

Y:/Drawings - 2019/Jacobs/Richmond/FirstNET/Summer 2019/CV376/CD's - REV 3/7/1.dwg 02-21-20 NPATL 13:11:36

| PROJECT INFORMATION |  |                    |   |
|---------------------|--|--------------------|---|
| SCOPE OF WORK:      | REMOVE/RELOCATE/INSTALL WIRELESS COMMUNICATIONS ANTENNAS, RRH'S, AND ASSOCIATED SUPPORT EQUIPMENT ON EXISTING ANTENNA MOUNT. INSTALL ASSOCIATED SUPPORT EQUIPMENT AT GROUND LEVEL AND ON EXISTING LTE RACK IN AN EXISTING EQUIPMENT SHELTER. REMOVE/RE-ROUTE/INSTALL ALL NECESSARY COAXIAL CABLES, JUMPERS, FIBER AND DC CABLES ROUTED FROM EQUIPMENT SHELTER ON GROUND LEVEL TO TOP OF TOWER. |                    |   |
| SITE ADDRESS:       | 527 WOODCHUCK LANE<br>CHARLOTTESVILLE, VA 22902  | NAME OF APPLICANT: | AT&T<br>4801 COX RD<br>GLEN ALLEN, VA 23060     |
| LATITUDE:           | N 37° 57' 46.40004"  |                    |   |
| LONGITUDE:          | W 78° 30' 59.92992"  |                    |   |
| JURISDICTION:       | ALBEMARLE COUNTY   | PROPERTY OWNER:    | ROSS, WALTER B TRUST & MARION W/<br>ROSS TRUST  |
| PARCEL ID:          | 09000-00-00-014B2  |                    | 527 WOODCHUCK LN.<br>CHARLOTTESVILLE, VA. 22902 |
| ZONING:             | MU-5A  |                    |   |
| GROUND ELEVATION:   | 740' (AMSL)  |                    |   |
| TOWER TYPE:         | MONOPOLE   |                    |   |
| FA#:                | 10122490   |                    |   |

THE DESIGN SHOWN IN THESE DRAWINGS IS BASED ON INFORMATION GATHERED FROM THE AT&T RFDS VERSION 3.00 UPDATED 02/21/2020

UTILITY INFORMATION

|        |                 |                |
|--------|-----------------|----------------|
| POWER: | DOMINION ENERGY | (866) 366-4357 |
| TELCO: | CENTURY LINK    | (855) 893-1284 |

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MAGNETIC DECLINATION

NOTE: MAGNETIC DECLINATION - 9.69° W ± 0.35° CHANGING BY 0.00° E PER YEAR AS OF 02/20/2020


NO WORK IS TO BE PERFORMED ON THIS SITE WITHOUT REVIEW OF THE APPROVED STRUCTURAL ANALYSIS, IF ANY DISCREPANCIES ARE FOUND THE GENERAL CONTRACTOR SHALL NOTIFY ENGINEER IN WRITING. AT NO TIME WILL ANY ADDITIONAL ANTENNAS BE INSTALLED WITHOUT WRITTEN CONSENT FROM TOWER ENGINEER.



**at&t**  
Mobility

**JACOBS**

**SITE #: CV376**  
**SITE NAME: AVON ST**  
**FA #: 10122490**  
**LTE 3C/4C/5C - ANTENNA & RRU ADD**



**Know what's below.**  
**Call before you dig.**

FOR MORE INFORMATION CONTACT THE STATE CORPORATION COMMISSION DIVISION OF UTILITY AND RAILROAD SAFETY


VIRGINIA UTILITY PROTECTION SERVICE, INC.  
CALL BEFORE YOU DIG:  
811 OR 1-800-552-7001

VICINITY MAP

**DIRECTION:**  
HEAD SOUTHWEST ON STANDARD DR 0.4 MI. TURN LEFT ONTO PARKWAY DR 72 FT. TURN RIGHT ONTO PARK CIR DR 0.4 MI. TURN LEFT ONTO COCA COLA DR 0.4 MI. TURN LEFT TO MERGE ONTO MD-100 E TOWARD GLEN BURNIE 0.3 MI. MERGE ONTO MD-100 E 0.2 MI. TAKE EXIT 9A FOR MD-295 S/BALT/WASH PARKWAY TOWARD WASHINGTON 0.5 MI. MERGE ONTO MD-295 S 2.1 MI. CONTINUE ONTO BALTIMORE-WASHINGTON PKWY 18.2 MI. USE THE RIGHT 2 LANES TO MERGE ONTO US-50 W/NEW YORK AVE NE TOWARD WASHINGTON 0.6 MI. TURN RIGHT ONTO MONTANA AVE NE 0.7 MI. CONTINUE ONTO 14TH ST NE 440 FT. TURN LEFT ONTO FRANKLIN ST NE 1.1 MI. TURN LEFT ONTO MICHIGAN AVE NE 0.8 MI. CONTINUE ONTO COLUMBIA RD NW DESTINATION WILL BE ON THE LEFT 0.8 MI.



SCALE: 1"=2000'(11X17)  
1"=1000'(24X36)

 NORTH

APPLICABLE BUILDING CODES AND STANDARDS

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.

ATT STANDARDS - ATT-TP 76300, ATT -+P 76416 & ATT UPDATES AS REQUIRED

BUILDING CODE: VIRGINIA UNIFORM STATEWIDE BUILDING CODE (VUSBC 2015)

ELECTRICAL CODE: NATIONAL ELECTRIC CODE 2014 (NEC 2014)

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

AMERICAN CONCRETE INSTITUTE (ACI) 318-11, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION.

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)  
TIA 222-G, STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES.  
TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS.

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)  
IEEE 81-2012, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM.  
RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT.  
IEEE C62.41.2, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE").

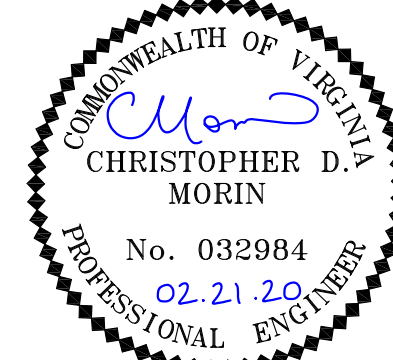
TELCORDIA, GR-1275, GENERAL INSTALLATION REQUIREMENTS.


ANSI T1.311, FOR TELECOM - DC POWER SYSTEMS - TELECOM, ENVIRONMENTAL PROTECTION.


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.

DRAWING APPROVAL SIGNATURES

|             |       |
|-------------|-------|
| JACOBS SA:  | DATE: |
| JACOBS A&E: | DATE: |
| JACOBS CM:  | DATE: |
| AT&T CM:    | DATE: |
| AT&T RF:    | DATE: |
| AT&T PM:    | DATE: |




|   |                |     |
|---|----------------|-----|
| AT&T PROJECTS   |                |     |
| TITLE SHEET   |                |     |
|  | DRAWING NUMBER | REV |
|   | T-1            | 3   |



**JACOBS**  
4801 COX RD SUITE 302  
GLEN ALLEN, VA 23060

CV376  
AVON ST  
10122490

SITE ADDRESS:  
527 WOODCHUCK LN.  
CHARLOTTESVILLE, VA 22902



4801 COX ROAD  
GLEN ALLEN, VA 23060

|        |          |                                   |           |       |           |
|--------|----------|-----------------------------------|-----------|-------|-----------|
| 3      | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME        | NP    | CDM       |
| 2      | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP        | NP    | CDM       |
| 1      | 11-08-19 | FINAL CONSTRUCTION DRAWINGS       | ME        | NP    | CDM       |
| 0      | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME        | NP    | CDM       |
| A      | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME        | NP    | CDM       |
| NO.    | DATE     | REVISIONS                         | BY        | CHK   | APP'D     |
| SCALE: | AS SHOWN | DESIGNED                          | MANASA E. | DRAWN | MANASA E. |



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GENERAL CONSTRUCTION NOTES:

- FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
  - GENERAL CONTRACTOR - JACOBS
  - SUBCONTRACTOR - CONTRACTOR (CONSTRUCTION)
  - OWNER - AT&T MOBILITY
- ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
- GENERAL CONTRACTOR AND SUBCONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR AND SUBCONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
- ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.
- ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, AFFURTANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
- THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ENGINEER PRIOR TO PROCEEDING.
- GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
- GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
- ERECTION SHALL BE DONE IN A WORKMAN-LIKE MANNER BY COMPETENT EXPERIENCED WORKMAN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
- SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. SUBCONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
- WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. SUBCONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
- SUBCONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
- THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
- THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
- GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND SUBCONTRACTORS TO THE SITE AND/OR BUILDING.
- THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
- THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
- THE GENERAL CONTRACTOR AND SUBCONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2A TO 2A10BC AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.
- ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO: A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.
- ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLOUGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
- THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
- SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
- NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
- THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL, PRE-APPROVED BY THE LOCAL JURISDICTION.
- ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
- ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
- SUBCONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS-BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
- SUBCONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
- THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
- OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
- NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
- ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE

WITH THE LATEST REVISION OF AT&T STANDARDS. IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.

- SUBCONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF SUBCONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
- SUBCONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
- INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
- NO WHITE STROBIC LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FMA STANDARDS AND REQUIREMENTS.
- ALL COAXIAL CABLE INSTALLATIONS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
- NO NOISE, SMOKE, DUST, ODOR, OR VIBRATIONS WILL RESULT FROM THIS FACILITY.
- NO ADDITIONAL PARKING TO BE PROPOSED. EXISTING ACCESS AND PARKING TO REMAIN.
- NO LANDSCAPING IS PROPOSED AT THIS SITE.

SITE WORK & DRAINAGE:

PART 1 - GENERAL

CLEARING, GRUBBING, STRIPPING, EROSION CONTROL, SURVEY, LAYOUT, SUBGRADE PREPARATION AND FINISH GRADING AS REQUIRED TO COMPLETE THE PROPOSED WORK SHOWN IN THESE PLANS.

1.1 REFERENCES:

- ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE).
- ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS).
- OSHA (OCCUPATION SAFETY AND HEALTH ADMINISTRATION).

1.2 INSPECTION AND TESTING:

- FIELD TESTING OF EARTHWORK COMPACTION AND CONCRETE CYLINDERS SHALL BE PERFORMED BY SUBCONTRACTOR'S INDEPENDENT TESTING LAB. THIS WORK TO BE COORDINATED BY THE SUBCONTRACTOR.
- ALL WORK SHALL BE INSPECTED AND RELEASED BY THE GENERAL CONTRACTOR WHO SHALL CARRY OUT THE GENERAL INSPECTION OF THE WORK WITH SPECIFIC CONCERN TO PROPER PERFORMANCE OF THE WORK AS SPECIFIED AND/OR CALLED FOR ON THE DRAWINGS. IT IS THE SUBCONTRACTOR'S RESPONSIBILITY TO REQUEST TIMELY INSPECTIONS PRIOR TO PROCEEDING WITH FURTHER WORK THAT WOULD MAKE PARTS OF WORK INACCESSIBLE OR DIFFICULT TO INSPECT.
- SITE MAINTENANCE AND PROTECTION:
  - PROVIDE ALL NECESSARY JOB SITE MAINTENANCE FROM COMMENCEMENT OF WORK UNTIL COMPLETION OF THE SUBCONTRACT.
- AVOID DAMAGE TO THE SITE AND TO EXISTING FACILITIES, STRUCTURES, TREES, AND SHRUBS DESIGNATED TO REMAIN. TAKE PROTECTIVE MEASURES TO PREVENT EXISTING FACILITIES THAT ARE NOT DESIGNATED FOR REMOVAL FROM BEING DAMAGED BY THE WORK.
- KEEP SITE FREE OF ALL PONDING WATER.
- PROVIDE EROSION CONTROL MEASURES IN ACCORDANCE WITH STATE DOT AND EPA REQUIREMENTS.
- PROVIDE AND MAINTAIN ALL TEMPORARY FENCING, BARRICADES, WARNING SIGNALS AND SIMILAR DEVICES NECESSARY TO PROTECT AGAINST THEFT FROM PROPERTY DURING THE ENTIRE PERIOD OF CONSTRUCTION. REMOVE ALL SUCH DEVICES UPON COMPLETION OF THE WORK.
- EXISTING UTILITIES: DO NOT INTERRUPT EXISTING UTILITIES SERVING FACILITIES OCCUPIED BY THE OWNER OR OTHERS. EXCEPT WHEN PERMITTED IN WRITING BY THE ENGINEER AND THEN ONLY AFTER ACCEPTABLE TEMPORARY UTILITY SERVICES HAVE BEEN PROVIDED.
- PROVIDE A MINIMUM 48-HOUR NOTICE TO THE ENGINEER AND RECEIVE WRITTEN NOTICE TO PROCEED BEFORE INTERRUPTING ANY UTILITY SERVICE.

PART 2 - PRODUCTS

- SUITABLE BACKFILL: ASTM D2321 (CLASS I, II, III OR IV) FREE FROM FROZEN LUMPS, REFUSE, STONES OR ROCKS LARGER THAN 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.
- NON-POROUS GRANULAR EMBANKMENT AND BACKFILL: ASTM D2321 (CLASS III, IV OR IVB) COARSE AGGREGATE, FREE FROM FROZEN LUMPS, REFUSE, STONES OR ROCKS LARGER THAN 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.
- POROUS GRANULAR EMBANKMENT AND BACKFILL: ASTM D2321 (CLASS IA, IB OR II) COARSE AGGREGATE FREE FROM FROZEN LUMPS, REFUSE, STONES OR ROCKS LARGER THAN 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.
- SELECT STRUCTURAL FILL: GRANULAR FILL MATERIAL MEETING THE REQUIREMENTS OF ASTM E850-95, FOR USE AROUND AND UNDER STRUCTURES WHERE STRUCTURAL FILL MATERIAL ARE REQUIRED.
- GRANULAR BEDDING AND TRENCH BACKFILL: WELL-GRADED SAND MEETING THE GRADATION REQUIREMENTS OF ASTM D2487 (SW OR SW-SM).
- COARSE AGGREGATE FOR ACCESS ROAD SUBBASE COURSE SHALL CONFORM TO ASTM D2480.
- UNSATURABLE MATERIAL: HIGH AND MODERATELY PLASTIC SILTS AND CLAYS (LL>45). MATERIAL CONTAINING REFUSE, FROZEN LUMPS, DEMOLISHED BITUMINOUS MATERIAL, VEGETATIVE MATTER, WOOD, STONES IN EXCESS OF 3 INCHES IN ANY DIMENSION, AND DEBRIS AS DETERMINED BY THE CONSTRUCTION MANAGER. TYPICAL THESE WILL BE SOILS CLASSIFIED BY ASTM AS PT, MH, CH, OH, ML, AND OL.
- GEOTEXTILE FABRIC: MIRAFI 500X OR APPROVED EQUAL.
- PLASTIC MARKING TAPE: SHALL BE ACID AND ALKALI RESISTANT POLYETHYLENE FILM SPECIFICALLY MANUFACTURED FOR MARKING AND LOCATING UNDERGROUND UTILITIES, 6 INCHES WIDE WITH A MINIMUM THICKNESS OF 0.004 INCH. TAPE SHALL HAVE MINIMUM STRENGTH OF 1500 PSI IN BOTH DIRECTIONS AND MANUFACTURED WITH INTEGRAL CONDUCTORS, FOL BACKING OR OTHER MEANS TO ENABLE DETECTION BY A METAL DETECTOR WHEN BURIED UP TO 3 FEET DEEP. THE METALLIC CORE OF THE TAPE SHALL BE ENCASED IN A PROTECTIVE JACKET OR PROVIDED WITH OTHER MEANS TO PROTECT IT FROM CORROSION. TAPE COLOR SHALL BE RED FOR ELECTRIC UTILITIES AND ORANGE FOR TELECOMMUNICATION UTILITIES.

PART 3 - EXECUTION

3.1 GENERAL:

- BEFORE STARTING GENERAL SITE PREPARATION ACTIVITIES, INSTALL EROSION AND SEDIMENT CONTROL MEASURES. THE WORK AREA SHALL BE CONSTRUCTED AND MAINTAINED IN SUCH CONDITION THAT IN THE EVENT OF RAIN THE SITE WILL BE DRAINED AT ANY TIME.
- BEFORE ALL SURVEY, LAYOUT, STAKING, AND MARKING, ESTABLISH AND MAINTAIN ALL LINES, GRADES, ELEVATIONS AND BENCHMARKS NEEDED FOR EXECUTION OF THE WORK.
- CLEAR AND GRUB THE AREA WITHIN THE LIMITS OF THE SITE. REMOVE TREES, BRUSH, STUMPS, RUBBISH AND OTHER DEBRIS AND VEGETATION RESTING ON OR PROTRUDING THROUGH THE SURFACE OF THE SITE AREA TO BE CLEARED.
- REMOVE THE FOLLOWING MATERIALS TO A DEPTH OF NO LESS THAN 12 INCHES BELOW THE ORIGINAL GROUND SURFACE: ROOTS, STUMPS, AND OTHER DEBRIS AND BRUSH. EMBEDDED IN OR PROTRUDING THROUGH THE GROUND SURFACE, RAKE, DISK OR PLOW THE AREA TO A DEPTH OF NO LESS THAN 6 INCHES, AND REMOVE TO A DEPTH OF 12 INCHES ALL ROOTS AND OTHER DEBRIS THEREBY EXPOSED.
- REMOVE TOPSOIL MATERIAL COMPLETELY FROM THE SURFACE UNTIL THE SOIL NO LONGER MEETS THE DEFINITION OF TOPSOIL. AVOID MIXING TOPSOIL WITH SUBSOIL OR OTHER UNSUITABLE MATERIALS.

- EXCEPT WHERE EXCAVATION TO GREATER DEPTH IS INDICATED, FILL DEPRESSIONS RESULTING FROM CLEARING, GRUBBING & DEMOLITION WORK COMPLETELY WITH SUITABLE FILL.
- REMOVE FROM THE SITE AND DISPOSE IN AN AUTHORIZED LANDFILL ALL DEBRIS RESULTING FROM CLEARING AND GRUBBING OPERATIONS. BURNING WILL NOT BE PERMITTED.
- PRIOR TO EXCAVATING, THOROUGHLY EXAMINE THE AREA TO BE EXCAVATED AND/OR TRENCHED TO VERIFY THE LOCATIONS OF FEATURES INDICATED ON THE DRAWINGS AND TO ASCERTAIN THE EXISTENCE AND LOCATION OF ANY STRUCTURE, UNDERGROUND STRUCTURE, OR OTHER ITEM NOT SHOWN THAT MIGHT INTERFERE WITH THE PROPOSED CONSTRUCTION. NOTIFY THE CONSTRUCTION MANAGER OF ANY OBSTRUCTIONS THAT WILL PREVENT ACCOMPLISHING THE WORK AS INDICATED ON THE DRAWINGS.
- SEPARATE AND STOCK PILE ALL EXCAVATED MATERIALS SUITABLE FOR BACKFILL. ALL EXCESS EXCAVATED AND UNSUITABLE MATERIALS SHALL BE DISPOSED OF OFF-SITE IN A LEGAL MANNER.
- BACKFILL:
  - AS SOON AS PRACTICAL, AFTER COMPLETING CONSTRUCTION OF THE RELATED STRUCTURE, INCLUDING EXPIRATION OF THE SPECIFIED MINIMUM CURING PERIOD FOR CAST-IN-PLACE CONCRETE, BACKFILL THE EXCAVATION WITH APPROVED MATERIAL TO RESTORE THE REQUIRED FINISHED GRADE.
  - PRIOR TO PLACING BACKFILL AROUND STRUCTURES, ALL FORMS SHALL BE REMOVED AND THE EXCAVATION CLEANED OF ALL TRASH, DEBRIS, AND UNSUITABLE MATERIALS.
  - BACKFILL BY PLACING AND COMPACTING SUITABLE BACKFILL MATERIAL OR SELECT GRANULAR BACKFILL MATERIAL WHEN REQUIRED IN UNIFORM HORIZONTAL LAYERS OF NO GREATER THAN 8 INCHES LOOSE THICKNESS AND COMPACTED, WHERE HAND OPERATED COMPACTORS ARE USED, THE FILL MATERIAL SHALL BE PLACED IN LIFTS NOT TO EXCEED 4 INCHES IN LOOSE DEPTH AND COMPACTED.
  - WHENEVER THE DENSITY TESTING INDICATES THAT THE CONTRACTOR HAS NOT OBTAINED THE SPECIFICATION REQUIREMENTS ARE MET UNLESS OTHERWISE AUTHORIZED BY THE GEOTECHNICAL ENGINEER, THE CONTRACTOR SHALL TAKE WHATEVER APPROPRIATE ACTION IS NECESSARY SUCH AS REWORKING AND DRYING OR ADDING WATER OR INCREASING THE COMPACTIVE EFFORT TO MEET THE MINIMUM COMPACTION REQUIREMENTS.
  - THOROUGHLY COMPACT EACH LAYER OF BACKFILL TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D 698.
- TRENCH EXCAVATION:
  - UTILITY TRENCHES SHALL BE EXCAVATED TO THE LINES AND GRADES SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE GENERAL CONTRACTOR. PROVIDE SHORING, SHEETING AND BRACING AS REQUIRED TO PREVENT CAVING OR SLOUGHING OF THE TRENCH WALLS.
  - EXTEND THE TRENCH WIDTH A MINIMUM OF 6 INCHES BEYOND THE OUTSIDE EDGE OF THE OUTERMOST CONDUIT.
  - WHEN SOFT YIELDING, OR OTHERWISE UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED, BACKFILL AT THE REQUIRED TRENCH TO A DEPTH OF NO LESS THAN 12 INCHES BELOW THE REQUIRED ELEVATION AND BACKFILL WITH GRANULAR BEDDING MATERIAL.
- TRENCH BACKFILL:
  - PROVIDE GRANULAR BEDDING MATERIAL IN ACCORDANCE WITH THE DRAWINGS AND THE UTILITY REQUIREMENTS.
  - NOTIFY THE GENERAL CONTRACTOR 24 HOURS IN ADVANCE OF BACKFILLING.
  - CONDUCT UTILITY CHECK TESTS BEFORE BACKFILLING. BACKFILL AND COMPACT TRENCH BEFORE ACCEPTANCE TESTING.
  - PLACE GRANULAR TRENCH BACKFILL UNIFORMLY ON BOTH SIDES OF THE CONDUITS IN 6-INCH UNCOMPACTED LIFTS UNTIL 12 INCHES OVER THE CONDUITS. SOLIDLY RAM AND TAMP BACKFILL INTO SPACE AROUND CONDUITS.
  - PROTECT CONDUIT FROM LATERAL MOVEMENT, IMPACT DAMAGE, OR UNBALANCED LOADING.
- ABOVE THE CONDUIT EMBEDMENT ZONE, PLACE AND COMPACT SATISFACTORY BACKFILL MATERIAL IN 8-INCH MAXIMUM LOOSE THICKNESS LIFTS TO RESTORE THE REQUIRED FINISHED SURFACE GRADE.
- COMPACT FINAL TRENCH BACKFILL TO A DENSITY EQUAL TO OR GREATER THAN THAT OF THE EXISTING UNDISTURBED MATERIAL, IMMEDIATELY ADJACENT TO THE TRENCH BUT NO LESS THAN A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D 698.

