIQUE ANGLE NOT TO EXCEED 45'
- 12. EXOTHERMIC WELDS SHALL BE MADE IN ACCORDANCE WITH ERICO PRODUCTS BULLETIN A-AT OR EQUAL.
- 13. CONSTRUCTION OF GROUND RING AND CONNECTIONS TO EXISTING GROUND RING SYSTEM SHALL BE DOCUMENTED WITH PHOTOGRAPHS PRIOR TO BACKFILLING SITE. PROVIDE PHOTOS TO THE CONSTRUCTION MANAGER.
- 14. ALL GROUND LEADS EXCEPT THOSE TO THE EQUIPMENT ARE TO BE #2 TINNED SOLID COPPER WIRE. ALL EXTERIOR GROUND BARS TINNED COPPER.
- 15. PRIOR TO INSTALLING LUGS ON GROUND WIRES, APPLY THOMAS & BETTS KOPR-SHIELD (TM OF JET LUBE INC.). PRIOR TO BOLTING GROUND WIRE LUGS TO GROUND BARS, APPLY KOPR-SHIELD OR EQUAL.
- 16. ENGAGE AN INDEPENDENT ELECTRICAL TESTING FIRM TO TEST AND VERIFY THAT IMPEDANCE DOES NOT EXCEED FIVE OHMS TO GROUND BY MEANS OF "FAUL OF POTENTIAL TEST". TEST SHALL BE WITNESSED BY A REPRESENTATIVE, AND RECORDED ON THE "GROUND RESISTANCE TEST" FORM.
- 17. WHERE BARE COPPER GROUND WIRES ARE ROUTED FROM ANY CONNECTION ABOVE GRADE TO GROUND RING, INSTALL WIRE IN 3/4" PVC SLEEVE, FROM 1' BELOW GRADE AND SEAL TOP WITH SILICONE MATERIAL.
- 18. PREPARE ALL BONDING SURFACES FOR GROUNDING CONNECTIONS BY REMOVING ALL PAINT AND CORROSION DOWN TO SHINY METAL. FOLLOWING CONNECTION, APPLY APPROPRIATE ANTI-OXIDIZATION PAINT.
- 19. ANY SITE WHERE THE EQUIPMENT (BTS, CABLE BRIDGE, PPC, GENERATOR, ETC.) IS LOCATED WITHIN 6 FEET OF METAL FENCING, THE GROUND RING SHALL BE BONDED TO THE NEAREST FENCE POST USING (3) RUNS OF #2 BARE TINNED COPPER WIRE.

## **GROUNDING GUIDELINES:**

MUST BE GROUND TO A MAIN BUSS BAR OR HOME RUN GROUND FROM THE GROUND PIN OR STUD THAT IS ON THE CHASSIS. IF ANY EQUIPMENT HAS A GROUND POINT ON IT, IT SHOULD BE GROUND. THE GROUNDING CABLE SIZE SHOULD FOLLOW LOCAL GUIDELINES ON EQUIPMENT GROUNDING. NORMALLY THE STANDARD IS 6 UV RATED STRANDED GROUND CABLE TO BE USED ON RHH'S. THE LUG NEEDS TO FIT THE PROPER CABLE SIZE AS WELL AS THE HOLE SIZE FOR THE STUD, IT SHOULD BE A DONE HOLE LUG, IT HAS A FOLCE FOR TWO HOLE LUG THEN THAT SHOULD BE USED, (I.E. COMMSCOPE ION M HAS A SINGLE STUD GROUND, TE PRISM HAS A GROUND FOR A 2 HOLE LUG, DO NOT CUT THE LUGS TO FIT. THEY MAKE LUGS IN ALL SHAPES AND SIZES. ORDER THE CORRECT ONE AND ATTACH IT PROPERLY.

IN LINE GROUNDS SHOULD BE INSTALLED WITH THE PROPER SIZE GROUND KITS ON ALL COAX CABLES. THE KITS ARE INSTALLED ON FRONT AND BACK OF COAX RUNS OVER APPROXIMATELY 15 FEET. ANYTHING OVER 300 FEET NEEDS AN ADDITIONAL GROUND AROUND THE 150 FOOT MARK.

IF IT HAS A PLACE FOR A GROUND - GROUND IT.

#### MAST PIPES

ALL MAST PIPES SHOULD BE GROUND WITH BEAR METAL ON THE PLACE THE GROUND IS ATTACHED AND THEN COLD GALVANIZATION OVER THE BARE METAL TO PREVENT RUST. THE GROUND CAN BE ATTACHED MECHANICALLY OR AN EXOTHERMIC WELD (CAD WELD) MAY BE USED. IF THE MAST PIPE IS THE TALLEST POINT ON A BUILDING IT SHOULD ALSO HAVE A LIGHTNING ROD ATTACHED TO IT AS WELL.

