ADDENDUM TO THE TERMINAL CONSTRUCTION STANDARDS	Page Number 1	No. of Pages 2
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Issuing Office Eric Miyashiro, P.E. Chief Engineer Ted Stevens Anchorage International Airport P.O. Box 196960 Anchorage, Alaska 99519-6960 Phone: (907) 266-2406, Fax: (907) 266-2622	Previous Addenda Issued: Addendum No. 1 – May 19, 2003	

The Terminal Construction Standards are amended as follows:

1. Replace *TABLE OF CONTENTS*, Feb 2003 with *TABLE OF CONTENTS*, Revision 03/04, attached to and made part of this Addendum

2. Section 00700, Article 6.2 Superintendence by TENANT - delete Article completely and replace with Article 6.2 Construction Coordination by TENANT as follows:

   6.2 Construction Coordination by TENANT:

   6.2.1 The TENANT shall assign a local, competent Project Coordinator to oversee and manage TENANT construction activities at all times during its progress. The Airport Director shall be advised in writing of the Project Coordinator's name, local address, and 24-hour telephone number(s). The Project Coordinator will be the TENANT representative at the site and shall have full authority to manage the TENANT construction contractor(s) and coordinate TENANT work activities with ANC and other contractors.

   6.2.2 The Project Coordinator shall:
   - *a) be on-site during construction activities, or be able to be on-site within 2 hours if needed;*
   - *b) attend weekly coordination meetings with ANC and other contractors;*
   - *c) participate materially in any ANC inspections prior to occupancy, during construction and at completion; and*
   - *d) be the single point of contact with ANC during construction for all formal communications, RFI's, submittals, etc.*

   6.2.3 Further, the Project Coordinator shall have the authority to act on behalf of the TENANT, make final decisions regarding TENANT construction work, direct contractor or TENANT workforces, and commit to TENANT construction related expenditures. Alternatively, the Project Coordinator shall be in direct contact with an individual who has such final authority and can make timely decisions on behalf of the TENANT.

3. Section 00701, DESIGN STANDARDS - add Article 1.05 as follows:

   1.05 CONCOURSE C STRUCTURAL LIMITATIONS FOR TENANT IMPROVEMENTS

   A. Structural designs for Tenant improvements in Concourse C shall comply with the requirements specified in *Appendix D, Concourse C Structural Limitations for Tenant Improvements*, of these Standards.

4. Delete *Section 16745, Telecommunications Infrastructure* entirely and replace with *Section 16745, Telecommunications Copper Cable Distribution*, Revision 03/04, attached to and made part of this Addendum.

5. Add *Section 16747, Telecommunications Fiber Optic Distribution* and *Section 16748, Communications Cable Management Documentation,* Revision dates 03/04, attached to and made part of this Addendum.

6. Appendix B, Building Permit Forms - delete all forms, except the “Sample” letter, in Appendix B and replace with *Airport Building Permit Application, Certification of Compliance To Terminal Construction Standards,* and *Request For Waiver From Terminal Construction Standards* forms, all Revision 09/03, attached to and made part of this Addendum.

7. Add *Appendix C, ANC Telecommunications*, Revision 03/04, attached to and made part of this Addendum.

8. Add *Appendix D, Concourse C Structural Limitations for Tenant Improvements*, Revision 03/04, attached to and made part of this Addendum.

END OF ADDENDUM

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SECTION 16745

TELECOMMUNICATIONS COPPER CABLE DISTRIBUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for installation of a centrally managed Telecommunications Premises Wiring Distribution System (PWDS) by Tenants, in Tenant facilities and spaces within Ted Stevens Anchorage International Airport, hereinafter referred to as "ANC". Requirements include strict adherence to ANC's established materials and methods, designer and installer qualifications, and telecommunications space and pathway utilization.

B. ANC has established system manufacturers and strict design requirements for PWDS at all facilities at ANC. Tenants are required to maintain compatible systems, including parts, installation methods, extended warranty, etc., for all lease spaces. Tenants are encouraged to employ ANC's designated, pre-qualified telecommunications contractor. However, tenants may utilize a different, ANC-approved, **qualified** specialty contractor, subject to the qualifications of this Section.

1.2 SCOPE OF WORK

A. Provide complete design and installation of all building infrastructure, cabling, outlets, jacks, etc., required to support Tenant's telecommunications requirements, including engineering, materials, equipment, labor, testing and documentation, in accordance with ANC's requirements.

B. Minor adds, moves and changes to telecommunication wiring within an existing tenant space may not require additional design documents to obtain a permit from ANC, but shall be installed and documented in accordance with this Section, by qualified installers.

1.3 QUALITY ASSURANCE

A. Provide system engineering and design required to produce drawings and specifications for all Work to be installed in Tenant facilities. Submit drawings and specifications to ANC for approval and permits prior to beginning Work. See Referenced Standards and Submittal Requirements below for system design requirements.

B. Design and layout of the Tenant's telecommunications system shall be performed by a Professional Electrical Engineer, Registered in the State of Alaska, or by a BICSI Registered Communications Distribution Designer (RCDD). Submit the name and qualifications of the system designer as specified in this Section.

C. Perform Work in accordance with all regulatory rules and regulations as well as references in this specification.

D. Perform Work in accordance with ANC Terminal Construction Standards, as required by this and all related Sections. ANC Telecom Standard Details are available from ANC and shall be utilized as a basis for the system arrangement.

E. Perform all Testing in accordance with ANSI/TIA/EIA-568-B specifications and submit printed reports to ANC.

F. Perform all labeling and documentation of the installation in accordance with Section 16748 - Communications Cable Management Documentation and submit all required documentation to ANC.

G. Qualifications:

1. The telecommunications work specified in this Section requires special skills mastered by education, experience, or both. A specialty telecommunications contractor, who may be a division of, or a sub-contractor to, the Tenant's electrical contractor shall perform telecommunications work described in this Section.

2. These systems will become part of an airport wide structured cabling system (Premises Wiring Distribution System – PWDS) based on **Krone** UTP copper cabling and **Corning** fiber cabling systems. **The installer of cabling systems specified herein shall be a certified installer of the respective system, pre-qualified by the Manufacturer for the purpose of offering the extended system Warranty as specified in this Section. Refer to Section 16747 – Tenant Telecommunications Fiber Optic Distribution for requirements for fiber optic cabling systems.**

3. Specialty contractors performing telecommunications work shall have a minimum of five years experience in the construction, testing, and servicing of systems of the type specified herein. The contractor shall have direct access to all tools and test equipment required to complete the telecommunications work.

H. Regulatory Requirements

1. Where a Nationally Recognized Testing Laboratory (NRTL) listing or classification exists for a product and the product is suitable for the purpose specified and indicated, the product shall bear the appropriate marking indicating the listing or classification.

2. Where a UL Standard is in effect, equipment shall:

a. Meet that Standard.

b. Bear the UL Label.

1.4 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only, **latest edition** with all addenda. The reference codes and standards are minimum requirements

Reference	Title/Revision
ANSI/NFPA 70	National Electrical Code
ANSI/TIA/EIA-568-B	Commercial Building Telecommunications Cabling Standard
ANSI/TIA/EIA-569-A	Commercial Building Standards for Telecommunications Pathways and Spaces
ANSI/TIA/EIA-571	Environmental Considerations for Telephone Terminals
ANSI/TIA/EIA-607	Commercial Building Grounding and Bonding Requirements for Telecommunications
BICSI	Telecommunications Distribution Methods Manual
IEEE	LAN Standards: 802.3; 802.4; 802.5; 802.6

B. Related Terminal Construction Standards Sections:

1. 16111 – Conduit and Fittings

2. 16115 – Cable Tray

3. 16131 – Outlet Boxes
4. 16450 – Grounding
5. 16747 –Telecommunications Fiber Optic Distribution
6. 16748 –Communications Cable Management Documentation

1.5 DEFINITIONS

A. “PWDS” refers to the Telecommunication Premises Wiring Distribution System cabling and hardware infrastructure internal and external to a building or buildings used to transmit voice and data, etc.

B. "Stations" refer to individual telephone or computers, or remote peripherals of those systems (e.g., printers, facsimile machines, modems, etc.

C. "Outlets" refer to the group of receptacles or jacks at the location where the stations connect.

D. "Jacks" or "Ports" refer to the individual receptacles where phones, computers, etc., connect.

E. "Station Cables" refer to the equipment connection cords connecting end-user equipment to modular telecommunications outlets at the work station.

F. “Patch Cords” refer to the equipment connection cords connecting horizontal patch panel ports to other ports or to active layer networking equipment in the Telecommunications Room.

G. “Pathways” refer to conduits, sleeves, cable-trays, distribution rings, etc., which are employed to route backbone and horizontal cables between equipment rooms, telecommunications rooms, stations, outlets, etc. .

H. “Backbone Cables”, "Riser Cables" or "Tie Cables" refer to copper cables 25-pair or more and optical fiber cables 6-strand or more, connecting main cross-connect facilities, intermediate cross-connect facilities and telecommunications rooms. These cables may include outside plant cables between buildings and riser cables between floors.

I. "Main Distribution Frame (MDF)" refers to the physical star point for all backbone cabling. It is the facility served from the utilities' Main Point of Presence (MPOP) or inter-building backbone cables.

J. "Telecommunications Rooms (TR)" refer to an area-serving facility for housing cable terminations, cross-connect wiring and telecommunications equipment. This is the point at which all horizontal and backbone cables (copper and fiber) terminate.

K. “Equipment Rooms” (ER) refer to a special-purpose room that provides space and maintains a suitable operating environment for building special systems equipment.

L. "Terminal Blocks" refer to multiple punch down cable terminations.

M. “Cable Management” refers to rings, troughs, gutters etc., mounted in conjunction with telecommunications distribution equipment and terminal blocks, for the orderly routing of cables, patch cords, etc.

N. “LEC” refers to the Local Exchange Carrier providing telephone service to the facility.

O. “Colocation Cabinet” refers to frame mounted, enclosed, compartmentalized, and secured equipment cabinets on standard EIA frames, for segregation of equipment by adjacent users.

1.6 SYSTEM REQUIREMENTS

A. ANC’s telecommunication distribution system is a centrally managed, structured Premises Wiring Distribution System (PWDS) consisting of optical fiber backbone, copper voice

backbone, Category 5e horizontal cabling and a system of interconnected cabling pathways and equipment spaces.

B. Main Distribution Frame rooms (MDF) in the North and South Passenger Terminals serve distributed Telecommunications Rooms (TR) in a star configured backbone cabling system. (Some older documents refer to these rooms as IDFs using the then-current terminology for such spaces. References to TRs and IDFs mean the same type of space.) The South Passenger Terminal MDF is the system's primary MDF, located in close proximity to the serving telecom utilities' Main Point of Presence (MPOP). The primary MDF is accessible from MDF rooms in satellite facilities and the North Passenger Terminal via existing inter-building cable plant owned by ANC.

C. The system is structured for shared Tenant use of ANC owned backbone cabling. Tenants having a single location presence shall utilize ANC's backbone to access utility service via the MPOP. Tenants having multiple location presence shall utilize ANC's backbone for utility access and for transport between non-adjacent tenant spaces. If Tenant's special circumstances require additional backbone capacity, the Tenant shall submit request in writing to ANC. ANC will have the option of modifying or approving tenant modifications to the backbone structure. Use of backbone transport shall be in accordance with Airport Telecommunications Policy. Contact ANC Facilities' Utility Manager for additional information.

D. Horizontal cabling to Tenant equipment such as servers and workstations shall terminate at modular patch panels in the Telecommunications Rooms (TRs). Horizontal cabling, outlets, patch panels and connectivity shall be provided by the Tenant in accordance with Airport requirements as specified herein. The Tenant shall utilize existing Airport-furnished patch panels on a first come, first served, space available basis, subject to approval. If sufficient patch panel space is not available, Tenant shall furnish patch panels.

E. Tenant telecommunications equipment such as network switches and routers may be located in TRs or in adjacent equipment rooms. All equipment racks, cable management, etc shall comply with Airport requirements as specified herein. The Tenant shall utilize existing Airport furnished equipment racks on a first come, first served, space available basis, subject to approval. If sufficient rack space is not available, Tenant shall furnish additional rack(s).

F. Secure Equipment Racks: ANC Telecommunication Rooms are secured and airport badge readers strictly control access. If the Tenant requires additional security for Tenant's networking equipment, the Tenant shall provide colocation equipment cabinet(s) at location(s) approved by ANC. The Tenant shall furnish cabinets with compartments no larger than required to house the equipment planned for their immediate needs, e.g., for Tenant equipment occupying ¼ of a rack section, Tenant shall furnish a four-section cabinet and use one section. The unused cabinet compartments shall be equipped and usable by the ANC or their Tenants.

G. The Tenant shall furnish and install all required uninterruptible power supplies (UPS) for Tenant equipment. Equipment Rooms and TRs are environmentally controlled, and are provided with Controlled Access and Standby Power.

H. Tenant network servers shall reside within the Tenant's lease space or Equipment Rooms, in accordance with current ANC policy. Only networking equipment requiring direct connection to backbone transport cabling or horizontal cabling, such as equipment identified in Paragraph E, above, may reside in TRs.

I. Tenants may provide locking cabinets in the ER or TR at their expense for an added level of security if desired. Reworking of any existing equipment racks whether occupied or not, to accommodate the provision of locking racks shall be submitted in advance for approval by ANC.

J. All cross connecting shall occur in the TR using patch cords.

K. Tenant telephone switches (PBX) shall be located in accordance with current ANC policy as follows:

1. North Passenger Terminal tenant telephone switches (PBX) may reside in the large Basement Equipment Room adjacent to the MDF or, for small systems, in an equipment room adjacent to the TR. No Tenant equipment will be allowed in the MDF. Voice backbone requirements will depend on the type and location of telephone PBX equipment. Large Tenants who provide their own PBX equipment may require backbone cable modifications at the Tenant's expense. Installing the PBX equipment at an Airport approved location in the Basement Equipment Room will minimize the need for backbone modification. If a Tenant procures direct POTS or Centrex Service from the utility, or if ANC provides PBX functionality to a tenant, existing backbone cabling shall be used from the MDF to the TR cross-connect point. Additional backbone cabling provisions to suit special Tenant needs will be the financial responsibility of the Tenant and shall be approved by ANC.

2. South Passenger Terminal tenant telephone switches (PBX) shall reside in an equipment room adjacent to the TR. No Tenant equipment will be allowed in the MDF. Voice backbone requirements will depend on the type and location of telephone PBX equipment. Large Tenants who provide their own PBX equipment may require backbone cable modifications at the Tenant's expense. If a Tenant procures direct POTS or Centrex Service from the utility, or if ANC provides PBX functionality to a tenant, existing backbone cabling shall be used from the MDF to the TR cross-connect point. Additional backbone cabling provisions to suit special Tenant needs will be the financial responsibility of the Tenant and shall be approved by ANC.