3.5 AGGREGATE ACCESS ROAD:

- CLEAR, GRUB, STRIP AND EXCAVATE FOR THE ACCESS ROAD TO THE LINES AND GRADES INDICATED ON THE DRAWINGS. SCARP TO A DEPTH OF 6 INCHES AND PROOF-ROLL. ALL HOLES, RUTS, SOFT PLACES AND OTHER DEFECTS SHALL BE CORRECTED.
- THE ENTIRE SUBGRADE SHALL BE COMPACTED TO NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE MODIFIED STANDARD PROCTOR TEST, ASTM D 1557.
- AFTER PREPARATION OF THE SUBGRADE IS COMPLETE THE GEOTEXTILE FABRIC (MIRAFI 500X) SHALL BE INSTALLED TO THE LIMITS INDICATED ON THE DRAWINGS BY ROLLING THE FABRIC OUT LONGITUDINALLY ALONG THE ROADWAY. THE FABRIC SHALL NOT BE DRAGGED ACROSS THE SUBGRADE. PLACE THE ENTIRE ROLL IN A SINGLE OPERATION, ROLLING OUT AS SMOOTHLY AS POSSIBLE.
- OVERLAPS PARALLEL TO THE ROADWAY WILL BE PERMITTED AT THE CENTERLINE AND AT LOCATIONS BEYOND THE ROADWAY SURFACE WIDTH (I.E. WITHIN THE SHOULDER WIDTH) ONLY. NO LONGITUDINAL OVERLAPS SHALL BE LOCATED BETWEEN THE CENTERLINE AND THE SHOULDER. PARALLEL OVERLAPS SHALL BE A MINIMUM OF 3 FEET WIDE.
- TRANSVERSE (PERPENDICULAR TO THE ROADWAY) OVERLAPS AT THE END OF A ROLL SHALL OVERLAP IN THE DIRECTION OF THE AGGREGATE PLACEMENT (PREVIOUS ROLL ON TOP) AND SHALL HAVE A MINIMUM LENGTH OF 3 FEET.
- ALL OVERLAPS SHALL BE PINNED WITH STAPLES OR NAILS A MINIMUM OF 10 INCHES LONG TO INSURE POSITIONING DURING PLACEMENT OF AGGREGATE. PIN LONGITUDINAL SEAMS AT 25 FOOT CENTERS AND TRANSVERSE SEAMS EVERY 5 FEET.
- THE AGGREGATE BASE AND SURFACE COURSES SHALL BE CONSTRUCTED IN LAYERS NOT MORE THAN 4 INCH (COMPACTED) THICKNESS. AGGREGATE TO BE PLACED ON GEOTEXTILE FABRIC SHALL BE END-DUMPED ON THE FABRIC FROM THE FREE END OF THE FABRIC OR OVER PREVIOUSLY PLACED AGGREGATE. THE FIRST LIFT SHALL BE BLAZED DOWN TO A THICKNESS OF 8 INCHES PRIOR TO COMPACTION. AT NO TIME SHALL EQUIPMENT, EITHER TRANSPORTING THE AGGREGATE OR GRADING THE AGGREGATE, BE PERMITTED ON THE ROADWAY WITH LESS THAN 4 INCHES OF MATERIAL COVERING THE FABRIC.
- THE AGGREGATE SHALL BE IMMEDIATELY COMPACTED TO NOT LESS THAN 95 PERCENT OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE PROCTOR TEST, ASTM D 1557 WITH A TAMING ROLLER, OR WITH A PNEUMATIC-TIRED ROLLER, OR WITH A VIBRATORY MACHINE OR ANY COMBINATION OF THE ABOVE. THE TOP LAYER SHALL BE GIVEN A FINAL ROLLING WITH A THREE-WHEEL OR TANDEN ROLLER.

3.6 FINISH GRADING:

- PERFORM ALL GRADING TO PROVIDE POSITIVE DRAINAGE AWAY FROM STRUCTURES AND SMOOTH, EVEN SURFACE DRAINAGE OF THE ENTIRE AREA WITHIN THE LIMITS OF CONSTRUCTION. GRADING SHALL BE COMPATIBLE WITH ALL SURROUNDING TOPOGRAPHY AND STRUCTURES.
- UTILIZE SATISFACTORY FILL MATERIAL RESULTING FROM THE EXCAVATION WORK IN THE CONSTRUCTION OF FILLS, EMBANKMENTS AND FOR REPLACEMENT OF REMOVED UNSUITABLE MATERIALS.
- ACHIEVE FINISHED GRADE BY PLACING A MINIMUM OF 4 INCHES OF 1/2" - 3/4" CRUSHED STONE ON TOP SOIL STABILIZER FABRIC.
- REPAIR ALL ACCESS ROADS AND SURROUNDING AREAS USED DURING THE COURSE OF THIS WORK TO THEIR ORIGINAL CONDITION.

3.7 ASPHALT PAVING ROAD:

- SECTION 400 - HOT ASPHALT MIX.
- SECTION 702 - BITUMINOUS MATERIALS.

CONCRETE WORK

PART 1 - GENERAL

1.1 SCOPE:

- FORM WORK, REINFORCING STEEL, ACCESSORIES, CAST-IN PLACE CONCRETE, FINISHING, CURING AND TESTING FOR STRUCTURAL CONCRETE FOUNDATIONS.

1.2 REFERENCES:

- ACI (AMERICAN CONCRETE INSTITUTE)
  - ACI 301 SPECIFICATIONS FOR STRUCTURAL CONCRETE.
  - ACI 304 GUIDE FOR MEASURING, MIXING, TRANSPORTING AND PLACING CONCRETE.
  - ACI 305 GUIDE TO HOT WEATHER CONCRETING.
  - ACI 308 STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING.
  - ACI 306 GUIDE TO CURING CONCRETING.
  - ACI 309 GUIDE FOR CONSOLIDATION OF CONCRETE.
  - ACI 318 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY.
  - ACI 347 GUIDE TO FORMWORK FOR CONCRETE.
- ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS). THE APPLICABLE STANDARDS OF THE AMERICAN SOCIETY FOR TESTING AND MATERIALS ARE LISTED IN THE ACI STANDARDS AND ARE A PART OF THIS SPECIFICATION.

PART 2 - PRODUCTS

2.1 REINFORCING MATERIALS:

- REINFORCING BARS: ASTM A615, GRADE 60, PROPOSED DEFORMED BILLET-STEEL BARS, PLAIN FINISH.
- FURNISH CHAIRS, BOLSTERS, BAR SUPPORTS, SPACERS AS REQUIRED FOR SUPPORT OF REINFORCING STEEL AND WIRE FABRIC.

2.2 CONCRETE MATERIALS:

- PORTLAND CEMENT SHALL BE TYPE II, CONFORMING TO ASTM C-150.
- AGGREGATE SHALL CONFORM TO ASTM C-33.
  - FINE AGGREGATE SHALL BE UNIFORMLY GRADED, CLEAN SHARP, WASHED NATURAL, OR CRUSHED SAND, FREE FROM ORGANIC IMPURITIES.
  - COARSE AGGREGATE SHALL BE NATURAL WASHED GRAVEL OR WASHED CRUSHED ROCK HAVING HARD, STRONG, DURABLE PIECES, FREE FROM ADHERENT COATINGS.
  - MAXIMUM SIZE OF COARSE AGGREGATE SHALL BE 3/4 INCH IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM C-33 GRADATION SIZE NO. 67.
- WATER USED IN CONCRETE MIX SHALL BE POTABLE, CLEAN, AND FREE FROM OILS, ACIDS, SALTS, CHLORIDES, ALKALI, SUGAR, VEGETABLE, OR OTHER DELETERIOUS SUBSTANCES.
- THE CONCRETE SHALL CONTAIN AN AIR-ENTRAINING ADMIXTURE COMPLYING WITH THE REQUIREMENTS OF ASTM C-260 AND ACI 212.1R AND A WATER-REDUCING ADMIXTURE COMPLYING WITH THE REQUIREMENTS OF ASTM C-494 AND ACI 212.1R. ADMIXTURES SHALL BE PURCHASED AND BATCHED IN LIQUID SOLUTION. THE USE OF CALCIUM CHLORIDE OR AN ADMIXTURE CONTAINING CALCIUM CHLORIDE IS PROHIBITED. ADMIXTURES SHALL BE OF THE SAME MANUFACTURER TO ASSURE COMPATIBILITY. ACCEPTABLE MANUFACTURERS ARE:
  - GRACE
  - SKA CORP.
  - BASF/MASTER BUILDERS
  - EMULSOL
  - APPROVED EQUAL
- CURING COMPOUND SHALL CONFORM TO ASTM C308, TYPE I, ID, CLASS A AND B AND ASTM C171 AS APPLICABLE.

2.3 CONCRETE MIX:

- PROPORTION CONCRETE MIX IN ACCORDANCE WITH REQUIREMENTS OF ACI 301. THE STRENGTH OF CONCRETE SHALL BE AS INDICATED ON THE DRAWINGS. WHERE STRENGTH IS NOT CLEARLY INDICATED, CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI.
- ALL CONCRETE SHALL BE 4% TO 6% AIR ENTRAINED.
- ALL STRUCTURAL CONCRETE SHALL CONTAIN A WATER-REDUCING AGENT.

PART 3 - EXECUTION

3.1 GENERAL:

- CONSTRUCT AND ERECT THE FORM WORK IN ACCORDANCE WITH ACI 301 AND ACI 347.
- COLD-WEATHER CONCRETING SHALL BE IN ACCORDANCE WITH ACI 308.
- HOT-WEATHER CONCRETING SHALL BE IN ACCORDANCE WITH ACI 305.

3.2 INSERTS, EMBEDDED COMPONENTS AND OPENINGS:

- CONTRACTOR SHALL CHECK ALL CIVIL, ARCHITECTURAL, STRUCTURAL AND ELECTRICAL DRAWINGS FOR OPENINGS, SLEEVES, ANCHOR BOLTS, INSERTS AND OTHER ITEMS TO BE BUILT INTO THE CONCRETE WORK.
- COORDINATE THE WORK OF OTHER SECTION IN FORMING AND SETTING OPENINGS. RECESSES, SLOTS, CHASES, ANCHORS, INSERTS AND OTHER ITEMS TO BE EMBEDDED.
- EMBEDDED ITEMS SHALL BE SET ACCURATELY IN LOCATION, ALIGNMENT, ELEVATION AND PLUMBNESS, LOCATE AND MEASURE FROM ESTABLISHED SURVEYED REFERENCE BENCHMARKS.
- EMBEDDED ITEMS SHALL BE ANCHORED INTO PLACE IN A MANNER TO PREVENT MOVEMENT DURING CONCRETE PLACEMENT AND CONSOLIDATION. COMPONENTS FORMING A PART OF A COMPLETE ASSEMBLY SHALL BE ALIGNED BEFORE ANCHORING INTO PLACE. PROVIDE TEMPORARY BRACING, ANCHORAGE, AND TEMPLATES AS REQUIRED TO MAINTAIN THE SETTING AND ALIGNMENT.

3.3 REINFORCEMENT PLACEMENT:

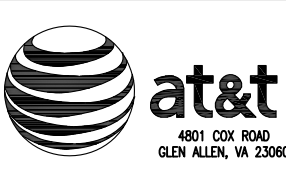
- PLACE REINFORCEMENT ACCORDING TO CHECKED AND RELEASED DRAWINGS AND IN ACCORDANCE WITH ACI 301 AND ACI 318.
- ACCURATELY POSITION, SUPPORT AND SECURE REINFORCEMENT AGAINST DISPLACEMENT FROM FORM WORK CONSTRUCTION OR CONCRETE PLACEMENT AND CONSOLIDATION. SUPPORT REINFORCING ON METAL CHAIRS, RUNNERS, BOLSTERS, SPACERS AND HANGERS.
- SPICES OF REINFORCING BARS SHALL BE CLASS B UNLESS SHOWN OTHERWISE ON THE DRAWINGS. SPICES SHALL BE STAGGERED. FULL DEVELOPMENT LENGTH SHALL BE PROVIDED ACROSS JOINTS.
- LOCATE REINFORCING TO PROVIDE CONCRETE COVER AND SPACING SHOWN ON THE DRAWINGS. MINIMUM COVER SHALL BE AS REQUIRED BY ACI 318.
- WELDING OF AND TO ANY REINFORCING MATERIALS INCLUDING TACK WELDING OF CROSSING BARS IS STRICTLY PROHIBITED.

3.4 CONCRETE PLACEMENT:

- PRIOR TO PLACING CONCRETE, THE FORMS AND REINFORCEMENT SHALL BE THOROUGHLY INSPECTED. ALL TEMPORARY BRACING, TIES AND CLEATS REMOVED. ALL OPENINGS FOR UTILITIES PROPERLY BOXED; ALL FORMS PROPERLY SECURED IN THEIR CORRECT POSITION AND MADE TIGHT. ALL REINFORCEMENT AND EMBEDDED ITEMS SHALL BE SECURED IN THEIR PROPER LOCATIONS. ALL OLD AND DRY CONCRETE AND DIRT SHALL BE CLEANED OFF AND ALL STANDING WATER AND OTHER FOREIGN MATERIAL REMOVED.
- PLACING CONCRETE SHALL BE IN ACCORDANCE WITH ACI 301 AND ACI 304 AND SHALL BE CARRIED OUT AT SUCH A RATE THAT THE CONCRETE PREVIOUSLY PLACED IS STILL PLASTIC AND INTEGRATED WITH THE FRESHLY PLACED CONCRETE. CONCRETING ONCE STARTED, SHALL BE CARRIED ON AS A CONTINUOUS OPERATION UNTIL THE SECTION IS COMPLETED. NO COLD JOINTS SHALL BE ALLOWED.
- ALL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED AND COMPACTED BY VIBRATION SPACING, RODDING, OR FORGING DURING THE OPERATION OF PLACING AND DEPOSITING IN ACCORDANCE WITH ACI 308. THE CONCRETE SHALL BE THOROUGHLY WORKED AROUND REINFORCEMENT, EMBEDDED ITEMS, AND INTO THE CORNER OF THE FORMS SO AS TO ELIMINATE ALL AIR AND STONE POCKETS.

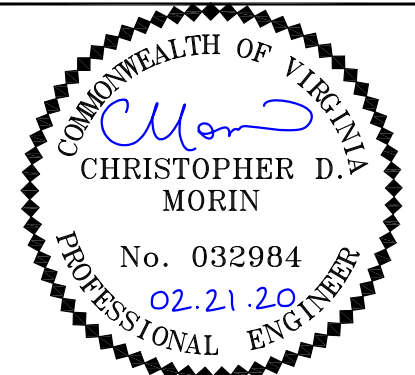


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AVON ST  
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SITE ADDRESS:  
527 WOODCHUCK LN.  
CHARLOTTESVILLE, VA 22902



|        |          |                                   |       |           |       |
|--------|----------|-----------------------------------|-------|-----------|-------|
| 3      | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME    | NP        | CDM   |
| 2      | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP    | NP        | CDM   |
| 1      | 11-08-19 | FINAL CONSTRUCTION DRAWINGS       | ME    | NP        | CDM   |
| 0      | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME    | NP        | CDM   |
| A      | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME    | NP        | CDM   |
| NO.    | DATE     | REVISIONS                         | BY    | CHK       | APP'D |
| SCALE: | AS SHOWN | DESIGNED MANASA E.                | DRAWN | MANASA E. |       |

|                |     |
|----------------|-----|
| AT&T PROJECTS  |     |
| GENERAL NOTES  |     |
| DRAWING NUMBER | REV |
| GN-1           | 3   |





3.5 FINISHING:

- A. FINISHING OF THE FLOOR SLABS SHALL BE IN ACCORDANCE WITH ACI 302.1 SECTION 7.2 WITH A MINIMUM OF THREE TROWELINGS. THE SLAB FINISH TOLERANCE AS MEASURED IN ACCORDANCE WITH ASTM E 1155 SHALL HAVE AN OVERALL TEST NUMBER FOR FLATNESS, FF=20 AND FOR LEVEL, FL=15. THE MINIMUM LOCAL NUMBER FOR FLATNESS, FF=15 AND FOR LEVEL, FL=10.

- B. SURFACE OF FLOOR SLAB SHALL RECEIVE TWO COATS OF CLEAR SEALER/HARDENER.

- C. ABOVE GRADE WALL SURFACES SHALL HAVE A SMOOTH FORM FINISH AS DEFINED IN CHAPTER 10 OF ACI 301.

3.6 CURING:

- A. FRESHLY DEPOSITED CONCRETE SHALL BE PROTECTED FROM PREMATURE DRYING AND EXCESSIVELY HOT AND COLD TEMPERATURES AND SHALL BE MAINTAINED WITH MINIMUM MOISTURE LOSS AT A RELATIVELY CONSTANT TEMPERATURE FOR A PERIOD OF TIME NECESSARY FOR THE HYDRATION OF THE CEMENT AND PROPER HARDENING OF THE CONCRETE.

- B. CONCRETE SHALL BE KEPT CONTINUOUSLY MOIST AT LEAST OVERNIGHT, IMMEDIATELY FOLLOWING THE INITIAL CURING, BEFORE THE CONCRETE HAS DRIED. ADDITIONAL CURING SHALL BE ACCOMPLISHED BY ONE OF THE FOLLOWING MATERIALS OR METHODS:
- PONDING OR CONTINUOUS SPRINKLING.
  - ABSORPTIVE MAT OR FABRIC KEPT CONTINUOUSLY WET.
  - NON-ABSORPTIVE FILM (POLYETHYLENE) OVER PREVIOUSLY SPRINKLED SURFACE.
  - SAND OR OTHER COVERING KEPT CONTINUOUSLY WET.
  - CONTINUOUS STEAM (NOT EXCEEDING 150 F) OR VAPOR MIST BATH.
  - SPRAYED-ON CURING COMPOUND APPLIED IN TWO COATS, SPRAYED IN PERPENDICULAR DIRECTIONS.

- C. THE FINAL CURING SHALL CONTINUE UNTIL THE CUMULATIVE NUMBER OF DAYS OR FRACTION THEREOF, NOT NECESSARILY CONSECUTIVE, DURING WHICH TEMPERATURE OF THE AIR IN CONTACT WITH CONCRETE IS ABOVE 50 DEGREES F HAS TOTALED SEVEN (7) DAYS. CONCRETE SHALL NOT BE PERMITTED TO FREEZE DURING THE CURING PERIOD. RAPID DRYING AT THE END OF THE CURING PERIOD SHALL BE PREVENTED.

STRUCTURAL STEEL

PART 1 -- GENERAL

1.1 SCOPE:

- A. PROVIDE FABRICATION AND ERECTION OF STRUCTURAL STEEL AND OTHER ITEMS AS SHOWN IN THE DRAWINGS OR REQUIRED BY OTHER SECTIONS OF THESE SPECIFICATIONS.

1.2 REFERENCES:

- A. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC). MANUAL OF STEEL CONSTRUCTION (13TH EDITION).
- B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).
- ASTM A36: STRUCTURAL STEEL.
  - ASTM A53: PIPE, STEEL, BLACK AND HOT DIPPED, ZINC-COATED WELDED AND SEAMLESS.
  - ASTM A108: STEEL BARS, CARBON, COLD FINISHED, STANDARD QUALITY.
  - ASTM A123: ZINC (HOT-DIPPED GALVANIZED) COATING ON IRON AND STEEL PRODUCTS.
  - ASTM A307: CARBON STEEL BOLTS AND STUDS, 60,000 PSI TENSILE STRENGTH.
  - ASTM A325: HIGH-STRENGTH BOLT FOR STRUCTURAL STEEL JOINTS.
  - ASTM A490: HEAT-TREATED, STRUCTURAL STEEL BOLTS, 150 (KSI) (1035MPA) TENSILE STRENGTH.
  - ASTM A500: COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES.
  - ASTM A563: CARBON AND ALLOY STEEL NUTS.
  - ASTM B695: COATINGS OF ZINC MECHANICALLY DEPOSITED ON IRON AND STEEL.
  - ASTM F436: HARDENED STEEL WASHERS.
  - ASTM F959: COMPRESSIBLE-WASHER-TYPE DIRECT TENSION INDICATOR FOR USE WITH STRUCTURAL FASTENERS.

- C. AMERICAN WELDING SOCIETY (AWS):
- AWS A5.1: COVERED CARBON STEEL ARC WELDING ELECTRODES.
  - AWS A5.5: LOW ALLOY STEEL COVERED ARC WELDING ELECTRODES.
  - AWS D1.1: STRUCTURAL WELDING CODE -- STEEL.

- D. RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RSCC): "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS OR ASTM A490 BOLTS" AS ENDORSED BY AISC.

- E. STEEL STRUCTURES PAINTING COUNCIL (SSPC):
- SSPC-SP3: POWER TOOL CLEANING.
  - SSPC-PAINT 11: RED IRON OXIDE, ZINC CHROME, RAW LINSEED OIL OR ALKYD PAINT.

1.3 SUBMITTALS:

- A. SUBMIT THE FOLLOWING FOR APPROVAL:

- B. FABRICATION AND ERECTION DRAWINGS SHOWING ALL DETAILS, CONNECTIONS, MATERIAL DESIGNATIONS, AND ALL TOP STEEL ELEVATIONS.

- C. WELDERS SHALL BE QUALIFIED AS PRESCRIBED IN AWS D1.1.

PART 2 -- PRODUCTS

2.1 STRUCTURAL STEEL:

- A. SHAPES, PLATES AND BARS SHALL CONFORM TO ASTM A36 AND ASTM A992.

- B. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B. STEEL PIPE SHALL CONFORM TO ASTM A53, TYPE E OR S, GRADE B.

2.2 ANCHOR BOLTS:

- A. ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 GRADE 36.

2.3 BOLTS:

- A. HIGH STRENGTH BOLT SHALL CONFORM TO ASTM A325, ONE HIGH STRENGTH BOLT ASSEMBLY SHALL CONSIST OF A HEAVY HEX STRUCTURAL BOLT, A HEAVY HEX NUT, A HARDENED WASHER CONFORMING WITH ASTM F436 AND A DIRECT TENSION INDICATOR CONFORMING WITH STM F959. THE HARDENED WASHER SHALL BE INSTALLED AGAINST THE ELEMENT TURNED IN TIGHTENING

2.4 WELDING ELECTRODES:

- A. WELDING ELECTRODES SHALL COMPLY WITH AWS D1.1 USING A5.1 OR A5.5 E70XX AND SHALL BE COMPATIBLE WITH THE WELDING PROCESS SELECTED.

2.5 PRIMER:

- A. PRIMER SHALL BE RED OXIDE-CHROMATE PRIMER COMPLYING WITH SSPC PAINT SPECIFICATION NO. 11.

2.6 STEEL GRATING:

- A. BEARING BARS FOR STEEL GRATING SHALL BE OF RECTANGULAR SECTION AND CONFORM TO ASTM A1011 HOT ROLLED CARBON STEEL SHEET AND STRIP. BEARING BARS SHALL BE SPACED 1 3/16" O.C.

- B. CROSS BARS SHALL BE OF ASTM A510 CARBON STEEL RODS AND COURSE ROUND WIRE. CROSS BARS SHALL BE TWISTED WIRE ROD SPACED AT 4" O.C.

- C. STEEL GRATING EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED.

D. PART 3 -- EXECUTION

3.1 FABRICATION:

- A. SHOP FABRICATE AND ASSEMBLY MATERIALS AS SPECIFIED HEREIN.

- B. FABRICATE ITEMS OF STRUCTURAL STEEL IN ACCORDANCE WITH THE AISC SPECIFICATION, AND AS INDICATED ON THE APPROVED SHOP DRAWINGS.

- C. ALL EXPOSED STRUCTURAL STEEL TO WEATHER SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123.

- D. PROPERLY MARK AND MATCH-MARK MATERIALS FOR FIELD ASSEMBLY AND FOR IDENTIFICATION AS TO LOCATION FOR WHICH INTENDED.

- E. FABRICATE AND DELIVER IN A SEQUENCE WHICH WILL EXPEDITE ERECTION AND MINIMIZE FIELD HANDLING OF MATERIALS.

- F. WHERE FINISHING IS REQUIRED, COMPLETE THE ASSEMBLY, INCLUDING THE WELDING OF UNITS, BEFORE START OF FINISHING OPERATIONS.

- G. UPON COMPLETION OF ERECTION INSPECT ALL GALVANIZED STEEL AND PAINT ANY FIELD CUTS, WELDS, OR GALVANIZED BREAKS WITH ZINC BASED PAINT.

