DocuSign Envelope ID: 293D2406-986A-4764-8ED7-D2F9238756A6

T-Mobile Site Name/Site ID: SLYH095A Columbia Regional Airport
T-Mobile Market/Region: St. Louis/Central

DAS LICENSE AGREEMENT

This DAS License Agreement ("**Agreement**"), dated as of the latter of the signature dates below (the "**Effective Date**"), is made and entered into by and between City of Columbia, Missouri, a municipal corporation ("**Owner**") and T-Mobile Central LLC, a Delaware limited liability company ("**Provider**"). Each of Owner and Provider may be referred to as a "**Party**" and collectively as the "**Parties**".

WHEREAS, Owner holds leasehold or ownership rights in and to the venue commonly referred to as Columbia Regional Airport, located at 11300 S Airport Dr. Columbia, MO 65201, and the surrounding real property described on **Exhibit A** (collectively, the "**Property**"); and

WHEREAS, Provider is in the business of providing wireless telecommunications services and Owner desires that Provider install a Distributed Antenna System ("**DAS**") to facilitate the provision of such services to Provider's customers and patrons of the Property.

NOW THEREFORE, for and in consideration of the mutual covenants and agreements contained herein and other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Owner and Provider agree as follows:

ARTICLE 1 – LICENSE

1.1 Grant of License. Owner hereby grants to Provider a license to use certain spaces on and within the Property (such spaces being referred to as the "**Premises**"), as initially set forth on **Exhibit B**, necessary to design, install, operate, maintain, upgrade, inspect, replace, repair and manage a DAS and to install associated equipment in order to provide wireless services to Provider's customers and patrons of the Property. Provider shall also have reasonable access to, over and across portions of the Property to enable Provider to exercise its rights and obligations hereunder, including ingress, egress and telecommunication and utility connections to and from the DAS. To support the operation of the DAS, Provider shall have the right to install, operate, maintain, upgrade, inspect, replace and repair telecommunications equipment on the roof of the Property, including, without limitation, microwave dishes and related equipment, and any such rooftop space utilized by Provider shall for all purposes be deemed to be part of the Premises.

1.2 Access. Owner shall provide Provider, its employees, agents and contractors reasonable access to the Premises during the Term (as defined below), at reasonable times to conduct the activities permitted herein. In the event of an emergency, Provider shall have access to the Premises 24 hours per day, 7 days per week. In order to obtain access to the Premises during off hours when a representative of Owner is not available, Provider shall contact Operations staff at 573-817-5063.

1.3 No Interference with Owner Operations. Construction of the DAS shall be done in a manner which does not unreasonably interfere with the operations of Owner.

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1.4 Provider acknowledges the areas where Provider's equipment is to be located in the part of a secure Airport terminal, and Owner may impose reasonable restrictions on the time and means of access to the Premises as Owner deems reasonably necessary for security purposes. Provider must establish background check procedures to assure that all persons employed by Provider or who are doing any work as independent contractors for Owner are in compliance with all requirement of 49 CFR 1542.

1.5 Provider agrees to prevent any use of the Premises areas that would knowingly interfere with or adversely affect the operation or maintenance of the airport or otherwise constitute an airport hazard. Provider shall restrict the height of any antennas or other equipment to comply with Federal Aviation Regulations, Part 77.

ARTICLE 2 – TERM

2.1 Term. The initial term of this Agreement is ten (10) years (the "**Initial Term**") and shall commence on the date that the DAS becomes operational for commercial use (the "**Commencement Date**"), which date shall be confirmed by a notice from Provider to Owner.

2.2 Renewal Terms. The Agreement shall automatically renew for four (4) additional and successive five (5) year terms (each, a "**Renewal Term**") unless either party elects not to renew by providing written notice to the other party before the end of the then current Term. The Initial Term plus any Renewal Terms utilized by Provider shall be referred to as the "**Term**".

ARTICLE 3 – LICENSE FEE

3.1 License Fee. Upon the Commencement Date, Provider shall pay Owner a license fee of Four Hundred Sixteen and 67/100 Dollars ($416.67) per month (the "License Fee") for its use of the Premises. Provider shall deliver the License Fee at the address specified in Section 13.2 or by electronic payment. The first License Fee payment will be due within twenty (20) days after the Commencement Date, and subsequent payments will be due by the first day of each month. Owner shall cooperate with Provider regarding the use of any electronic payment systems and the provision of any associated documentation, including an IRS form W-9 or similar governmental forms.

3.2 Escalation. The License Fee shall increase by fifteen percent (15%) on the fifth anniversary of the Commencement Date and on each five (5) year anniversary thereafter.

ARTICLE 4 – LICENSED FACILITIES AND OWNERSHIP OF DAS

4.1 Utilities. Provider will have the right to connect the DAS to an existing source of electrical power at the Property for the operation of the DAS at Owner's cost. Provider shall also have the right to connect the DAS to existing optical fiber facilities on the Property or, if Provider determines it is necessary, install

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new optical fiber or microwave facilities on the Property to serve the DAS. Owner shall reasonably cooperate with Provider's efforts to obtain all necessary utilities necessary for the operation of the DAS.

4.2 Ownership and Control. The DAS shall remain the personal property of Provider, owned and controlled by Provider at all times. Within sixty (60) days after the expiration or earlier termination of this Agreement, Provider, at its sole cost, shall remove all portions of the DAS which have not become a part of the Property's infrastructure and repair any damage caused by such removal, ordinary wear and tear excepted.

4.3 Maintenance and Repair. Provider is responsible for maintenance and repair of the DAS, excluding any damage caused by Owner or Owner's employees and agents.

4.4 Construction. Before installing the DAS, Provider will obtain Owner's prior written approval of the construction drawings for such installation, which approval will not be unreasonably withheld, conditioned or delayed, and Owner's approval is deemed given as to the construction drawings attached as **Exhibit B**. Provider will also obtain any other necessary governmental permits or approvals required for the installation and operation of the DAS. After the initial installation of the DAS, Provider may add to, upgrade or otherwise modify the DAS, including, without limitation, the utilization of additional technologies or frequencies, without Owner's consent as long as such actions do not increase the dimensions of the Premises.

4.5 Provider's Frequencies. Pursuant to one or more licenses acquired from the Federal Communications Commission ("**FCC**"), Provider (directly, or through an affiliate) owns the sole and exclusive right to utilize the frequencies to be broadcast through the DAS. The Parties agree that Owner does not have, and will not acquire through this Agreement, any proprietary or ownership rights or interest in Provider's frequencies, network, cell sites and related components, or the public revenues associated with the services provided by Provider. Provider shall at all times have the unfettered right to control the operation of Provider's frequencies.

4.6 Confidentiality. Notwithstanding anything to the contrary in this Agreement, unless pre-approved by the other Party in writing, neither Party shall disclose any information of any type relating to the operation and performance of the DAS, including, without limitation, information regarding system availability, coverage area, call statistics, data usage and data speeds, and all such information shall be deemed to be confidential ("**Confidential Information**"). Each Party will be responsible for any improper use or disclosure of any Confidential Information of the other by the receiving Party's officers, partners, principals, employees, agents or independent contractors.

ARTICLE 5 – ENVIRONMENTAL

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5.1 Pre-Existing Conditions. Provider shall have no responsibility for environmental conditions existing within the Premises prior to the Effective Date or any environmental conditions not arising out of the use and occupancy of the Premises by Provider.

5.2 Environmental Indemnity. As between Owner and Provider, Owner is responsible for the identification, investigation, monitoring and remediation and cleanup of any substances brought onto the Property that are identified by any law, ordinance or regulation as hazardous, toxic or dangerous (collectively, the "**Hazardous Substances**") discovered on the Property and agrees to indemnify, defend, and hold harmless Provider from and against any and all claims relating to the Hazardous Substances on or affecting the Property, unless the presence of the Hazardous Substances results from Provider's activities. Provider will not introduce or use any Hazardous Substances at the Premises or on the Property in violation of any applicable law and Provider will indemnify, defend and hold harmless Owner from and against any and all claims arising out of Provider's breach of this provision. The indemnity obligations under this Paragraph will survive the termination or expiration of this Agreement.

ARTICLE 6 – INSURANCE AND INDEMNIFICATION

6.1 Insurance. Provider and Owner shall, as applicable, maintain the following insurance coverage in full force during the Term of this Agreement:

(a) Commercial General Liability Insurance. Provider shall carry commercial general liability insurance covering all operations by or on behalf of Provider for personal injury and damage to property (including the loss of use thereof), including broad form property damage and explosion, collapse and underground hazards, and products and completed operations coverage. Limits of liability shall not be in amounts less than One Million Dollars ($2,000,000) per occurrence and Two Million Dollars ($3,000,000) general aggregate. The general aggregate limit shall apply on a per location and per project basis. Owner shall be included as an additional insured.

(b) Workers' Compensation and Employer's Liability Insurance. Provider shall maintain workers' compensation insurance as mandated by state law where the Property is located for all Provider employees. Provider shall maintain employer's liability insurance in an amount not less than One Million Dollars ($1,000,000).

(c) Automobile Insurance. Provider shall maintain commercial automobile liability insurance, including coverage for all owned, hired and non-owned automobiles. The amount of coverage shall not be less than One Million Dollars ($1,000,000) combined single limit for each accident and for bodily injury and property damage.

(d) Commercial Property and Builder's Risk Insurance. Provider shall carry "all risks" or "special causes of loss" property insurance on its personal property, including but not limited to its tools, equipment, machinery, materials and supplies in an amount sufficient to repair or replace such property.

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(e) Umbrella Insurance. Provider shall maintain an umbrella insurance policy providing coverage in excess of its primary commercial general liability, automobile liability and employer's liability policies in an amount not less than Five Million Dollars ($5,000,000) per occurrence and Five Million Dollars ($5,000,000) general aggregate. The general aggregate limit shall apply on a per location and per project basis. Owner shall be included as an additional insured.

(f) Certificates of Insurance. Certificates of insurance, as evidence of the insurance required by this Agreement, shall be furnished by Provider to Owner before any access to the Property or construction is commenced by Provider, its agents or contractors. The policies required herein will be endorsed to include a thirty (30) days' notice prior to cancellation to the additional insured referenced herein and copies of said endorsements shall be attached to the certificates of insurance.

(g) Owner Insurance. Owner shall maintain commercial general liability insurance covering the Property in an amount of not less than Two Million Dollars ($2,000,000), commercial property insurance covering the Property and an umbrella insurance policy with the coverage set forth in Subsection 6.1(e) above.

(h) Insurer Qualifications. All of the above-required insurance coverages/policies shall be written by insurance companies licensed to issue policies in the state where the Property is located and with an A.M Best rating of no less than A-.

(i) Waiver of Subrogation. Owner and Provider hereby mutually release each other (and their directors, officers, employees, agents, successors or assigns) from liability and waive all right of recovery against the other for any loss or damage; (i) covered by their respective first party property insurance policies for all perils insured there under, (ii) within any deductible or self-insured retention, or (iii) in excess of the applicable limits of such policy or policies, it being the intent of the Parties that each shall look solely to its own insurance to protect itself from loss to its own property. In the event of such insured loss, neither Party's insurance company shall have a subrogated claim against the other.

(j) Indemnification. Owner and Provider shall each indemnify, defend, and hold the other harmless from and against any claim of liability or loss, including reasonable attorneys' fees, from personal injury, property damage, or other liability resulting from or arising out of the negligence or willful misconduct of the indemnifying Party or its employees, contractors or agents, except to the extent such claims or damage may be due to or caused by the negligence or willful misconduct of the indemnified Party or its employees, contractors or agents. The indemnity obligations under this paragraph will survive the termination or expiration of this Agreement.

ARTICLE 7 – ASSIGNMENT

This Agreement may be assigned by Provider without Owner's consent to any parent, affiliate or subsidiary of Provider, any party that merges or consolidates with Provider or its parent, or any party that purchases or otherwise acquires a majority of Provider's ownership interest or assets in the FCC market in which the Property is located. Any other assignment of this Agreement by Provider will require Owner's prior written consent, which consent shall not be unreasonably withheld, conditioned or delayed.

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ARTICLE 8 – DEFAULT

It shall constitute an "**Event of Default**" under this Agreement if either Party defaults in the performance of any of its covenants or obligations hereunder and such default continues for a period of thirty (30) days after written notice thereof from the non-defaulting Party (unless the nature of the event takes longer to cure and the defaulting Party commences a cure within the time period and diligently pursues it thereafter), the non-defaulting Party may thereafter terminate this Agreement upon written notice to the defaulting Party. In addition, if an Event of Default is not cured as provided herein, the non-defaulting Party may pursue any other available remedies at law or in equity.

ARTICLE 9 – TERMINATION

9.1 Provider may terminate this Agreement immediately upon written notice to the Owner if Provider fails to obtain all necessary permits or other approvals required from any governmental authority, or any easements required from any third party to operate the DAS on the Premises, or if any such approval is canceled, expires or is withdrawn or terminated.

9.2 Provider may terminate this Agreement upon ninety (90) days' written notice to Owner if Provider determines that the Premises are no longer needed for Provider's operations.

9.3 Owner may terminate this Agreement upon thirty (30) days' written notice to Provider without cause. In the event Owner terminates this Agreement without cause, Owner shall reimburse Provider a prorated portion of the sum of $179,000 (which amount shall be prorated based on the remaining number of months in the Initial Term), which amount the Parties acknowledge represents Provider's reasonable costs of designing, installing, and removing the DAS and purchasing equipment and related services. Owner shall not reimburse costs for termination pursuant to Section 9.1 or Section 9.2 of this Agreement.

ARTICLE 10 – NO INTERFERENCE

Owner represents that it will utilize good faith efforts to eliminate any interference from any other source if such interference is affecting the DAS.

ARTICLE 11 –CASUALTY AND CONDEMNATION

11.1 Separate Claims and Continued Operations. In any condemnation proceeding, Owner and Provider shall have the right to present separate claims for their respective interest in the award or portions of any potential condemnation award. Each Party shall immediately notify the other of any notice regarding an actual or potential condemnation or taking of the Property or Premises. In the event of a partial condemnation, Owner and Provider shall work together in good faith to develop a continuation of

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operations plan that provides for the continued operation of the DAS in all then surviving portions of the Property, including plans for any additional installations required to continue operations.

11.2 Condemnation or Casualty. If (a) a condemnation of the Property or the Premises by a governmental authority or (b) total or partial damage or destruction of the Property or the Premises, in either event to an extent that precludes or prohibits Provider from using the Premises for the purposes contemplated in this Agreement for more than sixty (60) days, then Provider shall have the right to terminate this Agreement upon fifteen (15) days' written notice to Owner.

