ADDENDUM

Lab Tech Bachelors Program
Bakersfield College
Kern Community College District
550-0047

Date: **February 16, 2024**

To: **All Bidders**

Subject: **Addendum #4**

Total Addendum includes:
[62] 8.5x11

NOTICE TO CONTRACTORS FIGURING THIS WORK

You are hereby notified of the following changes in the Plans and Specifications, which shall take precedence over anything to the contrary therein.

Item # **Description**

4.1 Refer to Sheet P1.01:

4.1.1 Delete note “REPLACE ALL BAD SECTIONS OF CAST IRON SEWER LINES IN BASEMENT” shown at Room 20 Men.

4.2 Refer to Sheet A2.00 and attached HAWS Product Cut Sheet:

4.2.1 Refer to attached revised ACCESSORY SCHEDULE. Accessory 101 added. Refer to attached product cut sheet.

4.3 Refer to Sheet A2.10:

4.3.1 Change Keynote 05 to read” REMOVE EXISTING EYEWASH SHOWER AND ASSOCIATED UTILITIES AS REQUIRED FOR REPLACEMENT EYEWASH SHOWER”. Typical of (3) locations.

4.4 Refer to Sheet A2.20:

4.4.1 Change Keynote 06 to read” EMERGENCY EYEWASH SHOWER. SEE ACCESSORY 101. RECONNECT TO EXISTING UTILTIES”. Typical of (3) locations.

4.5 Refer to Sheet A6.00 and A6.01:

4.5.1 Replace (3) “EXISTING EMERGENCY EYEWASH SHOWER TO REMAIN” with Accessory 101. Typical of (3) locations. Locations are noted on 24 East, 26 North and 27A North interior elevations.

4.6 Refer to Sheet P2.00:

4.6.1 Refer to Detail 6. Change condensate drain line from AC equipment from 3/4” to 1”.

4.7 Refer to Sheet M1.01:

4.7.1 Contractor to allow for removal of existing insulation wrap at existing ductwork above ceiling for connections of new ductwork as shown. Contractor to consider the existing insulation wrap to be asbestos containing and require abatement.

4.8 Refer to Sheet M2.00:

4.8.1 Refer to Detail 4. Clarification: Contractor to replace (2) HVAC dampers at AH 16 as part of Base Bid. HVAC damper replacement at AH 14, 15 and 17 to be part of Alternate Bid.

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4.9 Refer to Specifications:

4.9.1 Add attached Division 27 Specification Sections (District Standard Specifications) for specifications that are applicable to work identified on Electrical Sheets.

4.10 Refer to Sheet E2.01:

4.10.1 Refer to Vicinity Plan. IDF is located in Room 07 Computer Lab.

4.11 Refer to Sheet P2.00:

4.11.1 Clarification: Helium Tanks to be provided by Owner. Pressure switch and regulator to be provided by Contractor.

End of addendum

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ACCESSORY SCHEDULE

Typical Details

42 / A8.10	TYPICAL BACKING AT SURFACE MTD ACCESSORY (METAL)	52 / A8.10	TYPICAL BLKG AT SURFACE MTD ACCESSORY (WOOD)	11 / A8.20	TYPICAL DOOR SIGN INSTALLATION		