#### DIPLEXERS/DUPLEXERS/SPLITTERS/PASSIVE COMPONENTS

ANY STRUCTURE OR FRAME SHOULD HAVE 2 GROUND WIRE, I.E. MAST PIPES, OUTDOOR ENCLOSURES, SHROUDS, BUSS BAR HOME RUN TO EARTH GROUND. ALL EQUIPMENT HAS 6 TO BUSS BARS.

ALL BUSS BARS NEED TO HAVE A LINK TO AN EARTH GROUND SYSTEM AND MUST BE ISOLATED IF MOUNTED ON ANYTHING THAT MAY RETAIN AN ELECTRIC CHARGE. NO EXCEPTIONS, ALL EQUIPMENT SHOULD RUN TO BUSS BARS, LUGS ON BUSS BARS SHOULD HAVE FRONT AND BACK FLAT WASHERS SANDWICHING THE LUG(S) TO THE BAR AND NOT OVERLAPPING CAUSING IT TO HOLD OR PIN DOWN OTHER LUGS ON THE BAR. THERE HOULD ALWAYS BE A LOCK WASHER CLOSEST TO THE NUT ON THE BOLT FOR A LUG, NEVER IS IT OK TO STACK LUGS ON TOP OF EACH OTHER. IF THERE IS NOT ENOUGH SPACE, GET A BIGGER BUSS BAR. THEY SHOULD ALL WAY A DIRECT CONTACT TO A BUSS BAR WITH NO-OX COATED BETWEEN THE LUG AND THE BUSS BAR. ALL GROUNDS SHOULD HAVE HEAT SHRINK OVER THE LUG (UNLESS IT'S NON-JACKETED WIRE), ALL LUGS NEED TO BE CRIMED ON SECURELY WITH THE PROPER DYE AND TOOL (NOT CHANNEL LOCK CRIMPED). THERE SHOULD BE NO MORE THAN 1/16 INCH BARE CABLE SHOWING (SHINER) BETWEEN THE JACKET AND THE LUG. INSIDE LUGS SHOULD HAVE CLEAR HEAT SHRINK TO INSPECT THE CRIMPS AND SHINERS. INSIDE LUGS SHOULD HAVE INSPECTION WINDOWS TO SHOW THE GROUND WIRE IS INSERTED INTO THE LUG ALL THE WAY AND IS PROPERLY INSTALLED. OUTDOOR LUGS MAY HAVE BLACK OR GREEN HEAT SHRINK.

#### **WEATHER SEAL GUIDELINES:**

- 1. PRE WRAP ALL CONNECTIONS WITH BLACK ELECTRICAL TAPE TO COVER ALL METAL SHOWING TO PREVENT DAMAGE TO CONNECTOR WHEN WEATHER SEAL IS TO BE REMOVED. 3/4 INCH OR 2 INCH TAPE CAN BE USED
- 3. WRAP SEALANT WITH 2 LAYERS OF 2 INCH TAP, (YOU CAN CUT INTO STRIPS IN TIGHT AREAS). FIRST WRAP SHOULD BE PULLED SMOOTH TO MAKE FINAL WRAPS CLEAN AND CRISP. 2ND WRAP SHOULD BE PULLED TIGHTER THAN FIRST TO HOLD SEALANT INTO PROPER (CONE LIKE) SHAPE. OVER LAPPING TAPE SHOULD COVER AT LEAST 50% OF EACH LAYER OF TAPE PRIOR.
- 4. UPON COMPLETION OF 2 LAYERS OF 2 INCH TAPE FINALIZE WITH AT LEAST 3 LAYERS OF 3/4 INCH TAPE. EACH WRAP OF TAPE SHOULD BE PULLED TIGHTER THAN WRAP BEFORE TO SQUEEZE SEALANT INTO A MOLD AND WILL PREVENT ANY SEALANT FROM LEAKING OUT THE SIDES OVER TIME. EACH LAYER SHOULD COVER PRIOR LAYERS AT LEAST 50%.
- 5. OVERLAP THE TAPE 50% OF THE PREVIOUS LAYER.
- 6. ALWAYS FINISH THE LAST WRAP OF TAPE GOING UP TO CREATE A SHINGLING OF THE TAPE SO IN THE WEATHER ANYTHING THAT RUNS DOWN THE CABLE WILL NOT LEAK INTO THE SEALANT. CUT THE END OF THE TAPE AND LAY IT ONTO THE FINISH. DO NOT STRETCH THE END OF THE TAPE. THIS WILL CAUSE THE TAPE TO PULL OFF OVER TIME AND CREATE A FLAGGING AFFECT.