ARTICLE 12 – REPRESENTATIONS AND WARRANTIES

12.1 Representations and Warranties by Provider. Provider represents that it has all corporate authority necessary to enter into this Agreement, that Provider (or affiliates of Provider) hold all required FCC licenses necessary under this Agreement and that it is in good standing with the FCC.

12.2 Representations and Warranties by Owner. Owner represents that Owner has the right to grant the rights given in this Agreement, that (if applicable) Owner is not in material default under the ground lease or other agreement pursuant to which it occupies the Property, that Owner has obtained all required consents or approvals from any landlord, mortgagee or other person or entity having an interest in the Property in order to enter into this Agreement and that as of the Effective Date, no Hazardous Substances are present at the Property.

ARTICLE 13 – MISCELLANEOUS

13.1 Notices. All notices hereunder must be in writing and shall be sent by overnight mail via nationally recognized overnight courier or by certified mail, return receipt requested to each Party at the following addresses:

If to Owner:

Airport Manager
11300 Airport Drive
Columbia, MO 65201
Attn: Mike Parks

If to Provider:

T-Mobile USA, Inc.
12920 SE 38th Street
Bellevue, WA 98006

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Attn: Lease Compliance / Site #SLYH095A

13.2 Entire Agreement; Modification. The Agreement constitutes the entire agreement of the Parties with respect to its subject matter and supersedes all prior written and verbal agreements, representations, promises or understandings between the Parties. Any amendments to this Agreement must be in writing and executed by both Parties.

13.3 Governing Law, Venue. This Agreement will be governed by and construed in accordance with the laws of the state where the Property is located.

13.4 Force Majeure. Neither Party shall be liable for any breach of this Agreement for any delay or failure of performance resulting from any cause beyond such Party's reasonable control, including without limitation, strikes, labor disputes, war, terrorist acts, riots, government regulations, or acts of God.

13.5 No Third Party Beneficiaries. Owner and Provider are the only Parties to the Agreement, and as such are the only Parties entitled to enforce its terms. Nothing in this Agreement gives or shall be construed to create or provide any legal right or benefit, direct, indirect or otherwise to any other Party.

13.6 No Waiver of Breach. The failure of on Party to insist on any one or more instances, upon a strict performance of any of the covenants of this Agreement, or to exercise any right contained herein, shall not be constructed as a waiver of or relinquishment for the future performance of such covenant or right to exercise such right.

13.7 Successors Bound. This Agreement and each of its covenants and conditions shall be binding upon and shall inure to the benefit of the Parties hereto and their respective assignees.

13.8 Counterparts. This Agreement may be executed by original, facsimile, or electronic signatures (complying with the U.S. Federal ESIGN Act of 2000, 15 U.S.C. 96) and in any number of counterparts which shall be considered one instrument. Counterparts, signed facsimile and electronic copies of this Agreement shall legally bind the Parties to the same extent as original documents.

13.9 Captions and Article Numbers. The captions, article and section numbers appearing in this Agreement are inserted only as a matter of convenience and in no way define, limit, construe or describe the scope or intent of such sections or articles of the Agreement nor in any way otherwise affect the Agreement.

13.10 Severability. If any term, covenant, condition or provision of this Agreement shall to any extent be held by a court of competent jurisdiction to be invalid, void or unenforceable, the remainder of the terms, covenants, conditions or provisions of the Agreement shall remain in full force and effect and shall in no way be affected, impaired or invalidated.

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13.11 Limitation of Liability. Except for the indemnification required herein, neither Party shall be liable to the other or to any of their respective agents, representatives or employees for any lost revenue, lost profits, incidental, punitive, indirect, special or consequential damages.

13.12 Authority. Provider and Owner each warrant and represent to the other that the person signing this Agreement on such Party's behalf has the authority to do so and to bind such Party to the terms, covenants and conditions contained herein.

13.13 Taxes. Provider shall be responsible for all personal property and other taxes that may be assessed against Provider's equipment.

13.14 No Waiver. Nothing in the agreement shall be deemed to be a waiver of either sovereign immunity or public official immunity by the Owner, nor any other immunity which may be granted by State or Federal statute or constitution.

13.15 Compliance with Laws. Provider shall install and operate its equipment and use the site in a manner which complies with all the laws, regulations and rules of all federal, state and municipal agencies governing the installation, operation, and use of the site, including all laws, regulations and rules pertaining to hazardous, toxic or dangerous materials.

Provider covenants and agrees to comply with all Airport rules and regulations, including compliance with the Airport Security Plan, the Transportation Security Administration (TSA), and the Federal Aviation Administration (FAA), and all federal, state and local laws, regulations and ordinances now in effect or hereinafter promulgated, including but not limited to, the clauses set forth in **Exhibit C**, the laws, regulations and ordinances of the United States Environmental Protection Agency and the Missouri Department of Natural Resources and the same are made a part of this Agreement by reference as though they were set forth herein. Notwithstanding the foregoing or anything else to the contrary contained herein, if there shall be any conflict between any rules and regulations promulgated by the Owner and the express terms of this Agreement, the express terms of this Agreement shall control.

T-Mobile Site Name/Site ID: SLYH095A Columbia Regional Airport
T-Mobile Market/Region: St. Louis/Central

IN WITNESS WHEREOF, the Parties hereto have set their hands on the day and year written below.

CITY OF COLUMBIA, MISSOURI

By: _____

Name: De'Carlon Seewood

Title: City Manager

Date: _____

APPROVED AS TO FORM:

By: _____
Nancy Thompson, City Counselor

T-MOBILE CENTRAL LLC

By: DocuSigned by: SMITHA GANESHAN
1896AEABA08B400... SMITHA GANESHAN

Name: _____

Title: Sr Manager Technology Procurement

Date: 2/9/2024

TMO Signatory Level: L08
NLG-92610

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T-Mobile Site Name/Site ID: SLYH095A Columbia Regional Airport
T-Mobile Market/Region: St. Louis/Central

EXHIBIT A

LEGAL DESCRIPTION OF PROPERTY
11300 S Airport Dr. Columbia, MO 65201

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T-Mobile Site Name/Site ID: SLYH095A Columbia Regional Airport
T-Mobile Market/Region: St. Louis/Central

EXHIBIT B

PROVIDER'S SITE PLAN / CONSTRUCTION DRAWINGS

SEE ATTACHED

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LOCATION MAP

VICINITY MAP

BUILDING CODES

ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES:

- 2018 INTERNATIONAL BUILDING CODE, IBC
- 2018 INTERNATIONAL RESIDENTIAL CODE, IRC
- 2018 INTERNATIONAL FIRE CODE, IFC
- 2018 INTERNATIONAL MECHANICAL CODE, IMC
- 2018 INTERNATIONAL PLUMBING CODE, IPC
- 2018 INTERNATIONAL FUEL GAS CODE, IFGC
- 2018 INTERNATIONAL ENERGY CONSERVATION CODE, IECC
- 2017 NATIONAL ELECTRICAL CODE, NEC

NOTE:
THE PROPOSED EQUIPMENT WILL NOT BE USED FOR EMERGENCY RESPONSE EQUIPMENT.

SITE NAME:

COLUMBIA REGIONAL AIRPORT

LOCATION CODE:

SLYH095A

PREPARED FOR:

T-Mobile™

PREPARED BY:

PM&A
6801 PORTWEST DRIVE
SUITE 100
HOUSTON, TX 77024
713-677-0964

PROJECT INFORMATION

SITE ADDRESS:	11300 S. AIRPORT DR. COLUMBIA, MO 65201
LATITUDE: LONGITUDE:	38.81762498° -92.22156373°
JURISDICTION:	BOONE COUNTY
BUILDING OWNER:	CITY OF COLUMBIA 11450 S AIRPORT DR COLUMBIA, MO 65201
DEVELOPER:	T-MOBILE CLINT LIMBACH, 816-269-9793
ENGINEER:	P. MARSHALL & ASSOCIATES 6801 PORTWEST DR. SUITE 100 PATRICK MARSHALL, P.E. 713-677-0964
POWER:	EXISTING
TELCO:	EXISTING

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GC-3A	ROOF IBWAVE PLAN
GC-4	EXISTING HEAD END PLAN
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E-4	GROUNDING DETAILS

SCOPE OF WORK

- PROPOSED INSTALLATION DAS HEAD END EQUIPMENT IN 1ST FLOOR COMMUNICATIONS ROOM.
- PROPOSED INSTALLATION OF ANTENNAS THROUGHOUT BUILDING

811
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CALL BEFORE YOU DIG
811
or 1-800-344-7483
www.mo1call.com

ISSUED FOR REVIEW

T-Mobile™

PM&A
P. MARSHALL & ASSOCIATES

COLUMBIA REGIONAL AIRPORT

11300 S. AIRPORT DR.
COLUMBIA, MO 65201

LOCATION CODE:
SLYH095A

NO.	DATE	DESCRIPTION:
0	02/21/2023	PRELIM ISSUE
1	05/22/2023	REV ISSUE

DESIGNED:	NAM
DRAWN:	JAN
CHECKED:	SL

JOB #:
23_T3D-002

TITLE SHEET & PROJECT INFORMATION

T-1

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GENERAL NOTES:

1. THE GENERAL CONTRACTOR MUST VERIFY ALL DIMENSIONS, CONDITIONS AND ELEVATIONS BEFORE STARTING WORK. ALL DISCREPANCIES SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER AND SHALL BE RESOLVED BEFORE PROCEEDING WITH THE WORK. ALL WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER IN ACCORDANCE WITH ACCEPTED CONSTRUCTION PRACTICES.
2. IT IS THE INTENTION OF THESE DRAWINGS TO SHOW THE COMPLETED INSTALLATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY BRACING, SHORING, TIES, FORM WORK, ETC. IN ACCORDANCE WITH ALL NATIONAL, STATE, AND LOCAL ORDINANCES, TO SAFELY EXECUTE ALL WORK AND SHALL BE RESPONSIBLE FOR SAME. ALL WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES.
3. THE CONTRACTOR SHALL USE ADEQUATE NUMBER OF SKILLED WORKMEN WHO ARE THOROUGHLY TRAINED AND EXPERIENCED IN THE NECESSARY CRAFTS AND WHO ARE COMPLETELY FAMILIAR WITH THE SPECIFIED REQUIREMENTS AND METHOD NEEDED FOR PROPER PERFORMANCE OF THE WORK.
4. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. CONSTRUCTION CONTRACTOR FURTHER AGREES TO INDEMNIFY AND HOLD DESIGN ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH PERFORMANCE OF WORK ON THIS PROJECT.
5. SITE GROUNDING SHALL COMPLY WITH TMOBILE GROUNDING STANDARDS, LATEST EDITION, AND COMPLY WITH TMOBILE GROUNDING CHECKLIST, LATEST VERSION. WHEN NATIONAL AND LOCAL GROUNDING CODES ARE MORE STRINGENT THEY SHALL GOVERN.
6. ALL WORK SHALL COMPLY WITH OSHA AND STATE SAFETY REQUIREMENTS. PROCEDURES FOR THE PROTECTION OF EXCAVATIONS, EXISTING CONSTRUCTION AND UTILITIES SHALL BE ESTABLISHED PRIOR TO FOUNDATION INSTALLATION. IF TEMPORARY LIGHTING AND MARKING IS REQUIRED BY THE FEDERAL AVIATION ADMINISTRATION (FAA), IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE NECESSARY LIGHTS AND NOTIFY THE PROPER AUTHORITIES IN THE EVENT OF A PROBLEM.
7. ALL WORK SHALL BE ACCOMPLISHED IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL CODES AND ORDINANCES. THE MOST STRINGENT CODE WILL APPLY IN THE CASE OF DISCREPANCIES OR DIFFERENCES IN THE CODE REQUIREMENTS.
8. ANY DAMAGE TO ADJACENT PROPERTIES SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
9. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING AMPLE NOTICE TO THE BUILDING INSPECTION DEPARTMENT TO SCHEDULE THE REQUIRED INSPECTIONS. A MINIMUM OF 24 HOURS OF NOTICE SHALL BE GIVEN AND THE BUILDING INSPECTION DEPARTMENTS HAVE REQUESTED THAT GROUPS OF TWO OR THREE SITES BE SCHEDULED AT ONE TIME IF POSSIBLE.
10. CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES WITHIN CONSTRUCTION LIMITS PRIOR TO CONSTRUCTION.
11. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING POSITIVE DRAINAGE ON THE SITE AT ALL TIMES. SILT AND EROSION CONTROL SHALL BE MAINTAINED ON THE DOWNSTREAM SIDE OF THE SITE AT ALL TIMES. ANY DAMAGE TO ADJACENT PROPERTIES SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
12. CLEARING OF TREES AND VEGETATION ON THE SITE SHOULD BE HELD TO A MINIMUM. ONLY THE TREES NECESSARY FOR CONSTRUCTION OF THE FACILITIES SHALL BE REMOVED. ANY DAMAGE TO PROPERTY OUTSIDE THE LEASE PROPERTY SHALL BE REPAIRED BY THE CONTRACTOR.
14. ALL SUITABLE BORROW MATERIAL FOR BACK FILL OF THE SITE SHALL BE INCLUDED IN THE BID. EXCESS TOPSOIL AND UNSUITABLE MATERIAL SHALL BE DISPOSED OF OFF SITE AT LOCATIONS APPROVED BY GOVERNING AGENCIES PRIOR TO DISPOSAL.
15. SEEDING AND MULCHING OF THE SITE SHALL BE ACCOMPLISHED AS SOON AS POSSIBLE AFTER COMPLETION OF THE SITE DEVELOPMENT. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND MAINTAINING AN ADEQUATE COVER OF VEGETATION OVER THE SITE FOR A ONE YEAR PERIOD.
16. PERMITS: OBTAIN AND PAY FOR REQUIRED PERMITS, LICENSES, FEES, INSPECTIONS, ETC.
17. RECORD DRAWINGS: MAINTAIN A RECORD OF ALL CHANGES, SUBSTITUTIONS BETWEEN WORK AS SPECIFIED AND INSTALLED. RECORD CHANGES ON A CLEAN SET OF CONTRACT DRAWINGS WHICH SHALL BE TURNED OVER TO THE CONSTRUCTION MANAGER UPON COMPLETION OF THE PROJECT.
18. THE CONTRACTOR SHALL VISIT THE SITE BEFORE BIDDING ON THE WORK CONTAINED IN THIS DESIGN PACKAGE.