- H. PROVIDE CONNECTIONS AS SPECIFIED HEREIN:

- I. PROVIDE BOLTS AND WASHERS OF TYPES AND SIZE REQUIRED FOR COMPLETION OF FIELD ERECTION. USE 3/4 INCH DIAMETER A325 BOLTS UNLESS NOTED OTHERWISE.

- J. INSTALL HIGH STRENGTH THREADED FASTENERS IN ACCORDANCE WITH RSCC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS."

- K. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1 FOR PROCEDURES, APPEARANCE, QUALITY OF WELD, AND METHODS USED IN CORRECTING WELDED WORK.

- L. THE FABRICATOR SHALL FURNISH AND INSTALL ERECTION CLIPS FOR FIT-UP OF WELDED CONNECTIONS.

- M. GUSSET AND STIFFENER PLATES SHALL BE 3/8 INCH THICK MINIMUM.

3.2 PRIMING:

- A. STRUCTURAL STEEL SHALL BE PRIMED AS SPECIFIED HEREIN, UNLESS SHOWN OTHERWISE ON THE DRAWINGS.

- B. STRUCTURAL STEEL SURFACE PREPARATION SHALL CONFORM TO SSPC-SP3, "POWER TOOL CLEANING."

- C. SURFACE PREPARATION AND PRIMER SHALL BE IN ACCORDANCE WITH AISC CODE OF STANDARD PRACTICE.

- D. MATERIALS SHALL REMAIN CLOSED UNTIL REQUIRED FOR USE, MANUFACTURER'S POST-LIFE REQUIREMENTS SHALL BE STRICTLY ADHERED TO.

- E. PRIMER SHALL BE APPLIED TO DRY, CLEAN, PREPARED SURFACE AND UNDER FAVORABLE CONDITIONS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. UNLESS OTHERWISE RECOMMENDED BY THE MANUFACTURER PRIMING SHALL NOT BE DONE WHEN AMBIENT TEMPERATURE IS LESS THAN 50 DEGREES F, THE RELATIVE HUMIDITY IS MORE THAN 90 PERCENT, OR THE SURFACE TEMPERATURE IS LESS THAN 5 DEGREES F ABOVE THE DEW POINT.

- F. GENERALLY ALL PRIMER SHALL BE SPRAY APPLIED. BRUSH OR ROLLER APPLICATION SHALL BE RESTRICTED TO TOUCH UP AND TO AREAS NOT ACCESSIBLE BY SPRAY GUN.

- G. PRIMER SHALL BE UNIFORMLY APPLIED WITHOUT RUNS, SAGS, SOLVENT BLISTERS, DRY SPRAY OR OTHER DEFECTS. ALL BLEMISHES AND OTHER IRREGULARITIES SHALL BE REPAIRED OR REMOVED AND THE AREA RE-COATED. SPECIAL ATTENTION SHALL BE PAID TO CREVICES, WELD LINES, BOLT HEADS, CORNERS, EDGES, ETC., TO OBTAIN THE REQUIRED NOMINAL FILM THICKNESS.

- H. THE DRY FILM THICKNESS OF THE PRIMER SHALL BE 2.0 MILS.

- I. IF THE PRIMER IS DAMAGED BY WELDING OR PHYSICAL ABUSE, THE AREA SHALL BE TOUCHED-UP AND REPAIRED. THE TOUCHUP PAINT SHALL BE COMPATIBLE WITH THE APPLIED PRIMER WITH MINIMUM DRY FILM THICKNESS OF 1.5 MILS.

3.3 INSTALLATION:

- A. INSTALLATION OF STRUCTURAL STEEL SHALL COMPLY WITH AISC "CODE OF STANDARD PRACTICE."

- B. STRUCTURAL FIELD WELDING SHALL BE DONE BY THE ELECTRIC SUBMERGED OR SHIELDED METAL ARC PROCESS. WELDED CONSTRUCTION SHALL COMPLY WITH AWS D1.1.

- C. SPLICE MEMBERS ONLY WHERE INDICATED ON THE DRAWINGS.

- D. ANY GAS CUTTING TORCHES HAVE TO BE APPROVED IN WRITING BY THE PROJECT STRUCTURAL ENGINEER.

- E. PROVIDE TEMPORARY SHORING BRACING WITH CONNECTIONS OF SUFFICIENT STRENGTH TO BEAR IMPOSED LOADS. REMOVE TEMPORARY CONNECTIONS AND MEMBERS WHEN PERMANENT MEMBERS ARE IN PLACE AND THE FINAL CONNECTIONS HAVE BEEN MADE.

- F. ALIGN AND ADJUST MEMBERS, AND OTHER SURFACES WHICH WILL BE IN PERMANENT CONTACT, BEFORE ASSEMBLY.

- G. INSTALL AND FULLY TENSION HIGH STRENGTH THREADED FASTENERS IN ACCORDANCE WITH RSCC, "SPECIFICATIONS FOR STRUCTURAL JOINT USING ASTM A325 OR ASTM A490 BOLTS."

ELECTRICAL NOTES

PART 1 -- GENERAL

1.1 GENERAL CONDITIONS:

- A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE SUBCONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.

- B. THE SUBCONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE FOR THE WORK UNDER THIS SECTION.

- C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE SUBCONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES:

- A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.

1.3 REFERENCES:

- A. THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.

- AWS/ECE (AMERICAN NATIONAL STANDARDS INSTITUTE)
- ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
- ICE (INSULATED CABLE ENGINEERS ASSOCIATION)
- NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
- NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
- OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
- UL (UNDERWRITERS LABORATORIES, INC.)
- AT&T GROUNDING STANDARD ND-00071

1.4 SCOPE OF WORK:

- A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND BE OPERATIONAL.

- B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE SUBCONTRACTOR

- C. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.

- D. THE SUBCONTRACTOR SHALL FURNISH TO THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

- E. THE SUBCONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS

CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PART 2 -- PRODUCTS

2.1 GENERAL:

- A. ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.

- B. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

- C. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

- D. ALL OVER-CURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING EQUAL TO OR GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AC MINIMUM. VERY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT.

2.2 MATERIALS AND EQUIPMENT:

A. CONDUIT:

- RIGID METAL CONDUIT (RMC) SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
- LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.
- CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE TIGHT TYPE. GROUNDING BUSHINGS WITH INSULATED THROATS SHALL BE INSTALLED ON ALL CONDUIT TERMINATIONS.
- NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.

B. CONDUCTORS AND CABLE:

- CONDUCTORS AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/TW--2, 600 VOLT, SIZE AS INDICATED, 12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED.
- 10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND 8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
- SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.
- STRAIN-RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL.
- CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER'S RECOMMENDATIONS.
- ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J-BOXES, EQUIPMENT AND CABINETS AND SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).

C. DISCONNECT SWITCHES:

- DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE-D OR APPROVED EQUAL.

D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:

- INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM 2 AWG CU EXOTHERMALLY WELDED PITTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(\*)CS OR K2L-(\*)CS (\*) LENGTH AS REQUIRED.
- GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHER" HOLES, KIT MODEL #48-22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMINCO NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS ID NUMBERING, AND THE ELECTRICAL POWER SOURCE.
- BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.

E. SYSTEM GROUNDING:

- LL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE 2 AWG BARE, SOLID, TINNED, COPPER. ABOVE GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.
- GROUNDING BUSES SHALL BE BARE, TINNED, ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MORE SHALL BE TIGHTEN CONNECTIONS TO COMPLY WITH THE SUBCONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.
- CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS.
- EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
- GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLDED WELDED TO CORE. 5/8"x10"-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.
- INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.

F. OTHER MATERIALS:

- THE SUBCONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.
- PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.

- G. PANELS AND LOAD CENTERS:

- ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN.

PART 3 -- EXECUTION

3.1 GENERAL:

- A. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

- B. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORKMANSHIP:

- A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIRE MEN, IN A NEAT AND WORKMAN-LIKE MANNER.

- B. ALL ELECTRICAL EQUIPMENT SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE SUBCONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.

- C. UPON COMPLETION OF WORK, THE SUBCONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

- A. THE SUBCONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER-FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

A. CONDUIT:

- ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
- PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, RMC OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.
- THE INSTALLATION OF SCHEDULE 40 PVC AND RMC CONDUITS SHALL BE 24 INCHES MINIMUM DEPTH. ALL 90 DEGREE BENDS SHALL BE RMC. EXPANSION JOINTS ARE REQUIRED ON ALL CONDUIT RISERS.
- USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORT TO ALLOW FOR EXPANSION AND CONTRACTION.
- A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE QUARTER-BENDS. CONDUIT BEND SHALL BE MADE WITH THE

- UL LISTED BENDER OR FACTORY 90 DEGREE LBOWS MAY BE USED.
- FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REPAIR TO PROVIDE A SMOOTH INSIDE SURFACE.
- PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
- SUBCONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. SUBCONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
- ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.
- INSTALL PULL STRINGS IN CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
- INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
- CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
- PROTECT CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.

B. CONDUCTORS AND CABLE:

- ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:

| DESCRIPTION | 208/240/120 VOLT SYSTEMS |
|-------------|--------------------------|
| PHASE A     | BLACK                    |
| PHASE B     | RED                      |
| PHASE C     | BLUE                     |
| NEUTRAL     | WHITE                    |
| GROUNDING   | GREEN                    |

- SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDULETS APPROVED FOR THIS PURPOSE.
- PULLING LUBRICANTS SHALL BE UL APPROVED. SUBCONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
- CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES & EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS ARE PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE SUBCONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

- INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS INDICATED.

D. GROUNDING:

- ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING STANDARD ND-00071, ND-00135, AND THE NATIONAL ELECTRICAL CODE.
- PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES REQUIRED FOR A COMPLETE INSTALLATION.
- ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RESES.
- BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE SUBCONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP. TOWERS AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).
- TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
- SUBCONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
- APPLY CORROSION-RESISTANCE FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE COPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.
- A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
- BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE 6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
- DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.
- ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
- THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
- DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
- IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUNDING BAR AT THE BASE OF THE TOWER, A SECOND GROUNDING BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTERS.
- SUBCONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE SUBCONTRACTORS EXPENSE.

3.5 ACCEPTANCE TESTING:

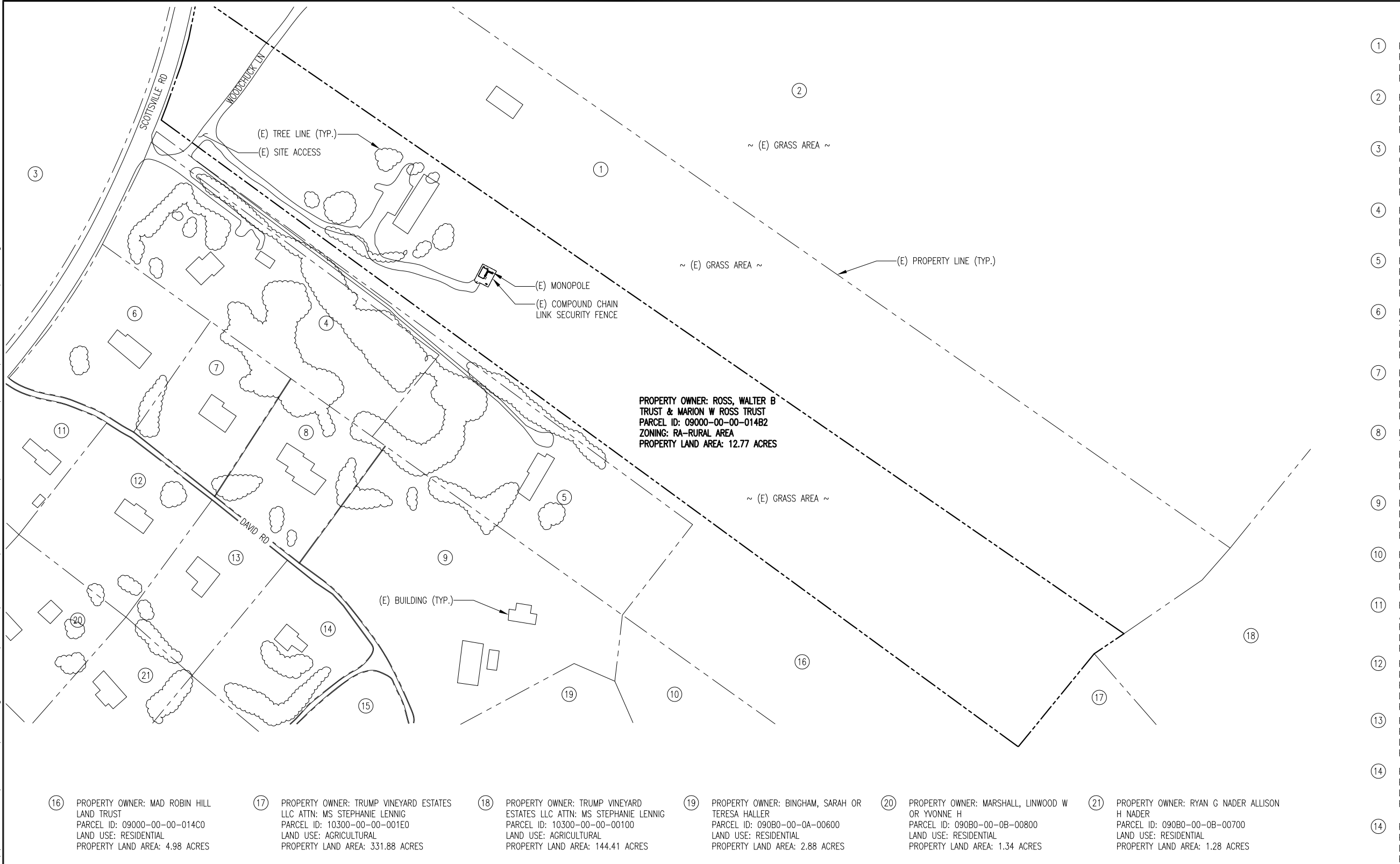
- A. CERTIFIED PERSONNEL, USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION.

- B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE.

C. TEST PROCEDURES:

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SITE PLAN  
SCALE: 1"=200' (11x17)  
SCALE: 1"=100' (24x36)



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CV376  
AVON ST  
10122490

SITE ADDRESS:  
527 WOODCHUCK LN.  
CHARLOTTESVILLE, VA 22902

**at&t**

4801 COX ROAD  
GLEN ALLEN, VA 23060

|                 |          |                                   |                 |     |       |
|-----------------|----------|-----------------------------------|-----------------|-----|-------|
| 3               | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| 2               | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP              | NP  | CDM   |
| 1               | 11-08-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| 0               | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| A               | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME              | NP  | CDM   |
| NO.             | DATE     | REVISIONS                         | BY              | CHK | APP'D |
| SCALE: AS SHOWN |          | DESIGNED MANASA E.                | DRAWN MANASA E. |     |       |

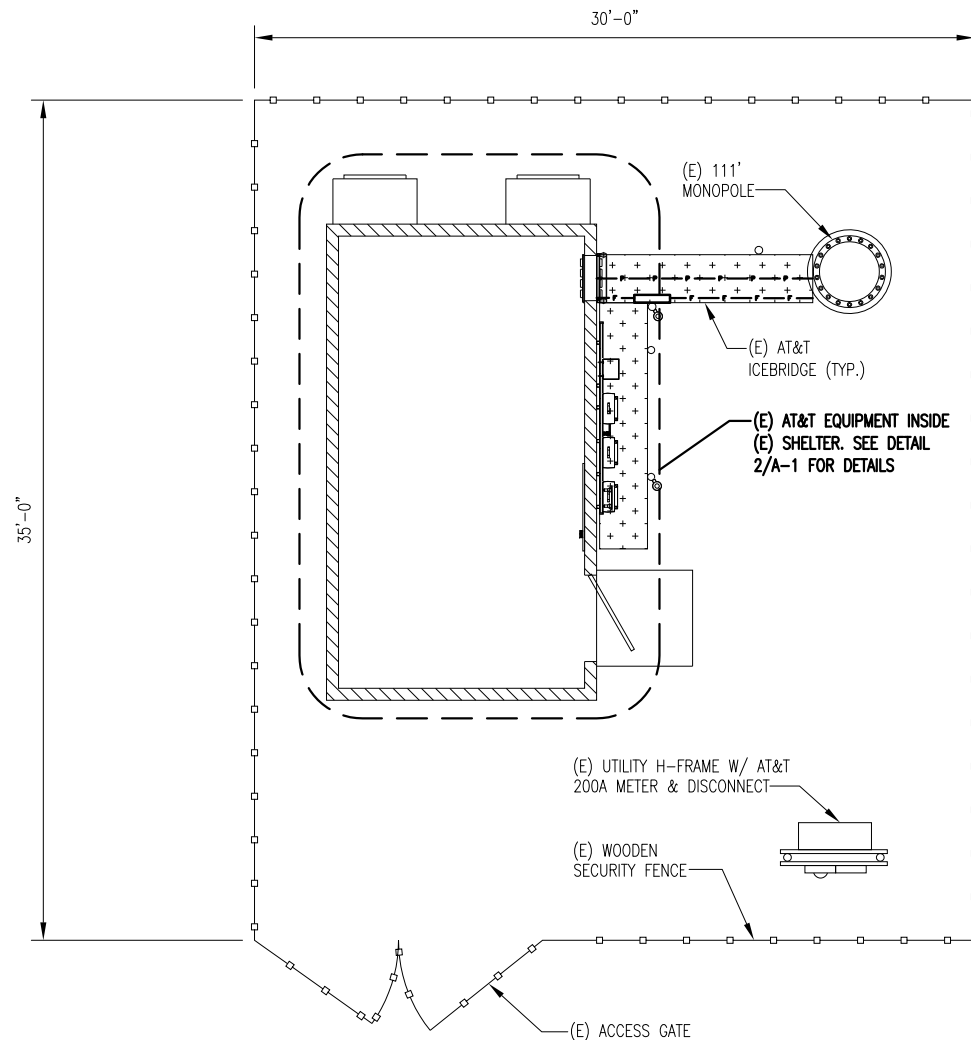
|                |     |
|----------------|-----|
| AT&T PROJECTS  |     |
| SITE PLAN      |     |
| DRAWING NUMBER | REV |
| A-0            | 3   |

COMMONWEALTH OF VIRGINIA  
CHRISTOPHER D. MORIN  
No. 032984  
02.21.20  
PROFESSIONAL ENGINEER



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SCALE IN FEET

0 4'-0" 8'-0" 12'-0"

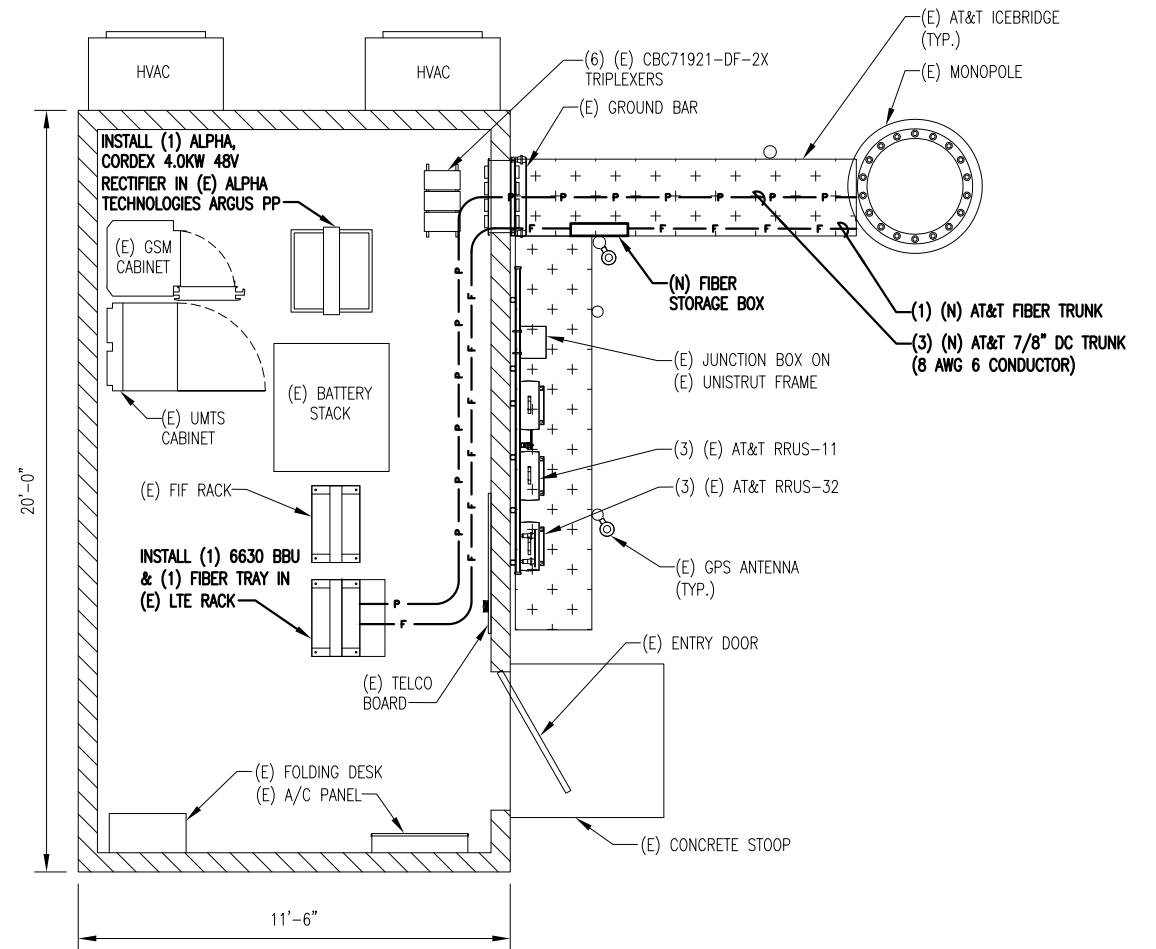
COMPOUND PLAN 1  
SCALE: 1/8"=1' (11x17)  
SCALE: 1/16"=1' (24x36)  
A-1



SCALE IN FEET

0 2.5 5 10 15

EQUIPMENT PLAN 2  
SCALE: 1"=5' (11x17)  
SCALE: 1"=2.5' (24x36)  
A-1



- SCOPE OF WORK
1. INSTALL (1) ALPHA, CORDEX 4.0KW 48V RECTIFIER FOR A TOTAL OF (5) RECTIFIERS IN THE (E) PP
  2. INSTALL (18) 1/C #8 TELCOFLEX POWER FEEDS FROM (E) PP TO (E) DC12'S FOR (N) RRUS
  3. INSTALL (1) 6630 BBU IN (E) LTE RACK
  4. INSTALL (2) 15A BREAKERS IN (E) PP FOR (N) 6630 BBU
  5. INSTALL (4) 1/C #8 TELCOFLEX POWER FEEDS FROM (E) PP TO (N) 6630 BBU
  6. INSTALL (3) 30A AND (6) 25A BREAKERS INSIDE THE (E) PP FOR (N) RRUS
  7. INSTALL (1) FIBER TRAY IN (E) LTE RACK
  8. INSTALL (1) FIBER STORAGE BOX ON (E) ICE BRIDGE POST
  9. INSTALL (N) FIBER IN 1" ORANGE INNERDUCT WITHIN THE SHELTER
  10. LABEL ALL POWER/FIBER

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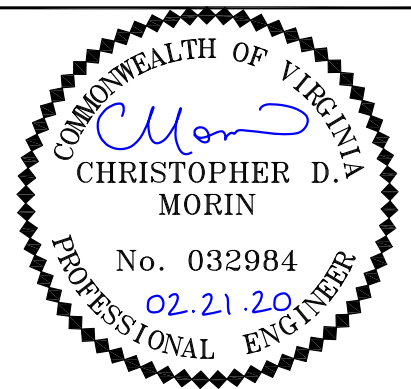
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AVON ST  
10122490

