1. GENERAL

1.01 SUMMARY

.1 This Section covers the supply and installation of a complete Communications Copper Horizontal Cabling system. The scope of work includes, but is not limited to, the following tasks, as well as all tasks specified by the Consultant or the Owner, stipulated in the Contract Documents, or required for proper completion and commissioning of the system.

.1 Supply, delivery, supervision, coordination, installation, testing and commissioning of a complete horizontal copper cabling system, as specified in the present document, the Contract Documents, and the Drawings.

.2 Submittal of complete documentation, including, certifications, test reports, progress reports, warranty certificates, manuals, as-built drawings, as specified in the present document and the Contract Documents, and as requested by the Consultant and the Owner for the purpose of proper completion of the project.

.2 Contractor shall examine, and is responsible for complying with, the Contract Documents in their entirety, including all relevant Drawings and Specification presented in other Sections and Divisions, regardless of whether such Drawings and Specification are referenced in this Section.

.3 Contractor shall provide, install and test a complete Communications Copper Horizontal Cabling system as follows.

.1 Contractor shall furnish and install all horizontal cabling system equipment, including:

.1 Horizontal Cables (Permanent links, patch cords and equipment cables).

.2 Termination Hardware.

.3 Telecom Outlets.

.4 Patch Panels.

.5 Device Connection.

.6 Testing (Including cable and channel verification, qualification and certification).

.7 Administration and Identification.

.2 Contractor shall furnish and install all miscellaneous items, accessories, appurtenances, and devices incidental to or necessary for a sound, secure, and complete installation, without claim for additional payment, even if such work or components are not specifically mentioned in the Specification or the Drawings.

.3 Contractor shall provide system testing and demonstration, proper commissioning, system documentation, as-built drawings, training and installation manuals, and adequate training for the Owner's personnel, without claim for additional payment.

.4 Errors, Omissions and Conflicts:

.1 Contractor shall notify the Consultant no later than ten (10) days prior to submitting the bid of any errors or omissions encountered in the Drawings, Specification, or other Contract Documents.

.2 Contractor shall use the more expensive material or method whenever a conflict is encountered between or within Drawings and Specification, unless Contractor has requested received a written response (addendum) as to which material or method is suitable.

.5 Related Requirements:

.1 Section 07 84 00 – Firestopping.

.2 Section 26 05 26 – Grounding and Bonding for Electrical System.

.3 Section 27 08 11 – Testing of Structured Cabling Systems.

.4 Section 27 11 16 – Communications Cabinets, Racks, Frames, and Enclosures.

.5 Section 27 11 19 – Communications Termination Blocks and Patch Panels.

.6 Section 27 11 23.13 – Communications Cable Management.

.7 Section 27 11 26 – Communications Rack Mounted Power Protections and Power Strips.

.8 Section 27 15 43 – Communications Faceplates and Connectors.

1.02 ACRONYMS AND ABBREVIATIONS

.1 ANSI - American Northern Standards Institute.

.2 AWG - American Wire Gauge.

.3 BICSI - Building Industry Consulting Service International.

.4 TDMM - Telecommunications Distribution Methods Manual (BICSI).

.5 EIA - Electronics Industry Alliance.

.6 IEEE - Institute of Electrical and Electronics Engineers.

.7 ISO - International Standards Organization.

.8 OESC – Ontario Electrical Safety Code.

.9 NFPA - National Fire Protection Agency.

.10 NRTL - Nationally Recognized Testing Laboratory.

.11 TIA - Telecommunications Industry Association.

.12 UL - Underwriters Laboratories.

1.03 REFERENCES

.1 Most recent editions and addenda of the following documents:

.1 ANSI/TIA-568 - Commercial Building Telecommunications Cabling Standard Set

.2 ANSI/TIA-569 - Telecommunications Pathways and Spaces

.3 ANSI/TIA-606 - Administration Standard for Telecommunications Infrastructure

.4 ANSI/TIA-607 - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises

.5 ANSI/TIA-862 - Structured Cabling Infrastructure Standard for Intelligent Building Systems

.6 ANSI/TIA-942 - Telecommunications Infrastructure Standard for Data Centers.

.7 ANSI/TIA-1179 - Healthcare Facility Telecommunications Infrastructure Standard.

.8 ANSI/TIA-4966 - Telecommunications Infrastructure Standard for Educational Facilities.