L. Provide outlet boxes, device rings, conduit and cable required to connect telecommunications outlets to the existing cable distribution system. Conduit shall typically be routed from outlet boxes to nearest available existing telecommunications cable tray. Existing cable tray is routed back to the local area TR. In areas without existing cable tray, conduits or new cable trays shall be routed directly back to the local area TR. Verify locations of available cable tray and TRs with ANC. If additional cable tray is required it shall comply with the requirements of this section and Section 16115 – Cable Tray.

M. Provide outlet faceplates, jacks, station cables, patch panels, racks, cable management, patch cords, terminal blocks, tie cables, etc., for a complete Category 5e structured horizontal cabling installation. Provide manufacturer's certificate from Krone for the completed installation with a TrueNet™ Extended Product and System Assurance Warranty as specified in this Section.

1.7 COORDINATION

A. The necessity to plan, schedule and coordinate this work with ANC is emphasized. ANC is not responsible for any omissions, delays and additional cost due to inadequate planning, scheduling, coordination or applications for approval.

B. Coordinate design and installation of Tenant's telecommunications cabling with ANC. Submit design documentation, work schedules, etc., and obtain Airport permits prior to beginning Work.

C. Coordinate work with other contractors and trades. The layout and installation of the systems specified herein shall be coordinated such that special requirements for telecommunications systems are provided and incorporated into the project. The systems to be coordinated include (but are not limited to) mechanical piping, ductwork and equipment, baggage handling systems, electrical raceway, grounding, fire rated assembly, lighting, power distribution, control and instrumentation.

D. Downtime for existing systems shall be avoided. Plan, coordinate, and execute installation activities so that facilities are not interrupted. Periods of unavoidable interruption shall be scheduled well in advance and approved in writing by ANC.

1.8 SUBMITTALS AND SHOP DRAWINGS

A. Submit designer and installer qualifications in accordance with this Section:

1. Submit the name, qualifications and experience of the system designer.

a. Submit experience of designer(s) to be assigned to this project on other Telecommunications projects of similar size and magnitude.

b. Designer shall have five years experience on projects of like magnitude and complexity.

c. Refer to designer qualification requirements in the Quality Assurance paragraph of this Section.

B. Submit contractor qualifications in accordance with this Section:

1. If ANC's designated, pre-qualified Telecommunications Contractor is utilized, identification of this fact will satisfy the qualification requirements.

C. If other than ANC's designated, pre-qualified Telecommunications Contractor is utilized, provide proof of qualifications and obtain ANC's prior approval of the Contractor.

1. Submit proof that the Contractor is a certified installer of the Krone TrueNet system, and approved by Krone to provide a fully warranted system.

2. Submit the names of the Contractor's personnel to be assigned to this project and the specific responsibility of each. Submit experience of those to be assigned to this project on other Telecommunications projects of similar size and complexity.

3. The Telecommunications contractor's project superintendent (in office) and foreman (field) shall have five years experience at the superintendent and foreman levels, respectively, on completed Telecommunications projects of like magnitude and complexity.

4. Demonstrate and document to the extent necessary that sufficient physical and personnel resources are available to accomplish the communications work of this project without endangering timely and proper completion of the work.

5. Provide a signed statement indicating that the telecommunications systems contractor has the ability to provide the service required by this Section, using factory trained and qualified technicians for each major system type and shall continue to maintain that capability until the end of the guarantee period.

D. Submit complete product information on the following items to ANC for review prior to beginning Work:

1. Copper Cable

2. Information Outlets (faceplates, jacks, bezels, etc.)

3. Patch Panels

4. Equipment Racks

5. Equipment Cabinets and Colocation Cabinets

6. Terminal Modules

7. Ladder Racking

8. Splice Cases

9. Patch Cords and other accessories

10. Label printing equipment and labeling products

E. Submit complete product information on related items such as conduit, boxes, cable trays, etc., as required by those related Sections.

F. Labeling System: Coordinate with ANC and satisfy all requirements of Section 16748 - Communications Cable Management Documentation for labeling conventions and Cable Management System (CMS) work. Submit completed labeling schedules to ANC for approval and entering into the existing CMS database by ANC before applying any labels.

G. Submit Manufacturers Certificate of Warranty as specified in this Section, including all warranty provisions and procedures for ANC to follow to obtain warranty service.

H. Shop Drawings: Provide detailed shop drawings for all installations. (Simple tenant installations connecting small numbers of horizontal cables to existing patch panels may request a waiver from this requirement.)

1. Detailed designs of equipment in racks shall be in accordance with the ANC Telecom Standard Details.

1.9 WARRANTY

A. The Krone ***TrueNet*** Warranty shall extend **twenty (20)** years from the date of final completion and shall be the standard warranty offered by Krone.

B. The warranty shall be provided to ANC by the manufacturer through a single point of contact (local warranty service agency or contractor) and shall be fully backed by the manufacturer.

C. The Extended Product Warranty and System Assurance Warranty for this wiring system shall be provided consisting of the following.

1. Extended Product Warranty - The Extended Product Warranty shall ensure against product defects, that all approved cabling components exceed the specifications of ANSI/TIA/EIA 568-B and ISO/IEC IS 11801-B, exceed the attenuation and NEXT requirements of ISO/IEC IS 11801-B for cabling links/channels, and that the installation will exceed the loss and bandwidth requirements of ISO/IEC IS 11801-B for links/channels. Testing shall include the additional test parameters included in ANSI/TIA/EIA-568-B. The warranty shall apply to all passive Telecommunication Distribution System (TDS) components.

2. System Assurance - The System Assurance shall cover the failure of the wiring system to support any existing application, as well as additional application(s) introduced in the future by recognized standards or user forums that use the ANSI/TIA/EIA 568-B or ISO/IEC IS 11801-B component and link/channel specifications for cabling.

3. All ANSI/TIA/EIA-568-B Category 5e communications system components shall be rated for end-to-end system Category 5e, or greater performance levels on all pair combinations and warranted to support any existing or future applications which are designed to operate over a 100 MHz horizontal channel (as defined in ANSI/TIA/EIA 568-B), to include support of the following applications. Performance shall be guaranteed under the Special Warranty at 100 meters (328 feet):

a. IEEE 802.3 10Base-T, 100Base-TX and 100Base-T4

b. IEEE 802.5 16 Mbps token ring

c. IEEE 802.12 Demand Priority Access Control

d. Asynchronous Transfer Mode (ATM) data transmission at 155 Mbps.

e. IEEE 802.3ab 1000Base-T

f. Future applications that become certified under the applicable standards as noted above, *such as* 1000Base-TX.

4. Extended Product Warranty - The Extended Product Warranty and the System Assurance shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective product(s).

a. In the event the Contractor, who is a certified installer for the manufacturer, is unable to perform, goes out of business or ceases to exist, the manufacturer shall be responsible for identifying a new contractor to assume the warranty work.

b. Manufacturers shall bear full responsibility for the work of their certified installer, including all aspects of the design and installation.

5. System Certification - Upon successful completion of the installation and subsequent inspection, ANC shall be provided with a numbered certificate, from the manufacturer, registering the installation.

PART 2 - PRODUCTS

2.1 TELECOMMUNICATIONS OUTLET BOXES

A. Provide telecommunications outlet boxes and device rings in accordance with Section 16131 – Outlet Boxes.

2.2 TELECOMMUNICATIONS CONDUIT

A. Provide conduit for telecommunications horizontal cabling in accordance with Section 16111 – Conduit and Fittings.

2.3 TELECOMMUNICATIONS CABLE TRAY

A. Provide cable tray for telecommunications horizontal cabling in accordance with Section 16115 – Cable Tray.

2.4 TELECOMMUNICATIONS ROOM OVERHEAD CABLE SUPPORT SYSTEM

A. Size: 4-inch deep by 12 or 20-inch wide, or other width as required.

B. Description: Continuous, rigid, welded steel wire mesh cable management system.

1. 2 x 4 inches (50 x 100 mm). mesh system.

2. Kinked and T-welded continuous top wire safety edge.

3. Welded at all intersections.

4. Minimum of one (1) bottom longitudinal wire along entire length.

C. UL Classification: Straight sections shall be UL classified as an equipment grounding conductor.

D. Material: Carbon steel wire, ASTM A 510, Grade 1008. Wire welded, formed, and then surface treated.

E. Finish for Carbon Steel Wire: Finish applied after welding and bending of mesh.

1. Electroplated Zinc Galvanizing.

F. Fittings: Field fabricated, (in strict accordance with manufacturer's instructions), from straight sections.

G. Provide hardware, including splice connectors and support components available from manufacturer.

H. Accessories:

1. “Z” brackets: Provide “Z” brackets were needed for support of trays under floors, to support vertical sections down walls, to terminate dead-end runs, etc.

2. Provide continuous strut support channel to support bottom of tray system and prevent sagging due to cable loading.

3. Cable Drops: Provide bend radius drop out fittings for cable drops from tray system.

4. Grounding: Provide grounding clip for continuous ground of cable management system.

I. Equipment: Flextray by GS Metals, or approved equal.

2.5 OPTIONAL FREE-STANDING EQUIPMENT CABINETS

A. Provide compartmentalized, full height enclosed modular 19 inch NEMA standard equipment colocation rack cabinet with the following features:

1. 12 gauge steel frame with floor mounting brackets.

2. 19-inch EIA 310-D compliant equipment mounting angle brackets, front and rear.

3. Locking compartment-height steel doors front and back, with ventilation openings.

4. Frame mounted divider shelf with ventilation openings.

5. Top, bottom, and side cable entry/exit openings for each compartment.

6. Maximum cabinet depth shall be 35.5 inches.

7. Top mount fan tray with four 120 volt axial cooling fans.

8. Full compartment height, vertically mounted, plug strip permanently attached to the right rear vertical interior rack support member.

9. Electrically isolated 0.125”x1” chassis ground bus bar on the right rear side of the rack compartment as the isolated chassis ground system (CGS). Mount on 1” insulating bushed standoffs. Bond to the chassis with #6 braided x 6” long bonding jumpers one at each end of the bus bar. Identify with engraved nameplate.

10. Equipment: Hoffman Proline-CL, or as approved.

2.6 FREE-STANDING EQUIPMENT RACKS

A. Provide extruded aluminum, full height 19-inch wide NEMA standard open rack frame designed with footprint not to exceed 24” width.

1. Provide with 6” wide by 105” deep vertical side distribution cable troughs between racks and 6” wide trough on each end of row (one 6” trough required between adjacent racks), Hubbell NextFrame Vertical Cable Management, VC76.

2. Provide an electrically isolated 3/16”x3/4”x18 5/16 chassis ground bus bar on the top rear side of the rack as the isolated chassis ground system (CGS) busbar. Bond to the chassis with #6 braided x 6” long bonding jumpers one at each end of the bus bar.

3. Provide all racks and rack mounted hardware with black finish.

4. Equipment: Hubbell NextFrame CR1976, or as approved.

2.7 CABLE MANAGEMENT

A. Backboard mounted cable management:

1. Distribution rings installed in communication rooms shall be “D” ring type. No bridle rings are permitted.

2. Distribution rings shall be sized according the number and size of cables to be supported plus 25 % spare capacity.

3. Vertical trough-type cable management shall be minimum 6-inch wide, cable management trough, 110 Vertical Cable Management trough, or as approved.

4. Horizontal trough-type cable management shall be minimum 3 1/2-inch wide, cable management trough, 110 Horizontal Cable Management trough, or as approved.

B. Rack mounted cable management:

1. Vertical trough-type cable management for use with standard 7 foot equipment rack are specified above with equipment racks.

2. Provide horizontal split D ring style, standard 19-inch rack mounted cable management panels, single rack unit height (1-3/4-inch).

3. Approved equipment: Refer to Appendix C.

2.8 IDC TERMINAL MODULES

A. Copper backbone cables shall be terminated on rack mounted IDC terminal modules.

B. Connecting blocks shall match cables punched down under block, i.e., 5-pair for 5-pair color scheme, 4-pair for 4-pair cable, 3-pair for 3-pair cable, etc. When six pair are used 2-3 pair connecting blocks shall be used. For 25-pair or larger, use the 5-pair for 5-pair color scheme. All hardware shall be rated for ANSI/TIA/EIA 568-B Category 5e ratings and installed in accordance with ANSI/TIA/EIA 568-B guidelines. Blocks shall be color coded according to drawings and documented in accordance with ANSI/TIA/EIA 606A and Section 16748 – Communications Cable Management Documentation. Blocks shall be identified using clear label holders and labels. Blocks shall be UL Listed.

C. Connecting blocks shall be in 100 or 300 pair modules. Provide a retaining trough between every 100 pair termination block.

D. Approved equipment: Refer to Appendix C.

2.9 DISCONNECT BLOCKS

A. Provide Disconnect Blocks and cross connect ahead of Backbone Terminal Modules for testing.

1. Mount Disconnect Blocks in the top rack unit spaces of the equipment rack.

2. Provide tie cables on the rear side of rack between disconnect blocks and terminal blocks mounted below. Disconnect blocks shall have the same characteristics as termination blocks, but shall have a center mounted disconnect module for bi-directional testing capability. Blocks shall be panel mounted for a 19-inch rack mounted panel or wall mounted, as shown on the drawings.

3. Approved equipment: Refer to Appendix C.

2.10 PATCH PANELS

A. Patch Panels: Modular jack panels shall be in 24 or 48 port configurations. Modular jack panel installations shall contain a retaining trough between every panel. Modular Jack Panels shall be wired for T568A configuration

B. Designation labels for each jack shall be provided for front/rear labeling of each patch panel. All cables shall be terminated in numerical sequence and labeled as to outlet number and jack position (A, B, C, D). Provide color-coded inserts ("icons") for all jacks at patch panels and at each outlet.

C. Approved Equipment: Refer to Appendix C.

2.11 INFORMATION OUTLETS/JACKS

A. Faceplates

1. All Faceplates shall be available in single, duplex, triplex, quad-plex, arrangement in a single gang configuration with both top and bottom labeling positions included.

2. Surface mount boxes may be used only where impractical to provide flush mounted box. Surface boxes may be single or dual gang versions, or surface mount boxes with side/bottom exits for one to twelve jack configurations.

B. Outlets for Voice and Data:

1. Provide 8-pin modular (8P8C) jacks with reusable insulation displacement terminations, utilizing T568A termination style.

2. Unless otherwise noted on the floor plans or within this document, all wall outlets shall be:

a. Equipped with modular jacks

b. Provided with blank module inserts for all unused module locations.

c. Provided with colored snap-in icon denoting the current media service (e.g., phone, data, video, etc.)