No	Mfr/Model No	Description	Mtg Ht	Dtls
01	"BOBRICK" NO B-6806 SERIES(PEENED)	PEENED GRAB BAR SET W/ CONCEALED MOUNTING (SIDE 48", REAR 36")	SEE DET	44 / A8.20
02	"BOBRICK" NO B-221	SURFACE MTD TOILET SEAT COVER DISPENSER (WALL/PARTITION SINGLE)	SEE INT ELEVS	- / -
03	"BOBRICK" NO B-4288	SURFACE-MOUNTED MULTI-ROLL TOILET TISSUE DISPENSER (CONTURA STYLE)	SEE INT ELEVS	- / -
07	"SCRANTON"	SOLID PLASTIC OVERHEAD BRACED TOILET PARTITION SYSTEM	SEE DET	55 / A8.20
30	"MOHAWK SIGN SYSTEM"	SAFETY SHOWER SIGN	SEE DET	41 / A8.20
32	"MOHAWK SIGN SYSTEM"	ROOM SIGN	SEE DET	21 / A8.20 ; 11 / A8.20
34	"MOHAWK SIGN SYSTEM"	ACCESSIBLE PATH OF TRAVEL SIGN (DIRECTIONAL)	SEE DET	22 / A8.20
63	"MECHO SHADE SYSTEMS"	ROLLERSHADES	SEE DET	12 / A8.20
66	"PROTEK SYSTEMS"	STAINLESS STEEL CORNER GUARD	SEE INT ELEVS	51 / A8.10
67	SEE PROJECT MANUAL	WALL MOUNTED SPEAKER, FOIO. PROVIDE BACKING AND CONDUIT, SEE ELECTRICAL SHEETS FOR MORE INFORMATION (OWNER TO PROVIDE INSTALLATION INSTRUCTIONS)	SEE INT ELEVS	- / -
78	"USA SAFETY" GB200SSFS OR EQUAL	SS WALL MTD CYLINDER RACK (2 CYLINDER)	SEE DET	52 / A8.20
92	"MOHAWK SIGN SYSTEMS"	ASSISTED LISTENING DEVICE SIGN, SEE SPECIFICATIONS FOR DEVICE REQUIREMENTS	SEE DET	31 / A8.20
93	SEE PROJECT MANUAL	10# FIRE EXTINGUISHER SURFACE MTD W/ SURFACE MOUNT BRACKET (4-A:60-B:C)	SEE DET	51 / A8.20
100	TBD BY OWNER	WALL MOUNTED SHORT THROW PROJECTOR, FOIO. PROVIDE BACKING AND CONDUIT, SEE ELECTRICAL SHEETS FOR MORE INFORMATION (OWNER TO PROVIDE INSTALLATION INSTRUCTIONS)	SEE INT ELEVS	16 / A8.20
101	HAWS MODEL 8309WC	HAWS ACCESSIBLE AXION MSR COMBINATIONSHOWER AND EYE/FACE WASH - MODEL 8309WC	SEE INT ELEVS	- / -

SEE SCHED

A

WI

model 8309WC

AXION® MSR Combination Shower and Eye/Face Wash

FEATURES & BENEFITS

EYE/FACE WASH HEAD

AXION® MSR eye/face wash head uses an inverted directional laminar flow to sweep contaminants away from the vulnerable nasal cavity.

SHOWERHEAD

AXION® MSR ABS plastic drench showerhead uses a hydrodynamic design to give equal distribution of water throughout the entire footprint of flow.

BALL VALVES

Eyewash and shower ball valves are designed to make the flushing of contaminants occur with the simple pull of a lever or push of a stainless steel flag. Both valves come equipped with stainless steel ball and stem to provide greater protection against corrosion and breakage.

BARRIER-FREE ACCESS

Barrier-free design offers a low profile eyewash assembly and a longer shower pull rod allowing for wheelchair access.

QUALITY CONTROL

Eye/face wash and valve assembly are pre-built and fully water/pressure tested to ensure no leaks and proper function which ultimately reduces installation time.

OPTIONS

- Scald Protect Bleed Valve: Model SP157A, stainless steel scald protection bleed valve. Automatic thermal actuator bleed valve opens when internal water temperature reaches 98° F (36.7° C) and closes at 95° F (35° C).
- Thermostatic Mixing Valve: Model 9201E AXION® Emergency Tempering Valve thermostatically mixes hot and cold water to provide a safe fluid supply for emergency showers and eyewash equipment, with a flow rate of 31 gpm (117.3 L).
- Emergency Alarm System: Model 9001, 1-1/4" 120 VAC emergency alarm and light system. Buzzer and flashing light are activated by an 1-1/4" double pole, double throw flow switch.
- AXION® MSR Showerhead: Model SP829SS, AXION® MSR stainless steel drench showerhead with integral 20 gpm (75.7 L) flow control.