LEGEND

x x	FENCE
550	CONTOUR LINE
	PROPERTY LINE / ROW
	LEASE AREA
	EASEMENT
	DISCONNECT SWITCH
M	METER
	CIRCUIT BREAKER
X	CODED NOTE NUMBER
	CHEMICAL GROUND ROD
	GROUND ROD
	GROUND ROD WITH INSPECTION SLEEVE
	CADWELD TYPE CONNECTION
	COMPRESSION TYPE CONNECTION
	GROUND WIRE
	FIBER
	COAX
(P)	PROPOSED
(E)	EXISTING

ISSUED FOR REVIEW

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COLUMBIA REGIONAL AIRPORT

11300 S. AIRPORT DR.
COLUMBIA, MO 65201

LOCATION CODE:

SLYH095A

NO.	DATE	DESCRIPTION:
0	02/21/2023	PRELIM ISSUE
1	05/22/2023	REV ISSUE

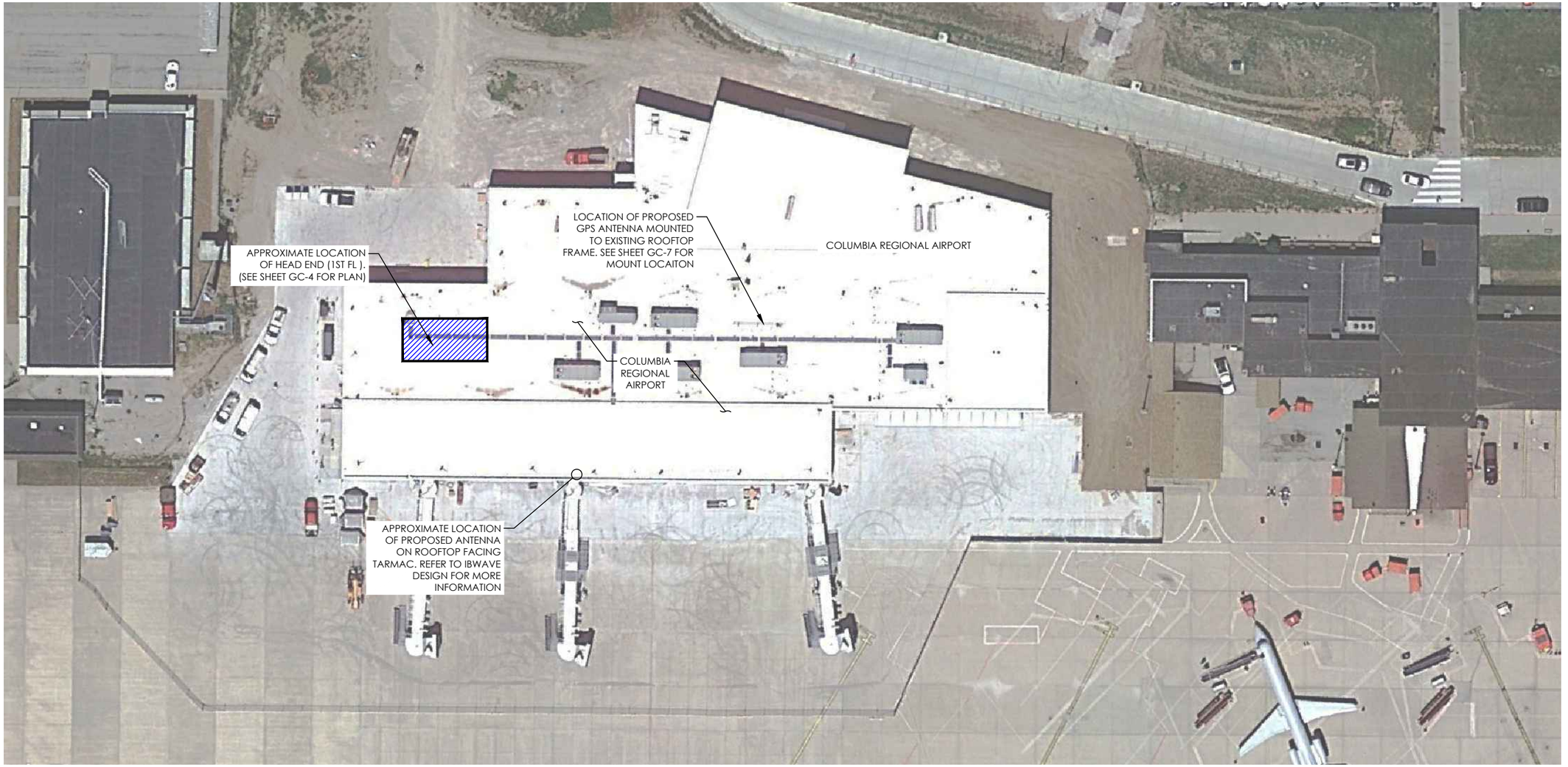
DESIGNED: NAM
DRAWN: JAN
CHECKED: SL

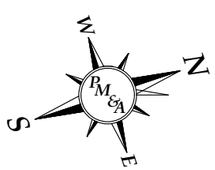
JOB #: 23_T3D-002

GENERAL NOTES

GC-1

DocuSign Envelope ID: 293D2406-986A-4764-8ED7-D2F9238756A6





GRAPHIC SCALE

0 40' 80'

SCALE: 1" = 40'

OVERALL SITE PLAN

SCALE: 1" = 40'

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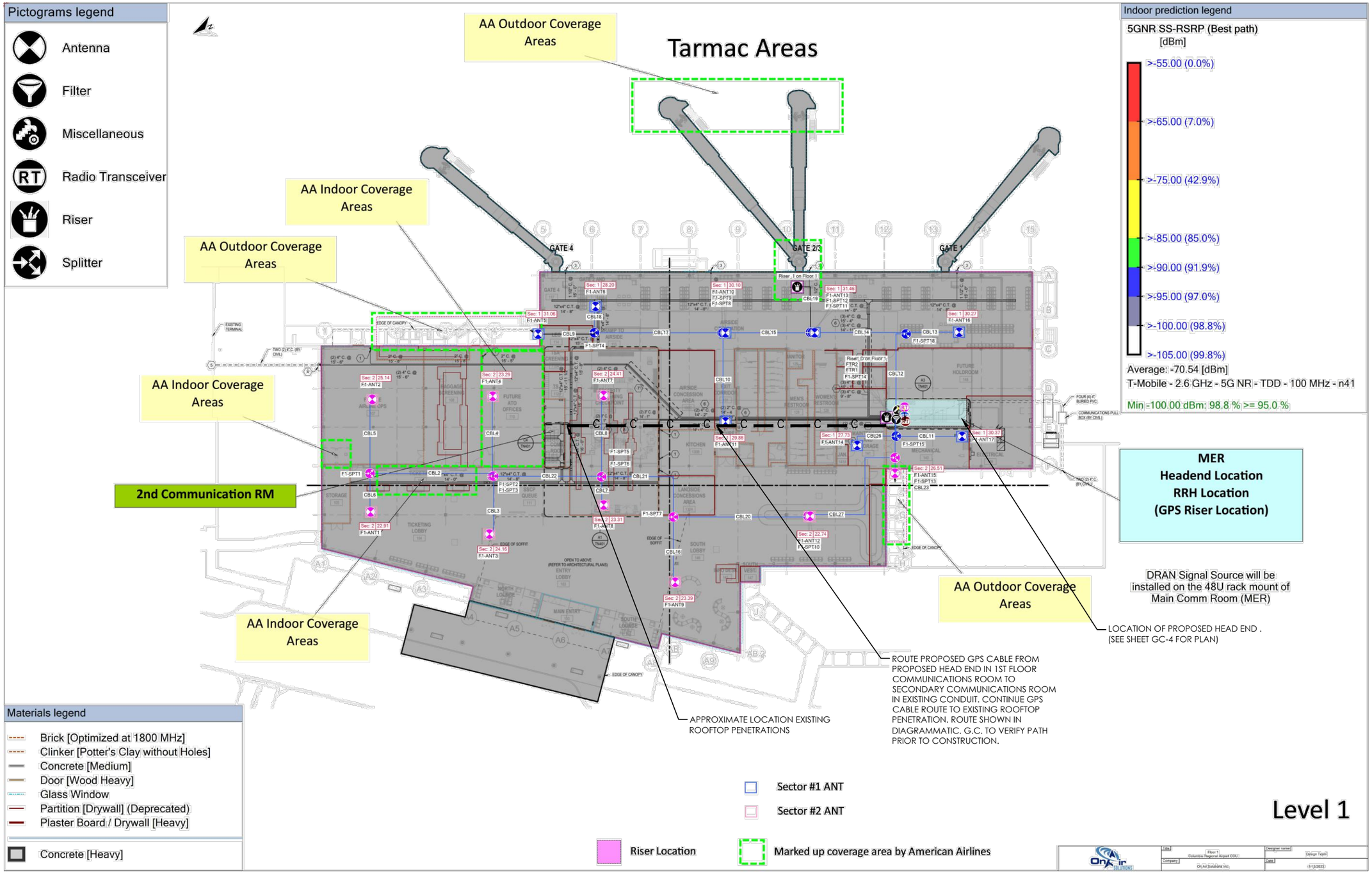
OVERALL SITE PLAN

GC-2

DocuSign Envelope ID: 293D2406-986A-4764-8ED7-D2F9238756A6



1ST FLOOR IBWAVE PLAN

SCALE: N.T.S.

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1ST FLOOR IBWAVE PLAN

GC-3

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Pictograms legend

- Antenna
- Miscellaneous
- Riser

AA Outdoor Coverage Areas

Tarmac Areas

Tilting 10 degrees

The Roof-ANT18 service Directional antennas will be mounted on the roof to cover the Tarmac areas

Sec:1 30.39
RF-ANT18
MSC6

Riser_1 on Roof
CBL19

Riser_D on Roof
RF-ANT19
CBL1
MSC8
MSC7

GPS antenna will be mounted here on the roof with non-penetrating roof mount.

Needs a new roof penetration above the main Communication room to run GPS antenna run here on the roof.

Indoor prediction legend

5GNR SS-RSRP (Best path)
[dBm]

- >-55.00 (0.0%)
- >-65.00 (1.9%)
- >-75.00 (29.7%)
- >-85.00 (100.0%)
- >-90.00 (100.0%)
- >-95.00 (100.0%)
- >-100.00 (100.0%)
- >-105.00 (100.0%)

Average: -73.66 [dBm]
T-Mobile - 2.6 GHz - 5G NR - TDD - 100 MHz - n41

Min -100.00 dBm: 100.0 % >= 95.0 %

Materials legend

- Glass Window
- Lime - Brick
- Concrete [Heavy]

Sector #1 ANT

Sector #2 ANT

Riser Location

Marked up coverage area by American Airlines (AA)

Roof

ROOF IBWAVE PLAN

SCALE: N.T.S.

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ROOF IBWAVE PLAN

GC-3A

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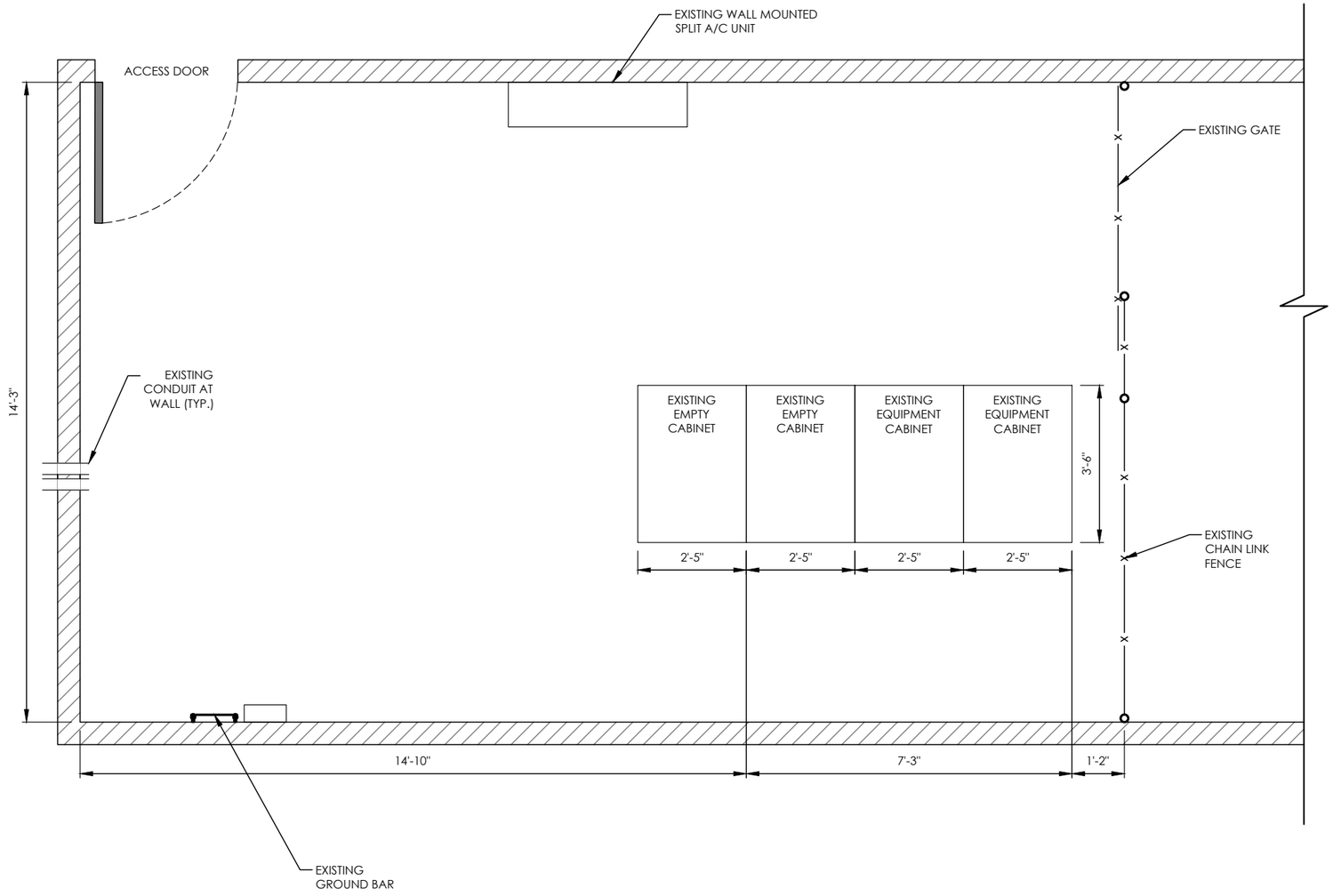