C. Approved Equipment: Refer to Appendix C.

2.12 PATCH CORDS

A. Provide factory assembled Category 5e Modular Patch Cords for each assigned port on the patch panel.

B. Provide Patch Cords of required length and type, colored blue for data and white for telephone.

C. All patch cords shall be Category 5e, 24-AWG copper, stranded patch cords manufactured by **Krone**, for TrueNet system channel performance.

D. Patch cords become the property of ANC upon termination of Tenant lease.

2.13 HORIZONTAL CABLES

A. High Speed Cables

1. Horizontal cables shall be installed continuous between the outlet and its associated TR and shall consist of 4 pair, 24 gauge, UTP, and shall be properly terminated at each end and tested.

2. All 4 pair UTP cables shall be UL Listed Type CMP (plenum).

3. Cables shall meet or exceed performance specifications for the Channel as defined by ANSI/TIA/EIA-568-B.2.

4. Approved Equipment: Refer to Appendix C.

PART 3 - EXECUTION

3.1 GENERAL

A. Telecommunications work shall be in complete accordance with the following:

1. ANC design and installation requirements.

2. National Electrical Code (NEC), latest legally enacted edition.

3. Regulations of the State Fire Marshal.

4. National Fire Protection Association (NFPA) Codes.

5. All state, county and local codes and ordinances.

B. Provide, connect and test all equipment and materials for the systems herein specified.

C. Cables shall be run in cable tray or raceway and shall be neatly tied or laced in cabinets and terminated on terminal strips provided for the purpose. Use of bridle rings or J-hooks is prohibited.

D. Cables shall be identified by an approved marking system at each end.

E. Outlets and jacks shall be identified with machine printed labels. Hand lettered labels shall not be used.

F. Provide color coded snap-in icons for workstation outlets to mark jacks for analog and digital telephones, unique classes of data, etc. Maintain existing color code and symbology currently in use at ANC.

G. Coordinate installation of lighting, ventilation and all other systems in the telecommunication rooms to avoid interferences.

H. Work under this section shall be closely coordinated with work under other sections of the project.

3.2 CODES AND PERMITS

A. Apply and pay for all fees, permits, and obtain serving utility and governmental approvals.

B. Coordinate all work with the serving utility.

3.3 LAYOUT

A. Work shall be laid out in advance and Shop Drawings submitted for review by ANC.

3.4 COLOR CODE SYSTEM

A. Horizontal cables for one floor may be run in the tray system of another floor where necessary, and shall be clearly identified by their unique floor-specific color. One color shall be used for all horizontal cables terminating on a floor. A different color shall be used for the floor above, and another unique color for the floor below. Conform to ANC's existing color coding scheme or provide as directed by ANC.

B. Where applicable, provide color coded cable in areas of the terminal or facility in accordance with existing or planned multi-level cable routing scheme.

3.5 LABELING

A. Provide labeling of equipment and telecommunications circuits in accordance with ANC's standards and labeling conventions. Label cables, outlets and patch panels with preprinted permanent labeling system.

B. Submit telecommunications circuit data to ANC, in accordance with Section 16748 – Communications Cable Management Documentation, for approval and entering into ANC's existing cable management database prior to applying labels.

3.6 EQUIPMENT RACKS

A. Equipment racks shall be seismically braced by securely bolting to the structural floor supplemented with additional braces as required for the Seismic Zone.

1. Mount ground bars on insulating bushed standoffs.

2. Electrically separate open racks with insulating washers and nonconductive screws

3. Electrically separate enclosed racks with insulating washers and nonconductive screws.

3.7 SEISMIC BRACING

A. Ladder racks and freestanding equipment racks shall be seismically braced in accordance with requirements for seismic Zone 4, as required by Section 16190 of these Specifications. Seismic bracing shall consist of rigid supports. Cables, wires, chains or other non-rigid materials shall not be used for seismic support. Provide approved fixed equipment anchorage assemblies as published by the manufacturer. In lieu of manufacturer's published seismic bracing assemblies, the Contractor shall provide seismic installations approved by a licensed structural engineer.

B. Approved drawings of seismic assemblies shall be made available for review by ANC or the inspecting Authority Having Jurisdiction upon request.

3.8 DELIVERY AND STORAGE

A. Materials and Equipment shall be stored with protection from mechanical damage, weather, humidity and temperature variation, dirt and dust, and other contaminants.

B. Materials shall be inspected and inventoried promptly upon receipt.

C. Report and record all serial numbers received and/or rejected.

3.9 CABLE INSTALLATION

A. Follow cable manufacturer's specification regarding handling methods, retaining/support methods, bending radius and maximum pulling tension limitations.

B. Telecommunication cables shall not be installed in the same raceway as power cables or fiber optic cables.

C. Cables placed in cable trays shall be installed in a neat and orderly manner and shall not cross or interlace other cables except at breakout points.

D. Cables in vertical trays shall be individually retained with straps at a maximum of 6 feet on center.

E. Tie wraps shall not deform the cable insulation when tightened.

F. Cables shall be routed to minimize EMI and RFI interference. Cable shall be routed with minimum spacing according to the following table.

Minimum Separation of Telecommunications pathways from 480 volt or less power lines

Condition	<2 kVA	2-5 kVA	>5 kVA
Unshielded power lines or electrical equipment in proximity to telecommunications open or nonmetal pathways.	5 in	12 in	24 in
Unshielded power lines or electrical equipment in proximity to telecommunications grounded metal conduit pathways	2.5 in	6 in	12 in
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a telecommunications grounded metal conduit pathway	N/A	3 in	6 in
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to telecommunications open or nonmetal pathways.	2.5 in	6 in	12 in
Mechanical ductwork, metal floors and other metallic planes to telecommunications open or nonmetal pathways.	2 in		
Mechanical ductwork, metal floors and other metallic planes to telecommunications open or grounded metal conduit pathways.	0 in		
Fluorescent or HID lighting fixtures	5 in	5 in	5 in

3.10 LUBRICANT

A. Pulling lubricant, shall be used to minimize pulling tension and prevent sheath damage when pulling cables into ducts and conduits. Lubricant shall be applied to the cable sheath with a lubricator. When pulling has been completed, the exposed cable ends shall be wiped clean of lubricant.

B. Lubricants shall be compatible with and intended for use with plastic-sheathed cables. Soap and grease type lubricants shall not be allowed.

3.11 TERMINATION MODULES

A. Lay out telephone and data terminal blocks consistently with existing ANC installations. Provide spacing as recommended by manufacturer.

3.12 CROSS-CONNECTIONS

A. Cross-Connections at and/or between all terminal hardware shall be provided to form a complete and functioning system.

B. Patch Cords shall be used to make all Cross-Connections, except where tie cables are used in voice backbone connections to disconnect blocks.

C. Patch cords shall be color-coded white for voice and blue for data.

D. Cross-Connections from Disconnect Blocks to Terminal Modules shall be 4-pair wide and serve a single jack or termination in the horizontal distribution.

3.13 COMPLETION AND TESTING

A. All inspection and testing shall be performed under the observation of ANC at ANC's option. Provide three (3) working days advance notice of tests.

B. Telecommunications System test reports shall be submitted to and approved by ANC. The test reports shall certify that the Telecommunications Distribution System is complete, passes all test criteria, is fully operational, and that all work has been witnessed as specified.

C. After installation and test of each system is complete, each system and the entire system shall be demonstrated and tested for proper operation. The Tenant shall schedule a demonstration with the following representatives present:

1. Tenant's representative.

2. Manufacturer's representative for each major communications subsystem.

3. Airport's representative.

D. Test all systems in accordance with the Krone ***TrueNet*** Warranty Program. The following requirements will generally familiarize users of this Section with the testing requirements.

E. Final Inspection Tests

1. Testing of copper wiring shall be performed prior to system acceptance. 100 percent of the horizontal and riser wiring pairs shall be tested. Link testing of copper cabling shall be performed. Complete, end to end test results shall be submitted to ANC.

a. Category 5e cable runs shall be tested for conformance to the specifications of EIA/TIA 568-B, Category 5e. Testing shall be done with a ANSI/TIA/EIA 568-B ETL verified Level II-E test set, with accuracy per Proposed TIA Level III standards.

1) Test shall include all requirements of ANSI/TIA/EIA 568-B, including wiremap, length, characteristic impedance, insertion loss, ambient and impulse noise, NEXT, PSNEXT, FEXT, ELFEXT, PSELFEXT, return loss, ACR, PSACR, Propagation Delay and Delay Skew.

2) Supported test frequency shall be 1-350 MHz.

3) "Full Plot" storage shall store entire test, and be capable of uploading saved data and re-characterizing cables against new or evolving performance standards. Testers only saving worst case data are not acceptable. Test data shall be saved and provided to ANC in neatly bound hardcopy and electronic format compatible with ScopeData Pro® software.

4) Reports shall be graphic, showing test results plotted against standards. Reports shall include a pass/fail summary of all network types specified.

5) Any cables not meeting the requirements of the standard shall be brought into compliance at no charge to ANC.

6) Tester shall be equal to **Agilent Technologies (HP)** WireScope 350 or Fluke DSP-4000.

2. Test cables from both ends.

3. Re-test cable disturbed after testing, at the direction of ANC.

F. Replace rejected materials.

G. Test AC grounds and voltages in equipment racks.

1. Record voltage at equipment rack power source both at no load and at 15 Amp resistive load.

3.14 INSTRUCTION AND TRAINING

A. Provide instruction to familiarize ANC with all additions and modifications to the PWDS.

END OF SECTION

SECTION 16747

TELECOMMUNICATIONS FIBER OPTIC DISTRIBUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for installation and modification of fiber optic distribution systems by Tenants, for use in Tenant facilities and spaces within Ted Stevens Anchorage International Airport, hereinafter referred to as "ANC". Requirements include strict adherence to ANC's established materials and methods, designer and installer qualifications, and telecommunications space and pathway utilization.

B. ANC has established system manufacturers and strict design requirements for fiber optic systems at all facilities on ANC premises. Tenants are required to maintain compatible systems, including parts, installation methods, extended warranty, etc., for all lease spaces. Tenants are encouraged to employ ANC's designated, pre-qualified telecommunications contractor. However, tenants may utilize a different, ANC-approved, **qualified** specialty contractor, subject to the qualifications of this Section.

1.2 SCOPE OF WORK

A. Provide complete design and installation of all additions and modifications to facility fiber optic telecommunications systems required to support Tenant's telecommunications systems, including engineering, materials, equipment, labor, testing and documentation, in accordance with ANC's requirements.

1.3 QUALITY ASSURANCE

A. Provide system engineering and design required to produce drawings and specifications for all Work to be installed in support of Tenant facilities. Submit drawings and specifications to ANC for approval and permits prior to beginning Work. See Referenced Standards and Submittal Requirements below for system design requirements.

B. Design and layout of the Tenant's fiber optic telecommunications Work shall be performed by a Professional Electrical Engineer, Registered in the State of Alaska, or by a BICSI Registered Communications Distribution Designer (RCDD). Submit the name and qualifications of the system designer as specified in this Section.

C. Perform Work in accordance with all regulatory rules and regulations as well as references in this specification.

D. Perform Work in accordance with ANC Terminal Construction Standards, as required by this and all related Sections. ANC Telecom Standard Details are available from ANC and shall be utilized as a basis for the system arrangement.

E. Perform all testing in accordance with ANSI/EIA/TIA-455-A, ANSI/TIA/EIA-526-7 and ANSI/TIA/EIA-526-14A specifications and submit printed reports to ANC.

F. Perform all labeling and documentation of the installation in accordance with Section 16748 - Communications Cable Management Documentation and submit all required documentation to ANC.

G. Qualifications:

1. The work specified in this Section and related telecommunications Sections requires special skills mastered by education, experience, or both. A specialty telecommunications contractor, who may be a division of, or a sub-contractor to, the

Tenant's electrical contractor shall perform fiber optic telecommunications work described in this Section.

2. These systems will become part of an airport wide structured cabling system (Premises Wiring Distribution System – PWDS) based on **Krone** UTP copper cabling and **Corning** fiber cabling systems. **The installer of cabling systems specified herein shall be a certified installer of the respective system, pre-qualified by the Manufacturer for the purpose of offering the extended system Warranty as specified in this Section. Refer to Section 16745 – Tenant Telecommunications Copper Cabling Distribution for requirements for copper telecommunications cabling systems.**

3. Specialty contractors performing telecommunications work shall have a minimum of five years experience in the construction, testing, and servicing of systems of the type specified herein. The contractor shall have direct access to all tools and test equipment required to complete the telecommunications work.

4. Fiber optic cable terminations and testing shall be made by journeymen fiber optic cable installers who have had a minimum of 3 years of individual experience in terminating fiber optic cables.

H. Regulatory Requirements

1. Where a Nationally Recognized Testing Laboratory (NRTL) listing or classification exists for a product and the product is suitable for the purpose specified and indicated, the product shall bear the appropriate marking indicating the listing or classification.

2. Where a UL Standard is in effect, equipment shall:

a. Meet that Standard.

b. Bear the UL Label.

I. Factory Testing Program:

1. Test all fiber optic cables on the spools at the factory prior to shipping. Submit factory test reports in accordance with submittal requirements.