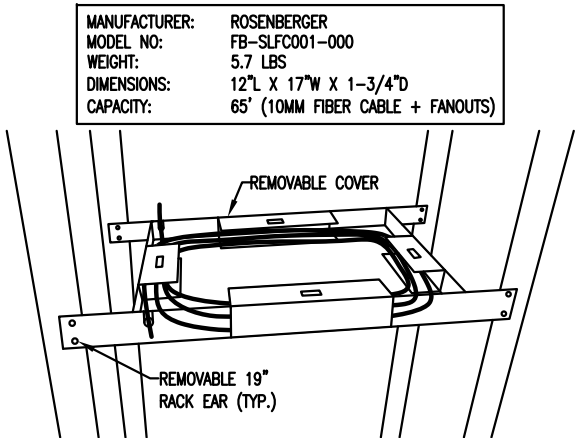
SITE ADDRESS:  
527 WOODCHUCK LN.  
CHARLOTTESVILLE, VA 22902



|                 |          |                                   |       |           |       |
|-----------------|----------|-----------------------------------|-------|-----------|-------|
| 3               | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME    | NP        | CDM   |
| 2               | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP    | NP        | CDM   |
| 1               | 11-08-19 | FINAL CONSTRUCTION DRAWINGS       | ME    | NP        | CDM   |
| 0               | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME    | NP        | CDM   |
| A               | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME    | NP        | CDM   |
| NO.             | DATE     | REVISIONS                         | BY    | CHK       | APP'D |
| SCALE: AS SHOWN |          | DESIGNED MANASA E.                | DRAWN | MANASA E. |       |

|                                  |     |
|----------------------------------|-----|
| AT&T PROJECTS                    |     |
| COMPOUND PLAN & EQUIPMENT LAYOUT |     |
| DRAWING NUMBER                   | REV |
| A-1                              | 3   |

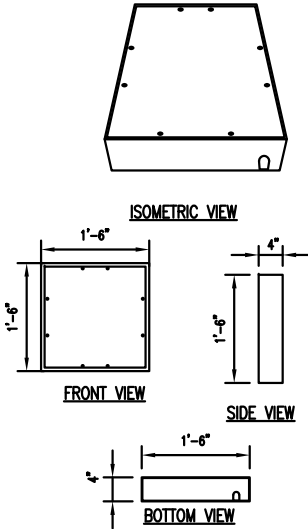




NOTE:  
OR APPROVED EQUIVALENT

FIBER TRAY DETAIL 1  
SCALE: N.T.S. A-1.1

SPECIFICATIONS  
MODEL NAME: ROSENBERGER  
FB-15-ABOX  
DIMENSION: 18"x18"x4"



NOTE:  
OR APPROVED EQUIVALENT

FIBER STORAGE BOX DETAILS 2  
SCALE: N.T.S. A-1.1

BC

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JACOBS

4801 COX RD SUITE 302  
GLEN ALLEN, VA 23060

CV376  
AVON ST  
10122490

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CHARLOTTESVILLE, VA 22902

at&t

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GLEN ALLEN, VA 23060

|                 |          |                                   |                 |     |       |
|-----------------|----------|-----------------------------------|-----------------|-----|-------|
| 3               | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| 2               | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP              | NP  | CDM   |
| 1               | 11-08-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| 0               | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| A               | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME              | NP  | CDM   |
| NO.             | DATE     | REVISIONS                         | BY              | CHK | APP'D |
| SCALE: AS SHOWN |          | DESIGNED MANASA E.                | DRAWN MANASA E. |     |       |

|                          |                |     |
|--------------------------|----------------|-----|
| AT&T PROJECTS            |                |     |
| GROUND EQUIPMENT DETAILS |                |     |
| BC                       | DRAWING NUMBER | REV |
|                          | A-1.1          | 3   |

COMMONWEALTH OF VIRGINIA

Christopher D. MORIN

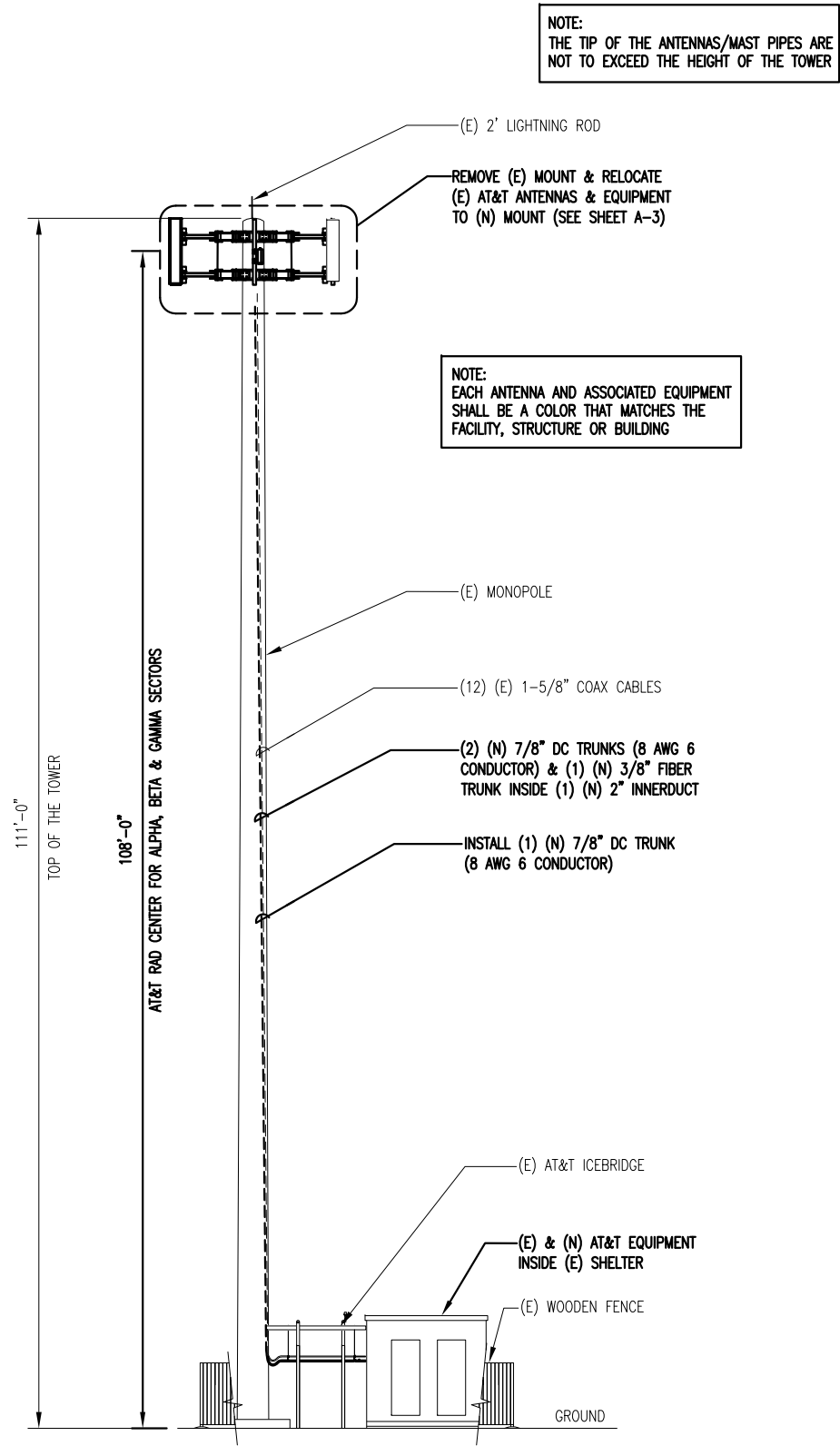
No. 032984

02.21.20

PROFESSIONAL ENGINEER



02-21-20 NPATL 13:15:00 Y:/Drawings - 2019/Jacobs/Richmond/\_\_\_FirstNET\_\_\_/Summer 2019/CV376/CD's - REV 3/A2.dwg



TOWER ELEVATION 1  
SCALE: 1/16"=1' (11x17)  
1/8"=1' (24x36) A-2

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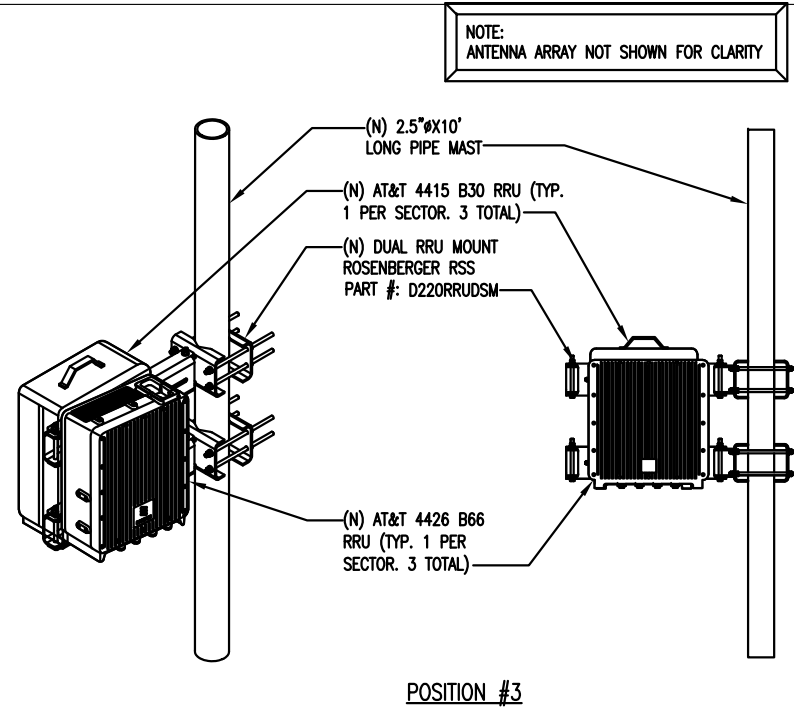
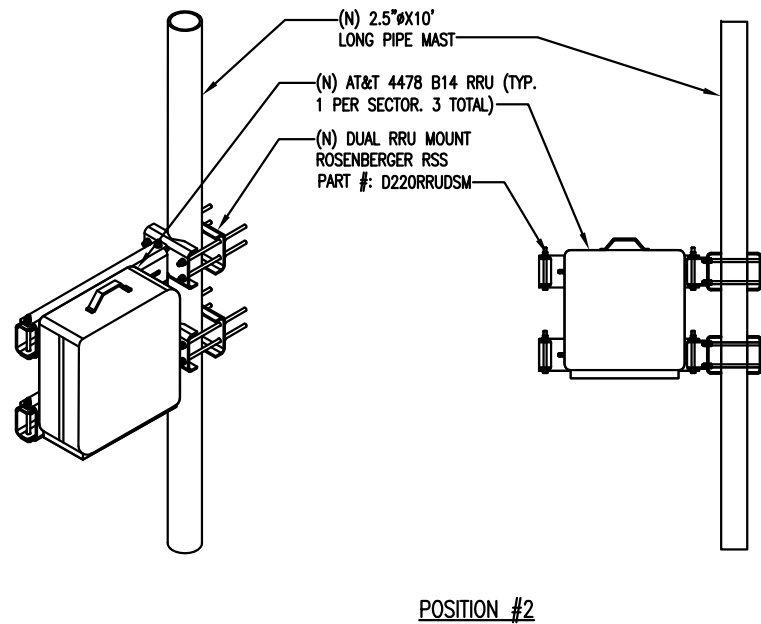
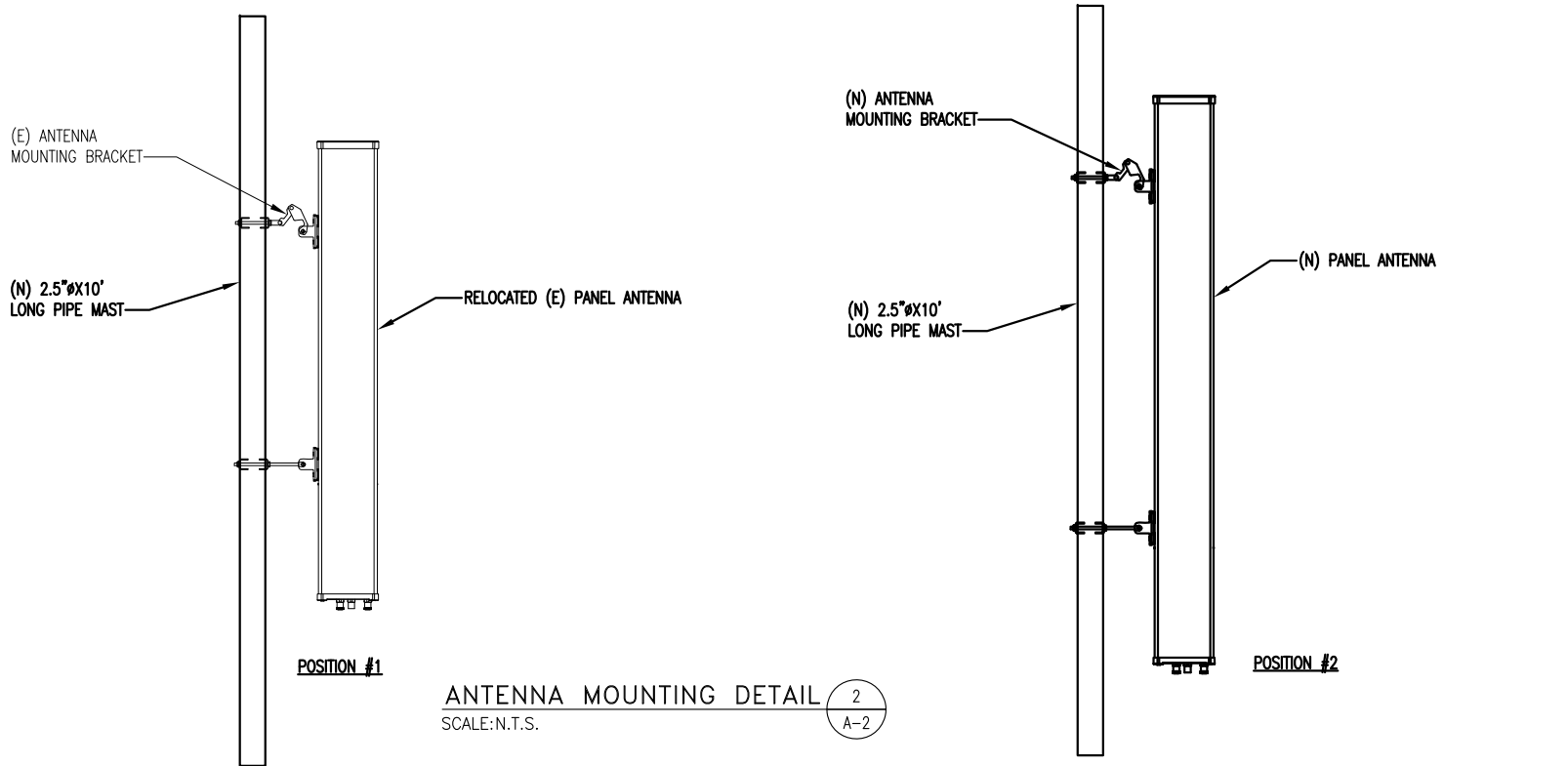
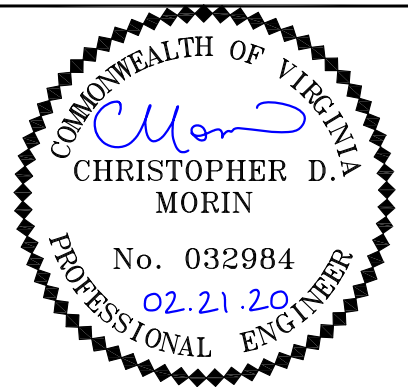
**JACOBS**  
4801 COX RD SUITE 302  
GLEN ALLEN, VA 23060

CV376  
AVON ST  
10122490  
SITE ADDRESS:  
527 WOODCHUCK LN.  
CHARLOTTESVILLE, VA 22902



|                 |          |                                   |                 |     |       |
|-----------------|----------|-----------------------------------|-----------------|-----|-------|
| 3               | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| 2               | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP              | NP  | CDM   |
| 1               | 11-08-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| 0               | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| A               | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME              | NP  | CDM   |
| NO.             | DATE     | REVISIONS                         | BY              | CHK | APP'D |
| SCALE: AS SHOWN |          | DESIGNED MANASA E.                | DRAWN MANASA E. |     |       |

| AT&T PROJECTS                                |     |
|--|-----|
| TOWER ELEVATION & EQUIPMENT MOUNTING DETAILS |     |
| DRAWING NUMBER                               | REV |
| A-2  | 3   |



EQUIPMENT MOUNTING ELEVATION DETAIL (TYP. FOR ALL SECTORS) 3  
SCALE: N.T.S. A-2

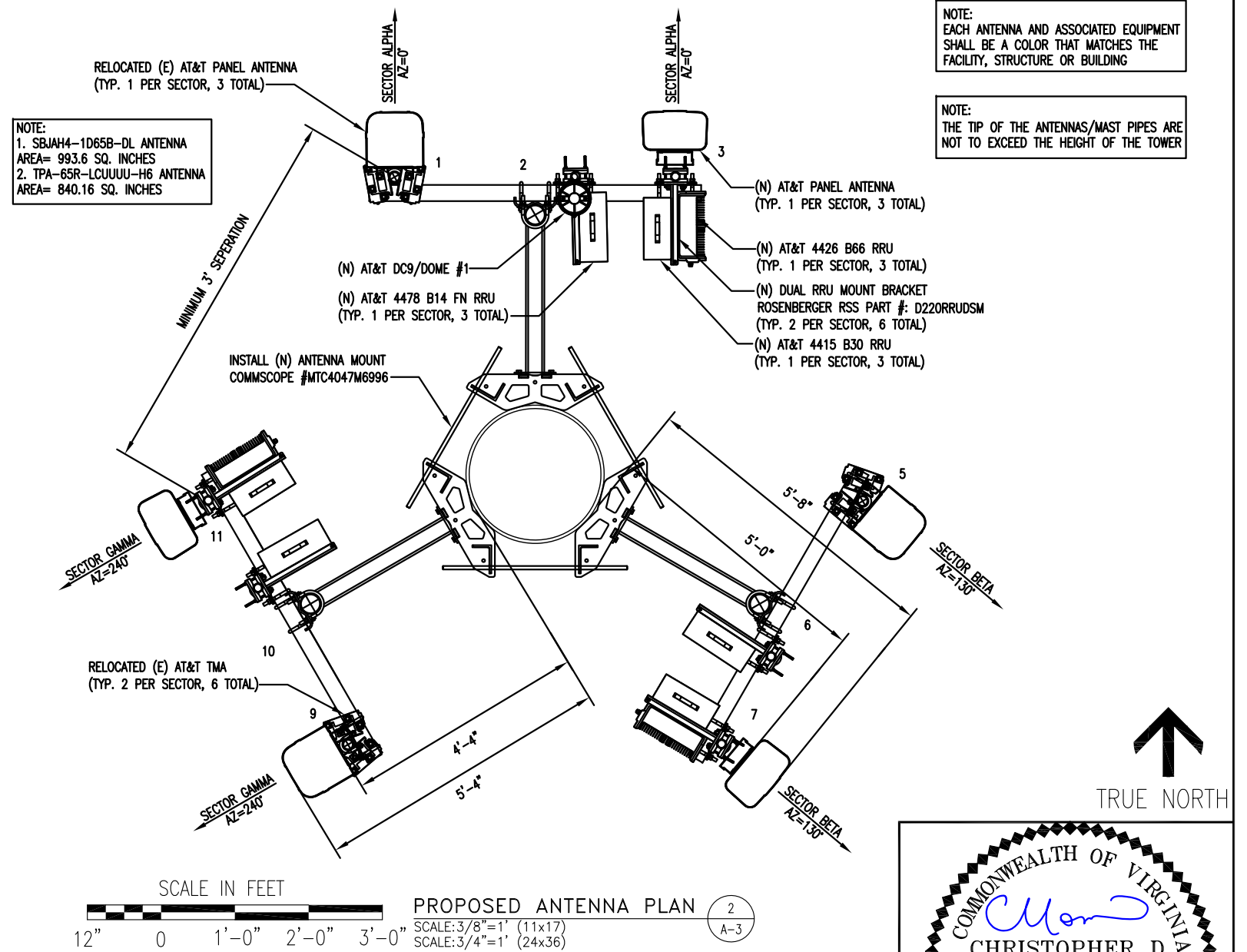
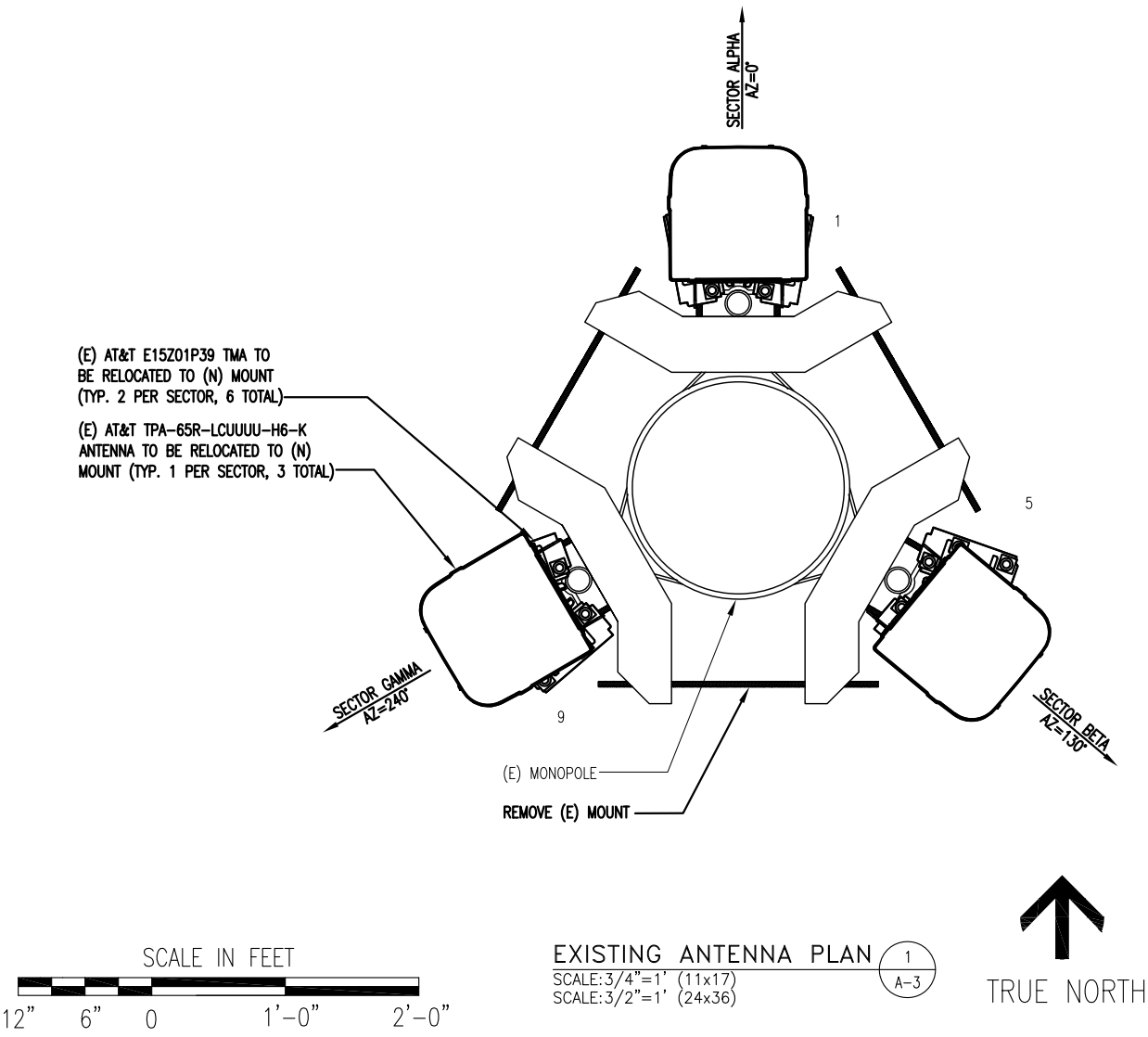
Y:/Drawings - 2019/Jacobs/Richmond/FirstNET/Summer 2019/CV376/CD's - REV 3/A3.dwg 13:17:57 02-21-20 NPATL

