Part 1

1.1 Related Documents

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections apply to this Section.

1.2 Related Sections

1.2.1 27 05 00 Common Work Results for Communications

1.2.2 27 05 53 Identification for Communication Systems

1.3 Quality Assurance

1.3.1 Verification

The University shall inspect work progress on the job site. It is incumbent upon the Contractor to verify that the installation and material used has been inspected before it is enclosed within building features, or otherwise hidden from view. The Contractor shall bear costs associated with uncovering or exposing installations or features that have not been inspected.

1.3.2 Equipment

The Contractor is to use equipment and rigs designed for pulling, placement and termination of fiber cable; including reel trucks, mechanical mules, sheaves, shoes, anchors etc., and equipment for drilling masonry, installing anchors, etc., to install support and cable management hardware.

1.4 Performance Requirements

Backbone cabling system shall comply with transmission standards in TIA-568.3-D, and tested according to test procedures of TIA-568.0-D

Part 2 Product

2.1 Singlemode Distribution Series Optical Fiber Cable (Intra-Building Cables) (ISP)

2.1.1 Optical fiber backbone cabling shall be distribution series indoor OFNP Plenum.

2.1.2 The cable(s) shall be CSA approved and stamped accordingly.

2.1.3 Distribution series optical fiber cabling shall have 900 micron tight buffered fiber individually placed with aramid strength members. Fiber count over 12 shall have individual sub units.

2.1.4 Distribution series optical fiber cabling shall be fully dielectric with no metallic components in the cable. For fiber cables not totally enclosed in conduit the dielectric armour cable shall be used.

Specified Product:

	Type	Rating	Strands	Colour	Part #
Panduit	OS2 9/125µm	OFNP	tbd	Yellow	FSDP9xxY
Corning	OS2 9/125µm	OFNP	tbd	Yellow	xxxE88-33131-29
Corning	OS2 9/125µm	OFNP	tbd	Yellow	xxxE88-33131-D3

2.1.5 Optical fiber intra-building backbone cabling shall be distribution series indoor OFNP Plenum.

2.2 Singlemode Ribbon Series Optical Fiber Cable (Inter-Building Cables) (OSP)

2.2.1 Optical fiber backbone cabling shall be ribbon series indoor/outdoor OFNR Riser.

2.2.2 The cable(s) shall be CSA approved and stamped accordingly.

2.2.3 Ribbon series optical fiber cabling shall have fiber count of 12 fibers/ribbon.

2.2.4 Ribbon series optical fiber cabling shall be fully dielectric with no metallic components in the cable.

Specified Product:

	Type	Rating	Strands	Colour	Part #
Corning	OS2 9/125µm	OFNR	tbd	Yellow	xxxECF-14101D20

Optical fiber inter-building backbone cabling shall be ribbon series indoor/outdoor OFNR Riser.

2.2.5 Fabric Innerduct shall be pulled in to the ducts before the fiber cable is placed.

Contractor to supply and install two (2) packs of three (3) cells in each duct

Specified Product: Maxcell

2.3 Fiber Optic Backbone Terminations

2.3.1 Provide and install all material required for the assembly and mounting of the Fiber Optic Termination panels in accordance to the accompanying Contract Documents and manufacturer's specifications.

2.3.2 All Data Fiber backbone cables to be terminated at both ends by CCS personnel onto Rack Mountable Fiber Optic Distribution Centre/Panels as provided by the contractor with the following components:

1. The Telecom Room (TR) fiber optic termination panel shall accommodate up to 48 LC Connectors and Minimum of two Separate Tight Buffered Cables. This panel to be a maximum of 4U high.

2. The Equipment Room (ER) fiber optic termination panel shall accommodate up to 288 Fiber Optic Connectors and be complete with fiber optic cable management

hardware for routing of fiber optic patch cables from termination to termination. This panel to be a maximum of 4U high.

3. Spools for storing patch cord slack and mechanism to control bend radius of fibers within cabinet.

4. Splice trays to accommodate pig-tail/ribbon fusion connectorization

5. Transparent Hinged Front Cover and Hinged Rear Cover for easy accessibility to connectors and/or splices.

6. Grommetted Jumper Cable Openings.

7. Front and Rear Labelling Panels.

8. Fiber Optic Panel with duplex LC Connector/Adapter Panel Modules. All modules to be provided with icon labels or designators for duplex fiber connections.

9. Single mode LC duplex adapter/connectors as required.

Specified Product:

	Type	Description	Part #
Panduit	Fiber panel	48 port patch panel	FCE1U
Panduit	Fiber module	12 fiber LC	FAP6WBUDLCZ
Panduit	Splice module	24 fiber	FOSMF
Panduit	Splice module	Handler	FOSMH1U
Corning	Fiber panel	CCH 1U-4U	CCH-0xU
Corning	Fiber module	12 port module	CCH-CS12-A9-P00RE
Corning	Fiber module (ribbon)	12 port module	CCH-CS12-A9-P00RJ
Corning	Wall Mount	WCH	WCH-0xP

2.4 Fiber Optic Backbone Pigtails/Patch Cords

2.4.1 Fiber Optic Patch Cords/Pigtails with LC connectors.

2.4.2 Two duplex patch cables for every fiber optic cable run.

2.4.3 Patch cables/pigtails to be of like type and connector to fiber cable.

2.4.4 Length of patch cords shall be adequate to reach owner provided electronic equipment mounted in lower section of equipment rack.