- 1. CHECK TO MAKE SURE ALL CONNECTORS ARE TORQUED TO PROPER SPECIFICATIONS BEFORE YOU BEGIN.
- 2. NOTE: THIS STEP DOES NOT NEED A CURTSY WRAP BECAUSE THE TAPE DOES NOT ACTUALLY ADHERE TO THE CONNECTOR ITSELF BUT BINDS TO ITSELF. ALSO KNOWN AS "SELF-AMALGAMATING TAPE.
- 3. WRAP CONNECTIONS FUSION TAPE SEALANT WITH TWO LAYERS TO FORM A CONE LIKE SHAPE. FUSION TAPE MUST OVER LEAST 50% TO FORM A PROPER SEAL COVER ALL OF THE BARE METAL SHOWING (AT LEAST 1-1/2 INCH PAST END OF CONNECTOR.)
- 4. IF THIS "TAPE" IS NOT PULLED TIGHT WHILE WRAPPING YOU WILL NOT CREATE A PROPER SEAL, IT MUST BE STRETCHED TO CREATE BOND TO ITSELF.
- 5. WRAP AT LEAST 2 LAYERS OF 3/4 INCH TAPE. EACH LAYER SHOULD COVER AT LEAST 50% OF PREVIOUS TAPE
- 6. ALWAYS FINISH THE LAST WRAP OF TAPE GOING UP TO CREATE A SHINGLING OF THE TAPE SO IN THE WEATHER ANYTHING THAT RUNS DOWN THE CABLE WILL NOT LEAK INTO THE SEALANT. CUT THE END OF THE TAPE AND LAY IT ONTO THE FINISH. DO NOT STRETCH THE END OF THE TAPE. THIS WILL CAUSE THE TAPE TO PULL OFF OVER TIME AND CREATE A FLAGGING AFFECT.

- PRE WRAP ALL CONNECTIONS WITH BLACK ELECTRICAL TAPE TO COVER ALL METAL SHOWING TO PREVENT DAMAGE TO CONNECTOR WHEN WEATHER SEAL IS TO BE REMOVED. 3/4 INCH OR 2 INCH TAPE CAN BE USED FOR THIS PROCESS.
- 2. USE ONLY OUTDOOR RATED HEAT SHRINK THAT HAS THE SELF-ADHESIVE WHEN HEATED PROPERLY. THIS IS WHAT WILL CREATE THE SEAL TO THE CONNECTOR.
- 3. MAKE SURE HEAT SHRINK COVERS ALL OF THE COUPLERS AND CONNECTIONS. HEAT THE HEAT SHRINK TO SHRINK TIGHTLY TO THE CONNECTIONS AND CABLE. MAKE SURE THE HEAT SHRINK IS SEALED TOP AND BOTTOM OF THE CONNECTIONS. ALSO CHECK TO MAKE SURE HEAT SHRINK WAS NOT OVER HEATED AND THERE ARE NO BREAKS IN SEAL THROUGH-OUT THE SHRINK TUBING.

#### ANDREWS CLAM SHALL

- 1. PROPERLY TORQUE CONNECTOR TO SPECIFICATION.
- 2. APPLY ONE LAYER OF 3/4 INCH BLACK TAPE AROUND ENTIRE CONNECTOR ENDING AT LEAST 1-1/2 INCHES PAST TOP AND BOTTOM OF CONNECTOR TO PREVENT ANY MOISTURE FROM STICKING TO THE CONNECTOR.
- 3. INSPECT THE DEVICE TO MAKE SURE IT IS NOT CHIPPED, CRACKED OR ANY SIGNS OF NEGLECT THAT WILL TAKE AWAY FROM MAKING A FULL SEAL AROUND THE CONNECTOR.
- 4. USE ONLY CORRECT SIZE PER CABLE AND CONNECTOR TYPE I.E: 1/2 INCH FOR 1/2 INCH NOT 7/8TH FOR 1/2 INCH.
- FOLLOW DIRECTIONS THAT COME WITH PRODUCT MOST CLAM SHELL TYPE SEALANT DEVICES WRAP AROUND OR CLAMP AROUND A CONNECTION POINT.
- 6. BE CAREFUL WHEN SETTING LOCKING DEVICE INTO PLACE ON CLAM SHELL STYLE SEALANTS (THEY ARE PLASTIC AND TEND TO BREAK OR CRACK IN EXTREME WEATHER CONDITIONS WHEN LOCKING DEVICE CLOSED TO CREATE THE SEAL.) IF THE LOCKING MECHANISM CRACKS OR BREAKS, REPLACE IT. DO NOT TAPE THE CLAMP CLOSED OR TRY TO RE-ENGINEER IT.
- 7. ONCE THE CLAMP IS ON AND LOCKED AROUND THE CONNECTOR THE PROCESS IS COMPLETE.