EXISTING HEAD END - 1ST FLOOR COMMUNICATIONS ROOM

SCALE: 1" = 3'

GRAPHIC SCALE

0 3' 6'

SCALE: 1" = 3'

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EXISTING HEAD END

GC-4

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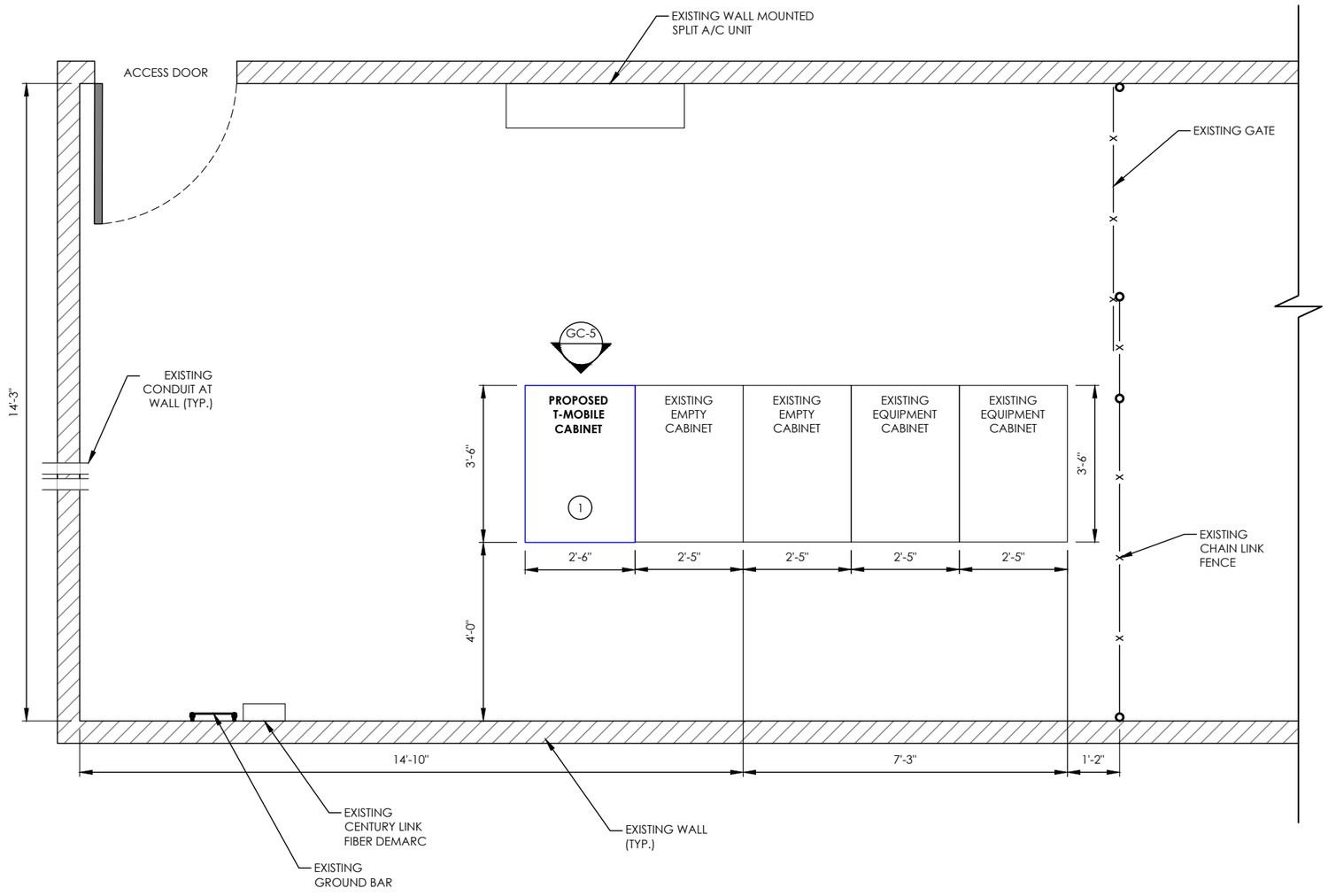
PROPOSED EQUIPMENT LIST:

(1) **PROPOSED 42U APC SX AR3150 EQUIPMENT CABINET:**

- **DELTA POWER PLANT MODEL# ESGC225AHCU21 W/ 3 DPR 3000 RECTIFIER**
- **AAV ROUTER**
- **IXR-E**
- **AIRSCALE BBU W/ (3) ABIO**
- **(1) AZHL RADIO**
- **(1) AHFB RADIO**
- **(1) AHIB RADIO**



PROPOSED HEAD END - 1ST FLOOR COMMUNICATIONS ROOM

SCALE: 1" = 3'

GRAPHIC SCALE

0 3' 6'

SCALE: 1" = 3'

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PROPOSED HEAD END

GC-4A

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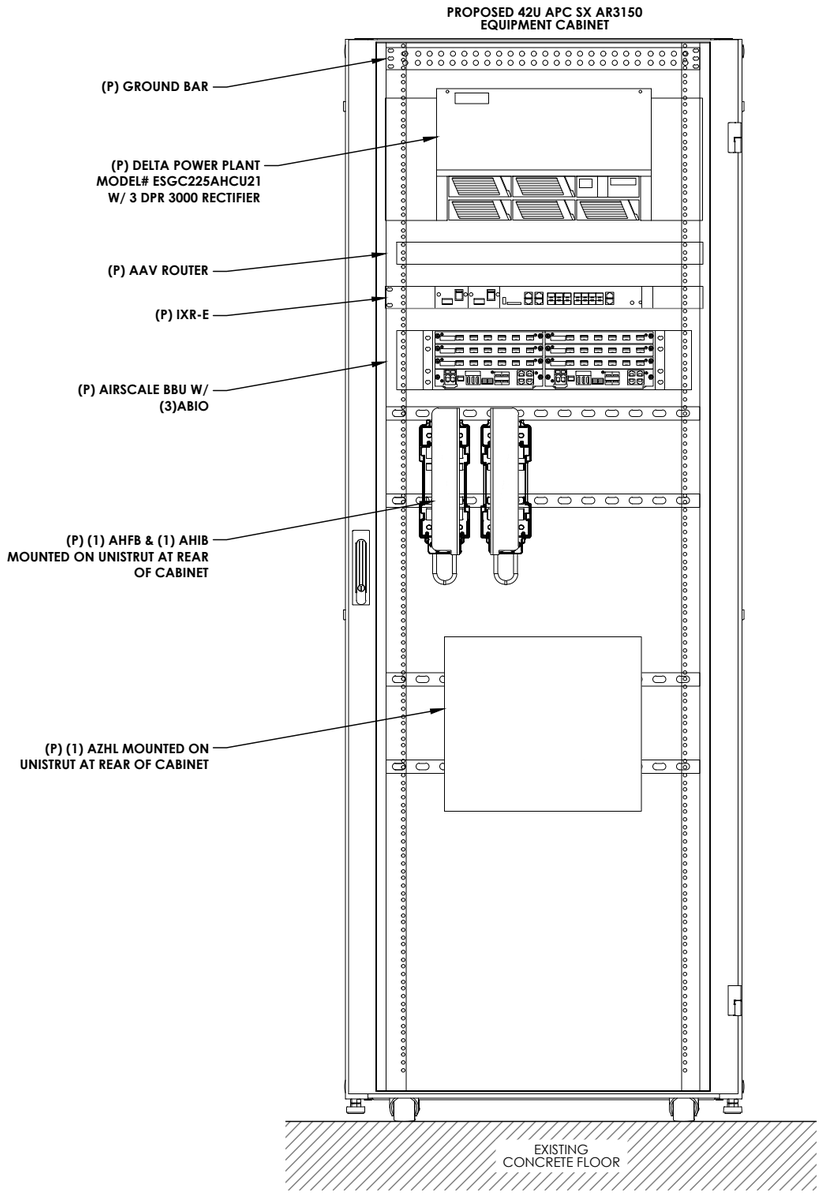

PROPOSED EQUIPMENT ELEVATION

SCALE: 1" = 1'

GRAPHIC SCALE

0 1' 2'

SCALE: 1" = 1'

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CHECKED: SL

JOB #: 23_T3D-002

PROPOSED EQUIPMENT ELEVATION

GC-5

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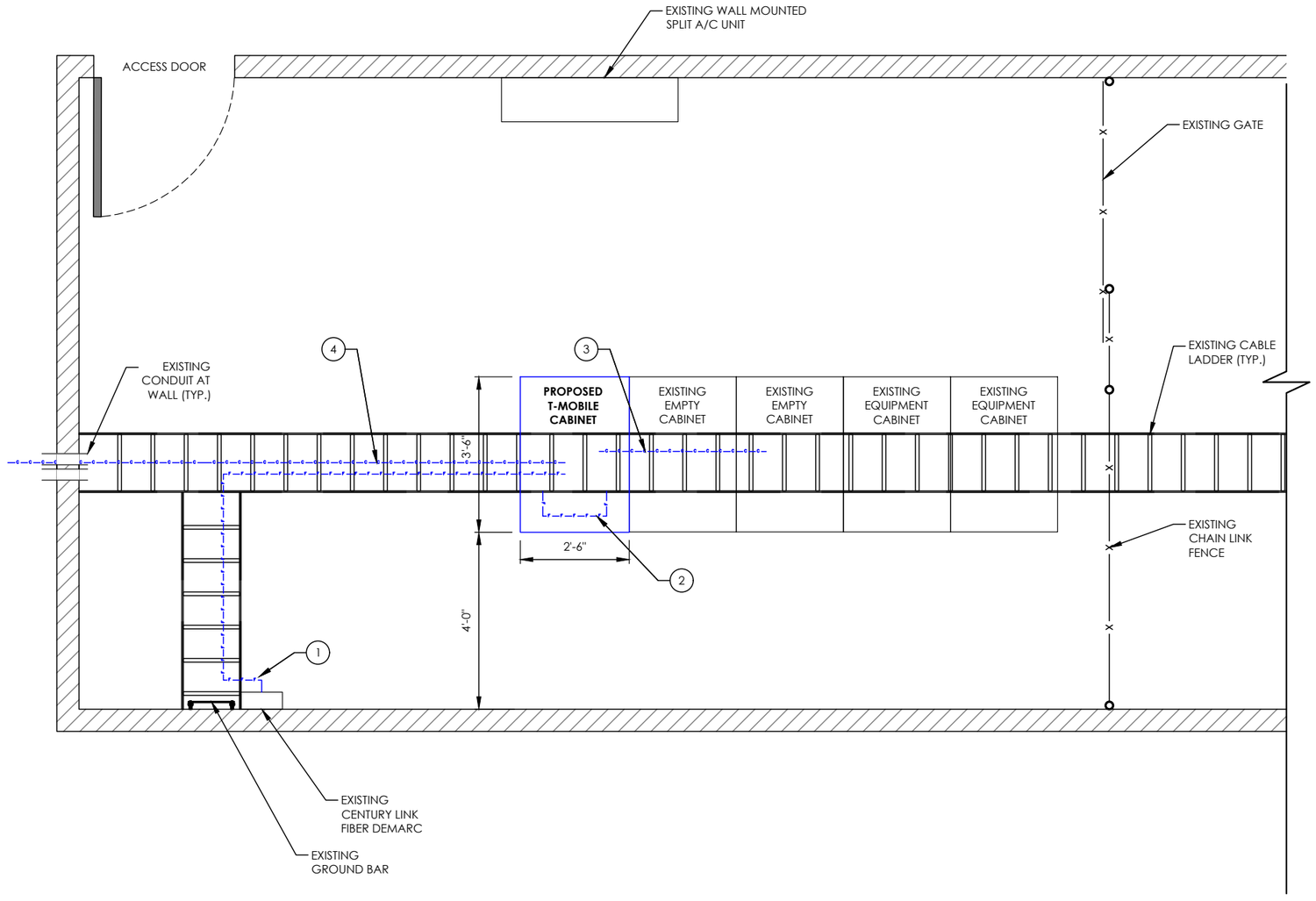
CABLE KEY NOTES:

1. ROUTE PROPOSED FIBER FROM EXISTING CENTURY LINK DEMARC PANEL TO PROPOSED T-MOBILE ROUTER IN EXISTING CABINET. (APPRX LENGTH 25' ±)

2. ROUTE PROPOSED FIBER FROM AIRSCALE BBU TO RADIOS. (APPRX LENGTH 3')

3. ROUTE PROPOSED COAX FROM RADIOS/TRIPLEXERS TO TO PROPOSED ANTENNAS THOROUGHOUT AIRPORT. REFER TO IBWAVE PLAN FOR ANTENNA DESIGN

4. ROUTE PROPOSED GPS CABLE FROM PROPOSED AIRSCALE TO PROPSOED GPS ANTENNA ON ROOFTOP. THE GPS CABLE WILL RUN IN EXISTING CONDUIT FROM THE PROPOSED HEAD END IN THE 1ST FLOOR COMMUNICATIONS ROOM TO THE SECONDARY 1ST FLOOR COMMUNICATIONS ROOM (NEAR TSA). EXACT CONDUIT TO BE VERIFIED PRIOR TO CONSTRUCTION. SEE GC-7 FOR GPS MOUNT PLAN



PROPOSED HEAD END CABLE PLAN

SCALE: 1" = 3'

GRAPHIC SCALE

0 3' 6'

SCALE: 1" = 3'

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PROPOSED HEAD END CABLE PLAN

