PART 2 - PRODUCTS

2.1 BACKBONE CABLING DESCRIPTION

A. Backbone cabling system shall provide connectivity between communications rooms/spaces, as shown on drawings.

B. Backbone cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords.

C. Backbone cabling cross-connects shall be located in communications rooms/spaces. Splices shall not be used, unless specifically indicated or where the total cable length exceeds the length of a cable reel. Where splices are required, they shall be provided within a splice enclosure.

2.2 BACKBONE PATHWAYS

A. General Requirements: Comply with TIA/EIA-569-A, BICSI Telecom Distribution Manual and Owner's design standards.

B. Provide corrosion-resistant cable support in shafts, drifts and any other spaces that are not conditioned or with high humidity.

1. Cable Support: NRTL labeled for support of optical fiber cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
2. Cable Trays
3. Support brackets with cable tie slots for fastening cable ties to brackets.
4. Lacing bars, spools, J-hooks, and D-rings.
5. Straps and other devices.

C. Seismic Performance: Cable trays and other pathways and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

D. Comply with NFPA 70, UL 2043 and UL 1666 flame test.

E. Refer to Section 270500 "Common Work Results For Communications"

2.3 OPTICAL FIBER CABLE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Corning Cable Systems.
2. Optical Cable Corporation
3. Draka Communications
4. General Cable Technologies Corporation.
5. Tyco Electronics/AMP Netconnect; Tyco International Ltd.
6. Or approved equivalent

B. Description: Single-mode OS2 (or higher), graded-index optical waveguide with nominal 8.3/125 µm core/cladding diameter conductive, tight buffer or loose tube, riser rated (OFCR) optical fiber cable, with moisture barrier.

1. Comply with ICEA S-83-596 for mechanical properties.
2. Comply with TIA/EIA-568-B.3 for performance specifications.
3. Comply with TIA/EIA-492AAAA-A/B for detailed specifications.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, NFPA 70 and UL-1666 for the following types:

    a. Rated for Indoor/outdoor use, with Low Smoke Zero Halogen (LSZH) jacket, gel filled loose tube, with interlocking armor, OFCR riser rated.

5. Dual jacket, armored construction for heavy duty protection, recommended for use in mining applications.
6. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
7. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.
8. Maximum Attenuation: 0.40 dB/km at 1310 nm; 0.30 dB/km at 1550 nm.
9. Jacket Color: Yellow.

C. Provide the following communications backbone cables:

1. Single mode optical fiber backbone cable – armored

    a. 192-strand optical fiber cable with LSZH, OFCR riser rated, heavy duty ARMORED jacket
    b. 48-strand optical fiber cable with LSZH , OFCR riser rated, heavy duty ARMORED jacket
    c. 12-strand optical fiber cable with LSZH, OFCR riser rated, heavy duty ARMORED jacket

2. Single mode optical fiber backbone cable – unarmored (surface facility connections)

    a. 24-strand optical fiber cable with LSZH , indoor/outdoor riser rated – MPO to MPO
    b. OS2 8.3/125µ zero water peak singlemode optical fiber cable
    c. Protective grip on one side

2.4 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Corning Cable Systems.
2. General Cable Technologies Corporation.
3. Optical Cable Corporation
4. Draka Communications
5. Superior Essex Inc.
6. Tyco Electronics/AMP Netconnect; Tyco International Ltd.
7. Or approved equivalent

B. Patch Panels: Rack mount enclosures providing high density terminations of fiber.

1. Number of Connectors per Field: one for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.
2. Provide IRU enclosures for CEs for up to 144 terminations
3. Provide 4RU enclosures using adapter plates or cassettes for MTP connectors, for up to 576 LC connector terminations, to be used for underground fiber terminations.

4. Patch panel enclosures shall be provided with individual sliding trays providing accessibility to front and rear bulkheads after installation.

C. Optical Fiber Splice

1. Comply with EIA/TIA-568 standards.
2. Fusion splicing. Insertion loss not more than 0.2 dB.
3. Provide fusion splices and splice trays at termination locations on the 4850L as required.
4. Provide modular panel housings with cable management for the splice trays.

D. Patch Cords: Factory-made, dual-fiber cables in 36-inch lengths.

E. Cable Connecting Hardware:

1. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.
2. Quick-connect, simplex and duplex, small for factor (SFF) connectors. Insertion loss not more than 0.5 dB.
3. Provide optical fiber connectors at the MCR, CDR/CRs and CEs.

2.5 GROUNDING

A. Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems." And Section 270500 “Common Work Results for Communications” for grounding conductors and connectors.

B. Comply with ANSI-J-STD-607-A.

2.6 IDENTIFICATION PRODUCTS

A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

B. Comply with Division 27 Section “Common Work Results for Communications”.

2.7 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test cables on reels according to TIA/EIA-568-B.1.

C. Factory test single-mode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.

D. Cable will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

Ross MCR to Yates 4850L- Fiber Loss Budget Calculations							
1310 nm	Footage in Km	0.4 dB / Km	# of Splices /per fiber	0.2 dB / Splice	# of Connectors/fiber	0.5 dB / Connector	Total Loss Budget
Ross MCR to Yates 4850L Cabinet	3.57	1.43 dB	3	0.6 dB	2	1 dB	3.03 dB
1550nm	Footage in Km	0.3 dB / Km	# of Splices	0.2 dB / Splice	# of Connectors/fiber	0.5dB / Connector	Total Loss Budget
Ross MCR to Yates 4850L Cabinet	3.57	1.07 dB	3	0.6 dB	2	1 dB	2.67 dB

Ross MCR to Ross 4850L- Fiber Loss Budget Calculations							
1310 nm	Footage in Km	0.4 dB / Km	# of Splices /per fiber	0.2 dB / Splice	# of Connectors/fiber	0.5 dB / Connector	Total Loss Budget
Ross MCR to Ross 4850L Cabinet	2.29	0.91 dB	2	0.4 dB	2	1 dB	2.31 dB
1550nm	Footage in Km	0.3 dB / Km	# of Splices	0.2 dB / Splice	# of Connectors/fiber	0.5dB / Connector	Total Loss Budget
Ross MCR to Ross 4850L Cabinet	2.29	0.69 dB	2	0.4 dB	2	1 dB	2.09 dB