- 1. PLACE BOOT OVER CABLE BEFORE CONNECTOR IS ATTACHED TO CABLE. THIS IS ONLY RATED FOR PPC TYPE CONNECTORS. (NOTE: IF THIS STEP IS SKIPPED OR NOT COMPLETED BEFORE MAKING A CONNECTOR THE SUBCONTRACTOR WILL NOT BE ABLE TO USE THE BOOT STYLE DEVICE TO SEAL THE CONNECTOR. IT IS NOT RECOMMENDED TO WASTE A CONNECTOR AND CUT IT OFF AND START AT STEP NO. 1 AGAIN. SINCE PPC CONNECTORS ARE NOT REUSABLE AND CAN GET QUITE EXPENSIVE. DO NOT TRY TO STRETCH THE BOOT TO SLIDE IT OVER THE CONNECTION.)
- 2. PLACE THE BOOT OVER THE CABLE, AND THEN MAKE THE CONNECTOR.
- 3. TORQUE THE CONNECTION TO PROPER SPECIFICATIONS.
- 4. SLIDE BOOT UP TO COVER THE ENTIRE CONNECTOR, FOLLOWING THE PPC GUIDELINES.
- 5. THIS PROCESS IS COMPLETE AT THIS TIME.



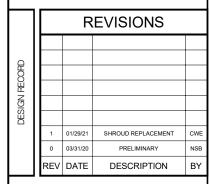


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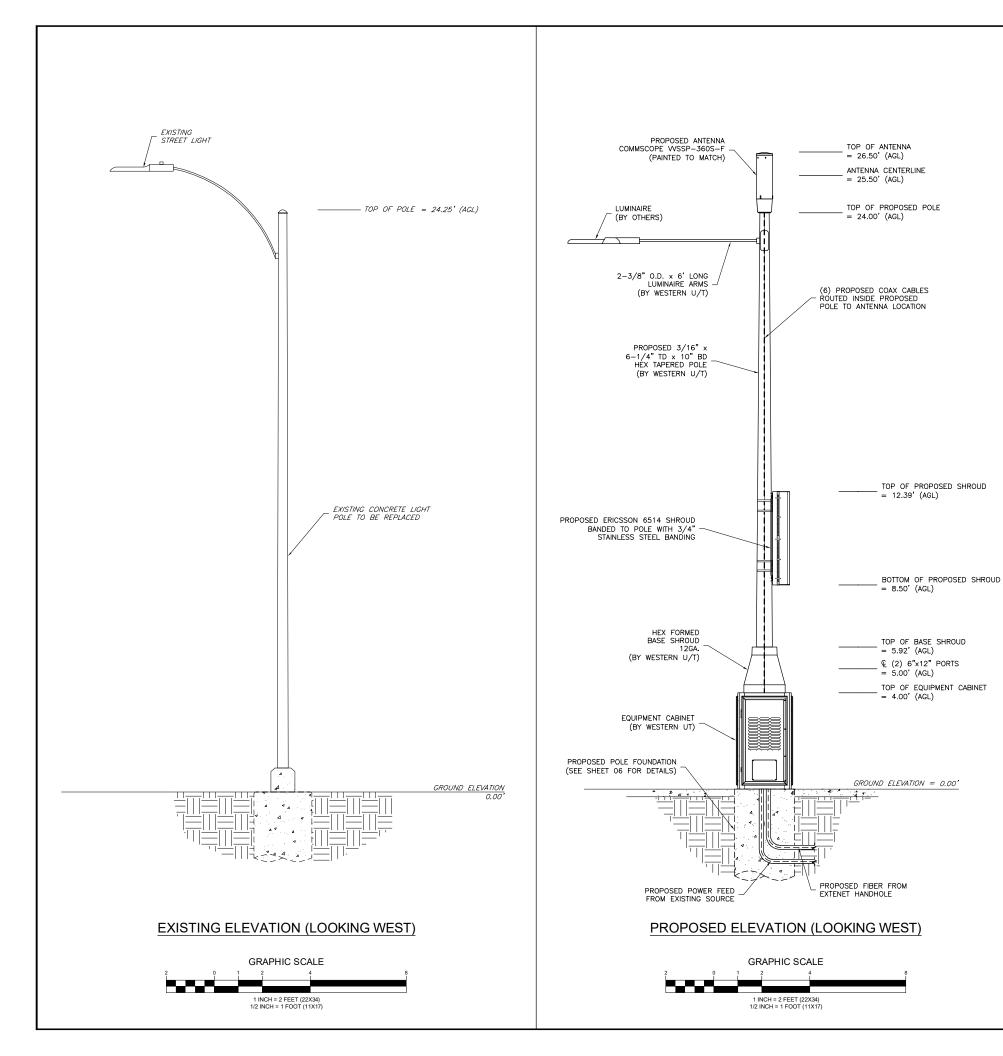
NE-MA-BSTN3N01-03127 TMO ID: NE3265BA 31LAB 147 BAY STATE ROAD BOSTON, MA 02215 SUFFOLK COUNTY