GC-6

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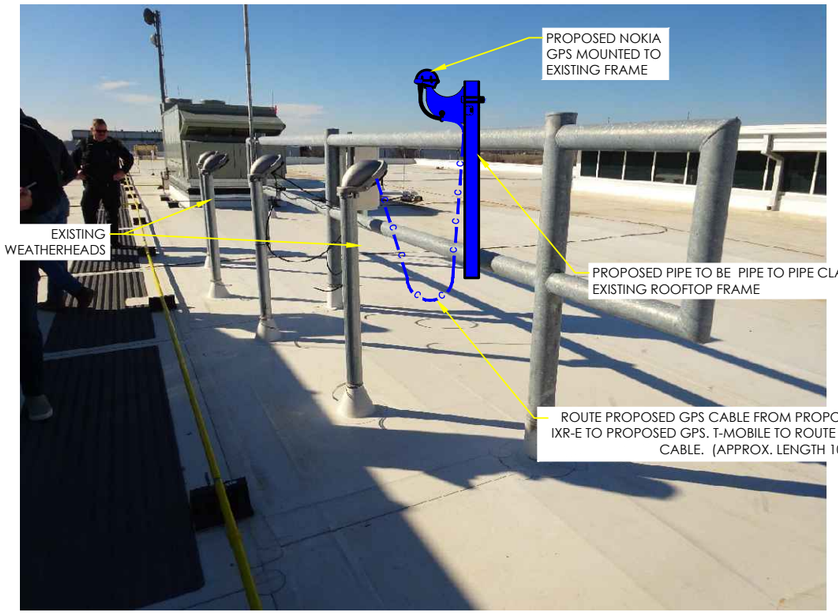
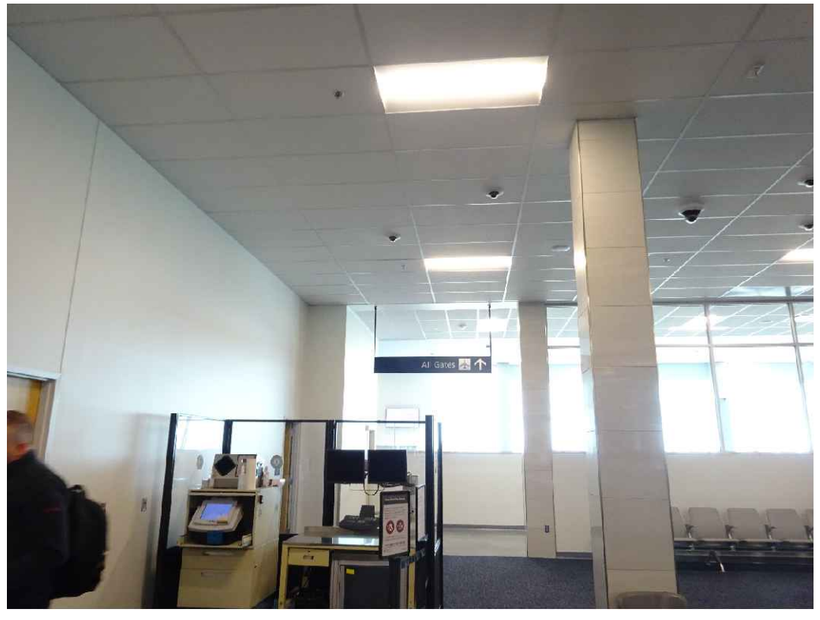


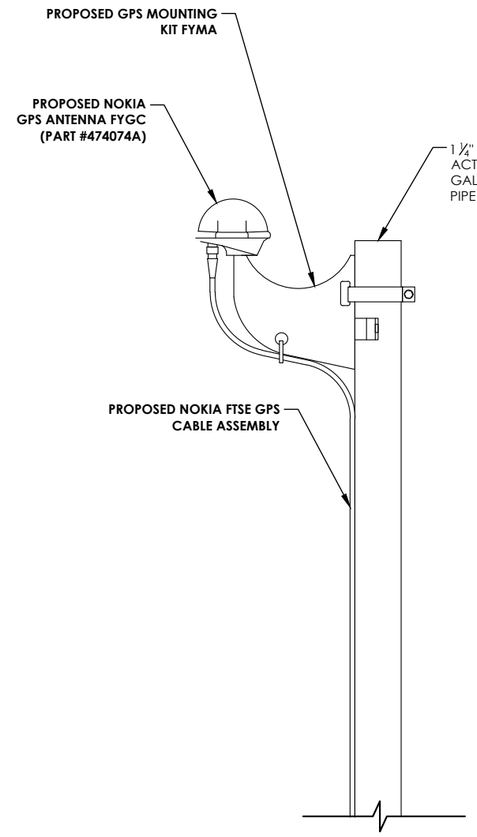
GPS ANTENNA MOUNT LOCATION

SCALE: N.T.S.



LOCATION UNDER ROOFTOP MOUNT - TSA

SCALE: N.T.S.



GPS MOUNTING DETAIL

SCALE: N.T.S.

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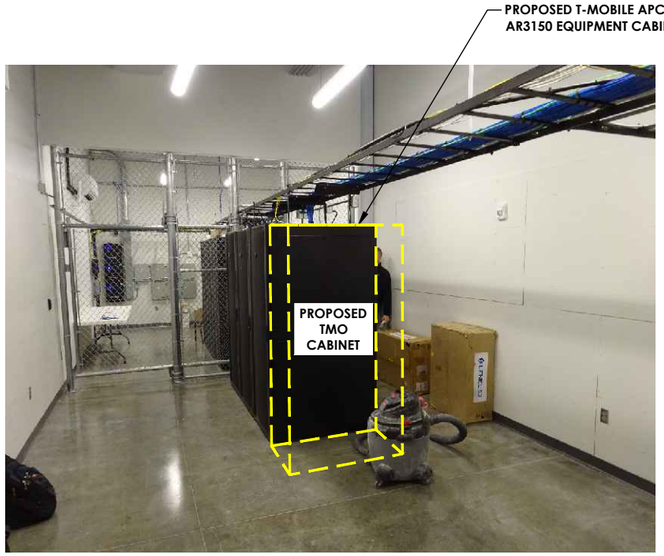
DRAWN:	JAN
CHECKED:	SL

JOB #: 23_T3D-002

GPS PLAN

GC-7

DocuSign Envelope ID: 293D2406-986A-4764-8ED7-D2F9238756A6

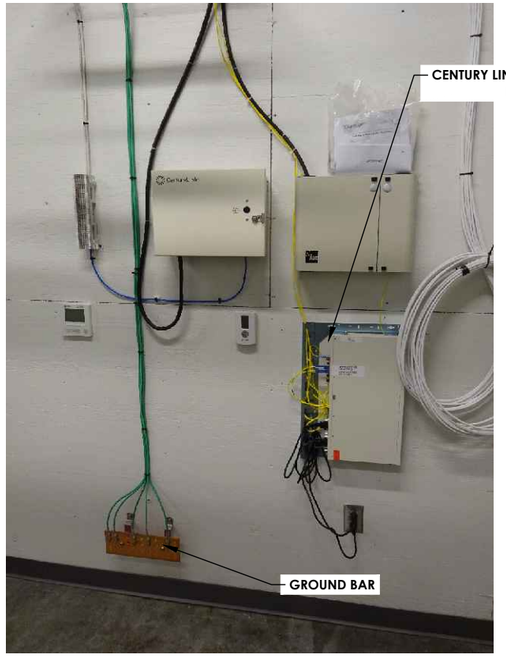


1ST FLOOR COMMUNICATION ROOM - HEAD END

SCALE: N.T.S.

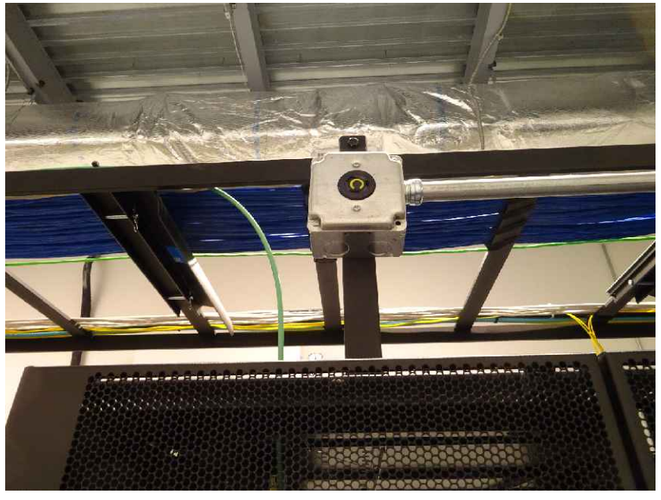
PROPOSED HEAD END CABINET

SCALE: N.T.S.



FIBER DEMARC AND GROUND BAR

SCALE: N.T.S.

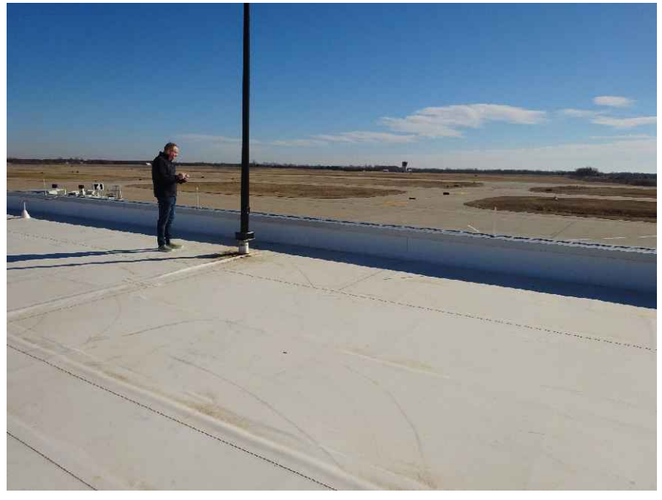


L5-20R ABOVE PROPOSED HEAD END CABINET

SCALE: N.T.S.

225A AC PANEL 'LA SEC-2' 208/120V 3PH

SCALE: N.T.S.



LOCATION OF PROPOSED ROOFTOP ANTENNA FACING TARMAC

SCALE: N.T.S.

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INSTALLATION PHOTOS

GC-8

DocuSign Envelope ID: 293D2406-986A-4764-8ED7-D2F9238756A6

Section 1 - Site Information

Site ID: SLYH095A
Status: ReadyForReview
Version: 1
Project Type: DAS
Approved: Not approved
Approved By: Not approved
Last Modified: 01/18/2023 4:39:53 PM
Last Modified By: Sangyup.Lee251@T-Mobile.com

Site Name: Columbia Regional Airport (COU)
Site Class: In-Building HUB
Site Type: Engineering DAS
Plan Year: 2023
Market: ST LOUIS MO
Vendor: Nokia
Landlord:

Latitude: 38.81762498
Longitude: -92.22156373
Address: 11300 S. Airport Dr.
City, State: Columbia, MO
Region: CENTRAL

RAN Template:
AL Template:

Sector Count: 0	Antenna Count: 0	Coax Line Count: 0	TMA Count: 0	RRU Count: 0

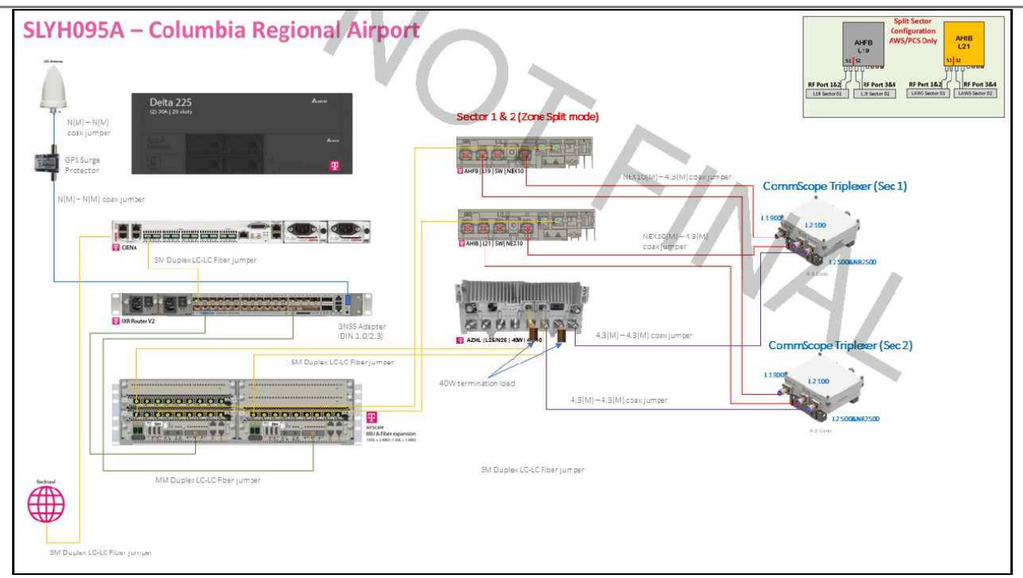
Proposed RAN Equipment

Template:

Enclosure	1
Enclosure Type	19 Inch Rack (Nokia)
Radio	AZHL
Small Cell Radio Only	AirScale Micro RRH DC Power Plug Kit (x3) · Nokia AirScale Micro B25 4X4 LP-RRH AHFB L1900 · Nokia AirScale Micro B66 4X4 LP-RRH AHIB L2100
Baseband	ASIL (x2)
Optical Cable/SFP	10Gb/s 850nm Multimode SFP+ Datacom Tran (x3) · FOSO SM 1.4km SFP 1310nm CPRI 9.8G (x8) · FOTA Optical SFP+ 10GBase-SR 850nm MM (x2) · MM Indoor Fiber LC-LC 5m (x2) · SM Indoor Fiber LC-LC 5m (x4)
Baseband Submodule	ABIO (x3) · FTSF Sych Cable F (2m HDMI + IP Boot to HDMI + IP Boot)
Baseband Subrack	AMIA
Transport System	CSR IXRe V2 (Gen2)

RAN Scope of Work:

2 Sectors of L19, L21, L25, and NR25. The zone-splitting mode was implemented in L19 and L21.



NOT FINAL

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PROPOSED RFDS

GC-9

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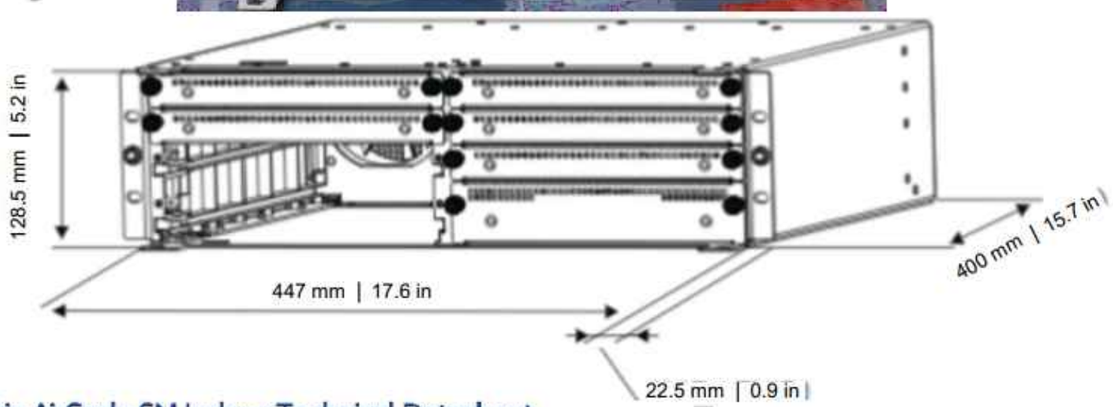