#### NOTES:

1. GENERAL CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ANTENNA RAD CENTERS, ANTENNA TIP HEIGHTS WITH A PRE-TAPE DROP, AND AZIMUTHS PRIOR TO CONSTRUCTION. ALL CHANGES TO THE ANTENNA POSITIONS, AZIMUTHS, AND RAD CENTERS NEED TO BE DISCUSSED WITH RF AND AT&T FIELD CONSTRUCTION MANAGER. ALL CHANGES SHALL BE NOTED ON CONSTRUCTION AS BUILTS.
2. TOWER AND TOWER FOUNDATION DESIGN HAS BEEN PREPARED AND PROVIDED BY OTHERS. REFER TO MANUFACTURER'S APPROVED TOWER DRAWINGS OR CURRENT STRUCTURAL ANALYSIS. THE RF RAD CENTER OF THE PROPOSED ANTENNAS AND MOUNTING PLATFORM ARE BASED ON INFORMATION PROVIDED THROUGH AT&T.
3. THIS DRAWING IS A GRAPHICAL REPRESENTATION OF THE TOWER, THE RF RAD CENTER OF THE PROPOSED ANTENNAS AND PROPOSED MOUNTING PLATFORM/SECTOR FRAME BASED ON INFORMATION PROVIDED THROUGH AT&T, AND /OR ANALYZED BY OTHERS. BC ARCHITECTS ENGINEERS CERTIFIES ONLY THAT INFORMATION PROVIDED TO BC ARCHITECTS ENGINEERS FOR THE PREPARATION OF THESE PLANS AND IS NOT CERTIFYING NOR WARRANTING THE DESIGN NOR VERIFYING THE ANALYTICAL RESULTS OF THE STRUCTURAL ANALYSIS PERFORMED BY OTHERS
4. THE CONTRACTOR SHALL VERIFY THE LOCATION OF THE PROPOSED CABLES, CABLE LADDER, AND/OR OTHER CABLE SUPPORTING SYSTEM PER CURRENT STRUCTURAL ANALYSIS.
5. ALL COAX CABLES SHALL BE STACKED IN ACCORDANCE WITH THE CURRENT STRUCTURAL ANALYSIS. THE CONTRACTOR OR SUBCONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAYS, ETC., AND/OR CONDUIT AS REQUIRED TO SUPPORT CABLES
6. THE CONTRACTOR SHALL VERIFY WITH CONSTRUCTION TURF VENDORS 48 HOURS PRIOR TO INSTALLATION OF ALL EQUIPMENT/RF CONFIGURATION AND ANY RELATED WORK RELATED TO THE COMPLETION OF THIS PROJECT.
7. THIS DRAWING IS FOR GENERAL INFORMATION ONLY

#### TOWER SCOPE OF WORK:

1. REMOVE OLD MOUNTS AND RE-INSTALL EXISTING ANTENNAS/TMAS ONTO NEW MOUNTS
2. INSTALL (1) COMMSCOPE MTC4047M6996 MOUNT
3. INSTALL (6) DUAL RRH MOUNTS BEHIND (N) ANTENNAS & (E) ANTENNAS (2 PER SECTOR)
4. INSTALL (3) B14 4478 (FIRNET) RRU'S ON (N) DUAL RRU MOUNT (1 PER SECTOR)
5. INSTALL (3) 4415 B30 (2300) RRU'S ON (N) DUAL RRU MOUNT (1 PER SECTOR)
6. INSTALL (3) 4426 B66 (2100) RRU'S ON (N) DUAL RRU MOUNT (1 PER SECTOR)
7. INSTALL (6) SFP7 CARDS IN (N) 4426 B66 RRU'S (2 PER RRU)
8. INSTALL (12) SFP3 CARDS IN (N) 4415 B30 & B14 4478 RRU'S (2 PER RRU)
9. INSTALL (36) 1/2" JUMPERS FROM (N) RRU'S TO (N) ANTENNAS (12 PER SECTOR)
10. INSTALL (3) RET CABLES FROM (N) B14 4478 (FIRNET) RRUS TO (N) ANTENNAS (1 PER SECTOR)
11. INSTALL (1) DC9/DOME
12. INSTALL (3) 7/8" DC TRUNKS (8 AWG 6 CONDUCTOR) FROM (E) DC12 #1 & (E) DC12 #2 TO (N) DC9/DOME
13. INSTALL (1) FIBER TRUNK FROM (N) FIBER TRAY TO (N) DC9/DOME
14. INSTALL (1) 2" INNERDUCT WITH (2) DC TRUNKS AND (1) FIBER TRUNK INSIDE THE MONOPOLE
15. INSTALL (1) OF THE (3) 7/8" DC TRUNKS (8 AWG 6 CONDUCTOR) "BARE" INSIDE THE MONOPOLE (NOT INSIDE AN INNERDUCT)
16. INSTALL (9) DUAL FIBER PAIR JUMPERS FROM (N) DC9/DOME TO (N) 4426 B66, B14 4478 & 4415 B30 RRUS (3 PER SECTOR)
17. INSTALL (9) 2/C #10 DC POWER CABLES FROM (N) DC9/DOME TO (N) 4426 B66, B14 4478 & 4415 B30 RRUS (3 PER SECTOR)
18. LABEL ALL ANTENNAS/RRUS WITH P-TOUCH LABELS
19. SECURE RET CABLES AND FIBERS WITH SNAPS INS AND GROMMETS
20. COLOR CODE JUMPERS PER DETAILS
21. SEAL UP ANY UNUSED COAX
22. MOUNT REPLACEMENT REQUIRED - REFER TO MMOD FOR DETAILS
23. PAINT ANTENNAS AND CABLES AS REQUIRED



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**JACOBS**

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GLEN ALLEN, VA 23060

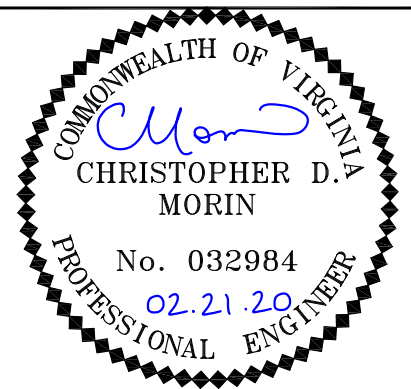
CV376  
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10122490  
  
SITE ADDRESS:  
527 WOODCHUCK LN.  
CHARLOTTESVILLE, VA 22902



at&t  
4801 COX ROAD  
GLEN ALLEN, VA 23060

|        |          |                                   |       |           |       |
|--------|----------|-----------------------------------|-------|-----------|-------|
| 3      | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME    | NP        | CDM   |
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| A      | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME    | NP        | CDM   |
| NO.    | DATE     | REVISIONS                         | BY    | CHK       | APP'D |
| SCALE: | AS SHOWN | DESIGNED MANASA E.                | DRAWN | MANASA E. |       |

| AT&T PROJECTS                     |     |
|-----------------------------------|-----|
| EXISTING & PROPOSED ANTENNA PLANS |     |
| DRAWING NUMBER                    | REV |
| A-3                               | 3   |





THE DESIGN SHOWN IN THESE DRAWINGS IS BASED ON INFORMATION GATHERED FROM AT&T RFDS 3.00 DATED 02/21/2020

| SECTOR | ANTENNA                          | ANTENNA  | MAKE      | MODEL               | RAD. CTR. | AZIMUTH | CABLE                          | APPROX. | DIPLEXERS                               | TMA               | FILTER | REPEATER | RRU   | SYSTEM  | ANTENNA |
|--------|----------------------------------|----------|-----------|---------------------|-----------|---------|--------------------------------|---------|---|-------------------|--------|----------|---|---------|---------|
|        | TECHNOLOGY                       | POSITION |           |                     | FT. AGL.  |         | TYPE                           | LENGTH  |   |                   |        |          |   | TYPE    | PORT #  |
| ALPHA  | LTE 700<br>LTE 1900<br>UMTS 1900 | #1       | CCI       | TPA-65R-LCUUUU-H6-K | 108'      | 0°      | (4) (E) 7/8"<br>COAX<br>CABLES | 125'    | (2) (E) CBC71921-DF-2X<br>(BOTTOM SIDE) | (2) (E) E15201P39 | -      | -        | (1) (E) RRU5-11 B12<br>(BOTTOM SIDE)<br>(1) (E) RRU5-32 B2<br>(BOTTOM SIDE) | LOW+45  | 1.1     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW-45  | 1.2     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW+45  | 1.3     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW-45  | 1.4     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 1.5     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 1.6     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 1.7     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 1.8     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 1.9     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 1.10    |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 1.11    |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 1.12    |
|        | -                                | #2       | -         | -                   | -         | -       | -                              | -       | -                                       | -                 | -      | -        | -   | -       | -       |
|        | LTE 700<br>LTE AWS<br>LTE WCS    | #3       | COMMScope | SBIAH4-1D65B-DL     | 108'      | 0°      | (N) FIBER                      | 151'    | -                                       | -                 | -      | -        | (1) (N) 4478 B14<br>(1) (N) 4426 B66<br>(1) (N) 4415 B30                    | LOW+45  | 3.1     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW-45  | 3.2     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW+45  | 3.3     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW-45  | 3.4     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 3.5     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 3.6     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 3.7     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 3.8     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 3.9     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 3.10    |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 3.11    |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 3.12    |

| SECTOR | ANTENNA                          | ANTENNA  | MAKE      | MODEL               | RAD. CTR. | AZIMUTH | CABLE                          | APPROX. | DIPLEXERS                               | TMA               | FILTER | REPEATER | RRU   | SYSTEM  | ANTENNA |
|--------|----------------------------------|----------|-----------|---------------------|-----------|---------|--------------------------------|---------|---|-------------------|--------|----------|---|---------|---------|
|        | TECHNOLOGY                       | POSITION |           |                     | FT. AGL.  |         | TYPE                           | LENGTH  |   |                   |        |          |   | TYPE    | PORT #  |
| BETA   | LTE 700<br>LTE 1900<br>UMTS 1900 | #5       | CCI       | TPA-65R-LCUUUU-H6-K | 108'      | 130°    | (4) (E) 7/8"<br>COAX<br>CABLES | 125'    | (2) (E) CBC71921-DF-2X<br>(BOTTOM SIDE) | (2) (E) E15201P39 | -      | -        | (1) (E) RRU5-11 B12<br>(BOTTOM SIDE)<br>(1) (E) RRU5-32 B2<br>(BOTTOM SIDE) | LOW+45  | 5.1     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW-45  | 5.2     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW+45  | 5.3     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW-45  | 5.4     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 5.5     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 5.6     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 5.7     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 5.8     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 5.9     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 5.10    |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 5.11    |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 5.12    |
|        | -                                | #6       | -         | -                   | -         | -       | -                              | -       | -                                       | -                 | -      | -        | -   | -       | -       |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | -       | -       |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | -       | -       |
|        | LTE 700<br>LTE AWS<br>LTE WCS    | #7       | COMMScope | SBIAH4-1D65B-DL     | 108'      | 130°    | (N) FIBER                      | 151'    | -                                       | -                 | -      | -        | (1) (N) 4478 B14<br>(1) (N) 4426 B66<br>(1) (N) 4415 B30                    | LOW+45  | 7.1     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW-45  | 7.2     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW+45  | 7.3     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | LOW-45  | 7.4     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 7.5     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 7.6     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 7.7     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 7.8     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 7.9     |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 7.10    |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH+45 | 7.11    |
|        |                                  |          |           |                     |           |         |                                |         |   |                   |        |          |   | HIGH-45 | 7.12    |

| SECTOR  | ANTENNA TECHNOLOGY               | ANTENNA POSITION | MAKE      | MODEL               | RAD. CTR | AZIMUTH | CABLE                          | APPROX. | DIPLEXERS                               | TMA               | FILTER | REPEATER | RRU   | SYSTEM   | ANTENNA |      |
|---------|----------------------------------|------------------|-----------|---------------------|----------|---------|--------------------------------|---------|---|-------------------|--------|----------|---|--|---------|------|
|         |                                  | FT. AGL.         |           |                     | TYPE     |         | LENGTH                         | TYPE    |   |                   |        |          |   | PORT #   |         |      |
| GAMMA   | LTE 700<br>LTE 1900<br>UMTS 1900 | #9               | CCI       | TPA-65R-LCUUUU-H6-K | 108'     | 240°    | (4) (E) 7/8"<br>COAX<br>CABLES | 125'    | (2) (E) CBC71921-DF-2X<br>(BOTTOM SIDE) | (2) (E) E15201P39 | -      | -        | (1) (E) RRU5-11 B12<br>(BOTTOM SIDE)<br>(1) (E) RRU5-32 B2<br>(BOTTOM SIDE) | LOW+45   | 9.1     |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | LOW-45   | 9.2     |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | LOW+45   | 9.3     |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | LOW-45   | 9.4     |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | HIGH+45  | 9.5     |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | HIGH-45  | 9.6     |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | HIGH+45  | 9.7     |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | HIGH-45  | 9.8     |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | HIGH+45  | 9.9     |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | HIGH-45  | 9.10    |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | HIGH+45  | 9.11    |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | HIGH-45  | 9.12    |      |
|         |                                  | #10              | -         | -                   | -        | -       | -                              | -       | -                                       | -                 | -      | -        | -   | -  | -       |      |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   | -  | -       |      |
|         | LTE 700<br>LTE AWS<br>LTE WCS    | #11              | COMMSCOPE | SBIAH4-1D65B-DL     | 108'     | 240°    | (N) FIBER                      | 151'    | -                                       | -                 | -      | -        | -   | (1) (N) 4478 B14<br>(1) (N) 4426 B66<br>(1) (N) 4415 B30 | LOW+45  | 11.1 |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   |  | LOW-45  | 11.2 |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   |  | LOW+45  | 11.3 |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   |  | LOW-45  | 11.4 |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   |  | HIGH+45 | 11.5 |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   |  | HIGH-45 | 11.6 |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   |  | HIGH+45 | 11.7 |
|         |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   |  | HIGH-45 | 11.8 |
| HIGH+45 |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   |  | 11.9    |      |
| HIGH-45 |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   |  | 11.10   |      |
| HIGH+45 |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   |  | 11.11   |      |
| HIGH-45 |                                  |                  |           |                     |          |         |                                |         |   |                   |        |          |   |  | 11.12   |      |

ATT Naming Convention for "RET NAME" ATT-002-290-125 (Issue 8, 02/03/14)

Antenna Remote Electrical Tilt (RET) Guidelines

Usage: [USID][CellId1][CellId2][CellId3][AntPos][FrequencyBand][Tech]

| USID        |  |  |  |  |  | CellId | CellId | CellId | AntPos | Freq | Tech |
|-------------|--|--|--|--|--|--------|--------|--------|--------|------|------|
| 1 2 3 4 5 6 |  |  |  |  |  | 7      | 8      | 9      | 10     | 11   | 12   |

| Field    | Length | Description   |                                       |
|----------|--------|---|---------------------------------------|
| USID     | 6      | Six characters that define the sites USID.<br>USID's less than 6 characteres in length are preceded with 0's (zeros)<br>(example: 003831) |                                       |
| CellId1  | 1      | Allowed Value   | Description                           |
|          |        | A   | Alpha                                 |
|          |        | B   | Beta                                  |
| CellId2  | 1      | C   | Gamma                                 |
|          |        | D   | Delta                                 |
| CellId3  | 1      | E   | Epsilon                               |
|          |        | F   | Zeta                                  |
| AntPos   | 1      | -   | No transmitter connected to this port |
|          |        | Allowed Value   | Description                           |
|          |        | 1   | Antenna Position 1 on this face       |
|          |        | 2   | Antenna Position 2 on this face       |
|          |        | 3   | Antenna Position 3 on this face       |
|          |        | 4   | Antenna Position 4 on this face       |
| FreqBand | 1      | 5   | Antenna Position 5 on this face       |
|          |        | Allowed Value   | Description                           |
|          |        | 2   | 2100 MHz (AWS)                        |
|          |        | 7   | 700 MHz                               |
|          |        | 8   | 850 MHz                               |
|          |        | 9   | 1900 MHz                              |
|          |        | Q   | 700 MHz D & E Band Only               |
|          |        | W   | 2300 MHz (WCS)                        |

| Field | Length | Description   |     |      |     |              |
|-------|--------|---------------|-----|------|-----|--------------|
| Tech  | 1      | Allowed Value | GSM | UMTS | LTE | Split Sector |
|       |        | G             | GSM |      |     |              |
|       |        | J             | GSM | UMTS |     |              |
|       |        | K             | GSM |      | LTE |              |
|       |        | L             |     |      | LTE |              |
|       |        | M             |     |      |     |              |
|       |        | N             |     | UMTS |     |              |
|       |        | U             |     | UMTS | LTE |              |
|       |        | Y             | GSM | UMTS | LTE |              |
|       |        | H             | GSM |      |     | Split        |
|       |        | M             | GSM | UMTS |     | Split        |
|       |        | P             | GSM |      | LTE | Split        |
|       |        | Q             |     |      | LTE | Split        |
|       |        | R             |     |      |     | Split        |
|       |        | S             |     | UMTS |     | Split        |
|       |        | T             |     | UMTS | LTE | Split        |

LTE RET NAMING CONVENTION 1  
SCALE: N.T.S. A-5

BC

architects  
engineers


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JACOBS

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10122490

SITE ADDRESS:  
527 WOODCHUCK LN.  
CHARLOTTESVILLE, VA 22902

at&t

4801 COX ROAD  
GLEN ALLEN, VA 23060

|                 |          |                                   |                 |     |                |                           |     |
|-----------------|----------|-----------------------------------|-----------------|-----|----------------|---------------------------|-----|
| 3               | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM            | AT&T PROJECTS             |     |
| 2               | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP              | NP  | CDM            |                           |     |
| 1               | 11-08-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM            | LTE RET NAMING CONVENTION |     |
| 0               | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM            |                           |     |
| A               | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME              | NP  | CDM            | BC                        |     |
| NO.             | DATE     | REVISIONS                         | BY              | CHK | APP'D          |                           |     |
| SCALE: AS SHOWN |          | DESIGNED MANASA E.                | DRAWN MANASA E. |     | DRAWING NUMBER |                           | REV |
|                 |          |                                   |                 |     | A-5            |                           | 3   |