KRUPAKARAN KOLANDAIVELU P.F. MA PROFESSIONAL ENGINEER LIC. #50019

NOTES

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## **EXISTING CONDITIONS**

- 1. ALL MATERIALS WILL MATCH CURRENTLY EXISTING MATERIALS AND WHERE NEEDED ANY RF FRIENDLY MATERIAL WILL BE PAINTED TO MATCH.
- 2. IT IS ASSUMED THAT ALL PROPOSED UTILITIES WILL BE ROUTED BELOW GRADE TO THE PROPOSED INSTALLATION.
- EXTENET WILL PLACE SMALL PLACARD ON POLE IDENTIFYING OWNERSHIP/CONTACT INFORMATION DIRECTLY TO POLE OR EMBEDDED INTO THE POLE (NOT ATTACHED WITH A BAND), SHALL BE MADE OF BRASS OR BRONZE.
- 4. CONTRACTOR SHALL FIELD VERIFY SITE OR LAYOUT RESTRICTIONS, SITE CONDITIONS, DIMENSIONS, AND ELEVATIONS BEFORE START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF ENGINEER OF RECORD PRIOR TO BEGINNING PROJECT. ALL WORK SHALL BE PERFORMED USING ACCEPTED
- 5. NO FIELD MODIFICATIONS MAY BE MADE TO THE STRUCTURE WITHOUT THE EXPRESS WRITTEN CONSENT FROM THE ENGINEER OF RECORD. WESTERN UT, INC. AND ENGINEER OF RECORD ASSUME NO RESPONSIBILITY FOR THE STRUCTURE IF ALTERATIONS AND/OR ADDITIONS ARE MADE.
- 6. THE CONTRACTOR AND ALL SUBCONTRACTORS SHALL COMPLY WITH ALL LOCAL CODES, REGULATIONS, AND ORDINANCES AS WELL AS STATE DEPARTMENT OF INDUSTRIAL REGULATIONS AND DIVISION OF INDUSTRIAL SAFETY (OSHA)
- 7. THE CONTRACTOR SHALL SUPERVISE AND DIRECT ALL WORK TO THE BEST OF HIS/HER ABILITY AND SKILL. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, PROCEDURES, AND SEQUENCES, AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
- 8. THE CONTRACTOR SHALL VERIFY, COORDINATE, AND PROVIDE ALL NECESSARY BLOCKING, BACKING, FRAMING, HANGERS, OR OTHER SUPPORTS FOR ALL ITEMS REQUIRING SAME, WHETHER SHOWN OR NOT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY BRACING, SHORING, FORMWORK, ETC., AND SHALL CONFORM TO ALL NATIONAL, STATE, AND LOCAL ORDINANCES AND CODES IN ORDER TO SAFELY EXECUTE ALL STAGES OF WORK TO COMPLETE THIS PROJECT.
- 9. CONTRACTOR ASSUMES RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES. THIS REQUIREMENT APPLIES CONTINUOUSLY, AND IS NOT LIMITED TO NORMAL WORKING HOURS.
- 10. CONTRACTOR TO HOLD ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT.
- 11. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES, SHOWN OR NOT SHOWN. THE CONTRACTOR IS FINANCIALLY RESPONSIBLE FOR REPAIR OR REPLACEMENT OF UTILITIES OR OTHER PROPERTY DAMAGED IN CONJUNCTION WITH THE EXECUTION OF WORK ON THIS PROJECT.

TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC.