1.4 REFERENCE CODES AND STANDARDS

A. The publications listed below form a part of this section to the extent referenced. Publications are referred to in the text by basic designation only, **latest edition** with all addenda. The reference codes and standards are minimum requirements:

REFERENCE	TITLE/REVISION
ANSI/EIA/TIA- 455-A	STANDARD TEST PROCEDURES FOR FIBER OPTIC FIBERS, CABLES AND TRANSDUCERS, SENSORS, CONNECTING AND TERMINATING DEVICES AND OTHER FIBER OPTIC COMPONENTS
ANSI/TIA/EIA-526-7	OPTICAL POWER LOSS MEASUREMENTS OF INSTALLED SINGLE MODE FIBER CABLE PLANT
ANSI/TIA/EIA-526-14A	OPTICAL POWER LOSS MEASUREMENTS OF INSTALLED MULTIMODE FIBER CABLE PLANT
ANSI/TIA-472CAAA	DETAIL SPEC. FOR ALL DIELECTRIC FIBER OPTIC CABLE FOR PLENUM USE

REFERENCE	TITLE/REVISION
ANSI/TIA-472DAAA	DETAIL SPEC. FOR ALL DIELECTRIC FIBER OPTIC CABLE FOR OUTSIDE PLANT USE
ANSI/TIA-492AAAA-A	DETAIL SPEC. FOR 62.5/125 MULTIMODE, GRADED INDEX OPTICAL FIBERS
ANSI/TIA-492AAAB	DETAIL SPEC. FOR 50/125 MULTIMODE, GRADED INDEX OPTICAL FIBERS
ANSI/TIA-492BAAA	DETAIL SPEC. FOR CLASS 4A DISPERSION-UNSHIFTED SINGLEMODE OPTICAL FIBERS
ANSI/ICEA S-83-596	FIBER OPTIC PREMISES DISTRIBUTION CABLE
ANSI/ICEA S-83-640	FIBER OPTIC OUTSIDE PLANT COMMUNICATION CABLE
ANSI/TIA/EIA-568-B	COMMERCIAL BUILDING TELECOMMUNICATION CABLING STANDARD
ANSI/TIA/EIA-569-A	COMMERCIAL BUILDING STANDARD FOR TELECOMMUNICATIONS PATHWAYS AND SPACES
ANSI/TIA/EIA-598-A	OPTICAL FIBER CABLE COLOR CODING
ANSI/TIA/EIA-606A	ADMINISTRATION STANDARD FOR THE TELECOMMUNICATIONS INFRASTRUCTURE OF COMMERCIAL BUILDINGS
ANSI/TIA/EIA-607	COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
ANSI/TIA/EIA-758	CUSTOMER-OWNED OUTSIDE PLANT TELECOMMUNICATIONS CABLING STANDARD
ANSI/TIA/EIA-758-1	ADDENDUM TO ANSI/TIA/EIA-758
ANSI Z136.2	AMERICAN STANDARD FOR THE SAFE OPERATION OF OPTICAL FIBER COMMUNICATION SYSTEMS UTILIZING LASER DIODE AND LED SOURCES
BICSI	TELECOMMUNICATIONS DISTRIBUTION METHODS MANUAL

B. Related Terminal Construction Standards Sections:

1. 16111 – Conduit and Fittings
2. 16115 – Cable Tray
3. 16745 – Tenant Telecommunications Copper Cable Distribution
4. 16748 – Communications Cable Management Documentation

1.5 DEFINITIONS

A. "Fiber" refers to optical fiber cable.

B. “Composite” – refers to cable constructed with single-mode and multi-mode fibers within a single hybrid cable jacket.

C. “Pathways” refers to conduits, sleeves, cable trays, distribution rings, etc., which are employed to route backbone and stations cables between equipment rooms, telecommunications closets, stations, outlets, etc.

D. “Backbone Cables”, "Riser Cables" or "Tie Cables" refers to optical fiber cables 6-strand or more, connecting main cross-connect facilities, intermediate cross-connect facilities and telecommunications Closets. These cables may include outside plant cables between buildings and riser cables between floors.

E. “Equipment Rooms” (ER) refer to a special-purpose room that provides space and maintains a suitable operating environment for building special systems equipment.

F. "Telecommunications Rooms (TR)" refer to an area-serving facility for housing cable terminations, cross-connect wiring and telecommunications equipment. This is the point at which all horizontal and backbone cables (copper and fiber) terminate.

G. “Patch Panel” refers to rack or frame mounted multiple fiber terminations with the type of connectors as specified herein.

H. “Cable Management” refers to rings, troughs, gutters etc., mounted in conjunction with telecommunications distribution equipment and terminal blocks, for the orderly routing of cables, patch cords, etc.

I. “FTTD” Fiber to the Desk, refers to two-strand, multi-mode fiber optic cable installed from the TR to the end user equipment for horizontal telecommunications circuits.

1.6 SYSTEM REQUIREMENTS

A. ANC’s telecommunication distribution system is a centrally managed, structured Premises Wiring Distribution System (PWDS) consisting of optical fiber backbone, copper voice backbone, Category 5e horizontal cabling and a system of interconnected cabling pathways and equipment spaces.

B. Main Distribution Frame rooms (MDF) in the North and South Passenger Terminals serve distributed Telecommunications Rooms (TR) in a star configured backbone cabling system. (Some older documents refer to these rooms as IDFs using the then-current terminology for such spaces. References to TRs and IDFs mean the same type of space.) The South Passenger Terminal MDF is the system’s primary MDF, located in close proximity to the serving telecom utilities' Main Point of Presence (MPOP). The primary MDF is accessible from MDF rooms in satellite facilities and the North Passenger Terminal via existing inter-building cable plant owned by ANC.

C. The system is structured for shared Tenant use of ANC owned backbone cabling. Tenants having a single location presence shall utilize ANC’s backbone to access utility service via the MPOP. Tenants having multiple location presence shall utilize ANC’s backbone for utility access and for transport between non-adjacent tenant spaces. If Tenant’s special circumstances require additional backbone capacity, the Tenant shall submit request in writing to ANC. ANC will have the option of modifying or approving tenant modifications to the backbone structure. Use of backbone transport shall be in accordance with Airport Telecommunications Policy. Contact ANC Facilities’ Utility Manager for additional information.

D. Where Tenants are unable to utilize existing ANC backbone fiber optic cabling, additional cables shall be installed by the Tenant in accordance with the requirements of this Section. ANC’s telecommunications backbone raceway system is a managed system. Obtain all required permits and duct assignments before installing backbone cabling.

1. Where required for inter-building fiber optic circuits, provide all trenching and backfill, raceways, innerducts, pull ropes, sleeves, boxes, etc.

2. Where required for intra-building fiber optic circuits, provide all cable trays, raceways, innerducts, pull ropes, sleeves, boxes, firestopping etc.

3. Where existing facilities are insufficient, provide all racks, shelves, enclosures, shelf and enclosure supports, fiber optic cables, connectors, patch panels, splice trays, patch cords, Fiber Distribution Units (FDUs), splices, connections, cable management, labeling, testing, etc., and all other material, equipment, and labor required to make the systems fully operational.

4. Provide patch panel capacity for the full termination of all installed fiber.

5. Provide termination and systematic identification of all cables, including all spare and unused fibers, on both ends.

6. Perform testing of all fiber strands, including all spare and unused fibers, in accordance with the requirements herein.

7. Provide factory assembled fiber patch cords of the proper configuration and termination type for the patching of circuits and connection of equipment.

E. The Tenant may install FTTD cabling in lieu of horizontal copper cabling or in the case of special equipment needs. FTTD cabling shall be in accordance with the requirements of this Section.

1.7 COORDINATION

A. The necessity to plan, schedule and coordinate this work with ANC is emphasized. ANC is not responsible for any omissions, delays and additional cost due to inadequate planning, scheduling, coordination or applications for approval.

B. Coordinate design and installation of Tenant's telecommunications Work with ANC. Submit design documentation, work schedules, etc., and obtain Airport permits prior to beginning Work.

C. Coordinate work with other contractors and trades. The layout and installation of the systems specified herein shall be coordinated such that special requirements for telecommunications systems are provided and incorporated into the project. The systems to be coordinated include (but are not limited to) mechanical piping, ductwork and equipment, baggage handling systems, electrical raceway, grounding, fire rated assembly, lighting, power distribution, control and instrumentation.

D. Downtime for existing systems shall be avoided. Plan, coordinate, and execute installation activities so that facilities are not interrupted. Periods of unavoidable interruption shall be scheduled well in advance and approved in writing by ANC.

1.8 SUBMITTALS AND SHOP DRAWINGS

A. Submit designer and installer qualifications in accordance with this Section:

1. Submit the name, qualifications and experience of the system designer.

a. Submit experience of designer(s) to be assigned to this project on other Telecommunications projects of similar size and magnitude.

b. Designer shall have five years experience on projects of like magnitude and complexity.

c. Refer to designer qualification requirements in the Quality Assurance paragraph of this Section.

B. Submit contractor qualifications in accordance with this Section:

1. If ANC's designated, pre-qualified Telecommunications Contractor is utilized, identification of this fact will satisfy the qualification requirements.

C. If other than ANC's designated, pre-qualified Telecommunications Contractor is utilized, provide proof of qualifications and obtain ANC's prior approval of the Contractor.

1. Submit proof that the Contractor is a certified installer of the Corning LANscape® system, and approved by Corning to provide a fully warranted system.

2. Submit the names of the Contractor's personnel to be assigned to this project and the specific responsibility of each. Submit experience of those to be assigned to this project on other Telecommunications projects of similar size and complexity.

3. The Telecommunications contractor's project superintendent (in office) and foreman (field) shall have five years experience at the superintendent and foreman levels, respectively, on completed Telecommunications projects of like magnitude and complexity.

4. Demonstrate and document to the extent necessary that sufficient physical and personnel resources are available to accomplish the communications work of this project without endangering timely and proper completion of the work.

5. Provide a signed statement indicating that the telecommunications systems contractor has the ability to provide the service required by this Section, using factory trained and qualified technicians for each major system type and shall continue to maintain that capability until the end of the guarantee period.

D. Submit complete product information on the following items to ANC for review prior to beginning Work:

1. Fiber Optic Cable

2. Fiber Optic Terminations

3. Pre-connected Fiber Optic Pigtails

4. Splice Cases

5. Splice Organizers (Splice Trays)

6. Pre-Connected Cable Assembly (Fiber Patch Cords)

7. Fiber Optic Patch Panels

8. Fiber Distribution Units

E. Submit complete product information on related items such as conduit, boxes, cable trays, etc., as required by those related Sections.

F. Labeling System: Coordinate with ANC and satisfy all requirements of Section 16748 - Communications Cable Management Documentation for labeling conventions and Cable Management System (CMS) work. Submit completed labeling schedules to ANC for approval and entering into the existing CMS database by ANC before applying any labels.

G. Submit Manufacturers Certificate of Warranty as specified in this Section, including all warranty provisions and procedures for ANC to follow to obtain warranty service.

H. Provide detailed shop drawings for all installations.

1. Detailed designs of equipment in racks shall be in accordance with the ANC Telecom Standard Details.

I. Submit factory test reports for all fiber optic cable shipped. Refer to Section on Quality Assurance for testing requirements.

J. Shop Drawings: Submit Shop Drawings for approval by ANC as follows:

1. Dimensioned routing of conduits and innerducts for fiber optic cables as provided under this specification and indicated on the Drawings. Dimensioned layouts for existing conduit systems are not required.

2. Dimensioned rack plan layouts for all fiber optic termination equipment in all telecommunication rooms.

3. Dimensioned rack elevation layouts for all fiber optic termination equipment in all telecommunication rooms.

4. Labeling System: Coordinate with ANC and satisfy all requirements of Section 16748 - Communications Cable Management Documentation for labeling conventions and Cable Management System (CMS) work. Submit completed labeling schedules to ANC for approval and entering into the existing CMS database by ANC before applying any labels.

5. Submit Manufacturers Certificate of Warranty as specified in this Section, including all warranty provisions and procedures for ANC to follow to obtain warranty service.

1.9 WARRANTY

A. The Corning ***LANscape*** Warranty shall extend **twenty (20)** years from the date of final completion and shall be the standard warranty offered by Corning.

B. The warranty shall be provided to ANC by the manufacturer through a single point of contact (local warranty service agency or contractor) and shall be fully backed by the manufacturer.

C. The Extended Product Warranty and System Assurance Warranty for this wiring system shall be provided consisting of the following:

1. Extended Product Warranty - The Extended Product Warranty shall ensure against product defects, that all approved cabling components exceed the specifications of ANSI/TIA/EIA 568-B and ISO/IEC IS 11801-B, exceed the attenuation requirements of ISO/IEC IS 11801-B for cabling links/channels, and that the installation will exceed the loss and bandwidth requirements of ISO/IEC IS 11801-B for links/channels. The warranty shall apply to all passive components.

2. System Assurance - The System Assurance shall cover the failure of the wiring system to support any existing application, as well as additional application(s) introduced in the future by recognized standards or user forums that use the ANSI/TIA/EIA 568-B or ISO/IEC IS 11801-B component and link/channel specifications for cabling.

    1) FDDI

    2) IEEE 802.3z 1000Base-SX, 1000Base-LX

    3) Future application certified under the applicable standards as noted above.

3. Extended Product Warranty - The Extended Product Warranty and the System Assurance shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective product(s).

4. System Certification - Upon successful completion of the installation and subsequent inspection, ANC shall be provided with a numbered certificate, from the manufacturing company, registering the installation.

5. Warranty work on the certificated system shall be authorized by the manufacturer and performed by any factory certified installer of LANscape® system components.

PART 2 - PRODUCTS

2.1 GENERAL

A. Where available the Tenant may utilize existing ANC owned and managed fiber optic cable, equipment racks patch panels, etc., on a first come, first served, space available basis, subject to approval

B. Where required, provide Corning LANscape® optical fiber cabling, connecting hardware, and related hardware manufactured by Corning Cable Systems.

2.2 MULTIMODE FIBER

A. Multimode (MM) fiber: Provide 50 μm dual window graded index optical glass with nominal 125 μm cladding diameter. The optical fiber shall comply with ANSI/TIA/EIA-492AAAB.

B. Each multimode optical fiber shall meet the following graded performance specifications.

1. Maximum Attenuation: 3.5 dB/Km @ 850 nm, 1.5 dB/Km @ 1300 nm
2. Minimum LED Bandwidth: 500 MHz-km @ 850 nm, 500 MHz-km @ 1300 nm
3. Gigabit Ethernet Distance Guarantee: 600 meters @ 850 nm, 600 meters @ 1300 nm
4. Numeric Aperture: 0.20 ± 0.015
5. Core Diameter: 50.0 ± 3.0. μm
6. Cladding Diameter: 125.0 ± 2.0 μm
7. Core/Cladding Concentricity Error: ≤ 3.0 μm
8. Cladding non-circularity: ≤ 2.0 %
9. Core Non-circularity: ≤ 6.0 %
10. Minimum Tensile Strength: 100,000 psi
11. Colored Fiber Diameter: 250 μm $\pm$ 15 μm

C. All fibers shall be color coded to facilitate individual fiber identification. Fibers shall have either AFC2 OR CPC6 coating or approved equivalent to ensure color retention, minimize micro-bending losses and improve handling. The coating shall be mechanically strippable.

2.3 SINGLEMODE FIBER

A. Singlemode (SM) fiber: Provide 8.3 μm step-index optical glass with nominal 125 μm core/cladding diameter. The optical fiber shall comply with ANSI/TIA/EIA-492CAAA.

B. Each singlemode optical fiber shall meet the following graded performance specifications.

1. Maximum Attenuation:
   a. Indoor Applications (1-4 fiber): 0.4 dB/Km @ 1310 nm, 0.3 dB/Km @ 1550 nm
   b. Indoor Applications (5-144 fibers): 0.4 dB/Km @ 1310 nm, 0.3 dB/Km @ 1550 nm
   c. Outdoor Applications and Indoor/Outdoor Applications:): 0.4 dB/Km @ 1310 nm, 0.3 dB/Km @ 1550 nm

2. Gigabit Ethernet Distance Guarantee: 5000 meters

3. Numeric Aperture: 0.12 ± 0.015

4. Core Diameter: 8.8 μm

5. Cladding Diameter: 125.0 ± 1.0 μm

6. Core/Cladding Concentricity Error: ≤ 0.8 μm

7. Cladding non-circularity: ≤ 1.0 %

8. Core Non-circularity: ≤ 6.0 %

9. Minimum Tensile Strength: 100,000 psi

10. Colored Fiber Diameter: 250 μm ± 15 μm

C. All fibers shall be color coded to facilitate individual fiber identification. Fibers shall have either AFC2 OR CPC6 coating or approved equivalent to ensure color retention, minimize micro-bending losses and improve handling. The coating shall be mechanically strippable.