.9 BICSI/TDMM - Telecommunications Distribution Methods Manual.

.10 TIA-TSB-162 - Telecommunications Cabling Guidelines for Wireless Access Points.

.11 CSA C22.1 - Canadian Electrical Code Part 1.

.12 UL 444 - Standard for Safety of Communications Cable.

.13 UL 1666 - Standard for Safety of Flame Propagation Height.

.14 Local Authority Having Jurisdiction (AHJ).

.15 Anywhere cabling standards conflict with one another or with electrical or safety codes, Contractor shall defer to the OESC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either.

1.04 SYSTEM DESCRIPTION

.1 The Contractor shall provide, install, test, label and document a complete horizontal structured cabling system, spanning from a centralized telecom room(s) (TR) to the telecom outlets (TO), in a star network topology. The main components of the system are specified below.

.2 Horizontal Cabling

.1 The horizontal cabling system extends from the telecom room (TR) or telecom enclosure (TE) to the work area telecom outlet (TO). It includes horizontal cable, hardware terminations, jumpers, patch cords, and may incorporate multiuser telecommunications outlet assemblies (MUTOAs) and consolidation points (CPs).

.2 Maximum horizontal cable length shall be 90 m (295 ft.), independently of media type. Where an MUTOA is deployed, the maximum horizontal copper cable length shall be adjusted accordingly.

.3 Telecom Room / Enclosure (TR / TE)

.1 Telecom Room (TR) is a dedicated and controlled space on each building floor, used for housing telecommunications equipment, cable terminations, and cross-connect hardware serving that particular floor. TR constitutes the recognized connection point between horizontal and backbone cabling systems. The telecom standards (ANSI/TIA, BICSI TDMM, etc.) require a minimum of one telecom room, closet, or enclosure per floor.

.2 Telecom Enclosure (TE) usage is project-specific rather than a standard requirement. TE is intended to serve relatively smaller floor area, and is often used to extend the space and reach of a TR.

.4 Pathways and Raceways

.1 Pathways and raceways are conveyance and routing systems for distributing, supporting and protecting telecom infrastructure cabling systems. Pathway system type and installation method shall be suitable for the media being supported and the environment being traversed.

.2 Pathway and raceway systems shall conform to the standards specified and referenced in Section 27 05 28 and Section 27 05 36.

.3 Pathway design shall combine continuous cable trays and non-continuous cable supports. Cable trays should, nonetheless, form the main horizontal cabling pathway, and should be located over the main corridors, to facilitate access and maintenance tasks.

.4 In low cable density areas, non-continuous supports shall be used in lieu of a cable tray system, unless otherwise specified in the design documents.

.5 In open-ceiling spaces where the cable is exposed, a conduit or a surface raceway shall be used in lieu of non-continuous supports, to enhance cable protection and aesthetic appearance.

1.05 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Shop Drawings

.1 Contractor shall submit shop drawings for all components and equipment used in the project, including, the items listed below.

.1 Modular Connectors.

.2 Telecom Outlet Faceplates.

.3 Horizontal Cable.

.4 Patch Panels.

.5 Patch Cables and Equipment Cords.

.6 Telecommunications Enclosures and Racks.

.7 Cable Management Components.

.8 Pathways and Raceways (Cable Trays, Cable Supports, Conduits, etc.).

.9 Firestopping Material.

.3 General Component Data

.1 Contractor shall submit the information and documents outlined below, with respect to all components and products covered under this Section or installed as part of communications copper horizontal cabling:

.1 Product Name, Manufacturer Name, Model Number and Part Number.

.2 Product Datasheets and Specifications.

.1 Complete specification, including but not limited to, standards compliance, Category type, fire rating, environmental rating, number and color code of pairs, conductor size and material, insulation type and material, performance and attenuation parameters, near-end cross talk (NEXT), cable diameter and weight, jacket type and material, cable color, etc.

.3 Product Manuals (Installation Instructions, User Manuals, Maintenance Manuals).

.4 Deviations

.1 Contractor shall be responsible for any deviation from Contract Documents, regardless of whether such deviation or associated drawings and samples have been reviewed by the Consultant, unless deviation has been approved in writing by the Consultant and the Owner.

.2 Contractor shall submit an indexed sheet detailing all deviations from Contract Documents, and shall be responsible for all such deviations, unless these have been expressly approved in writing by the Consultant and the Owner.