COMMONWEALTH OF VIRGINIA

CHRISTOPHER D. MORIN

No. 032984

02.21.20

PROFESSIONAL ENGINEER



AT&T Coax and Jumper Color Code Chart for WV-VA Sites

Updated 3/30/2018

| Color Code for Hard-Line Coax to Antennas |           |                   |                   |                   | Color Code for Jumpers from Antenna to TMAs/Diplexers or RRH - or - from Antenna to Hard-Line Coax |        |            |           |             |          |          |          |          |          |          |          |          |          |       |
|---|-----------|-------------------|-------------------|-------------------|--|--------|------------|-----------|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------|
| Sector                                    | Coax Line | A1                | A2                | A3                | A4   | Sector | Technology | Frequency | TX / RX     | 1st Band | 2nd Band | 3rd Band | 4th Band | 5th Band | 6th Band | 7th Band | 8th Band | 9th Band | Notes |
| Alpha                                     | 1st Line  | 1 Green           | 2 Green           | 3Green            | 4 Green  | A1-1   | LTE        | 700 D/E   | TXM / RXM   | Green    | Gray     | Orange   |          |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | A1-2   | LTE        | 700 D/E   | TXD1 / RXD1 | Green    | Gray     | Orange   | Brown    |          |          |          |          |          |       |
| Alpha                                     | 2nd Line  | 1 Green & 1 Brown | 2 Green & 1 Brown | 3Green & 1 Brown  | 4 Green & 1 Brown  | A1-3   | LTE        | WCS       | TXM / RXM   | Green    | Gray     | Red      |          |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | A1-4   | LTE        | WCS       | TXD1 / RXD1 | Green    | Gray     | Red      | Brown    |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | A1-5   | LTE        | WCS       | TXD2 / RXD2 | Green    | Gray     | Red      | Brown    | Brown    |          |          |          |          |       |
|   |           |                   |                   |                   |  | A1-6   | LTE        | WCS       | TXD3 / RXD3 | Green    | Gray     | Red      | Brown    | Brown    | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | A2-1   | UMTS/GSM   | 850       | TXM / RXM   | Green    | Green    | Yellow   | Orange   |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | A2-2   | UMTS/GSM   | 850       | TXD1 / RXD1 | Green    | Green    | Yellow   | Orange   | Brown    |          |          |          |          |       |
|   |           |                   |                   |                   |  | A2-3   | UMTS/GSM   | 1900      | TXM / RXM   | Green    | Green    | Yellow   | Violet   |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | A2-4   | UMTS/GSM   | 1900      | TXD1 / RXD1 | Green    | Green    | Yellow   | Violet   | Brown    |          |          |          |          |       |
|   |           |                   |                   |                   |  | A2-5   | UMTS/LTE   | 1900      | TXD2 / RXD2 | Green    | Green    | Yellow   | Violet   | Brown    | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | A2-6   | UMTS/LTE   | 1900      | TXD3 / RXD3 | Green    | Green    | Yellow   | Violet   | Brown    | Brown    | Brown    |          |          |       |
|   |           |                   |                   |                   |  | A3-1   | UMTS       | 850       | TXM / RXM   | Green    | Green    | Green    | Yellow   | Orange   |          |          |          |          |       |
|   |           |                   |                   |                   |  | A3-2   | UMTS       | 850       | TXD1 / RXD1 | Green    | Green    | Green    | Yellow   | Orange   | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | A3-3   | UMTS/LTE   | 1900      | TXM / RXM   | Green    | Green    | Green    | Yellow   | Violet   |          |          |          |          |       |
|   |           |                   |                   |                   |  | A3-4   | UMTS/LTE   | 1900      | TXD1 / RXD1 | Green    | Green    | Green    | Yellow   | Violet   | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | A3-5   | UMTS/LTE   | 1900      | TXD2 / RXD2 | Green    | Green    | Green    | Yellow   | Violet   | Brown    | Brown    |          |          |       |
|   |           |                   |                   |                   |  | A3-6   | UMTS/LTE   | 1900      | TXD3 / RXD3 | Green    | Green    | Green    | Yellow   | Violet   | Brown    | Brown    | Brown    |          |       |
|   |           |                   |                   |                   |  | A4-1   | LTE        | 700       | TXM / RXM   | Green    | Green    | Green    | Green    | Gray     | Orange   |          |          |          |       |
|   |           |                   |                   |                   |  | A4-2   | LTE        | 700       | TXD1 / RXD1 | Green    | Green    | Green    | Green    | Gray     | Orange   | Brown    |          |          |       |
|   |           |                   |                   |                   |  | A4-3   | LTE        | 2100      | TXM / RXM   | Green    | Green    | Green    | Green    | Gray     | Violet   |          |          |          |       |
|   |           |                   |                   |                   |  | A4-4   | LTE        | 2100      | TXD1 / RXD1 | Green    | Green    | Green    | Green    | Gray     | Violet   | Brown    |          |          |       |
|   |           |                   |                   |                   |  | A4-5   | LTE        | 2100      | TXD2 / RXD2 | Green    | Green    | Green    | Green    | Gray     | Violet   | Brown    | Brown    |          |       |
|   |           |                   |                   |                   |  | A4-6   | LTE        | 2100      | TXD3 / RXD3 | Green    | Green    | Green    | Green    | Gray     | Violet   | Brown    | Brown    | Brown    |       |
|   |           |                   |                   |                   |  | B1-1   | LTE        | 700 D/E   | TXM / RXM   | Blue     | Gray     | Orange   |          |          |          |          |          |          |       |
| Beta                                      | 1st Line  | 1 Green           | 2 Green           | 3Green            | 4 Green  | B1-2   | LTE        | 700 D/E   | TXD1 / RXD1 | Blue     | Gray     | Orange   | Brown    |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | B1-3   | LTE        | WCS       | TXM / RXM   | Blue     | Gray     | Red      |          |          |          |          |          |          |       |
| Beta                                      | 2nd Line  | 1 Green & 1 Brown | 2 Green & 1 Brown | 3Green & 1 Brown  | 4 Green & 1 Brown  | B1-4   | LTE        | WCS       | TXD1 / RXD1 | Blue     | Gray     | Red      | Brown    |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | B1-5   | LTE        | WCS       | TXD2 / RXD2 | Blue     | Gray     | Red      | Brown    | Brown    |          |          |          |          |       |
|   |           |                   |                   |                   |  | B1-6   | LTE        | WCS       | TXD3 / RXD3 | Blue     | Gray     | Red      | Brown    | Brown    | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | B2-1   | UMTS/GSM   | 850       | TXM / RXM   | Blue     | Blue     | Yellow   | Orange   |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | B2-2   | UMTS/GSM   | 850       | TXD1 / RXD1 | Blue     | Blue     | Yellow   | Orange   | Brown    |          |          |          |          |       |
|   |           |                   |                   |                   |  | B2-3   | UMTS/GSM   | 1900      | TXM / RXM   | Blue     | Blue     | Yellow   | Violet   |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | B2-4   | UMTS/GSM   | 1900      | TXD1 / RXD1 | Blue     | Blue     | Yellow   | Violet   | Brown    |          |          |          |          |       |
|   |           |                   |                   |                   |  | B2-5   | UMTS/LTE   | 1900      | TXD2 / RXD2 | Blue     | Blue     | Yellow   | Violet   | Brown    | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | B2-6   | UMTS/LTE   | 1900      | TXD3 / RXD3 | Blue     | Blue     | Yellow   | Violet   | Brown    | Brown    | Brown    |          |          |       |
|   |           |                   |                   |                   |  | B3-1   | UMTS       | 850       | TXM / RXM   | Blue     | Blue     | Blue     | Yellow   | Orange   |          |          |          |          |       |
|   |           |                   |                   |                   |  | B3-2   | UMTS       | 850       | TXD1 / RXD1 | Blue     | Blue     | Blue     | Yellow   | Orange   | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | B3-3   | UMTS/LTE   | 1900      | TXM / RXM   | Blue     | Blue     | Blue     | Yellow   | Violet   |          |          |          |          |       |
|   |           |                   |                   |                   |  | B3-4   | UMTS/LTE   | 1900      | TXD1 / RXD1 | Blue     | Blue     | Blue     | Yellow   | Violet   | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | B3-5   | UMTS/LTE   | 1900      | TXD2 / RXD2 | Blue     | Blue     | Blue     | Yellow   | Violet   | Brown    | Brown    |          |          |       |
|   |           |                   |                   |                   |  | B3-6   | UMTS/LTE   | 1900      | TXD3 / RXD3 | Blue     | Blue     | Blue     | Yellow   | Violet   | Brown    | Brown    | Brown    |          |       |
|   |           |                   |                   |                   |  | B4-1   | LTE        | 700       | TXM / RXM   | Blue     | Blue     | Blue     | Blue     | Gray     | Orange   |          |          |          |       |
|   |           |                   |                   |                   |  | B4-2   | LTE        | 700       | TXD1 / RXD1 | Blue     | Blue     | Blue     | Blue     | Gray     | Orange   | Brown    |          |          |       |
|   |           |                   |                   |                   |  | B4-3   | LTE        | 2100      | TXM / RXM   | Blue     | Blue     | Blue     | Blue     | Gray     | Violet   |          |          |          |       |
|   |           |                   |                   |                   |  | B4-4   | LTE        | 2100      | TXD1 / RXD1 | Blue     | Blue     | Blue     | Blue     | Gray     | Violet   | Brown    |          |          |       |
|   |           |                   |                   |                   |  | B4-5   | LTE        | 2100      | TXD2 / RXD2 | Blue     | Blue     | Blue     | Blue     | Gray     | Violet   | Brown    | Brown    |          |       |
|   |           |                   |                   |                   |  | B4-6   | LTE        | 2100      | TXD3 / RXD3 | Blue     | Blue     | Blue     | Blue     | Gray     | Violet   | Brown    | Brown    | Brown    |       |
|   |           |                   |                   |                   |  | G1-1   | LTE        | 700 D/E   | TXM / RXM   | White    | Gray     | Orange   |          |          |          |          |          |          |       |
| Gamma                                     | 1st Line  | 1 White           | 2 White           | 3 White           | 4 White  | G1-2   | LTE        | 700 D/E   | TXD1 / RXD1 | White    | Gray     | Orange   | Brown    |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | G1-3   | LTE        | WCS       | TXM / RXM   | White    | Gray     | Red      |          |          |          |          |          |          |       |
| Gamma                                     | 2nd Line  | 1 White & 1 Brown | 2 White & 1 Brown | 3 White & 1 Brown | 4 White & 1 Brown  | G1-4   | LTE        | WCS       | TXD1 / RXD1 | White    | Gray     | Red      | Brown    |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | G1-5   | LTE        | WCS       | TXD2 / RXD2 | White    | Gray     | Red      | Brown    | Brown    |          |          |          |          |       |
|   |           |                   |                   |                   |  | G1-6   | LTE        | WCS       | TXD3 / RXD3 | White    | Gray     | Red      | Brown    | Brown    | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | G2-1   | UMTS/GSM   | 850       | TXM / RXM   | White    | White    | Yellow   | Orange   |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | G2-2   | UMTS/GSM   | 850       | TXD1 / RXD1 | White    | White    | Yellow   | Orange   | Brown    |          |          |          |          |       |
|   |           |                   |                   |                   |  | G2-3   | UMTS/GSM   | 1900      | TXM / RXM   | White    | White    | Yellow   | Violet   |          |          |          |          |          |       |
|   |           |                   |                   |                   |  | G2-4   | UMTS/GSM   | 1900      | TXD1 / RXD1 | White    | White    | Yellow   | Violet   | Brown    |          |          |          |          |       |
|   |           |                   |                   |                   |  | G2-5   | UMTS/LTE   | 1900      | TXD2 / RXD2 | White    | White    | Yellow   | Violet   | Brown    | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | G2-6   | UMTS/LTE   | 1900      | TXD3 / RXD3 | White    | White    | Yellow   | Violet   | Brown    | Brown    | Brown    |          |          |       |
|   |           |                   |                   |                   |  | G3-1   | UMTS       | 850       | TXM / RXM   | White    | White    | White    | Yellow   | Orange   |          |          |          |          |       |
|   |           |                   |                   |                   |  | G3-2   | UMTS       | 850       | TXD1 / RXD1 | White    | White    | White    | Yellow   | Orange   | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | G3-3   | UMTS/LTE   | 1900      | TXM / RXM   | White    | White    | White    | Yellow   | Violet   |          |          |          |          |       |
|   |           |                   |                   |                   |  | G3-4   | UMTS/LTE   | 1900      | TXD1 / RXD1 | White    | White    | White    | Yellow   | Violet   | Brown    |          |          |          |       |
|   |           |                   |                   |                   |  | G3-5   | UMTS/LTE   | 1900      | TXD2 / RXD2 | White    | White    | White    | Yellow   | Violet   | Brown    | Brown    |          |          |       |
|   |           |                   |                   |                   |  | G3-6   | UMTS/LTE   | 1900      | TXD3 / RXD3 | White    | White    | White    | Yellow   | Violet   | Brown    | Brown    | Brown    |          |       |
|   |           |                   |                   |                   |  | G4-1   | LTE        | 700       | TXM / RXM   | White    | White    | White    | White    | Gray     | Orange   |          |          |          |       |
|   |           |                   |                   |                   |  | G4-2   | LTE        | 700       | TXD1 / RXD1 | White    | White    | White    | White    | Gray     | Orange   | Brown    |          |          |       |
|   |           |                   |                   |                   |  | G4-3   | LTE        | 2100      | TXM / RXM   | White    | White    | White    | White    | Gray     | Violet   |          |          |          |       |
|   |           |                   |                   |                   |  | G4-4   | LTE        | 2100      | TXD1 / RXD1 | White    | White    | White    | White    | Gray     | Violet   | Brown    |          |          |       |
|   |           |                   |                   |                   |  | G4-5   | LTE        | 2100      | TXD2 / RXD2 | White    | White    | White    | White    | Gray     | Violet   | Brown    | Brown    |          |       |
|   |           |                   |                   |                   |  | G4-6   | LTE        | 2100      | TXD3 / RXD3 | White    | White    | White    | White    | Gray     | Violet   | Brown    | Brown    | Brown    |       |

| Base Color |       |
|------------|-------|
| Sector A   | Green |
| Sector B   | Blue  |
| Sector C   | White |

| Technology Color |        |
|------------------|--------|
| LTE              | Gray   |
| UMTS             | Yellow |
| GSM              | Black  |

| Frequency Color |               |
|-----------------|---------------|
| 700/850         | Orange        |
| WCS             | Red           |
| 1900/2100       | Violet        |
| First Net       | Orange-Orange |

| Type Color    |       |
|---------------|-------|
| Main (M)      |       |
| Diversity (D) | Brown |

Info above on 3/29/2018 - from:  
Tami Samoraga  
Construction Manager WV-VA  
AT&T Mobility  
200 George St., Suite 6  
Beckley, WV 25801  
304-673-2639 ts957b@att.com

Jumpers from TMA to Antenna/Diplexer to Equipment:  
ORANGE band to note Low-Side frequencies  
VIOLET band to note High-Side frequencies  
YELLOW band to note UMTS  
GRAY band to note LTE

| DC POWE TRUNK COLOR CODE |                |
|--------------------------|----------------|
| 1st=                     | 1 White/1 Blue |
| 2nd=                     | 2 White/1 Blue |
| 3rd=                     | 3 White/1 Blue |
| 4th=                     | 4 White/1 Blue |

| FIBER TRUNK COLOR CODE |        |
|------------------------|--------|
| 1st=                   | 1 Gray |
| 2nd=                   | 2 Gray |

COLOR CODE CHART

SCALE: N.T.S.

1  
A-5.1



5661 COLUMBIA PIKE, SUITE 200  
FALLS CHURCH, VA 22041-2868  
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4801 COX RD SUITE 302  
GLEN ALLEN, VA 23060

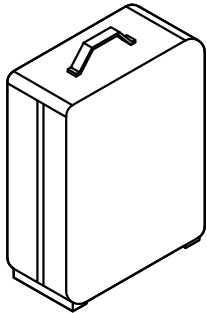
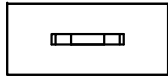
CV376  
AVON ST  
10122490  
  
SITE ADDRESS:  
527 WOODCHUCK LN.  
CHARLOTTESVILLE, VA 22902



4801 COX ROAD  
GLEN ALLEN, VA 23060

|                 |          |                                   |                 |     |       |
|-----------------|----------|-----------------------------------|-----------------|-----|-------|
| 3               | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| 2               | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP              | NP  | CDM   |
| 1               | 11-08-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| 0               | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| A               | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME              | NP  | CDM   |
| NO.             | DATE     | REVISIONS                         | BY              | CHK | APP'D |
| SCALE: AS SHOWN |          | DESIGNED MANASA E.                | DRAWN MANASA E. |     |       |

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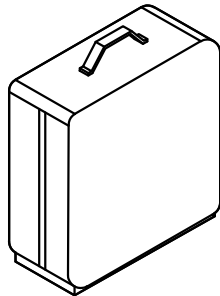
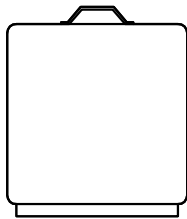
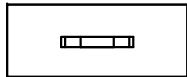


| RRUS 4415 B30   |  |
|---|--|
| TECHNICAL SPECIFICATIONS  |  |
| B30 A+ B  | TX=2350 - 2360 MHz<br>RX=2305 - 2315 MHz     |
| CPRI 2 PORTS x 2.5/4.9/9.8/10.1 GBPS  |  |
| INSTALL (2) SFPx AND CONNECT (2) FIBER PAIR TO THE RRUS 4415 DURING INITIAL INSTALL |  |
| BREAKER SIZE  | 25A,   |
| DC POWER CONSUMPTION  | 670 W (FOR DIMENSIONING)                     |
| 200 MM HORIZONTAL SEPARATION REQUIRED   |  |
| 200 MM SEPARATION REQUIRED FROM ANTENNA BACKPLANE TO RADIO                          |  |
| 400 MM VERTICAL OUTDOOR/INDOOR REQUIRED BETWEEN 2 RADIOS SEPARATION REQUIRED        |  |
| 500 MM VERTICAL SEPARATION BELOW ANTENNA  |  |
| MIN, MAX DC CABLE SIZE FROM SQUID TO RADIO = 10.8 AWG                               |  |
| 1. ADAPTER IS REQUIRED FOR 2-WIRE CONNECTION  |  |
| 2. SHIELDED DC CABLE IS REQUIRED  |  |
| GROUND CABLE SIZE = 2AWG  |  |
| DIMENSIONS INCL. HANDLE, FEET AND SUNSHIELD:  | HEIGHT: 16.5"<br>WIDTH: 13.4"<br>DEPTH: 5.9" |
| WEIGHT, EXCL. MOUNTING HARDWARE:  | 46 LBS                                       |

RRUS 4415 B30 WCS

SCALE: N.T.S.

1  
A-5.2

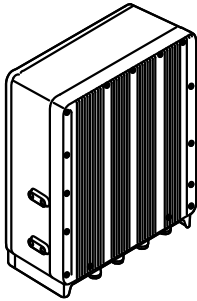
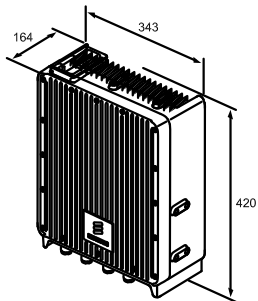
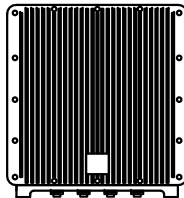


| RRUS 4478 B14            |   |
|--------------------------|---|
| TECHNICAL SPECIFICATIONS |   |
| CARRIER CAPACITY LTE:    | UP TO 6 CARRIERS IN MIMO  |
| IBW:                     | FULL BAND IBW   |
| MIMO:                    | YES, 4T4R   |
| OUTPUT POWER:            | UP TO 4 x 40W   |
| CONNECTION TYPE:         | 4x4.3-10 (F)  |
| OPTICAL INDICATORS:      | 5   |
| FIELD GROUND:            | DUAL LUG  |
| WEIGHT:                  | 27 KG   |
| VOLUME:                  | 27 LITER  |
| MOUNTING:                | RAIL, WALL AND POLE MOUNT<br>FANS NEEDED WHEN MOUNTED IN NON-VERTICAL DIRECTION |
| POWER SUPPLY:            | -48 VDC (3-WIRE)  |
| NORMAL OPERATING TEMP:   | -40° C TO +55° C (COLD START AT -40°C)  |
| ENVIRONMENT:             | OUTDOOR CLASS WITH IP65   |

RRUS 4478 B14 (FIRSTNET)

SCALE: N.T.S.

2  
A-5.2



| RRUS 4426                      |   |
|--------------------------------|---|
| TECHNICAL SPECIFICATIONS       |   |
| FREQUENCY:                     | 1710-1780 MHz UPLINK<br>2110-2200 MHz DOWNLOAD<br><br>B66 FOR WCDMA, LTE, MI NB-IoT in-BAND MODEM AND NB-Lot STANDALONE   |
| NUMBER OF CARRIERS PER RADIO   | LTE: 4x6 DOWNLINK, 4x6 UPLINK<br><br>WCDMA: 4x6 DOWNLINK, 4x6 UPLINK<br><br>NB-LOT IN-BAND MODE: ONE BC-LOT CARRIER PER CONFIGURED LTE HOST CARRIER, 4x1 CARRIERS |
| NUMBER OF CARRIERS PER BRANCH: | LTE: SIX DOWNLINK, SIX UPLINK<br><br>WCDMA: SIX DOWNLINK, SIX UPLINK<br><br>NB-LOT IN-BAND MODE: ON NB-LOT IN-BAND MODE, AND NB-LOT STANDALONE MODE               |
| CONNECTION TYPE:               | 4.3-10 FEMALE   |
| WEIGHT:                        | 48.94 LBS   |
| DIMENSION: (H"xW"xD)           | 16.14" x 13.11" x 4.13"   |

RRUS 4426 B66 AWS

SCALE: N.T.S.

3  
A-5.2



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4801 COX RD SUITE 302  
GLEN ALLEN, VA 23060

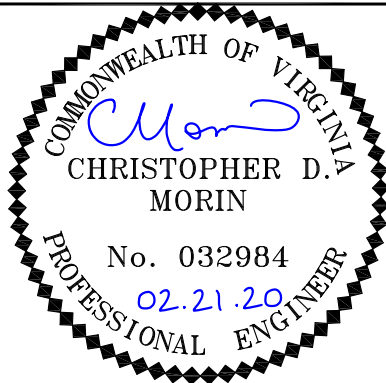
CV376  
AVON ST  
10122490  
  
SITE ADDRESS:  
527 WOODCHUCK LN.  
CHARLOTTESVILLE, VA 22902



4801 COX ROAD  
GLEN ALLEN, VA 23060

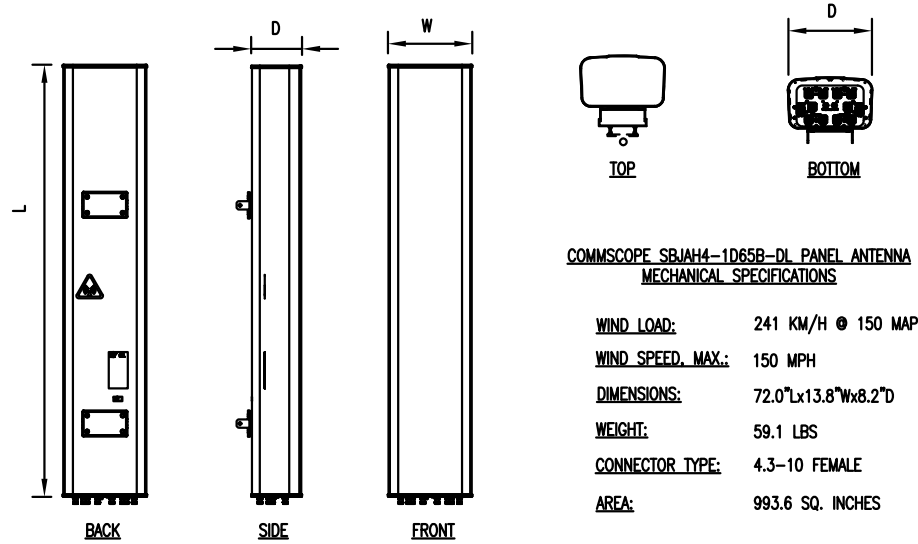
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| NO.             | DATE     | REVISIONS                         | BY    | CHK       | APP'D |
| SCALE: AS SHOWN |          | DESIGNED MANASA E.                | DRAWN | MANASA E. |       |

| AT&T PROJECTS           |                |     |
|-------------------------|----------------|-----|
| TOWER EQUIPMENT DETAILS |                |     |
|                         | DRAWING NUMBER | REV |
|                         | A-5.2          | 3   |





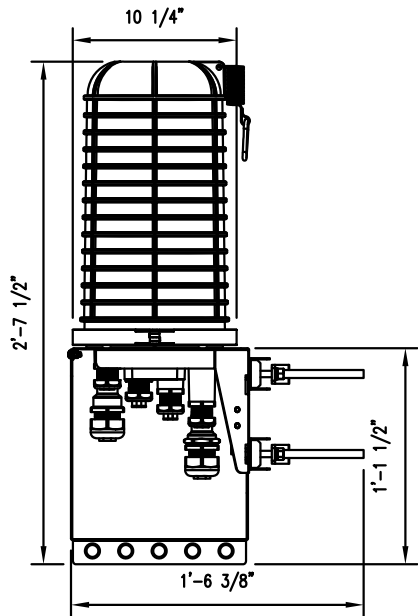
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| FREQUENCY BAND, MHZ                  | 698-798 | 824-896 | 1695-1880 | 1850-1990 | 1920-2180 | 2300-2360 |
|--------------------------------------|---------|---------|-----------|-----------|-----------|-----------|
| GAIN BY ALL BEAMS TILTS AVERAGE, DBI | 15.2    | 15.5    | 15.4      | 16.1      | 16.2      | 16.7      |
| BEAMWIDTH, HORIZONTAL, DEGREES       | 68°     | 65°     | 63°       | 63°       | 65°       | 65°       |
| BEAMWIDTH, VERTICAL, DEGREES         | 11.7°   | 10.3°   | 11.3°     | 10.4°     | 9.8°      | 8.9°      |
| INPUT POWER PER PORT, MAXIMUM, WATTS | 350     | 350     | 350       | 350       | 350       | 300       |
| POLARIZATION                         | ±45°    | ±45°    | ±45°      | ±45°      | ±45°      | ±45°      |
| IMPEDANCE                            | 50      | 50      | 50        | 50        | 50        | 50        |

PANEL ANTENNA (COMMScope SBJAH4-1D65B-DL)  
SCALE: N.T.S.

1  
A-5.3



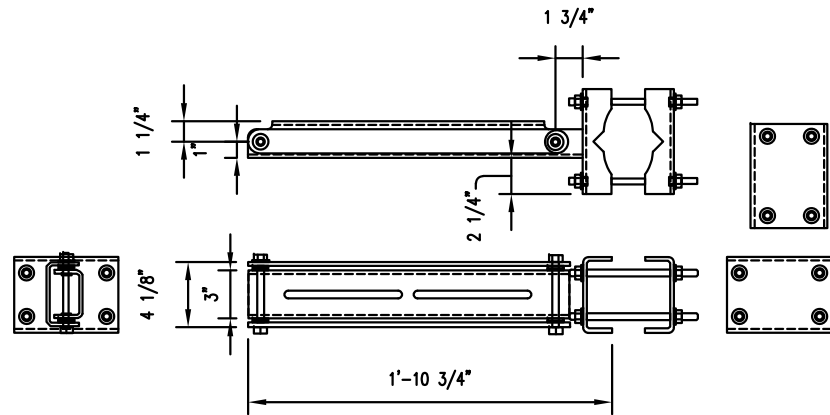
| TECHNICAL SPECIFICATIONS |  |
|--------------------------|--|
| DIMENSIONS: (LxHxW)      | 18.28"x10.24"x31.4"  |
| WEIGHT:                  | 16 LBS (WITHOUT MOUNTING KIT)<br>10 LBS (MOUNT)<br>26.2 LBS (TOTAL WEIGHT) |
| POWER SUPPLY:            | -48VDC   |
| POWER CONSUMPTION:       | 160 W (TYPICAL)<br>330 W (MAX)   |
| FIBER CONNECTION METHOD: | LC-CL DINGLE MODE  |
| PROTECTION MODES:        | -48V TO RETURN<br>RETURN TO GROUND   |

RAYCAP DC9-48-60-24-8C-EV DC  
POWER OVER VOLTAGE PROTECTOR (OVP)  
SCALE: N.T.S.

2  
A-5.3

NOTE:  
OR APPROVED EQUIVALENT

| ITEM | DESCRIPTION                       | QTY |
|------|-----------------------------------|-----|
| 1    | MOUNTING ARM                      | 2   |
| 2    | CLAMP PLATE                       | 2   |
| 3    | SWIVEL MOUNT                      | 2   |
| 4    | 3/8"-16 UNC x 8" HDG THREADED ROD | 8   |
| 5    | 3/8" HDG LOCK WASHER              | 20  |
| 6    | 3/8"UNC HDG HEX NUT               | 28  |
| 7    | 3/8"x5 GALV BOLT                  | 4   |
| 8    | 3/8" SS FLAT WASHER               | 8   |
| 9    | 3/8" SS LOCK WASHER               | 8   |
| 10   | 3/8" ID NYLON SHOULDER WASHER     | 32  |



ROSENBERGER RSS PART#: D220RRUDSM  
SCALE: N.T.S.