2.4 FIBER CABLE

A. Provide fiber cables of loose-tube or tight-buffered construction, comprised of all multi-mode, all single-mode or composite single-mode/multi-mode fibers.

B. Interior: Provide optical fiber cable of all dielectric, tight buffered design for interior applications.

1. Provide cables OFNR labeled and FT-4 Listed, which meet the requirements of NEC Article 770.

2. Riser rated:

a. Multimode, $2 \leq 24$ count: Refer to Appendix C

b. Multimode, $24 \leq 72$ count:Refer to Appendix C

c. Multimode, $72 \leq 144$ count: Refer to Appendix C

3. Plenum rated:

a. Multimode, $2 \leq 24$ count: Refer to Appendix C

b. Multimode, $24 \leq 72$ count: Refer to Appendix C

c. Multimode, $72 \leq 144$ count: Refer to Appendix C

C. Exterior: Provide optical fiber cable of all dielectric, stranded loose tube design for exterior applications.

1. Loose-tube, non-stranded designs are acceptable for fiber counts of 12 or less in exterior applications.

2. Provide UL-1666 OFNR compliant cables for interior/exterior applications to allow entry into the building beyond 50 feet without a splice.

a. The indoor/outdoor rated cable shall meet the flame retardant characteristics required for Riser rated cable while maintaining mechanical and environmental performance required for outside plant applications.

b. The cable shall consist of a dry block core design meeting all Bellcore outside plant water penetration requirements.

c. Environmental Specifications:

1) Operating Temperature Range: -40° F to 167° F (-40° C to 75° C)

2) UV protected jacket

d. Approved Equipment: Refer to Appendix C

3. The mechanical and environmental specifications for all-dielectric outside optical fiber cable shall be in accordance with ANSI/ICEA S-83-596. All other constructions of outside optical fiber cable shall be in accordance with ANSI/ICEA S-83-640.

2.5 FIBER DISTRIBUTION EQUIPMENT RACK

A. Provide fiber distribution equipment racks in TR spaces designated by ANC, as follows:

1. 19-inch free standing 7-foot high racks with 44 rack units, pre-installed jumper trough at the top and standard 1.75 inch TIA/EIA hole spacing, Hubbell NextFrame, or as approved.

2. On each side of the equipment rack provide inter-bay vertical cable management attachments with moveable front mounted flanged spools and moveable radiused cable guides. Adjacent racks require only one inter-bay unit between them.

3. Below and adjacent to each installed patch panel provide one two-unit (3.5 inch) horizontal cable management panel.

4. Provide a two unit (3.5 inch) horizontal cable management trough at the lowest useable position of each rack, or just below the bottom of the lowest mounted equipment, which ever is highest. Troughs on adjacent racks shall be at the same elevation to facilitate cross-connecting cables between racks.

2.6 FIBER PATCH PANELS

A. Provide low-density termination and administration point for fiber cables in the telecommunications equipment rooms with 24 or fewer fiber terminations:

1. 19-inch rack mountable frame with six adapter panel positions per two-unit (3.5 inch) frame.

2. Pre-punched and pre-loaded adapter panels with fiber adapters of the types specified herein, recessed a minimum of 2.5” from the front of the shelf for patch cable management. Provide full compliment of fiber adapters and adapter panels for each frame and label unused adapters “spare”.

3. Fiber management provisions to protect connectorized fibers from mechanical stress, macro-bending loss at the connection point and prevent tampering with the circuits.

4. Provisions for individual fiber identification on the panel faceplate.

5. Full front and rear accessibility.

6. Factory installed lock kit for hinged front panel, with two keys furnished for each panel. All panels provided for this project shall be keyed to match existing ANC panels.

7. Hinged translucent polycarbonate-tinted door in front of the connector panels.

8. Approved Equipment: Refer to Appendix C.

B. Patching Equipment:

1. Multimode Adapter Panel:

a. Type ST compatible with ceramic inserts and composite housing.

b. Approved Equipment: Refer to Appendix C.

2. Singlemode Adapter Panel:

a. “SC” simplex/UPC style with ceramic inserts, factory pre-pigtailed with single-mode MIC cable.

b. Approved Equipment: Refer to Appendix C.

C. Fiber Splicing Equipment:

a. Provide rack mounted splice cabinets with capacity as required to connect all single-mode fibers to pre-terminated pigtails for connection to fiber patch panels:

1) 19-inch rack mountable three-unit housing with 4.5 inch projection containing individual splice trays for transition splicing to pigtails.

2) Fiber management provisions to protect fibers from mechanical stress.

3) Full front and rear accessibility.

4) Sliding shelf to provide access to individual splice trays and routing guides.

5) Factory installed lock kit for hinged front and rear panels, with two keys furnished for each panel. All panels provided shall be keyed to match existing ANC panels.

6) Hinged translucent polycarbonate-tinted door in front of the connector panels.

7) Approved Equipment: Refer to Appendix C.

b. Provide adequate number of splice trays to fully transition all installed single-mode fibers to pre-terminated single-mode pigtails at each telecommunications room.

2.7 FIBER OPTIC CABLE CONNECTORS

A. Fiber Optic Connectors – Multi-mode:

1. Provide type ST field installable connectors to terminate multi-mode fiber optic cables from cable-to-cable, cable-to-equipment or equipment-to-equipment, and to make jumpers:

a. Insertion Loss: 0.2 dB

b. Fiber OD: 125 μm

c. Cable OD: 3.0 / 0.9 mm

d. Axial Load, min: 20 lb with less than 0.2 dB change

e. Temp. Stability: -40°C to 80°C

f. Ceramic Ferrule

g. Meet EIA and IEC standards for repeatability and have a locking feature to the coupler and assure non-optical disconnect.

h. Approved Equipment: Refer to Appendix C.

B. Fiber Optic Connectors – Single-mode:

1. Provide type SC simplex factory pigtailed connectors to terminate single-mode fiber. Refer to pigtailed connector panels specified above.

   a. UPC polish with $\leq$ 55 dB reflectance

2.8 PATCH CORDS AND JUMPERS

A. Multimode Patch Cord Specifications:

1. Provide fiber patch cord consisting of buffered, graded-index fiber with a 50 micron core and a 125 micron cladding for multimode. The 900 micron fiber coating shall be covered by aramid yarn and a jacket of flame retardant PVC. Ceramic ferrules.

2. Provide two-strand riser rated zipcord style cords for all duplex patch through and equipment connection applications. Provide single strand cords for single equipment connections.

3. Provide the quantity and length of patch cords required, to make an orderly, manageable connection between all patch panels and equipment being cross-connected.

4. Provide patch cords factory terminated with ST compatible connectors for multi-mode circuits.

5. Mated Connector Loss 0.2 dB typical, guaranteed maximum 0.5 dB, 500 insertions

6. Operating temperature: -40°C to 80°C, <0.3 dB change

7. Cable Retention: 20 lb. minimum, <0.2 dB change

B. Single mode Patch Cord Specifications:

1. The fiber patch cord shall consist of Corning SMFC/28 fiber with a 8 micron core and a 125 micron cladding for single mode. The 900 micron fiber coating shall be covered by aramid yarn and a jacket of flame retardant PVC. Provide connectors with ceramic ferrules and UPC polish.

2. Provide two-strand riser rated zipcord style cords for all duplex patch through and equipment connection applications. Provide single strand cords for single equipment connections.

3. Provide the quantities and length of patch cords required, to make an orderly, manageable connection between all patch panels and equipment being cross-connected.

4. Provide patch cords factory terminated with SC connectors for single-mode circuits.

5. Mated Connector Loss 0.2 dB typical, guaranteed maximum 0.5 dB, 500 insertions

6. Operating temperature: -40°C to 80°C, <0.3 dB change

7. Cable Retention: 20 lb. minimum, <0.2 dB change

2.9 FIBER SPLICES

A. Fiber optic splices are not allowed except where pre-terminated pigtails are used for single-mode fiber terminations. If field conditions are discovered that require additional splices, submit a request in writing to ANC and obtain approval prior to performing splice

B. Fiber optic splices shall be fusion splices performed in the field by a qualified splicer. Mechanical splices are not allowed.

C. Splicing equipment shall provide 3-axis alignment for fiber coatings of 250 micrometers to 900 micrometers and a splice loss of less than 0.05 dB for single-mode fibers.

D. Provide heat shrink splice protection for all fiber optic splices.

E. Fiber Optic splices, including single-mode termination pigtails, shall be performed within Splicing Cabinets:

a. Provide rack mounted splice cabinets with capacity as required to connect all single-mode fibers shown on the Drawings to pre-terminated pigtails for connection to fiber patch panels:

1) 19-inch rack mountable three-unit housing with 4.5 inch projection containing individual splice trays for transition splicing to pigtails.

2) Fiber management provisions to protect fibers from mechanical stress.

3) Full front and rear accessibility.

4) Sliding shelf to provide access to individual splice trays and routing guides.

5) Factory installed lock kit for hinged front and rear panels, with two keys furnished for each panel. All panels provided for this project shall be keyed alike.

6) Hinged translucent polycarbonate-tinted door in front of the connector panels.

7) Approved Equipment: Refer to Appendix C.

b. Provide adequate number of splice trays to fully transition all installed single-mode fibers to pre-terminated single-mode pigtails at each telecommunications room.

2.10 FIBER OPTIC FLEXIBLE DUCT

a. Provide conduit innerducts for use with fiber optic cabling in accordance with Section 16111.

b. Fiber optic innerducts shall extend to the racks or equipment cabinet unbroken via conduit or cable tray, and terminate at the top of the rack.

PART 3 - EXECUTION

3.1 FIBER SPLICES

A. All fiber optic cable splices shall be fusion splice type.

B. No FACTORY or OTHER splices are allowed except where pre-terminated pigtails are used for single-mode fiber terminations.

C. Completed splices shall be covered with a protective sleeve, heat shrink type, to restore the protective properties of the fiber coating and buffering. Deviations to the splice, location and pulling plan will be permitted, upon approval by ANC. All fiber colors shall be continuous from end to end. No switching or staggering of color scheme within the cable at splice points shall be allowed. Fibers shall be spliced in order.

D. Cables shall be brought out of the splice enclosure in a controlled environment to perform the fiber fusion splice operation. Splice shall be completed by returning the cable to the splice enclosure such that the excess cable does not impede future entrance and utilization. Cable shall be secured at regular intervals.

3.2 OPTICAL FIBER PATCH PANELS

A. All cable terminations shall be made on optical fiber patch panels. All installed fibers shall be terminated.

B. Optical fiber cables shall be enclosed in flexible duct over their entire length up to the fiber distribution equipment rack

3.3 CABLE INSTALLATION FOR ALL CABLES

A. Test each reel of received fiber optic cable using an Optical Time Domain Reflectometer (OTDR) prior to installation. Cables with detected flaws shall not be installed.

B. Follow cable manufacturer's specifications regarding handling methods, bend radius and maximum pulling tension limitations.

C. No copper cables shall be installed in same raceway as optical fiber cables.

3.4 UNDERGROUND CABLE INSTALLATION

A. All underground optical fiber cable shall be run in flexible ducts. Either three 1-1/4 inch flexible ducts or four 1 inch flexible ducts are to be installed in each 4 inch conduit.

B. Flexible duct shall enclose all optical fiber cable in conduit and ladder rack. Flexible duct shall be securely fastened to ladder rack and shall end directly above the rack in which the fiber is terminated.

C. Inner duct assignment of individual cables shall be as Approved by ANC. Cables shall not be placed in ducts other than those Approved.

D. Fiber optic cables transitioning through handholes and manholes shall be enclosed in flexible duct and positioned to avoid damage by personnel or equipment.

3.5 SECURING CABLE

A. Immediately after cable placement, a permanent identification tag shall be attached to visible cable sections. Cables shall be checked to ensure that the markings are intact.

B. Cables and equipment shall be supported and secured. Supports and fasteners shall be used to secure cables and equipment in position. Metallic supports and fasteners shall have a corrosion resistant finish. All cables shall be routed along the interior sides of manholes. Maintain manufacturer's specified minimum bend radius. Cables shall not be kinked during installation.

C. Corrosion resistant clamps and straps shall be used as necessary to properly secure the cable.

3.6 BENDING

A. Caution shall be used when bending cable to avoid kinks or other damage to the sheath. Bend radius shall be as large as possible with a minimum of 20 times cable diameter. Minimum radius shall be increased when necessary to meet cable manufacturer's recommendation. Cables shall not rest against any sharp edges.

3.7 CABLE PULLING LUBRICANT

A. Pulling lubricant, shall be used to minimize pulling tension and prevent sheath damage when pulling cables into ducts and conduits. Lubricant shall be applied to the cable sheath with a lubricator. When pulling has been completed, the exposed cable ends shall be wiped clean of lubricant.

B. Lubricants shall be compatible with and intended for use with plastic-sheathed cables. Soap and grease type lubricants are not allowed.

3.8 CABLE PULLING

A. Pulling lines shall be attached to both cable ends when cable is destined for bi-directional pull, and fitted with factory-installed pulling eyes where possible. Cables not equipped with a pulling eye shall have the pulling line attached to the cable end by means of a cable grip. Core hitches shall not be used.

B. Cable reels shall be located and aligned so that the cable is paid out from the top of the reel by rotating the reel in the feed direction at the rate of pull into the duct or conduit in a long, smooth bend without twisting. Cable shall not be paid out from the bottom of the reel or by pulling. A cable feeder guide of proper dimensions shall be used at the mouth to guide the cable into the duct or conduit.

C. Rigging shall be set up at the pulling end so that the pulling line and cable exit on a line parallel with the duct or conduit to prevent either from rubbing against the edge or mouth. Cable ends shall not be pulled around sheave wheels. When the sheave or pulley cannot be positioned to obtain sufficient cable end slack for proper racking and splicing with the pulling line attached to the end of the cable, a split cable grip may be used to obtain the necessary slack.

D. All equipment and the pulling set shall be checked to minimize interruptions once pulling begins. Cable shall be paid out without stopping until the required amount of the cable has been placed. If the pulling operation is halted before the pull is completed, the tension of the pulling line shall not be released. When pulling is resumed, the inertia of the cable shall be overcome by increasing the tension in small steps a few seconds apart until the cable is in motion.