.3 Contractor shall not assume that an approval of an item's shop drawing or sample is equivalent to an approval of the item itself. Deviations shall be treated specifically, and shall be approved separately as such, in writing by the Consultant and the Owner.

.4 Contractor shall be responsible for all deviations, errors and omissions in the submittal documents and process, regardless of whether such deviations, errors and omissions have been reviewed by the Consultant or the Owner.

1.06 CLOSEOUT SUBMITTALS

.1 Testing and Test Results

.1 Refer to Section 27 08 11.

.2 Specification and calibration sheets for all test equipment.

.3 Contracting firm qualifications and certifications.

.4 Installation team qualifications (by person).

.5 Test results (Intermediate and final test results, as specified in Part 3 - Execution).

.2 Contractor shall submit final closeout documents as required by the Consultant and the Owner. These shall include, but are not limited to, the following items.

.1 Test results covering all cable segments and links, in native tester and PDF formats, or as otherwise specified by the Consultant.

.2 Manufacturer and contractor warranties.

.3 Complete project manual set, including, product datasheets, material submittals, training manuals, user manuals, maintenance manuals and preventive maintenance plan.

.4 Spare parts recommendation list.

.3 Contractor shall submit a complete set of as-built drawings in an accessible AutoCAD format, as specified by the Consultant and the Owner. As-built drawings shall cover the following.

.1 Precise location and identification (labels) of all equipment, including, all data outlets, cables, cable trays, patch panels, racks, telecom rooms and enclosures, and all other equipment which is part of the horizontal cabling system.

.2 Detailed floor plans of all telecom rooms and spaces.

.3 Detailed layout of all racks, patch panels, cable trays, pathways, conduits.

.4 Detailed layout of all pathways, cable trays, and cable routes.

.4 Contractor shall submit and mount on the wall of each telecom space or room, detailed as-built drawings depicting the floorplan, floor area, TO points, and cabling layout, for that space or room. Drawings shall be printed on ANSI C paper size or larger, shall be laminated, and shall be approved and wall-mounted in coordination with the Consultant and the Owner.

1.07 QUALITY ASSURANCE

.1 Standards for Materials and Equipment

.1 Contractor shall provide all materials, equipment, and installations, in compliance with the latest applicable standards.

.2 Installer Qualifications

.1 Refer to Section 27 05 00 – Common Work Results for Communications.

1.08 WARRANTY

.1 Contractor shall ensure each piece of equipment installed including wiring is warranted by the manufacturer to be free of defects in operation, material, and workmanship for a period of 20 years from date of Substantial Completion.

2. PRODUCTS

2.01 MANUFACTURERS

.1 CommScope.

.2 Panduit.

.3 Belden.

.4 [ ].

2.02 CATEGORY 6A DATA COMMUNICATIONS HORIZONTAL CABLE

.1 Category 6A (Class EA) cable shall meet ANSI/TIA-568.2-D Category 6A component standard. Cable conductors shall consist of 23 AWG copper wires and shall be twisted in pairs. In addition, Category 6A cable shall comply with the following specifications and standards:

.2 General Requirements

.1 Cable shall consist of 4 unshielded twisted pairs with no outer shielding (Cat 6A U/UTP), unless otherwise specified in the design and expressly approved by the Owner.

.2 Cable used in data networking systems shall have a blue color jacket.

.3 Cable conductor insulations shall be color coded in compliance with the TIA-568 standard.

.4 Cable individual conductors shall be 23 AWG copper wires. Special applications requiring the use of the thinner 24 AWG conductor in patch cords (short length, max 2 m) shall be specified and expressly approved by the Owner. Note: Only

Category 6A cable with 23 AWG solid conductors is permitted in Permanent Link.

.5 Cable deployed as horizontal permanent link extending from the telecom enclosure/room to the telecom outlet shall have solid conductors.

.6 Equipment cable and patch cords shall have stranded conductors.

.7 Cable shall be properly rated for its use application and its installation environment (Outdoor/OSP, Plenum/CMP, Riser/CMR, LSZH, Industrial/Armored, Direct Burial, etc.), as required by the local and national codes.

.8 Cable weight shall not to exceed 30 lbs./1000 ft.

.3 Standards Compliance and Technical Specification

.1 Category 6A cable shall satisfy the following compliance and technical specification.

.2 Cable shall exceed requirements of ANSI/TIA-568.2-D Category 6A and ISO 11801 2nd Edition Class EA channels standard.