1  
A-5.2



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GLEN ALLEN, VA 23060

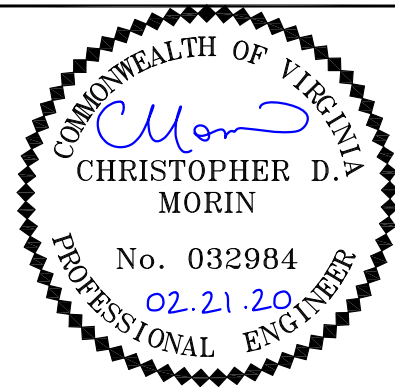
CV376  
AVON ST  
10122490  
  
SITE ADDRESS:  
527 WOODCHUCK LN.  
CHARLOTTESVILLE, VA 22902



4801 COX ROAD  
GLEN ALLEN, VA 23060

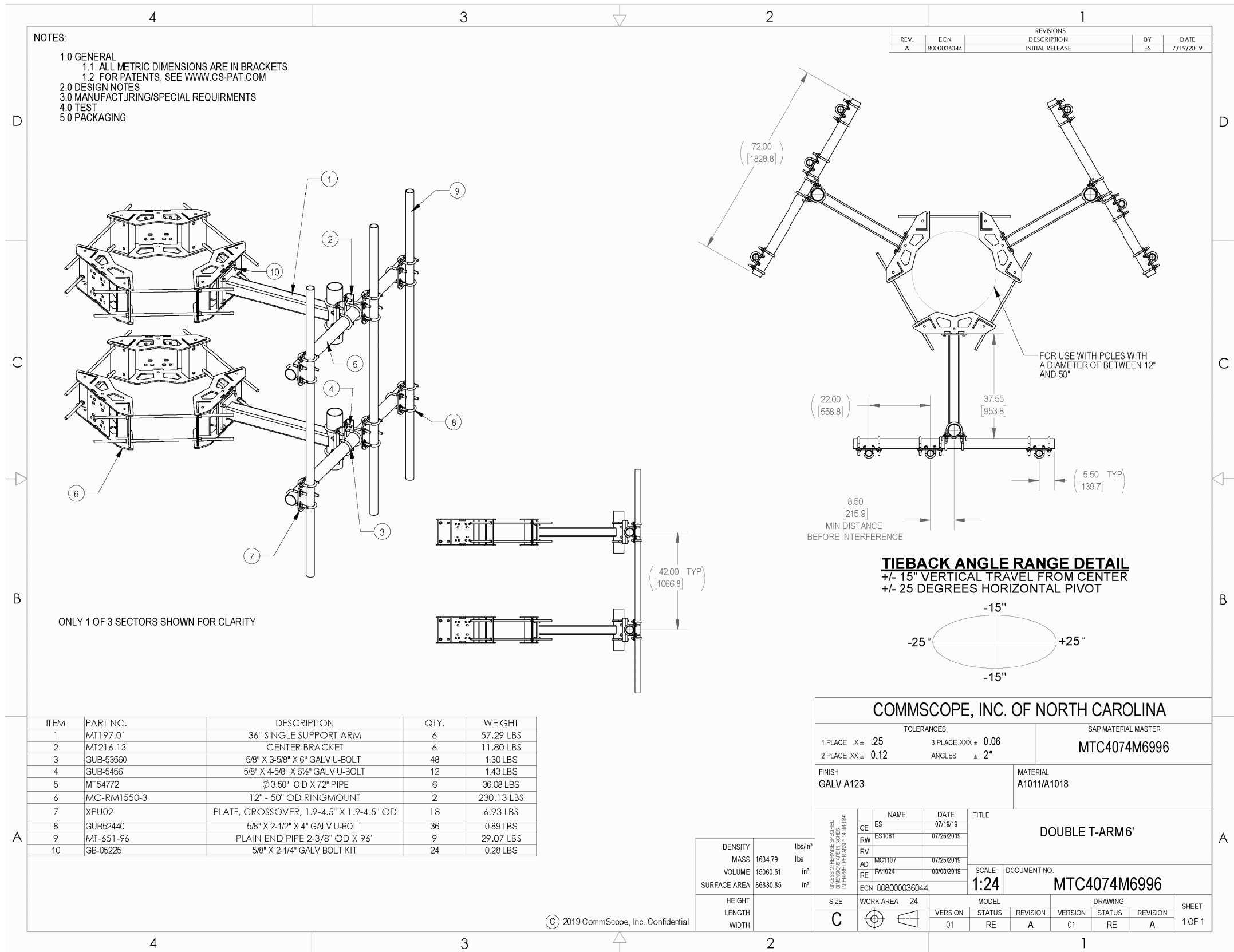
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| 2      | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP    | NP        | CDM   |
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| 0      | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME    | NP        | CDM   |
| A      | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME    | NP        | CDM   |
| NO.    | DATE     | REVISIONS                         | BY    | CHK       | APP'D |
| SCALE: | AS SHOWN | DESIGNED MANASA E.                | DRAWN | MANASA E. |       |

| AT&T PROJECTS           |     |
|-------------------------|-----|
| TOWER EQUIPMENT DETAILS |     |
| BC                      |     |
| DRAWING NUMBER          | REV |
| A-5.3                   | 3   |



Y:/Drawings - 2019/Jacobs/Richmond/\_\_\_FirstNET\_\_\_/Summer 2019/CV376/CD's - REV 2/A5.4.dwg

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COMMScope (MTC4074M6996)  
SCALE: N.T.S.

1  
A-5.4

**BC**  
architects  
engineers

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CV376  
AVON ST  
10122490  
SITE ADDRESS:  
527 WOODCHUCK LN.  
CHARLOTTESVILLE, VA 22902



at&t  
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GLEN ALLEN, VA 23060

|        |          |                                   |           |       |           |
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| 2      | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP        | NP    | CDM       |
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| 0      | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME        | NP    | CDM       |
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| NO.    | DATE     | REVISIONS                         | BY        | CHK   | APP'D     |
| SCALE: | AS SHOWN | DESIGNED                          | MANASA E. | DRAWN | MANASA E. |

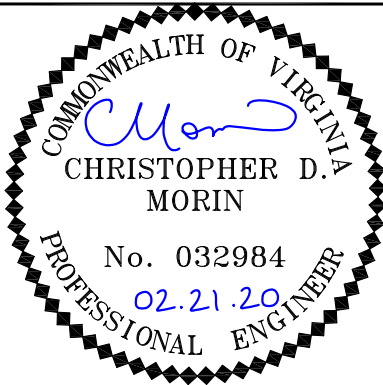
AT&T PROJECTS

TOWER EQUIPMENT DETAILS



DRAWING NUMBER  
A-5.4

REV  
3

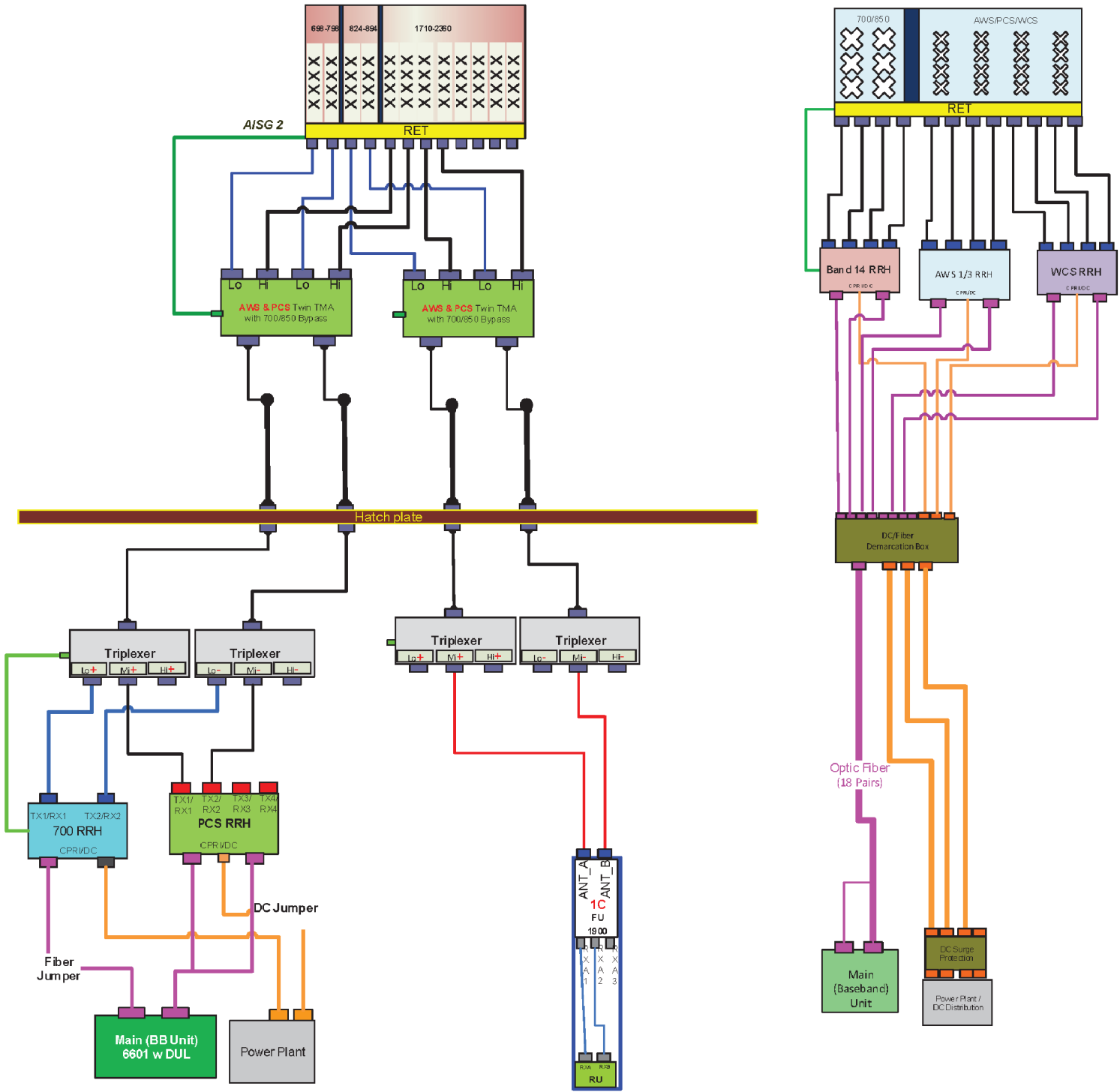




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|                   |          |                     |                       |          |          |                  |       |
|-------------------|----------|---------------------|-----------------------|----------|----------|------------------|-------|
| Diagram - Sector  | A        | Diagram File Name - | CV376_LTE3C_4C_V2.vsd | Market - | VIRGINIA | Market Cluster - | VAWVA |
| Atoll Site Name - | VAL02376 | Location Name -     | AVON ST               |          |          |                  |       |
| Comments:         | BWE: XMU |                     |                       |          |          |                  |       |



PLUMBING DIAGRAM (All SECTORS) 1  
SCALE: N.T.S. A-6

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AVON ST  
10122490

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CHARLOTTESVILLE, VA 22902

at&t  
4801 COX ROAD  
GLEN ALLEN, VA 23060

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| 0               | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME    | NP        | CDM   |
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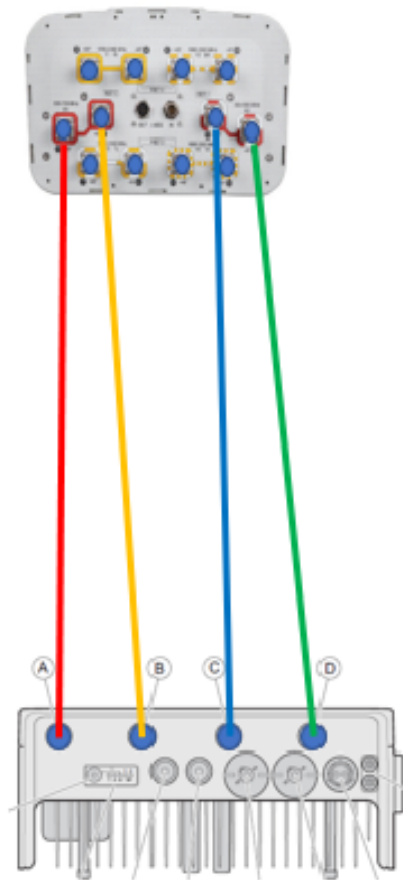
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| AT&T PROJECTS    |     |  |
| PLUMBING DIAGRAM |     |  |
| DRAWING NUMBER   | REV |  |
| A-6              | 3   |  |

COMMONWEALTH OF VIRGINIA  
CHRISTOPHER D. MORIN  
No. 032984  
02.21.20  
PROFESSIONAL ENGINEER

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### 4T SET A (Low Band)

Commscope\_12-port\_SBJAH4-1D65(B/C)-DL

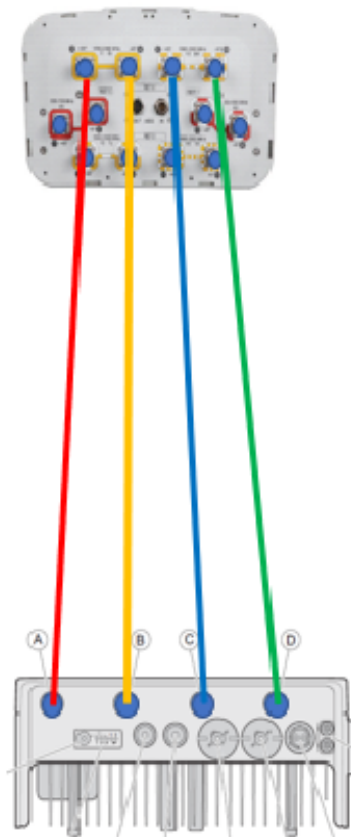


| RRH  | ANT   |
|------|-------|
| RRHA | Port1 |
| RRHB | Port2 |
| RRHC | Port3 |
| RRHD | Port4 |

4478 (B14/B5)

### 4T SET B (Mid/HighBand)

Commscope\_12-port\_SBJAH4-1D65(B/C)-DL

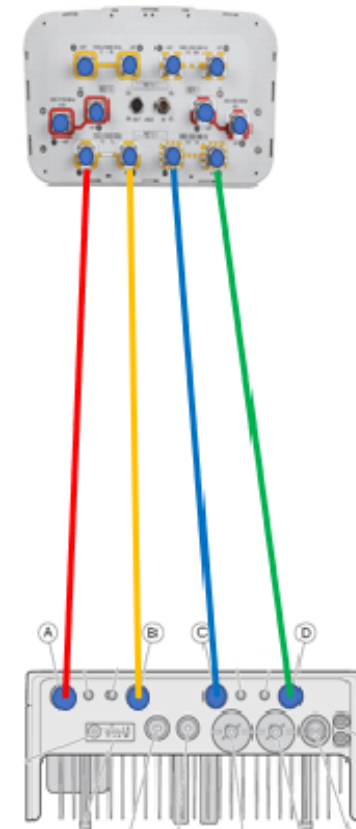


| RRH  | ANT    |
|------|--------|
| RRHA | Port5  |
| RRHB | Port6  |
| RRHC | Port9  |
| RRHD | Port10 |

4426 B66

### 4T SET C (Mid/HighBand)

Commscope\_12-port\_SBJAH4-1D65(B/C)-DL



| RRH  | ANT    |
|------|--------|
| RRHA | Port7  |
| RRHB | Port8  |
| RRHC | Port11 |
| RRHD | Port12 |

4415 B30

ANTENNA CONNECTION DIAGRAM  
SCALE: N.T.S.

1  
A-7

**BC**  
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CV376  
AVON ST  
10122490  
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|        |          |                                   |           |       |           |
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| NO.    | DATE     | REVISIONS                         | BY        | CHK   | APP'D     |
| SCALE: | AS SHOWN | DESIGNED                          | MANASA E. | DRAWN | MANASA E. |

AT&T PROJECTS

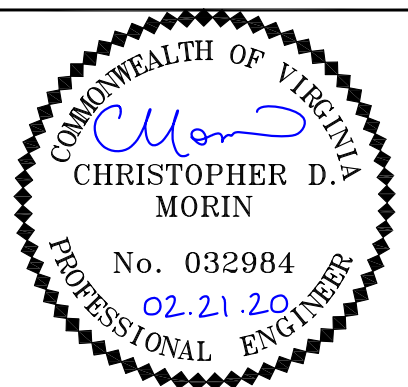
ANTENNA CONNECTION DIAGRAM



DRAWING NUMBER

A-7

REV  
3



GROUNDING NOTES

1.

GROUNDING SHALL COMPLY WITH NEC ART. 250. ADDITIONALLY, GROUNDING, BONDING AND LIGHTING PROTECTION SHALL BE DONE IN ACCORDANCE WITH METRO MOD CELL SITE GROUNDING STANDARDS.
2.

GROUND CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
3.

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.
4.

ALL POWER AND GROUND CONNECTIONS TO BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY HARGER (OR APPROVED EQUAL) RATED FOR OPERATION AT NO LESS THAN 75°C OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
5.

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.
6.

CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
7.

APPLY OXIDE INHIBITING COMPOUND TO ALL MECHANICAL GROUND CONNECTIONS.
8.

CONTRACTOR SHALL PROVIDE AND INSTALL OMNI DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALLS OVER EACH GROUND ROD AND BONDING POINT BETWEEN EXISTING TOWER/ MONOPOLE GROUNDING RING AND EQUIPMENT GROUNDING RING.
9.

CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION. 5 OHMS MINIMUM RESISTANCE REQUIRED.
10.

CONTRACTOR SHALL CONDUCT ANTENNA, CABLE, AND LNA RETURN-LOSS AND DISTANCE-TO-FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.
11.

THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
12.

ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
13.

THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
14.

METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
15.

EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG SOLID COPPER FOR OUTDOOR BTS.
16.

EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
17.

APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
18.

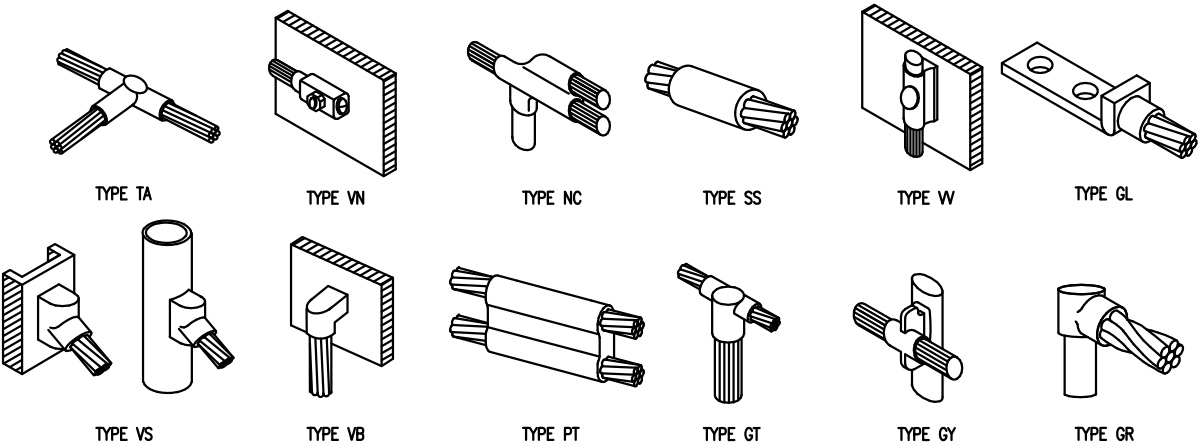
ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.
19.

ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
20.

MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
21.

METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
22.

GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.



NOTE: NO HOMERUN BONDS ALLOWED ON TOWER TO GROUND LEVEL

CADWELD GROUNDING CONNECTION DETAILS 1  
SCALE: N.T.S. E-1

BC

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|                 |          |                                   |                 |     |       |                           |                |     |
|-----------------|----------|-----------------------------------|-----------------|-----|-------|---------------------------|----------------|-----|
| 3               | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   | AT&T PROJECTS             |                |     |
| 2               | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP              | NP  | CDM   |                           |                |     |
| 1               | 11-08-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   | GROUNDING NOTES & DETAILS |                |     |
| 0               | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |                           |                |     |
| A               | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME              | NP  | CDM   | <div>BC</div>             |                |     |
| NO.             | DATE     | REVISIONS                         | BY              | CHK | APP'D |                           |                |     |
| SCALE: AS SHOWN |          | DESIGNED MANASA E.                | DRAWN MANASA E. |     |       |                           | DRAWING NUMBER | REV |
|                 |          |                                   |                 |     |       |                           | E-1            | 3   |

COMMONWEALTH OF VIRGINIA

Christopher D. Morin

CHRISTOPHER D. MORIN

No. 032984

02.21.20

PROFESSIONAL ENGINEER



Y:/Drawings - 2019/Jacobs/Richmond/FirstNET/Summer 2019/CV376/CD's - REV 2/E2.dwg 02-18-20 MPRAD 10:49:32

STEP 1: ENTER QUANTITIES OF EQUIPMENT & DC OPERATING VOLTAGE

STEP 2: ENTER DC PLANT TYPE FROM DROP-DOWN MENU:

GENERIC - ANY -48VDC PLANT  
-48V PRIMARY DC PLANT SPECIFIED  
(DC PLANT CONFIGURATION CAN BE REVIEWED ON DC PLANT WORKSHEET)

STEP 2A: THIS STEP ONLY SHOWN IF "GENERIC" DC PLANT PLANT TYPE HAS BEEN SELECTED:

|    |    |
|----|----|
| 70 | 12 |
| 75 | 4  |

\* ENTER 0 FOR SLOT VALUES TO BYPASS SLOT QUANTITY CHECK ON DC PLANT CONFIG. WORKSHEET  
THIS STEP ONLY SHOWN IF TYCO GPS2424 DC PLANT PLANT TYPE HAS BEEN SELECTED:

STEP 3: DO YOU WANT TO CONFIGURE A STANDARD STAND-ALONE DC CONVERTER SYSTEM? ☐ N  
NOTE: IF YOU SELECT "Y" ANY INTEGRATED DC PLANT CONVERTER OPTIONS WILL BE BYPASSED

STEP 4: ENTER INDOOR SITE BUILDING/SHELTER DATA:  
(Square footage used for interior AC lighting LOAD calculation)  
SELECT SITE BUILDING TYPE & SIZE: 11' 5" x 20' SHELTER

STEP 5: ENTER SITE HVAC SYSTEM DATA:  
SPECIFY INDIVIDUAL HVAC UNIT SIZE (TONS): 5 SPECIFY QUANTITY: 2  
DOES SITE HAVE ADDITIONAL HVAC (DIFFERENT SIZE)? ☐ N  
ARE THERE SITE HVAC HEATING UNITS? ☐ N  
TOTAL SPECIFIED SITE HVAC: 10-TONS ESTIMATED HVAC REQUIREMENT: TWO 2-TON UNITS  
THIS TOOL DOES NOT APPLY TO SITES THAT ARE EQUIPPED WITH FREE STANDING DIRECT AIR COOLING

STEP 6: ENTER SITE STATIONARY GENERATOR DATA:  
DOES SITE HAVE A STATIONARY GENERATOR? ☐ N  
ESTIMATED CAPACITY REQUIRED: 28 KW (NO SITE GENERATOR)