E. Pulling tension shall not exceed 500 lbs or cable manufacturer's recommendation, whichever is less.

3.9 DAMAGE AND DEFECTS

A. Contractor shall use a tension monitoring device to ensure that the maximum pulling tension that may be applied to the cable to be pulled into a conduit section is not exceeded. Contractor shall replace cable if cable manufacturer’s maximum pulling tension is exceeded at any time during a pull.

B. Cable shall be carefully inspected for sheath defects or other irregularities as it is paid out from the reel. When defects are detected, pulling shall stop immediately and the cable section shall be repaired or replaced. A system of communications shall be maintained between pulling and feed locations so that pulling can be stopped instantly, when required.

C. Cable shall be hand guided through intermediate pull points and into the next duct section when making pull-throughs. Proper rigging shall be used in the intermediate pull points to keep the pulling line and cable aligned with the exit duct to prevent the line or cable from rubbing against the edge of the duct. Cables in intermediate pull points shall be set up and/or racked before the cable ends in adjacent manholes are set up and/or racked.

D. Cable ends pulled into manholes, vaults, pull boxes, or terminal locations that are not to be racked or otherwise permanently positioned immediately shall be tied in fixed positions to prevent damage to the cables and provide adequate working space.

E. Adequate care shall be exercised when handling and storing reels of cable to prevent damage to the cable. Cable with dents, flat spots, or other sheath distortions shall not be installed.

3.10 SEAL

A. Ducts or inner ducts in which cable is placed shall be sealed with urethane foam duct seal. This material shall be inserted between the cable and the duct or inner ducts of which it is in, between the inner ducts and the duct, and in all unused inner ducts, in order to prevent damage to the cable sheath and to prevent the entrance of dirt or water into the manhole or vault.

3.11 TESTING

A. Upon receipt of fiber, verify in factory test reports that all fiber cables tested good prior to shipping.

B. Perform in-place testing of all installed, terminated fibers in accordance with TIA/EIA OFSTP-7 and OFSTP-14 methods. Document and submit all tests results in accordance with specifications.

C. Multi-mode Testing:

1. Perform optical power loss measurements in accordance with TIA/EIA Standard OFSTP-14 using method C. In addition, perform OTDR testing on multi-mode fiber in accordance with tester manufacturers procedures and examine traces for events indicating faults or flaws which may effect network performance.

    a. Method C: Using an Optical Loss Test Set (OLTS) with hard-copy and disk output capability to test each installed multi-mode permanent link fiber from both directions at 850 and 1300 nm.

    b. Using an Optical Time Division Reflectometer (OTDR) test each installed fiber from both directions at 850 and 1300 nm for multi-mode fiber permanent link, minus patch cords.

    c. Calculate and document test results in accordance with TIA/EIA Standard OFSTP-14.

D. Single-mode Testing:

1. Perform optical power loss measurements in accordance with TIA/EIA Standard OFSTP-7 using both methods A.3 and B.

    a. Method A.3: Using an Optical Loss Test Set (OLTS) with hard-copy and disk output capability to test each installed single-mode permanent link fiber from both directions at 1310 and 1550 nm.

    b. Method B: Using an Optical Time Division Reflectometer (OTDR) test each installed fiber single-mode permanent link fiber from both directions at 850 and 1300 nm.

E. Provide a graph which indicates the attenuation and distance of each optical fiber for each test performed. The OTDR and associated software shall be Tektronics TFP2 FiberMaster OTDR with FiberMaster Trace Analysis Package or approved equal. Note on each page of test output:

1. Date and Time

2. Test Location

3. Test Technician’s Name

4. Test Equipment Used

5. Cable number

6. Strand number
7. Strand Color
8. Direction of Test
9. Attenuation
10. Length

F. Test each strand in both directions and produce a graph for each direction. At completion of the project, provide photocopies of the OTDR and OLTS printouts on 8.5" x 11" pages. Also provide output data on CD and submit to ANC at project closeout.

G. Test jumpers shall be of the same fiber core size and connector type as the cable system.

H. The power meter and the light source shall be set to the same wavelength.

I. The light sources, OTDR or OLTS shall operate within the ranges of operation specified for 850 nm, 1300 nm, 1310 nm and 1550 nm in accordance with TIA/EIA-526-14 and TIA/EIA-536-7, or the manufacturer's recommendation whichever is the more stringent. Power meters shall be calibrated and traceable to the National Bureau of Standards.

J. All system connectors, sleeves and jumpers shall be properly cleaned before measurements are taken.

K. All testing shall be certified as passing testing standards established by TIA/EIA specification for fiber optic cable.

L. Test Reports

1. Contractor shall submit optical fiber test results for each fiber installed. Optical Time Domain Reflectometer (OTDR) Optical Loss Test Set (OLTS) output test result graphs shall be provided for each fiber installed on 8.5" x 11" pages. Also provide output data on CD. The OTDR CD files shall be for use with the OTDR analysis package software. If equipment or software used is incompatible with ANC's OTDR analysis software, a copy of the OTDR analysis package software, licensed to the Owner, shall be delivered to ANC upon completion of the project.

END OF SECTION

SECTION 16748

COMMUNICATIONS CABLE MANAGEMENT DOCUMENTATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Section includes: General requirements of procedures and documentation for Tenant space communications systems infrastructure at Ted Stevens International Airport, hereafter referred to as “ANC”.

B. Tenant communication systems infrastructure shall be labeled and documented by the Tenant in compliance with this Section and related Sections. Documentation shall be submitted to ANC for registration and inventory in ANC’s cable management system (CMS).

C. ANC or its agent will use the CMS to inventory communication cable plant and associated infrastructure throughout Tenant and the airport facilities. ANC’s CMS database will inventory all communication systems infrastructure including backbone cable plant and cross-connects to horizontal wiring feeding tenant space.

D. ANC is requiring Tenants to submit detailed information on communication infrastructure residing in tenant space, primarily for the following reasons:

1. The computerized tracking of cable plant offered by CMS will be used to increase the quality of service for tenants through increased efficiency of tracking circuits and troubleshooting faults.

2. The 2002 edition of the National Electric Code (NEC) mandates that the type of cable plant referenced in this Section must be terminated, labeled, and considered operational and being used by the tenant. Any unused or abandon cables must be removed or the local Fire Marshal may impose fines for violation of fire codes.

1.2 SCOPE OF WORK

A. Provide complete communication system identification, submitted in a labeling format compatible with ANC’s Cable Management System (CMS). Refer to ANC Telecom Standard Details for labeling scheme.

B. Provide complete communication system drawings, submitted in AutoCAD format compatible with ANC’s Cable Management System (CMS).

1.3 QUALITY ASSURANCE

A. All Tenant owned communication system infrastructure shall be labeled and identified in submittals to ANC. Cabling and associated infrastructure installed but not submitted to ANC shall be removed.

B. All Tenant owned communication system infrastructure shall be illustrated in drawing submittals. Drawings shall be accurate to +/- 0.5 feet of actual installed location. Communication cabling and associated infrastructure installed but not indicated on drawings submitted to ANC shall be removed at the Tenant’s expense.

1.4 REFERENCES:

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

B. National Electric Code (NEC) 2002 Edition, specifically defined in the following articles:

1. Article 640 – Audio Speaker Wires
2. Article 645 – Information Technology
3. Article 745 – Power-Limited Circuits
4. Article 760 – Fire Alarm Systems
5. Article 770 – Optical Fiber Cables
6. Article 800 – Communication Circuits
7. Article 810 – Radio, Television or Satellite
8. Article 820 – Coaxial cable
9. Article 830 – Network-Powered Broadband

C. Telecommunications Industries Association/ Electronics Industries Association (EIA/TIA)

1. TIA/EIA 606A: The Administration Standard for the Identification and Labeling of Telecommunications Infrastructure in Commercial Buildings.
2. TIA/EIA 607A: - Administration Standard for the Telecommunication Infrastructure of Commercial Buildings.
3. TIA/EIA 568B - Commercial Building Telecommunication Standard.
4. TIA/EIA 569 -Commercial Building Standard for Telecommunication Pathways and Spaces.

D. Related Terminal Construction Standards Sections:

1. 16111 – Conduit and Fittings
2. 16115 – Cable Tray
3. 16131 – Outlet Boxes
4. 16450 – Grounding
5. 16745 –Telecommunications Copper Cable Distribution
6. 16747 –Telecommunications Fiber Optic Distribution

1.5 SUBMITTALS TO BE FURNISHED TO ANC BY THE TENANT

A. Provide communication systems infrastructure manufacturers product description cut-sheets.

1. Submit 3 copies of Product Manual: Loose leaf, three ring binder.
2. Manuals shall include a cover identifying tenant space occupant, installing Contractor and date of submittal.
3. Manuals shall include labeled section tabs identifying categories of products

B. Provide communication systems infrastructure identities and labeling schedules in a format compliant with the CMS database.

1. Submit 3 copies of schedule spreadsheets (Hardcopy): Loose leaf, three ring binder.

2. Hardcopy schedules shall include a cover identifying tenant space occupant, installing Contractor and date of submittal.

3. Submit 2 electronic file copies (softcopy) of schedule spreadsheets saved in a .CSV (Comma Separated Value) format on CD media. Coordinate with ANC and CMS manufacture (iTRACS) for exact format requirements, which include header rows assignments and related spreadsheet setup requirements.

4. Softcopies of schedules shall include jewel cases with cover identifying tenant space occupant, installing Contractor and date of submittal

C. Provide communication systems infrastructure drawings in a format compliant with ANC's CMS AutoCAD revisions and CAD Standards.

1. Submit 3 copies of full size drawings (Hardcopy):

2. Hardcopy drawings shall include a cover sheet identifying tenant space occupant, key plan of portion(s) of ANC illustrated in drawing set, installing Contractor and date of submittal

3. Submit 2 electronic file copies (softcopy) of drawings saved in AutoCAD format compatible with current AutoCAD version in use at ANC.

4. Softcopies of drawings shall be master files used to produce hardcopy drawings. Include jewel cases with cover identifying tenant space occupant, installing Contractor and date of submittal

PART 2 - PRODUCTS

2.1 ACCEPTABLE PRODUCTS

A. General: ANC's CMS is standardized on the following software package. Softcopy submittals shall be fully compliant with data import format requirements of the CMS:

1. iTRACS: 1501 W. Fountainhead Parkway, Suite 190, Tempe, AZ, 85282. Phone: 480-557-8000, Email URL for technical support: support@itracs.com

2.2 SAMPLE SPREADSHEET FILE FORMAT

A. The following table is a sample of the type of format the tenant shall use for documentation of communication infrastructure. The exact format and identities shall be coordinated with ANC.

	A	B	C	D	E	F	G	H
1	Column Group	1	1	1	2	2	3	3
2	Action	u	u	u	u	a	u	u
3	Connections							
4	Class/Category	Active Equip	Blade	Port	Store	Patch Cable	Patch Panel	Position
5		Switch 1	B1	Port 01	Links	Patch1	PP 1	12
6		Switch 1	B1	Port 02	Links	Patch2	PP 1	13
7		Switch 1	B1	Port 03	Links	Patch3	PP 1	14

2.3 MANDATORY INVENTORY ITEMS

A. The following list includes tenant installed communication infrastructure items/identities considered mandatory for inclusion in the documentation submittals to ANC.

1. Building Name
2. Building Floor
3. Communication Room
4. Racks
5. Patch Panels
6. Patch Panel Ports
7. Data/Telephone Outlets
8. Copper and fiber cables: backbone, horizontal, riser, and inter-building cables.
9. Cable topologies and capacities.
10. Pathways between termination points.
11. Telecommunications bonding and grounding.

2.4 TENANT'S OPTIONAL INVENTORY ITEMS

A. General.

1. Each tenant may (at the tenants option) include submittal of additional communication infrastructure information for the purpose of tracking and documenting detailed information. Additional information may offer the tenant troubleshooting tools to increase operational efficiency.

B. Optional Tenant CMS Inventory Items

1. Circuit assignments
2. IP addresses
3. Telephone subscriber line numbers
4. Workstations and other devices.
5. Switches, routes, hubs and other transmission equipment port assignments

PART 3 - EXECUTION

3.1 GENERAL

A. Prior to installation of communication infrastructure cabling, pathways and associated products, the tenant shall submit sample copies of softcopy documentation formats for review by ANC.

B. Documentation shall comply with this and related Sections.

3.2 CABLE AND OUTLET LABELING

A. Cable and outlet labeling shall comply with Appendix C – ANC Telecommunications Cable/Outlet Labeling Standards.

END OF SECTION

TED STEVENS ANCHORAGE INTERNATIONAL AIRPORT
AIRPORT BUILDING PERMIT APPLICATION
(For work in terminal buildings)

Permit No._____
Lease/ADA No._____

The Tenant/Leaseholder shall complete lines 1 through 14.

1. First Name	M.I.	Last Name
2. Title		
3. Company Name		
4. Mailing Address		
City	State	Zip Code
5. Telephone No. Fax No. Email Address		

6. Point of Contact (Representative with Tenant decision authority)
Name
Telephone No.
Fax No.
Email Address

7. Description of proposed improvements

8. Location/Room No.(s)	9. Estimated Cost
10. Proposed construction start date	11. Proposed construction end date

12. Application Submittal Requirements (minimum)		Attached	N/A
A.	Four complete sets of construction contract documents (four specification sets, two full-size plan sets, and two half-size plan sets), ANC Engineering may require additional sets and/or a CD having a single Adobe Acrobat pdf format file containing the specification set and another, single pdf format file containing the plan set to facilitate reviews.	☐	☐
B.	8-1/2" x 11" Site Plan/Floor Plan showing location of proposed work.	☐	☐
C.	Certification of Compliance to Terminal Construction Standards.	☐	☐
D.	Request for Waiver from Terminal Construction Standards.	☐	☐
E.	Copy of MOA Building Permit or Permit Application	☐	☐
F.	_____	☐	☐

The Tenant agrees to the following conditions:

A. The Airport Building Permit consists of the Airport Building Permit Application, the Terminal Construction Standards, approved Waiver Request from Terminal Construction Standards, Special Conditions, Permit Modifications and the Lease.
B. Compliance with local, state and federal regulatory requirements is the responsibility of the Tenant. Approval of this permit does not imply that the Tenant has met all regulatory requirements.
C. A Permission to Proceed shall be obtained from ANC before starting construction.
D. The Applicant shall post a copy of this permit at the construction site.
E. This permit expires one year after the Airport Director's date of signature unless noted otherwise in the Special Conditions.