.3 Cable shall exceed requirements of ANSI/TIA-568.2-D and IEC 61156-5 Category 6A components standard.

.4 Cable shall meet requirements of IEEE 802.3af, IEEE 802.3at and IEEE 802.3bt for Power over Ethernet (PoE) applications up to 100 watts (IEEE 892.3bt Type 4, 4PPoE).

.5 Cable shall meet TIA TSB-184-A / IEEE 802.3bt cable requirements, and UL listed CMP-LP (0.7A).

.6 Cable shall be characterized up to 500 MHz or higher, as specified in the ANSI/TIA-568.2-D, Category 6A standard.

.7 Cable shall be third-party tested and verified for compliance with ANSI/TIA-568.2-D, Category 6A.

.8 Cable shall support IEEE 802.3 for 10GBASE-T (10 Gigabit Ethernet), 1000BASE-T (Gigabit Ethernet), 100BASE-T (Fast Ethernet), and 10BASE-T applications up to 100 meters.

.4 Safety Standards

.1 Category 6A cable shall strictly meet the following specification in order to achieve compliance with the local and national (CSA) safety codes and standards.

.2 Cable deployed in the plenum and/or raised floor space (whether partly or entirely) shall be plenum CMP rated and shall comply with the CSA FT6 or NFPA 262 (UL-910) fire test standards.

.3 Cable running between floors in non-plenum area shall be riser CMR rated and shall comply with the CSA FT4 and UL-1666 fire test standards.

.4 Plenum CMP rated cable (CSA FT6 or NFPA 262) may be used in riser applications, if needed. Riser CMR rated cable, however, is not approved for use in plenum space and shall not be deployed therein.

.5 Temperature Rating

.1 Installation Temperature Range: 32°F to 122°F (0°C to 50°C)

.2 Operating Temperature Range: -4°F to 167°F (- 20°C to 75°C)

3. EXECUTION

3.01 GENERAL

.1 Comply with the design requirements and industry standards, and with the applicable local and national codes.

.2 Follow best practices guidelines and applicable industry standards for the installation of the cable and all horizontal channel components.

.3 Ensure that patch panels, connectors, and all structured cabling components are compatible with the Category rating of the cable. For example, if Category 6A cable is used; then, all structured cabling components shall be Category 6A compatible.

.4 Ensure that all materials, components and equipment being installed are properly rated (Plenum or Riser), as required by local and national codes.

.5 Install all cables and horizontal channel components (connectors, outlets, faceplates, jacks, etc.) as instructed in the manuals and specified in the Drawings.

.6 Provide all installation and mounting accessories and components, such as, screws, anchors, clamps, hooks and loops, grounding and support hardware, etc., as required to carry out the installation of the cabling system.

.7 Furnish all special installation equipment or tools, as needed to properly complete the installation.

.8 Provide appropriate underlay for storage of cable reels. Rolling of cable reels is not permitted.

.9 Provide all additional material and labour required to rectify a situation arising from their failure to comply with applicable standards and best practices guidelines. This equally applies to all damage inflicted to cables by Contractor during the installation process.

.10 Provide fire blocking material at all fire rated penetrations, as required by design, standards, and codes.

.11 Seal all conduits where cabling has been installed with re-enterable duct sealing system, as required by design, standards, and code.

.12 Provide and install bushings on all conduit ends.

.13 Ensure means and methods promote ease of access to cables for maintenance and testing purposes.

.14 The pathways shown on the Drawings are an approximate representation, and should not be interpreted as an absolute and accurate layout. Conduct site surveys, and coordinate with other trades, as required, in order to determine the exact final pathway layout.

3.02 HORIZONTAL CABLING GUIDELINES

.1 Comply with best practices guidelines for horizontal cabling systems.

.2 Install horizontal cabling in a continuous run, from the TR patch panel to the peripheral telecom outlet. Spliced copper cable is not permitted.

.3 Group and bundle all cables by power level and cable type. Use "hook and loop" fasteners for bunding cables.

.4 Do not exceed the maximum cable pulling tension specified by the manufacturer.

.5 Terminate and test all cables.

.6 Install all patch panels inside the data racks, at the specified telecom spaces. Coordinate with the Owner for installation of network switches.

.7 Perform all cabling tasks in compliance with best practices guidelines, and applicable industry standards, particularly, BICSI'S TDMM and ANSI/TIA-568.