Nokia AirScale SM Indoor Technical Datasheet

Capacity Multi-RAT capable platform	Per Capacity plug-in unit in LTE16A: 8 LTE cells (FDD)
Minimum configuration	1 Common PIU (transport and control), 1 Capacity PIU (baseband processing)
Maximum configuration	2 Common PIU , 6 Capacity PIU
Installation options	19 inch standard rack, pole and wall (with mounting plinth), inside Outdoor Enclosure

Dimensions	(3U) H 128 mm x W 447 mm x D 400 mm (H 5.04"xW 17.60"xD 15.75")
Installation Depth	400mm + cooling air space 50mm (1.97")
Weight	Minimum (Common PIU + Capacity PIU): 10.1kg (22.27 lbs) Maximum (2 Common PIU + 6 Capacity PIU): 23.5kg (51.81 lbs)
Ingress protection	IP20
Operational Temperature Range	-5°C to 55°C

Supply Voltage / Voltage Range	Nominal: -48V DC / -40.5V to -57V
Power consumption	1 Common PIU & 1 Capacity PIU: typ 210W 1 Common PIU & 3 Capacity PIU: typ 420W 2 Common PIU & 6 Capacity PIU: typ 840W

Minimum configuration (1x BTS)

Minimum configuration (2x BTS, 1 BTS per half subrack

Maximum AirScale SM Indoor configuration (FL16A: 1 BTS per half subrack)

AIRSCALE SM INDOOR AMIA

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AIRSCALE AMIA SPECIFICATION

GC-9A

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NOKIA

Nokia 7250 IXR-e series Interconnect Routers

Release 21

Routers in the Nokia 7250 Interconnect Router (IXR)-e series[1] are used for access and aggregation and as 5G multi-access edge computing (MEC) leaf nodes. They are ideal for IP anyhaul and fixed-mobile convergence.

Ready for growth

The 7250 IXR-e series features high system throughput and a variety of interfaces. 100GE ports used for high-speed uplinks enable cost-effective 100GE ring architectures.

5G mobile and telco cloud infrastructures are moving toward 25GE interfaces. On the 7250 IXR-e series, the native 25GE ports are capable of supporting 1GE,[2] 10GE or 25GE transceivers. Combined with support for GE SFPs in all SFP+ cages, the 7250 IXR-e allows for seamless migrations from 1GE to 10GE to 25GE rates without the need to replace the router.

7250 IXR-e 2QSFP28 8SFP28 24SFP+

7250 IXR-e 14SFP+ 4RJ45

7250 IXR-ec 6SFP+ 20SFP 4RJ45

Compact and power saving

The 7250 IXR-e's compact (1RU) size and extended temperature range make it ideal for outside cabinet applications. It is ETSI 300-mm compliant, with all-up-front access and side-to-side air flow. A fan filter and redundant fans increase system lifetime and reduce maintenance costs.

7250 IXR-e systems consume approximately 20-25 percent less power than equivalent competing systems. Mass deployments for 5G will benefit significantly from this green design.

Differentiated service support

The 7250 IXR-e series supports low-latency applications while providing a large buffer memory for delay-tolerant applications. Very granular per-service and per-forwarding class policing and queuing features support differentiated quality of service (QoS), making the 7250 IXR-e series ideal for any-G aggregation and fixed-mobile network convergence.

1 The 7250 IXR-e series is part of the 7250 IXR product family. Additional data sheets are available for other models in the product family.
2 Future software deliverable

NOKIA

Automation

To simplify and automate network operations, the 7250 IXR-e series enables model-driven network management features through the Nokia Service Router Operating System (SR OS) and is managed by the Nokia Network Services Platform (NSP), which offers a rich set of service management features that automate end-to-end service provisioning and operations, administration and maintenance (OAM) to enhance end-user experience and reduce operating costs.

Standards-based software-defined networking (SDN) interfaces enable best-path computation to be offloaded to path computation elements (PCEs) such as the Nokia NSP. 7250 IXR-e-series routers operating as path computation clients (PCCs) collect and report per-link and per-service delay, jitter and loss metrics together with port utilization levels, for efficient path computation.

Software features

The 7250 IXR-e series supports, but is not limited to, the following features.

Services

- Point-to-point Ethernet pseudowires/virtual leased line (VLL)
- Ethernet Virtual Private Network (EVPN)
  - Virtual Private Wire Service (EVPN-VPWS)
  - Virtual Private LAN Services (EVPN-VPLS): IPv4 and IPv6 support, including Virtual Router Redundancy Protocol (VRRP)
  - Multihoming with single active or active/active modes
- Multipoint Ethernet VPN services with VPLS based on Targeted Label Distribution Protocol (T-LDP) and Border Gateway Protocol (BGP)
- Routed VPLS with Internet Enhances Services (IES)/IP-VPN IPv4 and IPv6
- Ingress and egress VLAN manipulation for L2 services
- IP VPN Virtual Private Routed Network (VPRN), Inter-Autonomous System (Inter-AS) Option A, B, and C
- IPv6 VPN Provider Edge (6VPE)

Network protocols

- Segment routing
  - Intermediate System-to-Intermediate System (SR-ISIS) and Open Shortest Path First (SR-OSPF)
  - Traffic engineering (SR-TE) IPv4, IPv6
- MPLS label edge router (LER) and label switching router (LSR) functions
  - LDP
  - Resource Reservation Protocol with traffic engineering (RSVP-TE)
- BGP Labeled Unicast (LU) (RFC 3107) route tunnels
- IP routing
  - Dual-stack Interior Gateway Protocol (IGP)
  - Multi-topology, multi-instance IS-IS
  - Multi-instance OSPF
  - Multiprotocol BGP (MP-BGP)
  - BGP-LU support in edge, area border router (ABR) and autonomous system boundary router (ASBR) roles
  - Usage-triggered download of BGP label routes to Label - Forwarding Information Base (L-FIB)
  - Accumulated IGP (AIGP) metric for BGP
  - BGP monitoring protocol (BMP)
  - BGP route-reflector for EVPN and IP-VPN with VPNv4 and VPNv6 address families (AFs)
  - BGP confederations
  - IGP and BGP shortcuts
- Layer 3 Multicast - base routing
  - Internet Group Management Protocol (IGMP)
  - Protocol Independent Multicast – Sparse Mode (PIM-SM), Source Specific Multicast (SSM)
  - Multicast Listener Discovery (MLD)
- Layer 3 Multicast - VPRN
  - Next-generation multicast VPNs (NG-MVPN)
  - SSM with multicast LDPv4 (mLDPv4)
  - IGMP/MLD
  - IGMP/MLD on Routed VPLS Interface
- Layer 2 Multicast
  - IGMP/MLD snooping

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IXR-E SPECIFICATION

GC-9B

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Interfaces

Figure 118 AHFB interfaces

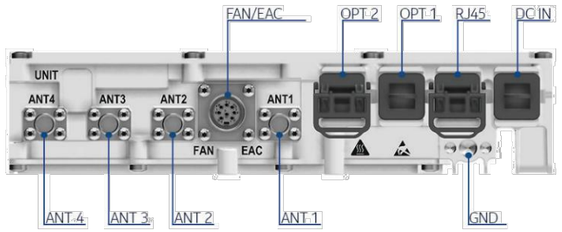

Table 472 AHFB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power Connector	DC IN	1	OCTIS Plug Kit	Hot insert not supported
Antenna connector	ANT	4	NEX 10	-
External Alarm Connection/Fan	FAN/EAC	1	CIRC 8F IP67 Flange	Hot insert not supported
Optical interface	OPT	2	OCTIS Plug Kit SFP/SFP+	9.8 Gbps, CPRI
Ethernet	RJ	1	RJ45	Separate feature required to enable this interface
Ground	⏚	1	M8 or dual M5 screws	-

Antenna Line Devices (ALDs) support

Note: There is no Antenna Line Device support for AHFB.

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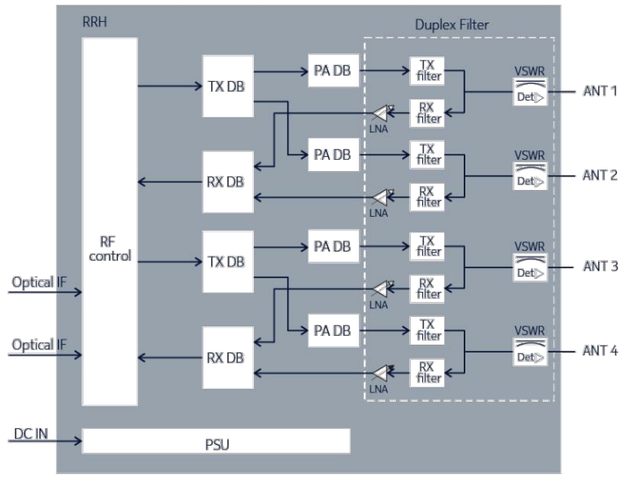
Functional block diagram

Figure 119 AHFB functional block diagram



Electrical specifications

Table 473 AHFB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36 V to -40.5 V and -57 V to -60 V (DC)

Power consumption

Typical power consumption [W] for 48VDC input, at 25°C, representative of typical product performance under the same conditions (HW variant, SW version, configuration, environment, and so on) with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h

Table 474 AHFB power consumption in LTE mode

Configuration	Output power per carrier [W]	Power consumption ETSI 202706 average P_{RRH}, static	Power consumption ETSI 202706 busy hour load $P_{BH\ RRH}$, static	Power consumption 100% RF power load $P_{100\%\ RRH}$
1 sector 2Tx	2x5	68	75	89
1 sector 4Tx	4x5	92	106	135

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AHFB SPECIFICATION

GC-9C

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Interfaces

Figure: *AHIB interfaces*

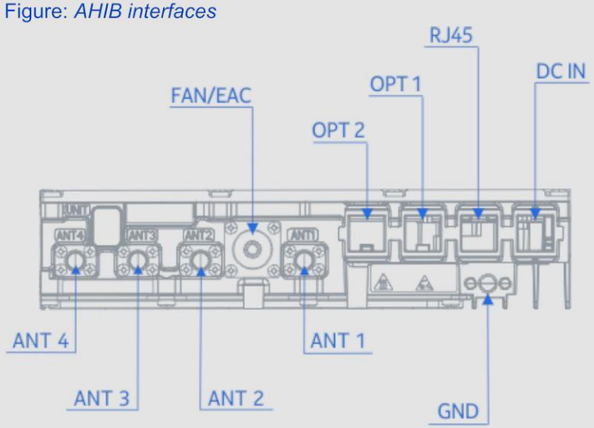


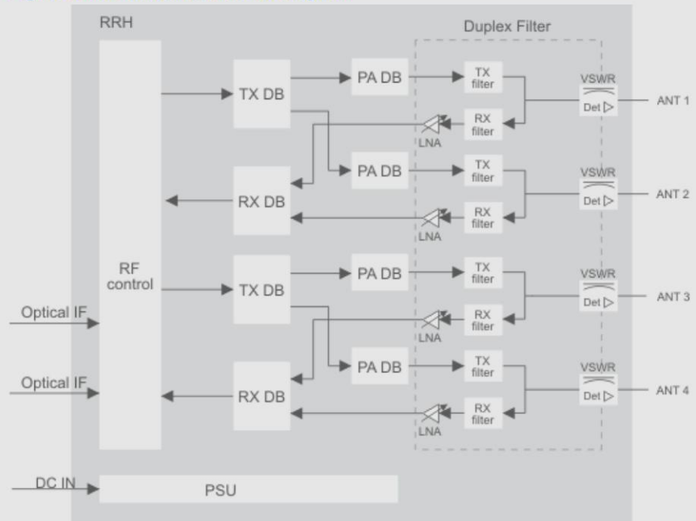
Table: *AHIB interfaces*

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power Connector	DC IN	1	Octis Plug Kit	Hot insert not supported
Antenna connector	ANT	4	NEX10	-
External Alarm Connection / Fan	FAN/EAC	1	CIRC 8F IP67 Flange	Hot insert not supported
Optical interface	OPT	2	OCTIS Plug Kit SFP/SFP+	9.8 Gbps, CPRI

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Ethernet	RJ	1	RJ45	Separate feature required to enable this interface
Ground	⏚	1	M8 or dual M5 screws	-

Functional block diagram

Figure: *AHIB functional block diagram*



Electrical specifications

Table: *AHIB electrical specifications*

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AHIB SPECIFICATION

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2.5GHz Radio AZHL Introduction

NOKIA

New Product Introduction Notification

AZHL 2.5GHz (B41) Radio

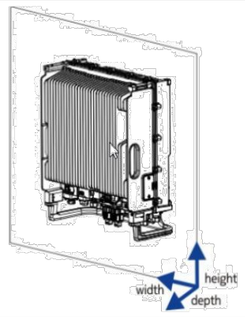
PURPOSE

2.5GHz radio (AZHL) is a high-power radio that is LTE and 5G capable. This radio will be installed where the AEHC installation is not possible for scenarios like radar mitigation or utility towers where active components can't be used or spectrum preservation. The AZHL deployment is considered a corner-case scenario and should only be used as a last option for B41.

BACKGROUND

The AZHL is a new RRH product radio for Band 41 (2.5GHz) from Nokia. This radio unit is LTE and 5G capable and has beamforming capability with 8T8R with 8 x 40W, which provides coverage and capacity gains.
The AZHL has 8T8R and 40W / TRX (320 W Total). The AZHL comes with the ability to operate in 8T8R and it needs the Airscale for baseband connectivity via CPRI/eCPRI.
The AZHL deployment will only be used in concurrent mode in T-Mobile network.

PRODUCT DESCRIPTION

Band	N41/B41 2496 –2690MHz	
Supported Modulation schemes	256QAM (DL) 256QAM (UL)	
No. of TX/RX	8TX8RX	
MIMO Streams	8	
Instantaneous IBW	194 MHz	
Occupied Bandwidth OBW	190 MHz	
Supported bandwidths	LTE: 10/15/20 MHz 5G: 20/40/60/80/100MHz	
Power Consumption	559 W typical (75% DL duty cycle, ETSI 24H Average) 1140 W max (75% DL duty cycle, 100% RF load)	
Optical Ports	2 x SFP28, 9.8G CPRI, 10/25GE eCPRI (Octis Boot - AOPE)	

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AZHL SPECIFICATION

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Multi-GNSS Smart Antenna (FYGC) dimensions and weight

Dimensions and weight of Multi-GNSS Smart Antenna (FYGC) 474074A.