13. Signature of Tenant/Leaseholder	14. Date

--------The following section is for Airport Staff use only---------

ANC STAFF RECOMMENDATIONS	Approve	Disapprove
Facilities	☐	☐
Leasing	☐	☐
Engineering	☐	☐
_____	☐	☐
_____	☐	☐
_____	☐	☐

Staff Comments

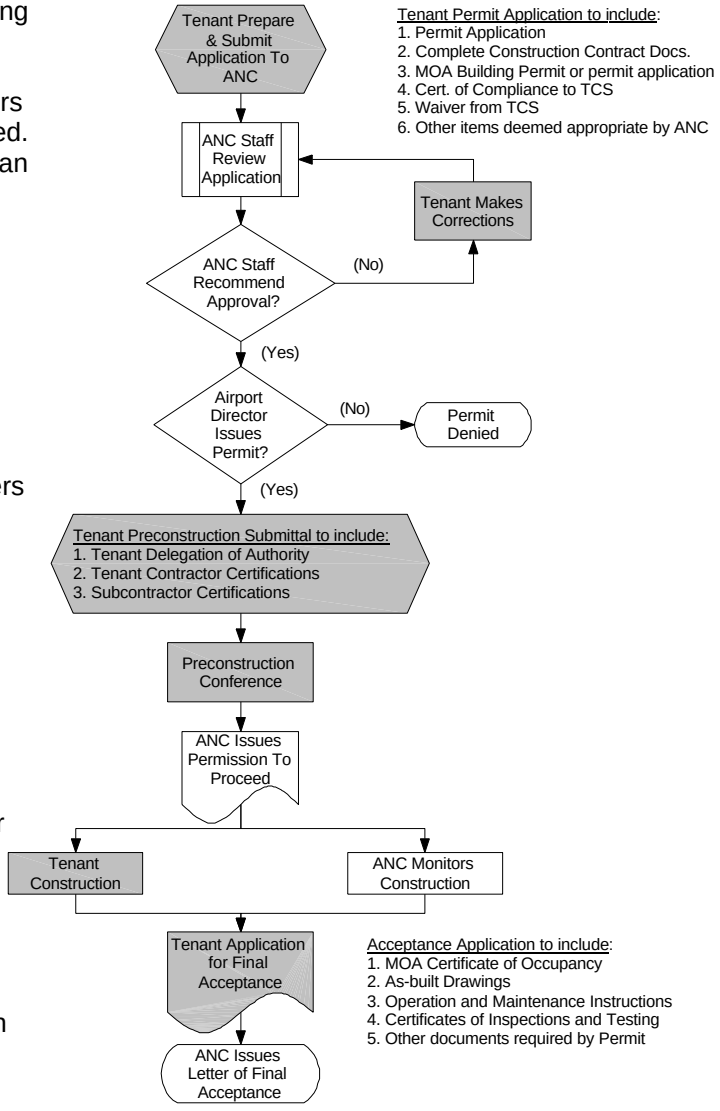
In addition to any Special Conditions attached, approval is subject to the following:	Attached	Separate Cover
A. _____	☐	☐
B. _____	☐	☐
C. _____	☐	☐
D. _____	☐	☐

Chief Engineer	Date
Deputy Director Comment	
Signature	Date
Airport Director	Permit Approved ☐ Permit Disapproved ☐
Comment	
Signature	Date

TED STEVENS ANCHORAGE INTERNATIONAL AIRPORT
AIRPORT BUILDING PERMIT APPLICATION INSTRUCTIONS
(For work in terminal buildings)

1. Write the name of the person applying for the Airport Building permit in this box. This person must be the person designated on the Airport Lease Agreement. Permit applications signed by others, including architects, engineers and contractors working for the lessee, will not be processed. Call Airport Leasing at 266-2420 if you are uncertain who can apply for this permit.
2. Enter the Applicant's title.
3. Enter the company name.
4. Enter the company's mailing address (Do not use a post office box).
5. Enter the applicant's phone and FAX numbers and email address.
6. Enter in Point of Contact name, telephone and FAX numbers and email address (Point of Contact is the Tenant representative having decision-making authority for the improvements being proposed).
7. Describe the proposed improvements.
8. Enter the room number(s) or location(s) where the construction is proposed.
9. Enter the estimated cost. This number may be used by Airport Leasing to evaluate future lease extensions.
10. Proposed construction start date (allow at least 2 weeks for permit processing).
11. Proposed construction end date.
12. The Airport requires the following attachments:
    - A. Four complete sets of construction contract documents (four specification sets, two full-size plan sets, and two half-size plan sets). ANC Engineering may require additional sets and/or a CD having a single Adobe Acrobat pdf format file containing the specification set and another, single pdf format file containing the plan set to facilitate reviews.
    - B. 8-1/2"x11" Site Plan/Floor Plan drawing(s) showing location of the proposed improvements.
    - C. Request(s) for Waiver from Terminal Construction Standards.
    - D. Certification of Compliance with Terminal Construction Standards.
    - E. Copy of the MOA Building permit or Building permit application for the proposed improvements.
    - F. Other submittal as required by the airport.
13. The Tenant/Leaseholder signature here.
14. Enter the date of signature here.

Submit the completed form to Ron Placko, Building Permits



CERTIFICATION OF COMPLIANCE TO TERMINAL CONSTRUCTION STANDARDS

The Tenant certifies the design contained within the construction documents submitted for an Airport Building Permit complies with the current version of the Ted Stevens Anchorage International Airport (ANC) *Terminal Construction Standards*. The Tenant acknowledges that any construction not in conformance with the *Terminal Construction Standards* shall be removed at the Tenant's expense ANC has approved a *Request for Waiver from Construction Standards for Tenant Improvements* for the nonconforming construction.

The Tenant agrees to abide by all construction and security processes and procedures required by the *Terminal Construction Standards*. The Tenant agrees to remove any company or employee who violates the construction and/or security processes and procedures required by the *Terminal Construction Standards*.

AGREE:

_____
Tenant/Leaseholder Company Name

_____
Signature of Tenant/Leaseholder

_____
Date

AGREE With Exceptions:
Request For Waiver(s) Attached

_____
Tenant/Leaseholder Company Name

_____
Signature of Tenant/Leaseholder

_____
Date

TED STEVENS ANCHORAGE INTERNATIONAL AIRPORT **Permit No.**_____
AIRPORT BUILDING PERMIT APPLICATION **Lease/ADA No.**_____
(for work in terminal buildings)

REQUEST FOR WAIVER FROM TERMINAL CONSTRUCTION STANDARDS

The Tenant/Leaseholder shall prepare a separate Request for Waiver from Terminal Construction Standards for each non-compliant design standard.

1. Write the Standard for which a waiver is being requested. Provide the section number.

_____
_____
_____
_____
_____

2. Write the reason for the waiver request. Explain why Ted Stevens Anchorage International Airport should approve this waiver request. Provide alternate design.

_____
_____
_____
_____
_____
_____
_____

_____
Tenant/Leaseholder Company Name

_____
Signature of Tenant/Leaseholder

_____
Date

----------*The following section is for Airport Staff use only* ----------

RECOMMENDATIONS	Approve	Disapprove
Leasing	☐	☐
Facilities	☐	☐
Engineering	☐	☐
_____	☐	☐
_____	☐	☐
_____	☐	☐

Staff Comments:

Airport Engineer	Date	Approve	Disapprove

APPENDIX C – ANC TELECOMMUNICATIONS

C1 - ANC TELECOMMUNICATIONS APPROVED EQUIPMENT

SECTION 16745 - COPPER CABLE DISTRIBUTION APPROVED EQUIPMENT

Description	TCS Section	Manufacturer	Part No.
Cable Management	16745-2.7	KRONE	6653-2-700-03
IDC Terminal Modules	16745-2.8	KRONE	7014-1-003-01
Disconnect Blocks	16745-2.9	KRONE	7014-1-004-01
Patch Panels – 24 Port	16745-2.10	KRONE	6653-1-587-24
Patch Panels – 48 Port	16745-2.10	KRONE	6653-1-587-48
Telecom Outlet Jacks	16745-2.11	KRONE	6467-1-081-10
Telecom Outlet Faceplates	16745-2.11	KRONE	6644-1-156-0X
Horizontal Cables	16745-2.13	KRONE	TN5ESP-XX02

SECTION 16747 – FIBER OPTIC DISTRIBUTION APPROVED EQUIPMENT

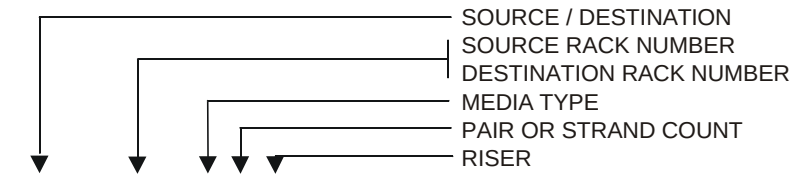
Description	TCS Section	Manufacturer	Part No.
Riser Rated Multi-Mode Cable (2-24 count)	16747-2.4	Corning	MIC nnnC81-3X131-24*
Riser Rated Multi-Mode Cable (24-72 count)	16747-2.4	Corning	Unitized MIC nnnC81-61131-24*
Riser Rated Multi-Mode Cable (72-144 count)	16747-2.4	Corning	Unitized MIC nnnC81-T3131-24*
Plenum Rated Multi-Mode Cable (2-24 count)	16747-2.4	Corning	MIC nnnC88-3X131-29*
Plenum Rated Multi-Mode Cable (24-72 count)	16747-2.4	Corning	Unitized MIC nnnC88-61131-29*
Plenum Rated Multi-Mode Cable (72-144 count)	16747-2.4	Corning	Unitized MIC nnnC88-T3131-29*
Exterior and Interior/Exterior	16747-2.4	Corning	FREEDM nnn(C/R)WF-141(31/01)A20**
Fiber Equipment Racks	16747-2.5	Hubbell	NextFrame CR1976, or as Approved
Fiber Horizontal Cable Management Panel	16747-2.5.A.3	Corning	CJP-02U, or as approved
Fiber Horizontal Cable Management Panel – Bottom of Rack	16747-2.5.A.4	Corning	CDF-CJT-02U-19, or as approved
Fiber Patch Panel Housing	16747-2.6.A	Corning	CCH-02U
Multimode Adapter Panel	16747-2.6.B.1	Corning	CCH-CP06-15T
Singlemode Adapter Panel	16747-2.6.B.2	Corning	CCH-CP06-5C-P03-RH
Closet Splice Housing	16747-2.6.C	Corning	CSH-03U
Fiber Optic Connectors – Multi-mode	16747-2.7	Corning	95-050-51

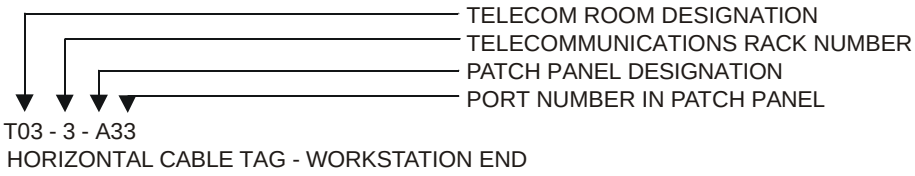
a. * nnn = fiber count; X = fiber identification scheme

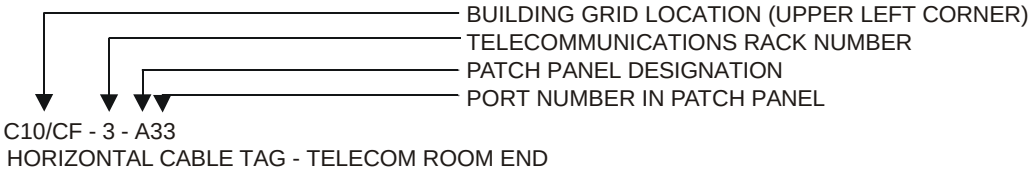
b. ** (C/R) and (31/01) = either 50/125 micrometer multi-mode, single-mode or composite.

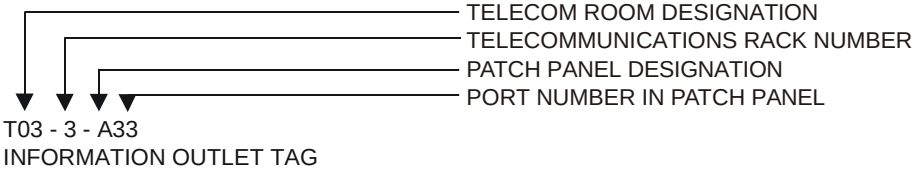
C2 - ANC TELECOMMUNICATIONS CABLE/OUTLET LABELING STANDARDS

TELECOM CABLE/OUTLET LABELING









TELECOM LABELING LEGEND

SOURCE / DESTINATION
DESIGNATED BY TELECOM ROOM

MEDIA TYPE
C = COPPER UNSHIELDED TWISTED PAIR (UTP)
MM = FIBER OPTIC MULTI-MODE, 50/125 MICRON
SM = FIBER OPTIC SINGLE-MODE
R = COPPER COAXIAL CABLE

TELECOM ROOM
REFER TO PLANS AND ONE-LINES

RACK NUMBER
SEQUENTIALLY NUMBERED IN EACH ROOM
WM = WALL MOUNTED IDC BLOCKS

PAIR OR STRAND COUNT
NUMERICAL AS INDICATED

RISER
A DATA BACKBONE
B DATA BACKBONE
BLANK = N/A

PORT NUMBER
NUMERICAL AS INDICATED

Appendix D - Concourse C Structural Limitations for Tenant Improvements

A.

OPEN WEB STEEL JOISTS: Location	Allowable eccentric load (on side of bottom chord) POUNDS. Total if no existing hangers/loads present.	Allowable load centered on bottom chords (total between each panel point if no existing hangers/loads present) POUNDS	Allowable load centered on bottom chords if existing hangers/loads present. POUNDS	Allowable eccentric load (on one side of top chord) POUNDS. Total between each panel point if no existing hangers/loads present	Allowable load centered on top chords POUNDS. Total between each panel point if no existing hangers/loads present	Allowable load centered on top chords if existing hangers/loads are present POUNDS
1. Area C3 and Area C4, Level 3	0	40	0	50	150	0
2. Area C4, Level 4	0	60	0	50	200	0
3. Level 5 (Grids C2 to C30 between Grids CC.4 and CC)	0	250	0	50	300	0
4. Lvl 5 (Grids C1 to C30 West of Grid CC)	0	80	0	50	200	0
5. All other areas of building with roof joists	0	40	0	50	150	0

A. See attached sketch 1 / TI for loading diagram
B. If these loading conditions are not exceeded additional angle braces (connecting top and bottom chords) are not required.
C. Where loads are exceeded, additional supports shall be added to reduce point loads or alternate support detail shall be submitted to the DEPARTMENT for review and approval prior to installation.
D. No items which may impose lateral loads on bottom chords of joists (braces, kickers etc) may be attached to the bottom chords of steel joists under any

DEFINITIONS:
Tributary width: Width of decking above (and associated loads on the decking) that is supported by each joist (perpendicular to joist span). Typically is the sum of half the distance from the joist to each adjacent structural support member.