.8 Ensure that all horizontal cables, including any required service loops, do not extend beyond 90 m (295 feet). Identify any areas that cannot be reached within the 90 meter constraint and report them to the Consultant.

Contractor shall strictly adhere to this rule, unless a written approval has been issued by the Consultant.

.9 Provide cable slack (service loop) at both ends of the cable for maintenance or future cabling system changes. The recommended lengths (BICSI TDMM) are:

.1 Minimum of 3 meters in the telecommunications closet for both twisted-pair and fiber cable

.2 Minimum 1 meter for fiber at the outlet.

.3 Minimum 30 cm for twisted-pair cable at the outlet.

.10 Ensure that all equipment installed in the horizontal channel including but not limited to, cable, pathways, conduits, connectors, is properly rated in compliance with local and national codes. All cables and components installed partly or entirely in the plenum space shall be plenum rated. All cables or components installed partly or entirely in the riser space shall be riser rated. All cables or components installed partly or entirely outdoors shall be weatherproof and OSP (outside plant) rated.

.11 Install all cable pathways and conduits perpendicular or parallel to the ceiling structure, unless otherwise specified in the Drawings.

.12 Exercise care and follow proper guidelines during cable installation in order to prevent damage to cable and equipment. Use grommets to protect cable where conduit or chase nipples are not installed around cut-outs or knockouts.

.13 Contractor shall not expose cable to water, paint overspray, paint removal products, water-based pulling lubricants, or any other substances or environments which can damage or compromise the integrity of the cable.

.14 Provide metallic isolation barriers to isolate different wiring groups, where cables with different classifications share a common box or enclosure.

.15 Coordinate as needed with the electrical and mechanical trades in order to implement a proper earthing and bonding system, and an effective Electromagnetic Compatibility (EMC) scheme.

.16 Mitigate electromagnetic interference (EMI) by maintaining the recommended separation between telecom and power (EMI) sources, as specified by ANSI/TIA-569 and shown in the table below.

Minimum Separation Distance Between Power and Data Cables (ANSI/TIA-569)			
	Minimum Separation Distance		
Condition	< 2 kVA in (mm)	2 - 5 kVA in (mm)	> 5 kVA in (mm)
Unshielded power lines or electrical equipment in proximity to open or nonmetal pathways	5 (127)	12 (305)	24 (610)
Unshielded power lines or electrical equipment in proximity to a grounded metal conduit pathway	2.5 (64)	6 (152)	12 (305)
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a grounded metal conduit pathway		3 (76)	6 (152)
Electrical motors and transformers			48 (1,220)

.17 Do not install telecom cables and power cables in the same pathways, cable trays, or conduits.

.18 Provide vertical cable support for all cables installed in vertical cable trays, using properly sized vertical cable supports on every third floor. Use of nylon cable ties is not permitted.

3.03 CABLE INSTALLATION IN CONDUIT AND DUCT

.1 Apply best practices when pulling cable inside conduits and ducts.

.2 Ensure that pulling tension never exceeds the manufacturer's specification.

.3 Ensure that cable bending during installation conforms to the manufacturer's specifications.

.4 Use a pull mandrel one size smaller than the conduit.

.5 Use cable pulling lubricant to reduce friction and tension during cable pulling.

.6 Use a dynamometer to measure pulling tension in the case of long or difficult installations.

.7 Use pulling grips suitable for copper cable installations. Contractor shall consult the cable manufacturer to determine the suitable pulling grip and method of attachment.

.8 Seal loose cable ends using cable caps (heat-shrinking type) to protect them until they are terminated.

.9 Use corner blocks to facilitate the bending of cable. Contractor should use 45° cable block for bends between 5° and 45°, and 90° corner block for bends between 45° and 90°.

3.04 CABLE BUNDLING MATERIAL

.1 Contractor shall use the appropriate cable bundling and securing material, in line with industry and best practices standards, to ensure cable runs are securely held in place, both vertically and horizontally.

.2 Contractor shall not tighten bundling and securing ties and straps around cables, to avoid deforming cable geometry, and as a result, cable performance.

.3 Contractor shall only use safe and soft cable fasteners to bundle or secure cable, such as, "hook and loop" cable fasteners. The use of regular plastic cable ties is strictly forbidden.

.4 Contractor shall not attach or secure cable runs to other building systems (such as, electrical or mechanical conduits, HVAC ducts, sprinkler pipes, ceiling suspension members, etc.).