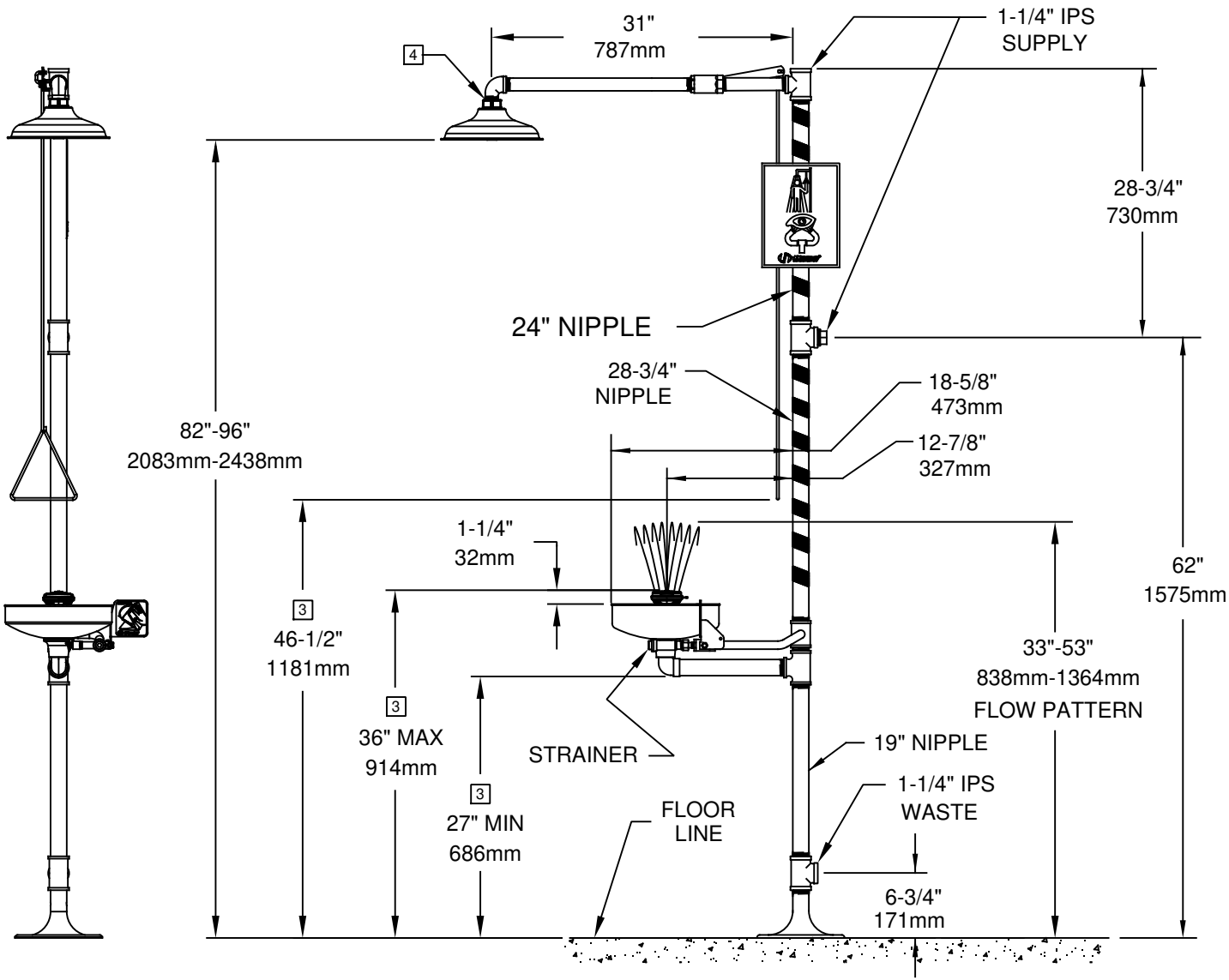
For more information, visit www.hawsco.com or call (888) 640-4297.