Eccentric Load : Vertical loads where line of action is not aligned with the vertical axis of the joist. Typical eccentric loads are attached to only one of the two bottom (or top) chord angles.

Chord: Horizontal angles that form top and bottom of joist. Each joist has 2 back to back steel angles which form the top chord and 2 angles which form the bottom chord.

Panel point: Location where web members (vertical or diagonal) connect to the top or bottom chords (typically by welding).

Appendix D - Concourse C Structural Limitations for Tenant Improvements

B.

CONCRETE HANGERS: (*These are structural support items that are attached to concrete from below that will support items to be hung below the concrete slab*): Location	Maximum allowable gravity point load. POUNDS (Concrete span only. Contractor to design hanger and connection to concrete)	Notes
1. Concrete on metal decking: Level 1 and 2 Area C1 and C2. Levels 2, 3, and 4 in remaining concrete on metal deck areas	500	Contractor to locate and avoid damage to all rebar, embedded conduit, etc. 3 inch maximum embedment into existing slab. Cutting of welded wire fabric is acceptable. Newly installed hangers shall be spaced 8 feet on center minimum.
2. Two way slab Level 1 Area C4 and Area C6	750	Contractor to locate and avoid damage to all rebar. Newly installed hangers shall be spaced 8 feet on center minimum.
3. Large loads on precast concrete panels Area C1 and C2 Level 1 and Level 2 (old C mechanical building)	500	Attachment to the existing threaded rods at panel seams only. See the attached sketch 2/TI. No drilling of concrete allowed (Connection to threaded rods only by addition of Unistrut or other bracket). Maximum of 1 additional 500 pound load for each existing threaded rod. May not attach to existing Unistrut.
4. Small loads on precast concrete panels Area C1 and C2 Level 1 and Level 2 (old C mechanical building)	less than 100	No drilling of concrete allowed. Connection to existing threaded rods or existing Unistrut. Maximum 1 additional hanger for each existing Unistrut span. Place minimum approximately 12 inches away from existing hanger. Contractor to verify Unistrut capacity as required if existing hangers present.

Appendix D - Concourse C Structural Limitations for Tenant Improvements

c.

CONCRETE ANCHORS AND CORE DRILLING: (*Anchors are structural support items that will prevent items that are sitting on top of concrete slabs from sliding or overturning. These would be attached to the concrete from above)* Location:	Allowable gravity point load. POUNDS. Concrete span only. Contractor to design anchor and connection to concrete)	Notes
1. Concrete on metal decking: Level 1 Area C1 and C2. Level 2, 3, and 4 and remaining concrete on metal deck areas	500	Contractor to locate and avoid damage to all rebar, embedded conduit, etc. 3 inch maximum embedment into existing slab. Cutting of welded wire fabric is acceptable. Newly installed hangers shall be spaced 8 feet on center minimum.
2. Two way slab level 1 (Same as level 0 ceiling) Area C4 and Area C6	750	Contractor to locate and avoid damage to all rebar, embedded conduit, etc. Cutting of welded wire fabric in 2 inch topping slab is acceptable. Newly installed hangers shall be spaced 8 feet on center minimum.
3. Core drilling 2 way slab level 1 Area C4 and Area C6	0 (See 1 above for allowable loads)	All rebar (top and bottom bars) shall be located by the contractor prior to drilling. No rebar shall be damaged in any way under any circumstances. All core drill locations shall be documented and submitted to Department for approval prior to
4. Precast concrete panels Area C1 and C2 Level 1 and Level 2 (old C mechanical building)	500	Contractor to locate and avoid damage to all rebar, embedded conduit, etc. Cutting of welded wire fabric in 2 inch topping slab is acceptable. 2 1/2 inch maximum embedment for all items.
5. Core drilling precast concrete panels Area C1 and C2. Level 1 and Level 2 (old C mechanical building)	0 (See 4 above for allowable loads)	All rebar and tendons shall be located by the contractor prior to drilling. No rebar or tendons shall be damaged in any way under any circumstances. All core drill locations shall be documented and submitted to Department for approval prior to drilling.
NOTE 1: For core drilling concrete on metal deck or installing anchors (from above or below), no rebar shall be cut or damaged (typically rebar occurs as trim bars at openings and diaphragm chord steel along perimeter of each area). Contractor shall locate all rebar prior to drilling and avoid damaging this rebar in any way. Cutting of WWF is acceptable.		
NOTE 2: For core drilling concrete on metal deck or installing anchors (from above or below), no embedded conduits shall be cut or damaged (there is approximately 80 miles of conduit in the concrete slab on metal decks). Contractor shall locate all conduits prior to drilling and avoid any and all damage.		

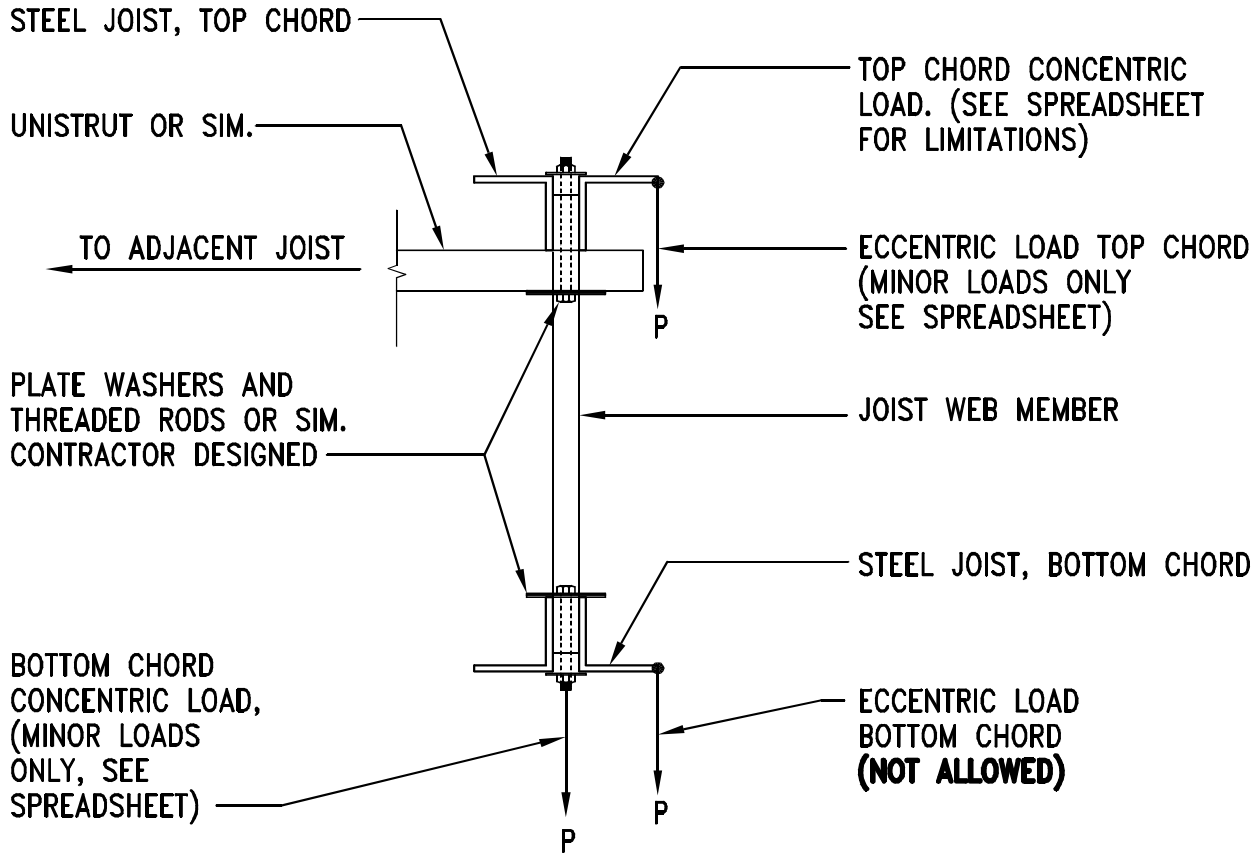
Appendix D - Concourse C Structural Limitations for Tenant Improvements

D.

METAL DECKING:	Maximum allowable gravity point load POUNDS. Deck span only. Contractor to design hanger and connection to metal decking	Notes
Hangers to be attahed to decking to support items hung from below decking. All areas	No loads exceeding 40 pounds	All hangers shall be spaced a minimum of 3 feet from any adjacent hanger (existing or new).
Roof penetrations	1000 total load distributed along perimeter of penetration	For all roof penetrations provide 6x6 angles along each edge. Angles parallel with deck span shall span between adjacent steel framing members (joists or beams). See Sketch 3/TI and 4/TI attached. Where loads exceed 1000 pounds contractor to submit a structural support system to the DEPARTMENT for review and approval prior to start of work.

FOR ANY LOCATIONS WHERE CONTRACTOR FEELS THAT THE COST TO COMPLY WITH THE BELOW REQUIREMENTS IS PROHIBITIVE, A SPECIFIC ALTERNATE PLAN OF WORK SHALL BE SUBMITTED TO THE DEPARTMENT FOR REVIEW AND APPROVAL PRIOR TO INITIATION OF SUCH WORK.

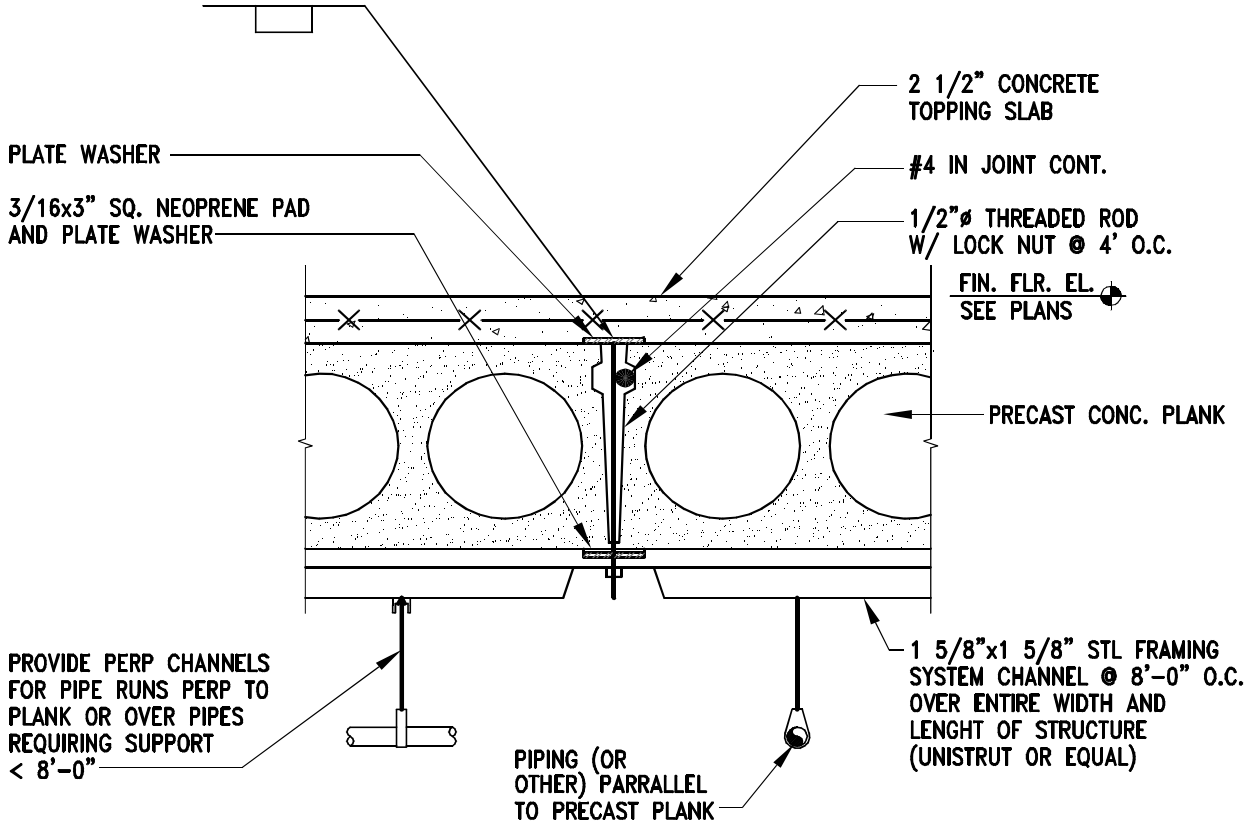
Appendix D - Concourse C Structural Limitations for Tenant Improvements



1/TI **JOIST LOADING DIAGRAM**

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

Appendix D - Concourse C Structural Limitations for Tenant Improvements

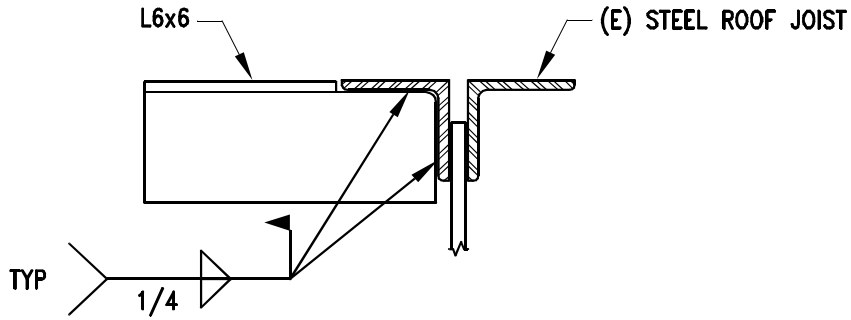


RECORD DOCUMENT

2 / TI **SUPPORT DETAIL IN C MECH BLDG**

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

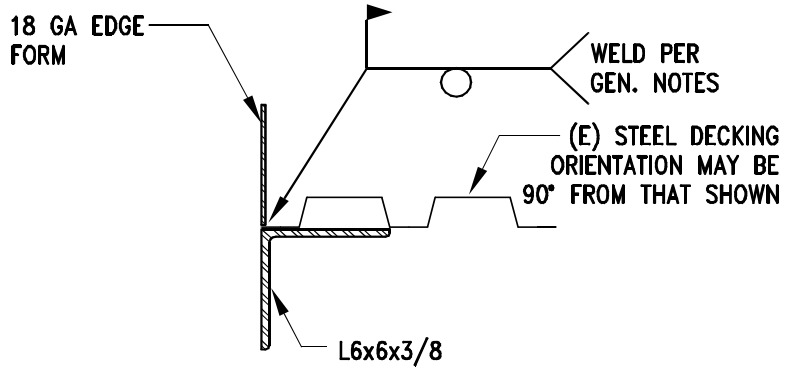
Appendix D - Concourse C Structural Limitations for Tenant Improvements



3
T1

EDGE ANGLE TO ROOF JOIST

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



4 / TI **EDGE ANGLE AT ROOF OPENING**

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