3030 WARRENVILLE ROAD, SUITE 340 (630) 505-3800

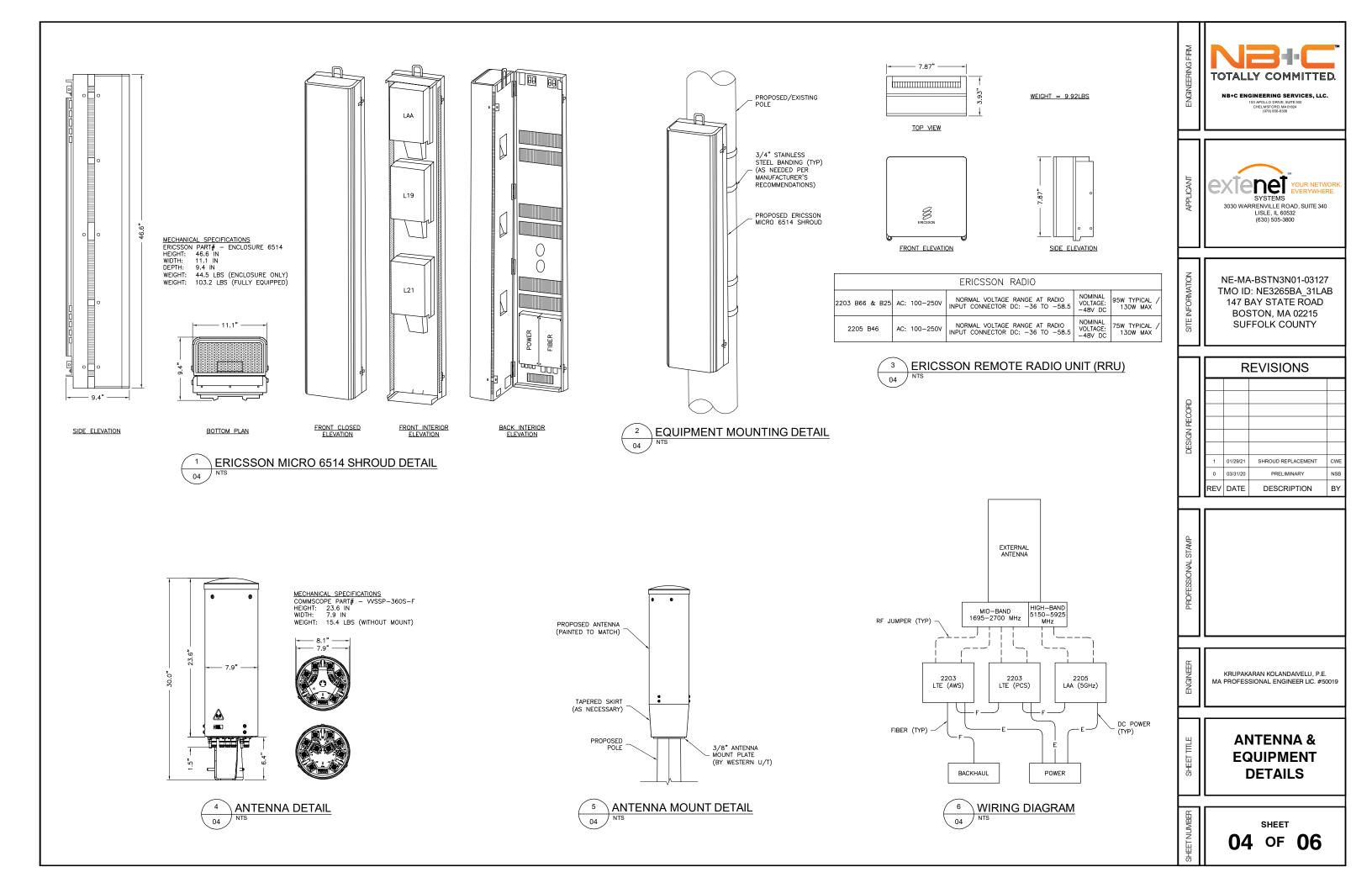
NE-MA-BSTN3N01-03127 TMO ID: NE3265BA\_31LAB 147 BAY STATE ROAD BOSTON, MA 02215 SUFFOLK COUNTY

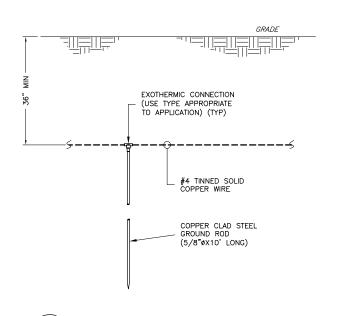
REVISIONS REV DATE

KRUPAKARAN KOLANDAIVELLI P.F. MA PROFESSIONAL ENGINEER LIC. #50019

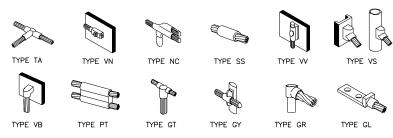
**ELEVATION** 

SHEET 03 of 06

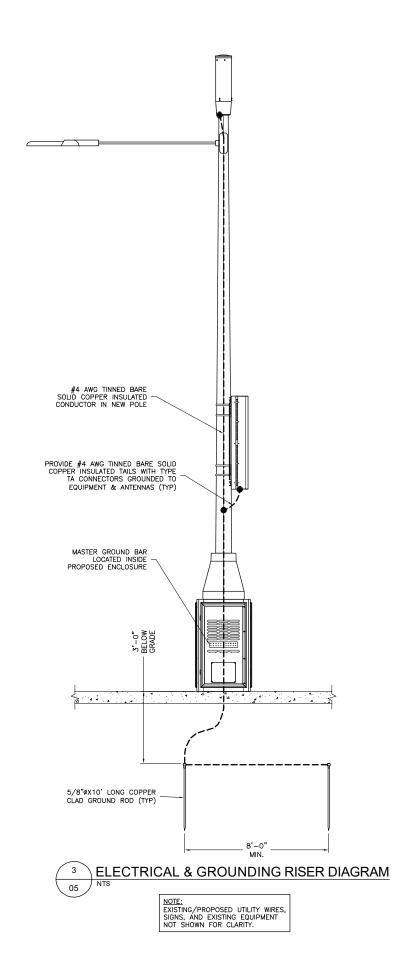




TYPICAL GROUND ROD DETAIL



<sup>2</sup> GROUNDING CONNECTION DETAILS



TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC.