Table: The FYGC dimensions and weight

Property	Value
Height	72.5 mm (2.85 in.)
Depth	95 mm (3.74 in.)
Weight	154 g (5.4 oz)

Table: GPS Mounting Kit (FYMA) dimensions (Multi-GNSS Smart Antenna excluded)

Property	Value
Height	146 mm (5.75 in.)
Depth	155 mm (6.10 in.)
Weight	0.32 kg (11.3 oz)

Table: Flexi GPS Surge Protector Kit (FYEA) dimensions and weight

Property	Value
Height (mounting plate included)	55 mm (2.17 in.)
Height (enclosure only)	47 mm (1.85 in.)
Width (mounting plate included)	162 mm (6.38 in.)
Width (enclosure only)	65 mm (2.56 in.)
Depth (cable lead-ins excluded)	150 mm (5.91 in.)
Weight	0.56 kg (1.23 lb)

Figure: *FYGC mounted on a pole using GPS Mounting Kit (FYMA)*

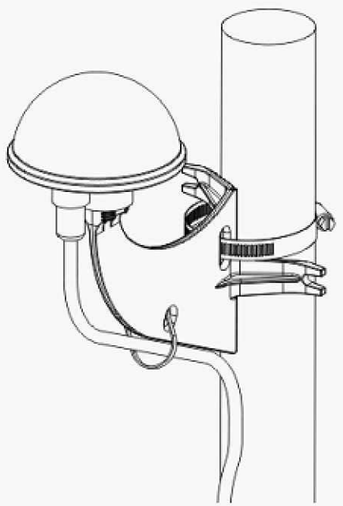
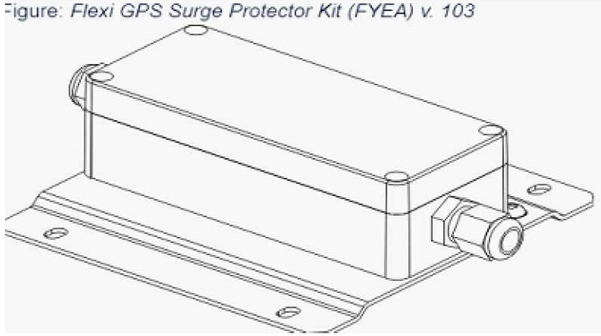


Figure: *Flexi GPS Surge Protector Kit (FYEA) v. 103*



Multi-GNSS Smart Antenna (FYGC) description

Hardware description of Multi-GNSS Smart Antenna (FYGC) 474074A and the related optional items and cables.

The following optional items for Multi-GNSS Smart Antenna (FYGC) are covered in this section:

GPS Mounting Kit (FYMA) 471605A
Flexi GPS Surge Protector Kit (FYEA) 471812A
Power/data cables:

GPS cable set (FYHA) up to 30 m 471606A (for a System Module with an MDR connector)

GPS cable set (FYHB) up to 100 m 471653A (for a System Module with an MDR connector)

GPS cable set (FTSE) up to 30 m 472510A (for a System Module with an HDMI connector)

GPS cable set (FTSH) up to 100 m 472577A (for a System Module with an HDMI connector)

GPS cable set (FTSM) up to 300 m 472870A (for a System Module with an HDMI connector)

Multi-GNSS Smart Antenna (FYGC) operation

Operation considerations for Multi-GNSS Smart Antenna (FYGC) 474074A.

The FYGC is a Multi-GNSS Smart Antenna in a rugged and weatherproof self-contained unit. FYGC is an integrated pipe thread-mounted multi-GNSS receiver, antenna and power supply solution in a single, environmentally sealed enclosure.

Multi-GNSS Smart Antenna is optimized for precise timing and network synchronization needs. The operating temperature range is from -40°C to +85°C (-40°F to +185°F).

Note:
Multi-GNSS Smart Antenna (FYGC) is set to support GPS, GLONASS, Beidou and Galileo satellite systems. To enable Galileo constellation a firmware update is required.

GPS Mounting Kit (FYMA)

Flexi GPS Surge Protector Kit (FYEA)

Flexi GPS Surge Protector Kit (FYEA) 471812A is available as an optional unit to protect the System Module from transient voltage and current spikes (Class III protection). It is installed to the GPS antenna line. The surge protector is particularly useful in locations with a high lightning risk.

NOKIA

Nokia 472510A FTSE GPS Cable

Manufacturer: Nokia

Description

Nokia 472510A.101 FTSE GPS Cable Assembly

- 30 meters
- Used with FSMF – GPS
- 3 Copper Cable With Connectors

Additional Nokia GPS antenna-related:
FYEA GPS Surge Protector Kit | **FYGB** GPS Antenna | **FYMA** GPS Antenna Mounting Kit

Description

Nokia FYGB GPS Glonass Receiver Base Station Antenna

A GPS or GLONASS antenna with an integrated receiver is installed outside for satellite visibility, and is directly connected to the System Module. DC power feed for the receiver is supplied through the combined power and data cable. The operating temperature range is from -40 to +85°C (-40 to 185°F).

- Mushroom Head
- FYGB is set to support both GPS and GLONASS satellite systems (GNSS mode selection is not possible)

GPS Antenna Kit (FYGA) and GPS GLONASS Receiver Antenna (FYGB) dimensions

- Depth:95 mm (3.74 in.)
- Height: 72.5 mm (2.85 in.)
- Weight: 154 g (5.4 oz)

Additional Nokia GPS antenna-related:
FISE GPS Cable | **FYEA** GPS Surge Protector Kit | **FYMA** GPS Antenna Mounting Kit

GPS GLONASS Receiver Antenna (FYGB)

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NOKIA GPS SPECIFICATION

GC-9F

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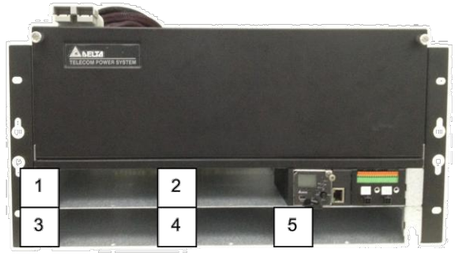
1 Specifications

1.1 System Specifications

This manual contains information and installation instructions for the Delta Power Systems with part number ESAA250-CCDxx (see chart below for shelf options). The system consists of an AC input, five (5) rectifier slots, controller (CSU502), lithium battery interface card, and a DC distribution section. See table in section 1.2 for information on available rectifiers.

Model Number	Load Circuit Breakers	Batt. Circuit Breakers	Breaker Configuration
ESAA250-CCD01	12	6	Breakers installed
ESAA250-CCD02	12	6	No breakers installed

Spec	Data
Electrical Requirements	
AC Input Voltage (x3)	110 - 120 VAC
AC Input Current (per input)	34A
DC Output Current	160A
AC Input Voltage (x3)	200 - 240 VAC
AC Input Current (per input)	29A
DC Output Current	250A
DC Output Voltage	43 - 58 VDC
Enviromental Requirements	
Operational Temperature	-40C - +75C
Storage Temperature	-40C - +80C
Relative Humidity	0 - 95%
Altitude	-100 - 4000 ft



1.2 Rectifier Specifications

The rectifiers are rated for operation in a temperature range of -40°C and 75°C. The modular design provides the flexibility to configure and expand the system as the load demand increases. Each rectifier is hot swappable with front access for ease of maintenance without system shutdown providing uninterrupted service. The airflow of the rectifiers is from front to rear.

Model Number	Nominal AC Input	Nominal Output Voltage	Rated Output of Rectifier
ESR-48/40B F*	110 VAC	54.00V	23.0A
	208/240 VAC	54.00V	37.0A
ESR-48/56A R	110 VAC	54.00V	31.0A
	208/240 VAC	54.00V	50.0A
ESR-48/56B F*	110 VAC	54.00V	31.0A
	208/240 VAC	54.00V	50.0A
* - High efficiency rectifier			

1.3 Controller Specifications

The power system uses the CSU502-series controller. The CSU502-series controller is a telecom-grade controller designed to work with Delta Greentech power systems. The controller provides the user with monitoring and control via a display and joy stick (control knob), an Ethernet based graphical user interface (GUI), and SNMP.

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DELTA ESAA250-CCD01 SPECIFICATION

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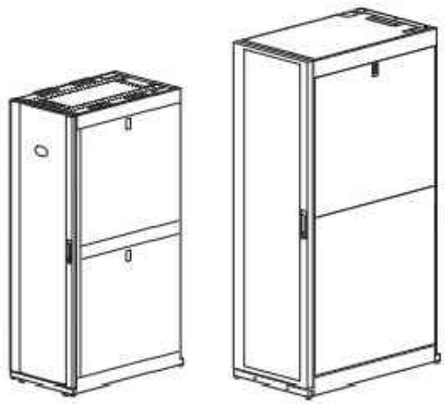
Installation and Customization

NetShelter™ SX Cabinet

990-2183J-001
Publication Date: January 2020



APC by Schneider Electric

Specifications

General specifications for SX cabinets:

(For detailed dimensions and weights refer to the NetShelter SX Specification manuals.)

Height

U	mm	in.
42U	1 991	78.4
45U	2 124	83.6
48U	2 258	88.9
50U	2 347	92.4
52U	2 436	95.9
54U*	2 525	99.4

* 54U models have not been evaluated by UL.

Width

mm	in.
600	23.6
700*	27.6
750	29.5
800	31.5

* 700 mm models in Japan only

Depth

mm	in.
1 070	42.1
1 200	47.2

Door Perforation pattern	69% open area
Clearance for wiring between front door and vertical rail	60.96 mm (2.40 in.)
Weight rating: static load[1]	1 704.97 kg (3,750 lb)
Weight rating: rolling[2]	1 020.58 kg (2,250 lb)

[1] Lower the leveling feet if the static weight is over 1 020.58 kg (2,250 lb).
[2] Rolling rating valid only for rolling the cabinet into position.

NOTE: Additional packaging is required if the cabinet is being shipped with equipment installed. See the NetShelter SX product family page at **www.apc.com** for details on cabinets with shock packaging.

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APC SX CABINET AR3150 SPECIFICATION

GC-9H

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ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.

2. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.

3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.

4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.

5. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.

6. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA.

7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).

8. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.

9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.

10. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#6 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

12. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.

13. ALL POWER AND POWER GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).

14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.

15. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40, OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

16. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.

17. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.

18. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.

19. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.

20. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.

21. CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.

22. WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.

23. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS

24. METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED, OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

25. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

26. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.

27. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

GROUNDING NOTES:

1. 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.

2. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. TESTING SHALL BE IN ACCORDANCE WITH SPECIFICATION 24782-000-3PS-EG00-00001. USE OF OTHER METHODS MUST BE PRE-APPROVED BY CONTRACTOR IN WRITING.

3. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. WHEN ADDING ELECTRODES, CONTRACTOR SHALL MAINTAIN A MINIMUM DISTANCE BETWEEN THE ADDED ELECTRODE AND ANY OTHER EXISTING ELECTRODE EQUAL TO THE BURIED LENGTH OF THE ROD. IDEALLY, CONTRACTOR SHALL STRIVE TO KEEP THE SEPARATION DISTANCE EQUAL TO TWICE THE BURIED LENGTH OF THE RODS.

4. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.

5. 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 AND UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

6. 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.

7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK-TO-BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.

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

9. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. IN ALL CASES, BENDS SHALL BE MADE WITH A MINIMUM BEND RADIUS OF 8 INCHES.

10. EACH INTERIOR BTS CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH #6 AWG STRANDED, GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES. EACH OUTDOOR CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE BURIED GROUND RING WITH # 2 AWG SOLID TIN-PLATED COPPER WIRE.

11. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE #2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.

12. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE. CONNECTIONS TO ABOVE GRADE EXTERIOR UNITS SHALL BE MADE WITH EXOTHERMIC WELDS WHERE PRACTICAL OR WITH 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS. HIGH PRESSURE CRIMP CONNECTORS MAY ONLY BE USED WITH WRITTEN PERMISSION FROM T-MOBILE MARKET REPRESENTATIVE.

13. EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTORS STRUCTURAL ENGINEER.

14. ALL WIRE TO WIRE GROUND CONNECTIONS TO THE INTERIOR GROUND RING SHALL BE FORMED USING HIGH PRESS CRIMPS OR SPLIT BOLT CONNECTORS WHERE INDICATED IN THE DETAILS.

15. ON ROOFTOP SITES WHERE EXOTHERMIC WELDS ARE A FIRE HAZARD COPPER COMPRESSION CAP CONNECTORS MAY BE USED FOR WIRE TO WIRE CONNECTORS. 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS SHALL BE USED FOR CONNECTION TO ALL ROOFTOP BTS EQUIPMENT AND STRUCTURAL STEEL.

16. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR USING TWO HOLED MECHANICAL TYPE BRASS CONNECTORS AND STAINLESS STEEL HARDWARE.

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

18. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.

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

20. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF THE BURIED GROUND RING WITH #2 SOLID AWG TIN-PLATED COPPER GROUND CONDUCTOR.

21. 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 WITH LISTED BONDING FITTINGS.