.5 Contractor shall strictly use plenum rated cable bundling components inside suspended ceilings, raised floors, and air-handling spaces.

3.05 SYSTEM ADMINISTRATION

.1 Refer to Section 27 05 53 – Identification for Communication Systems.

.2 Conform to the system administration guidelines of ANSI/TIA-606, Administration Standard for Telecommunications Infrastructure.

.3 Propose a consistent and comprehensive system administration scheme in coordination with the Consultant, the Owner and all stakeholders. Contractor shall seek the Consultant's or the Owner's written approval of the proposed scheme ahead of implementation.

.4 Uniquely identify all components of the installed system by location, function, unit, and sub-unit.

.5 Identify each location, telecom space, telecom room or enclosure in the building with a unique alphanumeric identifier.

.6 Identify each system component, including but not limited to, adapter modules, connectors, cables, patch panels, patch and equipment cords, cable management devices, grounding system components, power

cords, faceplates, outlets, cable trays and pathways, racks, enclosures, etc. with a unique alphanumeric identifier.

.7 Contractor shall supply all the required records and documentation in compliance with ANSI/TIA 606.

.8 Contractor shall provide an ODBC-compliant database (Open Database Connectivity), for administration of the cabling system described in this Section.

3.06 IDENTIFICATION

.1 Contractor shall seek the =Consultant's and the Owner's approval of the project's labeling plan, ahead of cable installation.

.2 Labeling Cables

.1 Mark each cable at each endpoint and at all intermediate pull and access points, and junction boxes with labels that indicate the origin and destination identifiers, the sheath identifier, and the strand or pair range.

.2 Contractor shall mark each horizontal cable on the sheath at each end with the TR, patch panel, and panel port where cable is terminated.

.3 Labeling Conduits and Pathways

.1 Contractor shall label conduits and pathways within 0.5 m (18 inches) of each end, on an exposed and accessible spot.

.2 Contractor should apply additional labeling, where possible, at every 3 m (10 feet) of exposed length.

3.07 CABLE TESTING

.1 Refer to Section 27 08 11 for cable testing procedures.

.2 Ensure all testing procedures and field-test instruments comply with the requirements of:

.1 ANSI/TIA-1152-A, Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling

.2 ANSI/TIA-568.0-D, Generic Telecommunications Cabling for Customer Premises

.3 ANSI/TIA-568.1-D, Commercial Building Telecommunications Cabling Standard

.4 ANSI/TIA 568.2-D, Balanced Twisted-Pair Telecommunications Cabling and Components Standards

.3 Provide all labor, materials, tools, field-test instruments and equipment required for the complete testing of the work.

.4 Test all horizontal UTP cables as instructed below.

.5 Perform tests using a level IV accuracy cable tester, updated with latest firmware.

.6 Provide all test records in both "native" and pdf formats, as part of the as-built package.

.7 Unless otherwise specified by the Consultant or the Owner, all horizontal links and channels shall be tested for the following:

.1 Wire Map.

.2 Length.

.3 Propagation Delay.

.4 Delay Skew.

.5 DC Loop Resistance.

.6 Insertion Loss.

.7 NEXT (Near-End Crosstalk).

.8 PS NEXT (Power Sum Near-End Crosstalk).

.9 ACR-N (Attenuation to Crosstalk Ratio Near-End).

.10 PS ACR-N (Power Sum Attenuation to Crosstalk Ratio Near-End).

.11 ACR-F (Attenuation to Crosstalk Ratio Far-End).

.12 PS ACR-F (Power Sum Attenuation to Crosstalk Ratio Far-End).

.13 Return Loss.

.8 All horizontal links and channels shall pass the test requirements for respective cable Category, as specified in ANSI/TIA-568.2-D. Category 6 and 6A cables shall be tested up to 250 MHz and 500 MHz, respectively.

.9 Any cable or link that fails the requirements shall be identified and corrected.

3.08 FIRESTOPPING

.1 Comply with the requirements of Section 07 84 00 – Firestopping.

.2 Comply with the requirements of the latest TIA/EIA-569, Annex A, Firestopping.

.3 Comply with the requirements of the latest BICSI TDMM, Chapter 7, Firestop Systems.

.4 Firestop systems shall meet the requirements of ULC Standard CAN/ULC-S115.

End of Section