3030 WARRENVILLE ROAD, SUITE 340 LISLE, IL 60532 (630) 505-3800

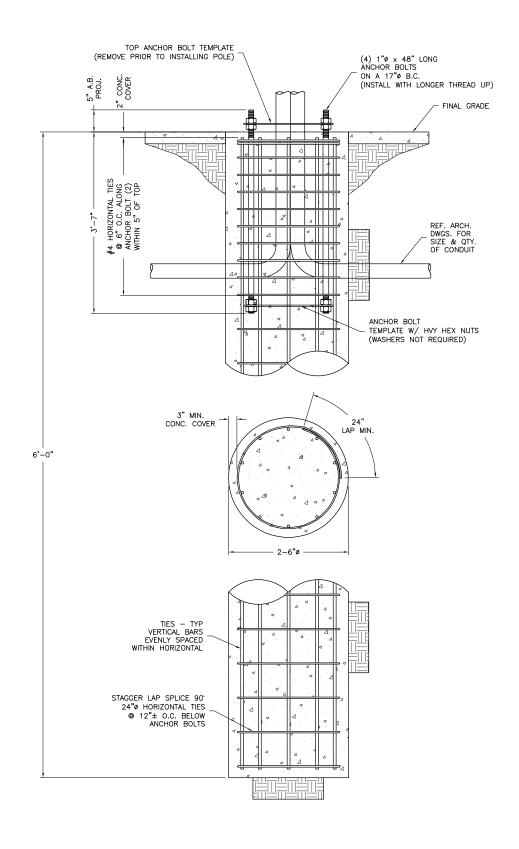
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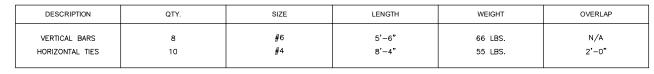
DESIGN RECORD	REVISIONS					
	1	01/29/21	SHROUD REPLACEMENT	CWE		
	0	03/31/20	PRELIMINARY	NSB		
	REV	DATE	DESCRIPTION	BY		

KRUPAKARAN KOLANDAIVELU. P.E. MA PROFESSIONAL ENGINEER LIC. #50019

**ELECTRICAL** & GROUNDING **DETAILS** 

SHEET 05 OF 06

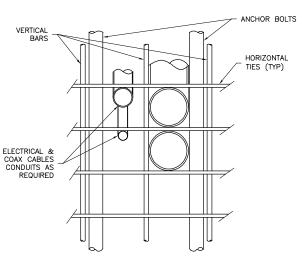




# VERTICAL REBAR DRILLED PIER HORIZONTAL TIE (TYP) REF. ARCH. DWGS. FOR SIZE & QTY. OF CONDUIT ANCHOR BOLT TEMPLATE O' TEMPLATE OUTLINE

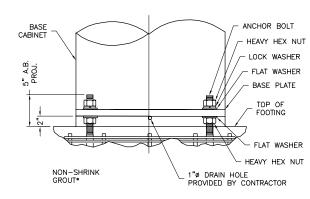
INSTALL CONDUIT IN CENTER OF CLUSTER TO CLEAR BASEPLATE

CONDUIT DETAIL @ PIER SEC. 06



ADJUST REBAR AS NEEDED TO ACCOMMODATE CONDUIT. SEE REINFORCEMENT SUMMARY FOR SIZE, QUANTITY AND LOCATION OF VERTICAL BARS AND HORIZONTAL TIES.





\*NON-SHRINK GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 6,000 PSI.

BASE PLATE SHALL NOT BE GROUTED UNTIL AFTER THE STRUCTURE HAS BEEN INSTALLED AND PLUMBED.



### **GENERAL NOTES**

- 1. CONTRACTOR IS RESPONSIBLE FOR CHECKING AREA FOR

- 1. CONTRACTOR IS RESPONSIBLE FOR CHECKING AREA FOR UNDERGROUND FACILITIES PRIOR TO EXCAVATING ANY MATERIALS.
  2. CONTRACTOR SHALL INSPECT AND REMOVE ALL DEBRIS FROM BOTTOM OF EXCAVATION.
  3. CONTRACTOR SHALL VERIFY ANCHOR BOLT LAYOUT PRIOR TO, AND IMMEDIATELY AFTER PLACING CONCRETE. ANCHOR BOLT LAYOUT IS CRITICAL FOR MONOPOLE INSTALLATION.
  4. CONTRACTOR SHALL USE AND PROVIDE DEFORMED REINFORCING BARS CONFORMING TO ASTM A615 GR. 60 (60,000 PSI MIN. YIELD). CONTRACTOR SHALL USE STEEL WIRE TO HOLD REINFORCING BARS TOGETHER IF WEIDING REFIARS IS PREFERRED. REINFORCING BARS TOGETHER. IF WELDING REBAR IS PREFERRED, SUBSTITUTE USING A706 GR. 60 DEFORMED BARS. S. CONTRACTOR SHALL USE AND PROVIDE CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI. CONCRETE SHALL USE 1"
- MAXIMUM STONE AGGREGATE MIX DESIGN: 6 1/2 SACKS OF CEMENT MINIMUM PER CUBIC YARD. 5" MINIMUM AND 7" MAXIMUM
- CEMENT MINIMUM PER CUBIC YARD. 5" MINIMÚM AND 7" MAXIMUM CONCRETE SLUMP.