Specified Product:

	Type	Length	Strands	Colour	Part #
Panduit	OS1 9/125µm pigtail	1 metre	1	Yellow	F9B10-NM1Y
Panduit	OS1 9/125 um patchcord	2 metre	2	Yellow	F9E10-10M2Y
Corning		1 metre	1	Yellow	Included in module

Corning	OS1 9/125µm pigtail OS1 9/125 um patchcord	2 metre	2	Yellow	040402R5120002M

Part 3 Execution

3.1 Fiber Cable Installation

3.1.1 The Communications Contractor shall be responsible for a complete backbone cabling installation including and not limited to, termination hardware, adaptor plates, cabling, ty-wraps, patch panels and labelling.

3.1.2 All newly installed intra-building fiber optic cable shall be placed inside fiber optic innerduct (orange) when not in conduit, excluding fiber cables with plastic armour.

3.1.3 Fiber optic cables shall always have minimum 6 metre (20-foot) service loop at the terminating ends and all approved splice points. Place service loops with large bend radii neatly bundled on walls or on the attached to the bottom side of ladder trays in 'figure-8' configuration.

3.1.4 Supply all materials and labour for the installation of the complete Fiber Optic Cabling system including all cables. Terminations to be completed by CCS personel as per the accompanying drawings, tables and Tender documents.

3.1.5 Install the Fiber Optic Cable System in accordance with manufacturer's specifications ensuring that proper installation techniques are observed and that the cable maximum pull-force and minimum bend radii specifications are adhered to.

3.1.6 Ensure that proper cable support techniques are utilized for suspending and supporting the riser cables as per manufacturer's specifications. Riser cables to utilize Vertical Rise Split Mesh Grips to suspend the weight of the Cable. Additionally, cable ties to be used to prevent side to side movement of the cable. The cable ties shall not be installed so as to deform the cable jacket.

3.1.7 Provide and install the indicated quantities of fiber ables in the noted Telecom and Equipment Rooms.

3.1.8 All cables are to be pulled in a continuous run. No cable splices will be permitted.

3.1.9 Supply and install proper cable harness according to manufacturer's specifications.

3.1.10 Utilize slots, sleeves, conduits and cable trays as indicated in accompanying drawings or by Engineer prior to installation to route cables vertically through building. Exercise caution when pulling cables in such pathways to avoid damage to any existing cabling and to ensure that the cable manufacturers' maximum pull-force and minimum bend radii specifications are adhered to.

3.1.11 All cables to be neatly bundled, tie-wrapped and routed together. Secure cable bundles to vertical and horizontal supports and neatly fasten to plywood backboards or termination racks when routing to termination panels.

3.1.12 For any cable bundles, ensure that cable ties or cable bundling does not put excess pressure on the cable at any point which may result in compression or deformation of the cable jacket and internal pair/conductor geometry.

3.1.13 When routing and bundling cables do not kink or exceed the cables minimum bend radius, do not exceed the cable's maximum tensile loading, do not over-cinch the cables with cable ties or cords that cause any compression of the cable jacket.

3.1.14 All cabling must be routed and organized to minimize cross-overs and congestion.

3.1.15 Where required, ground all cable and components according to manufacturers' specifications and standard practices.

3.1.16 The Contractor to be responsible for any additional coring required in the installation of the riser cabling. All cables to be tested after complete installation from termination end to termination end under worst-case environmental conditions and in accordance with this and the manufacturer's specification.

3.1.17 Installation shall carry a warranty from the contractor for no less than a year and a manufacturer’s warranty for no less than 25 years.

3.1.18 For Intra-Building fiber cable the contractor shall be a Panduit Certified Installer or Corning Network Preferred Installer (NPI) depending on the product used.

3.1.19 For Inter-Building fiber cable the contractor shall be a Corning Network Preferred Installer (NPI)

3.2 Fiber Termination Installation

3.2.1 Supply all materials and labour for the installation, assembly and mounting of the complete Distribution Termination Panels, Cabinets and Frames as per accompanying drawings and tender documents and manufacturer's specifications.

3.2.2 All fibers to be terminated on the Termination Panels according to manufacturer's specifications and installation schedules to be provided by the Engineer prior to installation. CCS personnel to terminate fibers.

3.2.3 Neatly route all backbone cables to their respective Termination Panels, securing cables to cabinets and plywood backboard where required.

3.2.4 Neatly mark the Blank Designation Labels with identifiers as per installation instructions provided by the Engineer prior to installation.

3.2.5 The Contractor to include for termination mounts and connectors at both ends of all fiber cables.

3.2.6 All fiber optic strands to be fusion spliced to the patch panel termination connectors by CCS personnel.

End of Section 27 13 23