STEP 7: ENTER SITE BATTERY CONFIGURATION DATA:  
SELECT SINGLE STRING BATTERY CAPACITY (AH): 1496  
SPECIFY TOTAL QUANTITY OF BATTERY STRINGS: 1  
TOTAL SITE BATTERY CAPACITY (AH): 1496  
NOTE: NON-STANDARD BATTERY CAPACITY HAS BEEN SPECIFIED  
(4) 4/0 CONNECTION CABLES PER POLARITY ON EACH STRING ARE REQUIRED  
ESTIMATED BATTERY RESERVE TIME 11.91 HOURS (NO SITE GENSET)  
SITES WITH STATIONARY GENSETS SHALL BE ENGINEERED WITH A MAX OF 3 SHELVES OF 180 AH BATTERIES  
(3 strings at -48v or 6 strings at +24v) - ALL OTHER SITES A MINIMUM OF 4 HOURS  
SITE POWER CALCULATION TOOL - VERSION 4.3 - October 17, 2017 R. BADGERO  
ANY QUESTIONS PLEASE CONTACT RICK BADGERO (RB6620@ATT.COM)

RADIO HEADS - Outdoor

Ericsson

|                      |                                 |    |      |
|----------------------|---------------------------------|----|------|
| 0                    | RRUS 01 B2, B5 (80W)            | 48 | 0    |
| 0                    | RRUS 01 B12 (60W)               | 48 | 0    |
| 0                    | RRUS 11 B12 (2x30W)             | 48 | 0    |
| 3                    | RRUS 11 B2, B4, B5, B12 (2x40W) | 48 | 960  |
| 0                    | RRUS 12 B2, B4, B5 (2x60W)      | 48 | 0    |
| 3                    | RRUS 32 B2 (4x40W)              | 48 | 2049 |
| 0                    | RRUS 32 B30 (4x25W)             | 48 | 0    |
| 0                    | RRUS 32 B66A                    | 48 | 0    |
| 0                    | RRUS A2 B2, B4, B12             | 48 | 0    |
| 0                    | RRUSE2 B29                      | 48 | 0    |
| 0                    | RRUW B2, B5                     | 48 | 0    |
| 0                    | AIR 21 (60W)                    | 48 | 0    |
| 3                    | RRUS 4478 B14                   | 48 | 1560 |
| 0                    | (FUTURE)                        |    | 0    |
| A-LU                 |                                 |    |      |
| 0                    | 4x45 B66A                       | 48 | 0    |
| 0                    | FDD RRH2x40-07L (UHLA) B17      | 48 | 0    |
| 0                    | RRH2x40-07L-AT (UHLB) B17       | 48 | 0    |
| 0                    | B25 RRH4x30 (UHFA) B25          | 48 | 0    |
| 0                    | B25 RRH2x60 (UHFA) B25          | 48 | 0    |
| 0                    | 2X60W-850 B5                    | 48 | 0    |
| 0                    | 2X60W-1900 B2                   | 48 | 0    |
| 0                    | 2X60W-1900A B2                  | 48 | 0    |
| 0                    | RRH2x40-07L-DE (UHLIC) B29      | 48 | 0    |
| 0                    | RRH 4T4R (FRBI) B14             | 48 | 0    |
| 0                    | RRH4X25 B30                     | 48 | 0    |
| 0                    | (FUTURE)                        |    | 0    |
| 0                    | (FUTURE)                        |    | 0    |
| RADIO HEADS - Indoor |                                 |    |      |
| Ericsson             |                                 |    |      |
| 0                    | RRUS 01 B2, B5 (80W)            | 48 | 0    |
| 0                    | RRUS 01 B12 (60W)               | 48 | 0    |
| 0                    | RRUS 11 B12 (2x30W)             | 48 | 0    |
| 0                    | RRUS 11 B2, B4, B5, B12 (2x40W) | 48 | 0    |
| 0                    | RRUS 12 B2, B4, B5 (2x60W)      | 48 | 0    |
| 0                    | RRUS 32 B2 (4x40W)              | 48 | 0    |
| 0                    | RRUS 32 B30 (4x25W)             | 48 | 0    |
| 0                    | RRUS 32 B66A                    | 48 | 0    |
| 0                    | RRUS A2 B2, B4, B12             | 48 | 0    |
| 0                    | RRUSE2 B29                      | 48 | 0    |
| 0                    | RRUW B2, B5                     | 48 | 0    |
| 0                    | AIR 21 (60W)                    | 48 | 0    |
| 0                    | RRUS 4478 B14                   | 48 | 0    |
| 0                    | (FUTURE)                        |    | 0    |
| A-LU                 |                                 |    |      |
| 0                    | 4x45 B66A                       | 48 | 0    |
| 0                    | FDD RRH2x40-07L (UHLA) B17      | 48 | 0    |
| 0                    | RRH2x40-07L-AT (UHLB) B17       | 48 | 0    |
| 0                    | B25 RRH4x30 (UHFA) B25          | 48 | 0    |
| 0                    | B25 RRH2x60 (UHFA) B25          | 48 | 0    |
| 0                    | 2X60W-850 B5                    | 48 | 0    |
| 0                    | 2X60W-1900 B2                   | 48 | 0    |
| 0                    | 2X60W-1900A B2                  | 48 | 0    |
| 0                    | RRH2x40-07L-DE (UHLIC) B29      | 48 | 0    |
| 0                    | RRH 4T4R (FRBI) B14             | 48 | 0    |
| 0                    | RRH4X25 B30                     | 48 | 0    |
| 0                    | (FUTURE)                        |    | 0    |
| 0                    | (FUTURE)                        |    | 0    |

LTE 4G & Multi-Std EQUIPMENT

|   |                                     |    |    |
|---|-------------------------------------|----|----|
| 0 | A-LU 9926 LTE BBU (w/max. 3 eCEM-u) | 48 | 0  |
| 0 | Nokia FSM-4                         | 48 | 0  |
| 0 | (FUTURE)                            |    | 0  |
| 0 | (FUTURE)                            |    | 0  |
| 0 | (FUTURE)                            |    | 0  |
| 0 | (FUTURE)                            |    | 0  |
| 0 | Ericsson LTE RBS6601 BBU - 1 DUL    | 48 | 0  |
| 0 | Ericsson LTE RBS6601 BBU - 2 DUL    | 48 | 0  |
| 0 | Ericsson WCDMA RBS6601 - 1 DUW      | 48 | 0  |
| 0 | Ericsson LTE RBS6601 BBU - 1DUS     | 48 | 0  |
| 0 | Ericsson LTE RBS6601 BBU - 2DUS     | 48 | 0  |
| 1 | Ericsson XMU                        | 48 | 40 |
| 0 | Ericsson LTE RBS5216                | 48 | 0  |
| 0 | (FUTURE)                            |    | 0  |
| 0 | (FUTURE)                            |    | 0  |
| 0 | (FUTURE)                            |    | 0  |
| 0 | (FUTURE)                            |    | 0  |

ANCILLARY CELL SITE EQUIPMENT

|   |                                       |    |    |
|---|---------------------------------------|----|----|
| 0 | A-LU 7705 SIAD                        | 48 | 0  |
| 0 | (FUTURE)                              |    | 0  |
| 0 | A-LU MPR-9500 MW Service Switch - MSS | 48 | 0  |
| 0 | A-Lu MPR-9500 MW Outdoor Unit - ODU   | 48 | 0  |
| 0 | A-Lu MPR-9500 MW MPT-HL (Indoor)      | 48 | 0  |
| 0 | (FUTURE)                              |    | 0  |
| 1 | Cisco MWR-2941 SIAD                   | 48 | 40 |
| 0 | Cisco SIAD ASR-901                    | 48 | 0  |
| 0 | Cisco 15310 EOS (SONET) MUX           | 48 | 0  |
| 0 | Cisco 15454 MSP (MW Ring Config.)     | 48 | 0  |
| 0 | (FUTURE)                              |    | 0  |
| 0 | Tru-Position LMU (E911)               | 48 | 0  |
| 0 | DC Free Air (per HVAC unit)           | 48 | 0  |
| 1 | GENERIC Ethernet NID                  | 48 | 60 |
| 0 | GENERIC Hydrogen Detector             | 48 | 0  |
| 0 | GENERIC RET Controller                | 48 | 0  |
| 0 | GENERIC RXAIT                         | 48 | 0  |
| 1 | GENERIC Smoke Detector                | 48 | 20 |
| 0 | GENERIC TMA System                    | 48 | 0  |
| 0 | GENERIC Tower Lighting (DC)           | 48 | 0  |
| 0 | NG480                                 | 48 | 0  |
| 0 | Cisco 2911                            | 48 | 0  |
| 0 | (FUTURE)                              |    | 0  |
| 0 | (FUTURE)                              |    | 0  |
| 0 | (FUTURE)                              |    | 0  |
| 0 | (FUTURE)                              |    | 0  |

UMTS 3G EQUIPMENT

|   |                                       |    |     |
|---|---------------------------------------|----|-----|
| 0 | A-LU MACRO NodeB (3S1C - 40W)         | 24 | 0   |
| 0 | A-LU MACRO NodeB (3S2C - 40W)         | 24 | 0   |
| 0 | A-LU MACRO NodeB (3S3C - 40W)         | 24 | 0   |
| 0 | A-LU MACRO NodeB (3S4C - 40W)         | 24 | 0   |
| 0 | A-LU MACRO NodeB (3S5C - 40W - 2 CAB) | 24 | 0   |
| 0 | A-LU MICRO NodeB                      | 24 | 0   |
| 0 | A-LU 9396 d2U Distributed NodeB MU    | 48 | 0   |
| 0 | A-LU 9396 d4U Distributed NodeB MU    | 48 | 0   |
| 0 | (FUTURE)                              |    | 0   |
| 0 | (FUTURE)                              |    | 0   |
| 0 | (FUTURE)                              |    | 0   |
| 1 | Ericsson RBS3206 NodeB 3S1C - 1 CAB   | 48 | 480 |
| 0 | Ericsson RBS3206 NodeB 3S2C - 1 CAB   | 24 | 0   |

NON-OBIF Ericsson 3rd, 4th & 5th Carrier

|   |                                     |    |   |
|---|-------------------------------------|----|---|
| 0 | Ericsson RBS3206 NodeB 3S3C - 2 CAB | 24 | 0 |
| 0 | Ericsson RBS3206 NodeB 3S4C - 2 CAB | 24 | 0 |
| 0 | Ericsson RBS3206 NodeB 3S5C - 3 CAB | 24 | 0 |

OBIF Ericsson 3rd, 4th & 5th Carrier

|   |  |    |   |
|---|--|----|---|
| 0 | Ericsson RBS3206 NodeB 3S3C - 1 CAB<br>(Select RRUS from left section) | 24 | 0 |
| 0 | Ericsson RBS3206 NodeB 3S4C - 1 CAB<br>(Select RRUS from left section) | 24 | 0 |
| 0 | Ericsson RBS3206 NodeB 3S4C - 1 CAB<br>(Select RRUS from left section) | 24 | 0 |
| 0 | Ericsson RBS3206 NodeB 3S5C - 2 CAB<br>(Select RRUS from left section) | 24 | 0 |
| 0 | Ericsson 3303 MICRO NodeB  | 24 | 0 |
| 0 | Ericsson RBS3418 Distributed NodeB MU                                  | 48 | 0 |
| 0 | (FUTURE)   |    | 0 |
| 0 | (FUTURE)   |    | 0 |

USER SPECIFIED AC EQUIPMENT

|                             |                                 |     |   |
|-----------------------------|---------------------------------|-----|---|
| 0                           | UMTS 3106                       | 240 | 0 |
| 0                           | Battery Heater Mats             | 120 | 0 |
| 0                           | Battery Heater Mats w/ Batt Cab | 120 | 0 |
| 0                           | PCB02                           | 240 | 0 |
| 0                           | Verizon CSC Cabinet             | 120 | 0 |
| 0                           | Gen Battery Charger             | 120 | 0 |
| 0                           | Gen Heater                      | 120 | 0 |
| 0                           | Lights                          | 120 | 0 |
| 0                           | Vent System                     | 120 | 0 |
| 0                           | Vent Fan                        | 120 | 0 |
| TOTAL USER SPECIFIED KVA: 0 |                                 |     |   |
| TOTAL 120VAC AMPS:          |                                 | 0   |   |
| TOTAL 240VAC AMPS:          |                                 | 0   |   |

ESTIMATED SITE MAX. AC LOAD (AMPS): 170.33 AMPS  
ESTIMATE 200A SERVICE SUFFICIENT

ON SITE GENERATOR CAPACITY: 28 KW  
(NO ON-SITE GENERATOR)

RECOMMENDED HVAC SYSTEM: TWO 2-TON  
SPECIFIED SITE TOTAL HVAC CAPACITY: 10-TONS  
ESTIMATE SUFFICIENT HVAC CAPACITY

-48V PRIMARY VOLTAGE DC PLANT SPECIFIED

|   |            |   |          |         |
|---|------------|---|----------|---------|
| +24VDC EQUIPMENT LOAD:                                    | 0 WATTS    | = | 0 AMPS   | at +24V |
| -48VDC EQUIPMENT LOAD:                                    | 9826 WATTS | = | 182 AMPS | at -48V |
| NO SECONDARY 24V LOADS - DC CONVERTER SYSTEM NOT REQUIRED |            |   |          |         |
| TOTAL PRIMARY 48V LOAD:                                   | 9826 WATTS | = | 182 AMPS | at -48V |

(DC PLANT CONFIGURATION CAN BE REVIEWED ON DC PLANT WORKSHEET)

|  |   |
|--|---|
| DC PLANT: GENERIC - ANY -48VDC PLANT                           |   |
| -48V RECTIFIERS REQUIRED (N+1):                                | 5   |
| -48V RECTIFIER SLOTS:  | 12  |
| CONV. TYPE: GENERIC - CONV. SIZE & SLOT QTY MANUALLY SPECIFIED |   |
| +24V CONVERTERS REQUIRED:                                      | 0 (NO DC CONVERTERS REQUIRED)               |
| +24V CONVERTER SLOTS:  | 4 (NO DC CONVERTERS REQUIRED)               |
| ESTIMATED BATTERY RESERVE TIME                                 |   |
| 1 1496 AH 48V STRING =   | 11.9 HOURS (4 HOUR MINIMUM BATTERY RESERVE) |

POWER CALCULATION SHEET  
SCALE: N.T.S.

COMMONWEALTH OF VIRGINIA  
CHRISTOPHER D. MORIN  
No. 032984  
02.21.20  
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AT&T PROJECTS  
POWER CALCULATION SHEET  
DRAWING NUMBER  
E-2  
REV  
3

BC

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GLEN ALLEN, VA 23060

|        |          |                                   |           |       |           |
|--------|----------|-----------------------------------|-----------|-------|-----------|
| 3      | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME        | NP    | CDM       |
| 2      | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP        | NP    | CDM       |
| 1      | 11-08-19 | FINAL CONSTRUCTION DRAWINGS       | ME        | NP    | CDM       |
| 0      | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME        | NP    | CDM       |
| A      | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME        | NP    | CDM       |
| NO.    | DATE     | REVISIONS                         | BY        | CHK   | APP'D     |
| SCALE: | AS SHOWN | DESIGNED                          | MANASA E. | DRAWN | MANASA E. |

|     |     |       |
|-----|-----|-------|
| ME  | NP  | CDM   |
| MP  | NP  | CDM   |
| ME  | NP  | CDM   |
| ME  | NP  | CDM   |
| ME  | NP  | CDM   |
| BY  | CHK | APP'D |
| BC  |     |       |
| E-2 |     | 3     |

| POSITION | BKR RATING (A) | (E) DESCRIPTION            |
|----------|----------------|----------------------------|
| 1        | 80             | UMTS                       |
| 2        | 20             | RAD A                      |
| 3        | 20             | RAD B                      |
| 4        |                |                            |
| 5        | 30             | LTE BBU                    |
| 6        | 30             | LTE RRUS-11 700 RRU ALPHA  |
| 7        | 30             | LTE RRUS-11 700 RRU BETA   |
| 8        | 30             | LTE RRUS-11 700 RRU GAMMA  |
| 9        | 30             | LTE RRUS-32 1900 RRU ALPHA |
| 10       | 30             | LTE RRUS-32 1900 RRU BETA  |
| 11       | 30             | LTE RRUS-32 1900 RRU GAMMA |
| 12       | 30             | LTE 4426 B66 AWS RRU ALPHA |
| 13       | 30             | LTE 4426 B66 AWS RRU BETA  |
| 14       | 30             | LTE 4426 B66 AWS RRU GAMMA |
| 15       | 25             | LTE 4415 B30 WCS RRU ALPHA |
| 16       | 25             | LTE 4415 B30 WCS RRU BETA  |
| 17       | 25             | LTE 4415 B30 WCS RRU GAMMA |
| 18       |                |                            |
| 19       |                |                            |
| 20       |                |                            |

| POSITION | BKR RATING (A) | (E) DESCRIPTION                 |
|----------|----------------|---------------------------------|
| 1        | 15             | LTE 6630 BBU A                  |
| 2        | 15             | LTE 6630 BBU B                  |
| 3        | 25             | LTE 4478 B14 FIRSTNET RRU ALPHA |
| 4        | 25             | LTE 4478 B14 FIRSTNET RRU BETA  |
| 5        | 25             | LTE 4478 B14 FIRSTNET RRU GAMMA |
| 6        |                |                                 |
| 7        |                |                                 |
| 8        |                |                                 |
| 9        |                |                                 |
| 10       |                |                                 |
| 11       |                |                                 |
| 12       |                |                                 |
| 13       |                |                                 |
| 14       |                |                                 |
| 15       |                |                                 |
| 16       |                |                                 |
| 17       |                |                                 |
| 18       |                |                                 |

DC PANEL SCHEDULE 1  
SCALE: N.T.S.

| 200 A MCB         |              |                |      |     | Voltage: 240 |         |         |       |     |                |       |             |               |    |    |
|-------------------|--------------|----------------|------|-----|--------------|---------|---------|-------|-----|----------------|-------|-------------|---------------|----|----|
| AC PANEL SCHEDULE |              |                |      |     | 1 $\phi$ 3 W |         |         |       |     |                |       |             |               |    |    |
| Breaker Pos #     | Description  | State (On/Off) | Use* | Amp | Load         | Phase A | Phase B | Load  | Amp | State (On/Off) | Use * | Description | Breaker Pos # |    |    |
| 1                 | SPARE        | OFF            | 2P   | 30  |              | 4800    |         | 4800  | 50  | ON             | 2P    | HVAC #1     | 2             |    |    |
| 3                 |              |                |      |     |              |         | 4800    | 4800  |     |                |       |             | 4             |    |    |
| 5                 |              |                |      |     | 980          | 5780    |         | 4800  |     |                |       |             | 6             |    |    |
| 7                 | RECTIFIER #1 | ON             | 2P   | 30  | 980          |         | 5780    | 4800  | 50  | ON             | 2P    | HVAC #2     | 8             |    |    |
| 9                 | RECTIFIER #2 | ON             | 2P   | 30  | 980          | 980     |         |       |     |                |       |             | 10            |    |    |
| 11                |              |                |      |     | 980          |         | 980     |       |     |                |       |             | 12            |    |    |
| 13                |              |                |      |     | RECTIFIER #3 | ON      | 2P      | 30    | 980 | 1160           |       | 180         | 20            | ON | 1P |
| 15                | RECTIFIER #4 | ON             | 2P   | 30  | 980          |         | 1700    | 720   | 20  | ON             | 1P    | INT LIGHTS  | 16            |    |    |
| 17                |              |                |      |     | 980          | 1280    |         | 300   | 20  | ON             | 1P    | EXT LIGHTS  | 18            |    |    |
| 19                |              |                |      |     | 980          |         | 980     |       |     |                |       |             | 20            |    |    |
| 21                | 980          | 980            |      |     | 22           |         |         |       |     |                |       |             |               |    |    |
| 23                | RECTIFIER #5 | ON             | 2P   | 30  | 980          |         | 980     |       |     |                |       |             | 24            |    |    |
| 25                | SPARE        | OFF            | 2P   | 30  |              | 0       |         |       |     |                |       |             |               | 26 |    |
| 27                |              |                |      |     |              |         | 0       |       |     |                |       |             |               | 28 |    |
| 29                |              |                |      |     |              |         | 0       |       |     | 30             |       |             |               |    |    |
| 31                | SPARE        | OFF            | 2P   | 30  |              |         | 0       |       |     |                |       |             | 32            |    |    |
| 33                | SPARE        | OFF            | 2P   | 30  |              | 0       |         |       |     |                |       |             | 34            |    |    |
| 35                |              |                |      |     |              |         | 0       |       |     |                | 36    |             |               |    |    |
| 37                |              |                |      |     |              |         | 0       |       |     |                | 38    |             |               |    |    |
| 39                |              |                |      |     |              |         | 0       |       |     |                |       |             | 40            |    |    |
| 41                |              |                |      |     | EXT RECEPT   | ON      | 1P      | 20    | 180 | 180            |       |             |               |    | 42 |
|                   |              |                |      |     | Total (VA)   |         | 15160   | 15220 |     |                |       |             |               |    |    |

NEW LOADS ADDED

| CONNECTED LOAD (KVA):        |  | 30.38  |
|------------------------------|--|--------|
| DEMAND CALCULATIONS:         |  |        |
| CONTINUOUS LOAD @ 125%       |  | 11.08  |
| NON CONTINUOUS LOAD @ 100%   |  | 0.36   |
| MECHANICAL LOADS @ 125%      |  | 24.00  |
| EXISTING LOADS @ 125%        |  | 0.00   |
| NEW LOADS @ 125%             |  | 2.45   |
| TOTAL PANEL CAPACITY (KVA)   |  | 48.00  |
| TOTAL LOADING ON PANEL (KVA) |  | 37.89  |
| TOTAL SPARE CAPACITY (KVA)   |  | 10.12  |
|                              |  | 200.00 |
|                              |  | 157.85 |
|                              |  | 42.15  |
| TOTAL PANEL CAPACITY (A)     |  |        |
| TOTAL LOADING ON PANEL (A)   |  |        |
| TOTAL SPARE CAPACITY (A)     |  |        |

NOTE: PANEL BOARD IS NOT OVERLOADED.

AC PANEL SCHEDULE 2  
SCALE: N.T.S.

- NOTE:
- EXISTING PP IS AN ARGUS -48 WITH +24 CONVERTER SHELF WITH (4) CORDEX 48-3.6KW RECTIFIERS AND (4) CORDEX CXDF 48-24/2KW CONVERTERS
  - INSTALL (1) ALPHA, CORDEX 4.0KW 48V RECTIFIERS FOR A TOTAL OF (5)
  - A TOTAL OF (5) RECTIFIERS AND (4 CONVERTERS ARE REQUIRED FOR NEW AND EXISTING LOADS.
  - CONTRACTOR TO MOVE ALL UNUSED BREAKERS TO THE "OFF" POSITION

ELECTRICAL NOTES 3  
SCALE: N.T.S.

BC

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GLEN ALLEN, VA 23060

|                 |          |                                   |                 |     |       |
|-----------------|----------|-----------------------------------|-----------------|-----|-------|
| 3               | 02-21-20 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| 2               | 02-18-20 | FINAL CONSTRUCTION DRAWINGS       | MP              | NP  | CDM   |
| 1               | 11-08-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| 0               | 10-31-19 | FINAL CONSTRUCTION DRAWINGS       | ME              | NP  | CDM   |
| A               | 09-13-19 | PRELIMINARY CONSTRUCTION DRAWINGS | ME              | NP  | CDM   |
| NO.             | DATE     | REVISIONS                         | BY              | CHK | APP'D |
| SCALE: AS SHOWN |          | DESIGNED MANASA E.                | DRAWN MANASA E. |     |       |

| AT&T PROJECTS                              |  |     |
|--|--|-----|
| AC & DC PANEL SCHEDULES & ELECTRICAL NOTES |  |     |
| DRAWING NUMBER                             |  | REV |
| E-3  |  | 3   |

COMMONWEALTH OF VIRGINIA

CHRISTOPHER D. MORIN

No. 032984

02.21.20

PROFESSIONAL ENGINEER