ISSUED FOR REVIEW

T-Mobile

P. MARSHALL & ASSOCIATES

COLUMBIA REGIONAL AIRPORT

11300 S. AIRPORT DR.
COLUMBIA, MO 65201

LOCATION CODE:

SLYH095A

NO.	DATE	DESCRIPTION:
0	02/21/2023	PRELIM ISSUE
1	05/22/2023	REV ISSUE

DESIGNED: NAM
DRAWN: JAN
CHECKED: SL

JOB #: 23_T3D-002

GENERAL ELECTRICAL & GROUNDING NOTES

E-1

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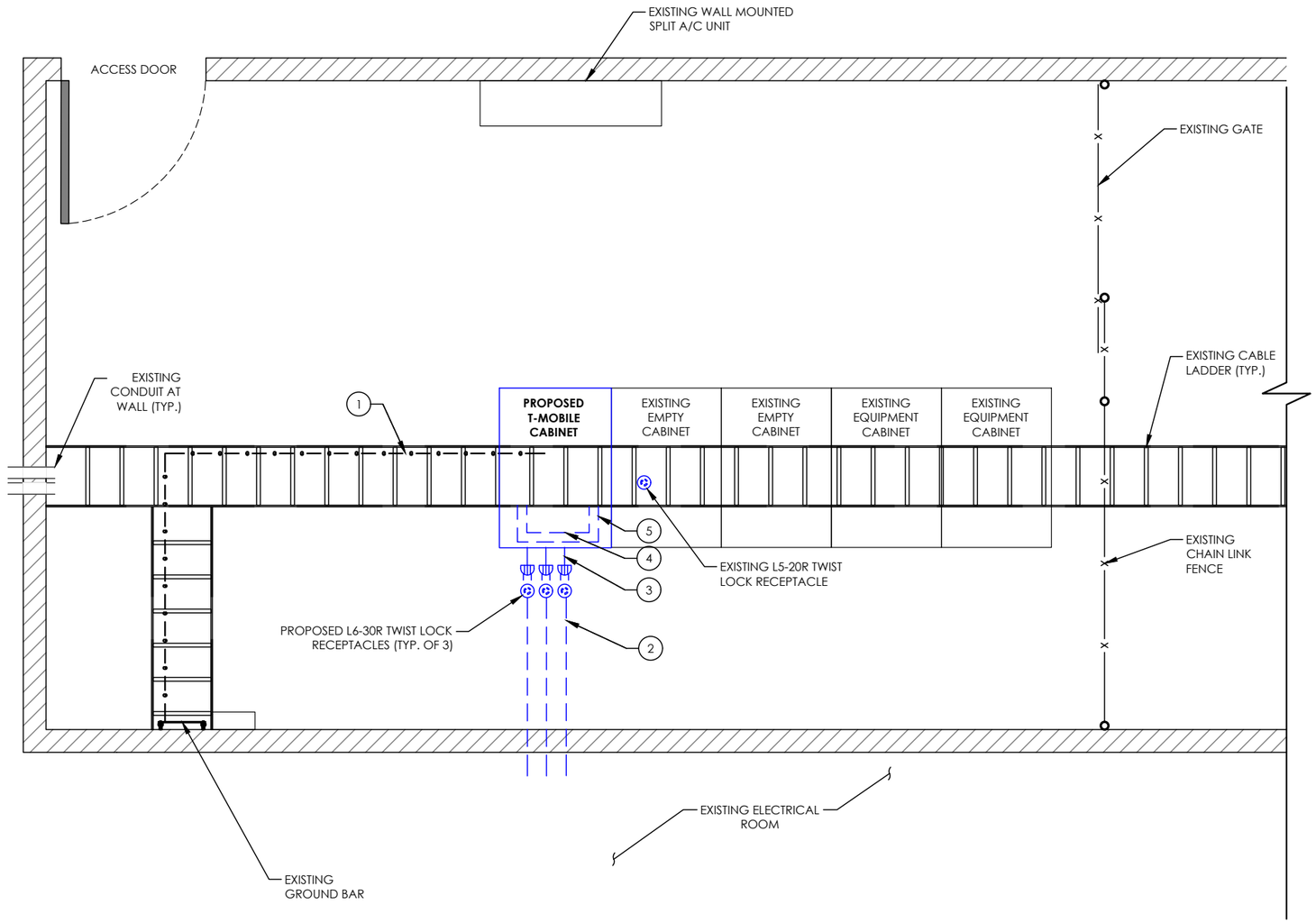
ELECTRICAL AND GROUNDING KEY NOTES:

1. PROPOSED #2 AWG GREEN STRANDED INSULATED GROUND WIRE FROM EXISTING GROUNDING BAR TO PROPOSED RACK MOUNTED GROUND BAR.
2. PROPOSED (3) L6-30R TWIST LOCK RECEPTACLES AT EXISTING CABINET. G.C. TO COORDINATE ELECTRICAL INSTALLATION WITH MIKE PARKS (573-817-5063).
3. EACH PROPOSED L6-30R POWERING RECTIFIERS AT DELTA 225 POWER PLANT.
4. ROUTE PROPOSED POWER FROM PROPOSED 225 DELAT POWER PLANT TO PROPOSED AIRSCALE BBU AND IXR-E.
5. ROUTE PROPOSED POWER FROM PROPOSED 225 DELTA POWER PLANT TO EACH RADIO.

LEGEND:
- SINGLE RECEPTACLE
- DUPLEX RECEPTACLE
- QUAD RECEPTACLE
- TWIST LOCK RECEPTACLE
- PLUG



ELECTRICAL & GROUNDING PLAN
SCALE: 1" = 3'

GRAPHIC SCALE
0 3' 6'
SCALE: 1" = 3'

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ELECTRICAL & GROUNDING PLAN

E-2

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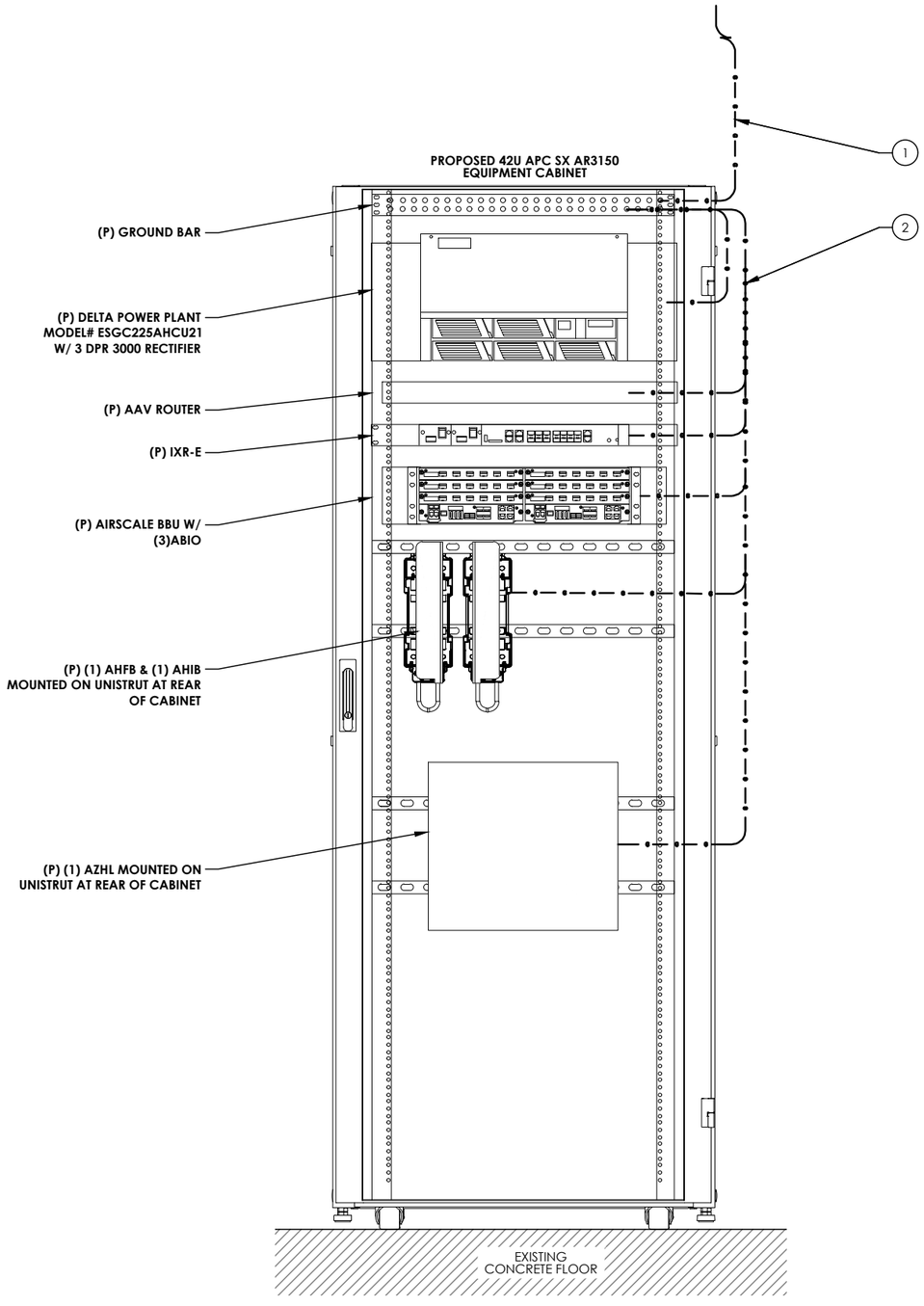

PROPOSED EQUIPMENT ELEVATION

SCALE: 1" = 1'

GRAPHIC SCALE

0 1' 2'

SCALE: 1" = 1'

GROUNDING KEY NOTES:

1. PROPOSED #2 AWG GREEN STRANDED INSULATED GROUND WIRE FROM EXISTING GROUND BAR TO PROPOSED CABINET MOUNTED GROUND BAR.

2. PROPOSED #6 AWG GREEN STRANDED INSULATED GROUND WIRE FROM PROPOSED T-MOBILE EQUIPMENT TO PROPOSED CABINET MOUNTED GROUND BAR. TYPICAL FOR EACH UNIT OF EQUIPMENT.

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EQUIPMENT RACK GROUNDING ELEVATION

E-3

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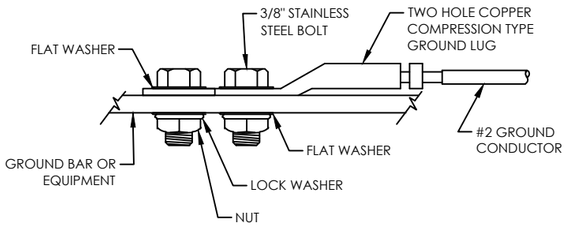
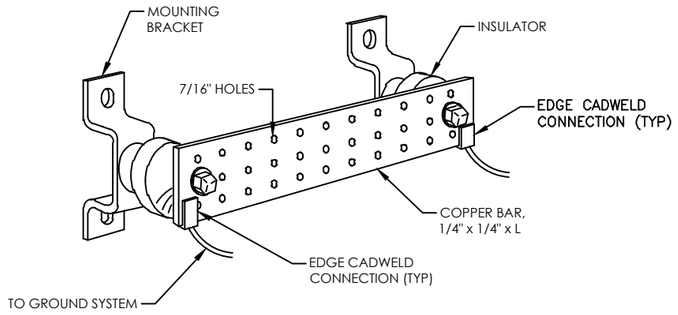


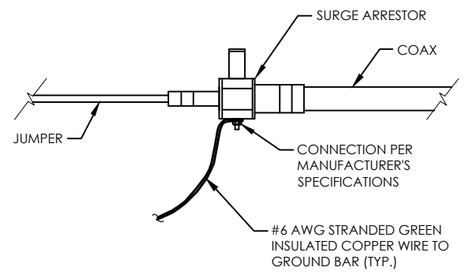
MECHANICAL GROUND CONNECTION



NOTE: L = AS REQUIRED FOR ALL CONNECTIONS PLUS 50% FUTURE CAPACITY.

GROUND BAR DETAIL

SCALE: N.T.S.



SURGE ARRESTOR GROUNDING DETAILS

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GROUNDING DETAILS

E-4

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EXHIBIT C

1. **Acknowledgement. T-Mobile (hereinafter "Contractor")** acknowledges that state and/or federal grant funds may be used in the development, construction, operation, or maintenance of the Airport. **Contractor** agrees to familiarize itself and comply with all conditions and requirements for utilization of such grant funds, including but not limited to those set forth in this Agreement.

   a. General Civil Rights Provisions. .In all its activities within the scope of its airport program, the Contractor agrees to comply with pertinent statutes, Executive Orders, and such rules as identified in Title VI List of Pertinent Nondiscrimination Acts and Authorities to ensure that no person shall, on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.
   This provision is in addition to that required by Title VI of the Civil Rights Act of 1964. If the Contractor transfers its obligation to another, the transferee is obligated in the same manner as the Contractor.
   The above provision obligates the Contractor for the period during which the property is owned, used or possessed by the Contractor and the airport remains obligated to the Federal Aviation Administration.

   b. Compliance with Nondiscrimination Requirements. During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor"), agrees as follows:

      1. **Compliance with Regulations:** The **Contractor** (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract

      2. **Nondiscrimination:** The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.

      3. **Solicitations for Subcontracts, including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding or negotiation made by the **Contractor** for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the **Contractor** of the contractor's obligations under this contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.

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4. **Information and Reports:** The **Contractor** will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts and Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the **Contractor** will so certify to the sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of the **Contractor's** noncompliance with the non-discrimination provisions of this contract, the sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:

    a. Withholding payments to the **Contractor** under the contract until the **Contractor** complies; and/or

    b. Cancelling, terminating, or suspending a contract, in whole or in part.

6. **Incorporation of Provisions:** The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Sponsor to enter into any litigation to protect the interests of the Sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

c. Real Property Acquired or Improved Under the Airport Improvement Program. The following clauses will be included in deeds, licenses, permits, or similar instruments/agreements entered into by the City of Columbia pursuant to the provisions of the Airport Improvement Program grant assurances.

    i. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:

        1. In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a Federal Aviation Administration activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain

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and operate such facilities and services in compliance with all requirements imposed by the Nondiscrimination Acts and Regulations listed in the Title VI List of Pertinent Nondiscrimination Acts and Authorities (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.

ii. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, City of Columbia will have the right to terminate the lease and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the lease had never been made or issued.

d. Title VI List of Pertinent Nondiscrimination Acts and Authorities. During the performance of this contract, the Airline, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

i. Title VI of the Civil Rights Act of 1964 (42 USC § 2000d *et seq*., 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);

ii. 49 CFR part 21 (Non-discrimination in Federally-Assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964);

iii. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 USC § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

iv. Section 504 of the Rehabilitation Act of 1973 (29 USC § 794 *et seq*.), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance);

v. The Age Discrimination Act of 1975, as amended (42 USC § 6101 *et seq*.) (prohibits discrimination on the basis of age);

vi. Airport and Airway Improvement Act of 1982 (49 USC § 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);

vii. The Civil Rights Restoration Act of 1987 (PL 100-259) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

viii. Titles II and III of the Americans with Disabilities Act of 1990 (42 USC § 12101, et seq) (prohibit discrimination on the basis of disability in the

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operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;

ix. The Federal Aviation Administration's Nondiscrimination statute (49 USC § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

x. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations);

xi. Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs [70 Fed. Reg. 74087 (2005)];

xii. Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 USC § 1681, et seq).