  6. CONCRETE SHALL BE CONSOLIDATED USING VIBRATORY METHODS THROUGHOUT DEPTH OF FOUNDATION. VIBRATING LOWER DEPTHS MAY BE ACCOMPLISHED BY TOUCHING REBAR CAGE WITH VIBRATOR.

  7. CONTRACTOR SHOULD ANTICIPATE THE USE OF A FULL\_LENGTH TEMPORARY CASING TO STABILIZE THE EXCAVATION. THE CASING SHALL BE WITHDRAWN DURING THE PLACEMENT OF CONCRETE IN THE EXCAVATED HOLE. CONCRETE SHALL BE PLACED USING CONVENTIONAL METHODS TO MINIMIZE SEGREGATION OF CONCRETE AND AGGREGATE. CONCRETE SHALL NOT TREE FALL MORE THAN 5 FT. CONCRETTE SHALL POR TREE FALL MORE THAN 5 FT. CONCRETTE MAY BE PLACED BELOW WATER USING TERMIE
- AND AGGREGALE. CONCRETE SHALL NOT FREE FALL MORE THAN 5 FT. CONCRETE MAY BE PLACED BELOW WATER USING TREMIE METHODS.

  8. CONCRETE SHALL BE PLACED TO THE DEPTH INDICATED, AND THE ABOVE GRADE PORTION SHALL BE FORMED. THE REBAR CAGE, ANCHOR BOLTS, AND CONCRETE SHALL BE PLACED WITHIN 24 HOURS OF COMPLETING THE EXCAVATION. COLD JOINTS ARE NOT ALLOWER.
- ALLOWED.

  9. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ADEQUATE CONCRETE COVERAGE OVER REINFORCING BARS TO MINIMIZE CORROSION POTENTIAL. UNLESS OTHERWISE NOTED, CONTRACTOR SHALL USE 3" CONCRETE COVER OVER REBAR. TOP OF FOOTING SHALL BE TROWELLED LEVEL AND SMOOTH
- 10. DRILLED PIER FOUNDATION DESIGN PER 2009/2012 IBC, TABLE
- 1806.2, CLASS 4 MATERIAL.

  11. TOTAL VOLUME OF CONCRETE REQUIRED FOR THIS FOUNDATION IS APPROXIMATELY 1.1 CU. YDS.

# FACTORED BASE REACTIONS

18.1 ft-kips SHEAR = 1.51 kips VERTICAL = 0.57 kips

### SPECIAL INSPECTIONS

ITEM DESCRIPTION

SPECIAL INSPECTION: THE FOLLOWING ELEMENTS OF CONSTRUCTION SHALL REQUIRE SPECIAL INSPECTION PER 2009/2012 IBC, SECTION 1704

INSPECTION BY

MATERIAL

1.	PIER EXCAVATION LATERAL BEARING CAPACITY	SOILS ENGINEER	300 PSF/FT LATERAL
2.	PIER CONSTRUCTION REINFORCING STEEL BAR SIZES AND INSTALLATION	SPECIAL INSPECTOR	ASTM A615 GR. 60
3.	ANCHOR BOLTS BOLT SIZE AND LENGTHS INSTALLATION	SPECIAL INSPECTOR	ASTM F1554 GR. 55
4.	CONCRETE TEST SPECIMENS PLACEMENT OF CONCRETE	SPECIAL INSPECTOR	f'c=4,000 PSI TYPE II CEMEN

FOUNDATION DESIGN PREPARED BY WESTERN UTILITY/TELECOM, INC.



NB+C ENGINEERING SERVICES, LLC.



(630) 505-3800

NE-MA-BSTN3N01-03127 TMO ID: NE3265BA 31LAB 147 BAY STATE ROAD BOSTON, MA 02215

SUFFOLK COUNTY

**REVISIONS** SHROUD REPLACEMENT REV DATE DESCRIPTION

KRUPAKARAN KOLANDAIVELU P.F. MA PROFESSIONAL ENGINEER LIC. #50019

**FOUNDATION DETAILS & NOTES** 

SHEET OF **06**