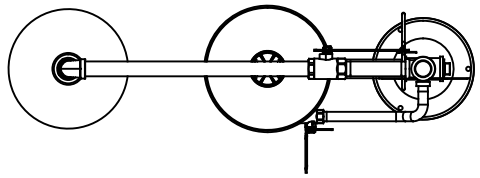
SPECIFICATIONS

Model 8309WC barrier-free combination shower and eye/face wash shall include a stainless steel 11″ (27.9 cm) round bowl, an AXION® MSR eye/face wash head shall feature inverted directional laminar flow which achieves Zero Vertical Velocity™ supplied by an integral 3.7 gpm flow control. Unit shall also include the AXION MSR hydrodynamic designed ABS plastic showerhead with 20 gpm flow control, chrome-plated brass stay-open ball valve equipped with stainless steel ball and stem which requires less than 5lbs push force to operate, and wheel chair accessibility. Unit shall also include Schedule 40 hot-dipped galvanized steel pipe and fittings, powder-coated cast-iron 9″ (22.9 cm) diameter floor flange, yellow plastic pop-off dust cover for eyewash head, self-adhesive high visibility safety green and bright yellow stripes, universal sign, and 1-1/4″ NPT supply.

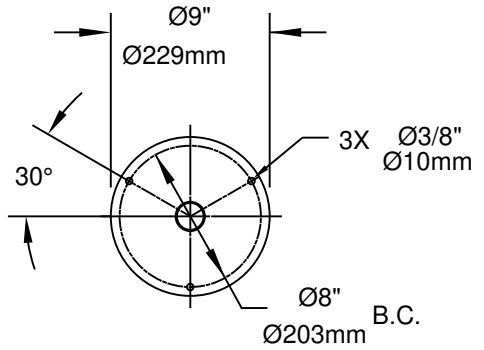
APPLICATIONS

Where the eyes, face, or body of any person may be exposed to injurious or corrosive materials, suitable facilities for quick drenching or flushing of the eyes, face, and body shall be provided within the work area for immediate emergency use. Emergency eye/face wash facilities and deluge showers shall be in unobstructed and accessible locations that require no more than 10 seconds for the injured person to reach. Model 8309WC is certified by CSA to meet the ANSI/ISEA Z358.1 Standard for Emergency Eyewash and Shower Equipment.





TOP VIEW



MOUNTING DETAIL

NOTES:

1. WHEN INSTALLING THIS UNIT, LOCAL , STATE, OR FEDERAL CODES SHOULD BE ADHERED TO FOR INSTALLATION DIMENSIONS (LOCATIONS), WASTE AND SUPPLY REQUIREMENTS OTHER THAN SHOWN.

2. TO COMPLY WITH ANSI Z358.1-2014 FOR EMERGENCY EYEWASH OR EYE/FACE WASH:
   - EYEWASH OR EYE/FACE WASH SHALL BE POSITIONED SUCH THAT FLUSHING FLUID PATTERN IS NOT LESS THAN 33" (838mm) AND NO GREATER THAN 53" (1346mm) FROM SURFACE ON WHICH USER STANDS; AND 6.0" (153mm) MINIMUM FROM WALL OR NEAREST OBSTRUCTION.
   - SHOWER SHALL BE POSITIONED SUCH THAT SHOWER HEAD IS NOT LESS THAN 82" (2083mm) AND NO GREATER THAN 96" (2438mm) FROM SURFACE ON WHICH USER STANDS.
   - SHOWER SPRAY PATTERN SHALL HAVE A MINIMUM DIAMETER OF 20" (508mm) AT 60" (1524mm) ABOVE SURFACE ON WHICH USER STANDS. CENTER OF SPRAY PATTERN SHALL BE LOCATED AT LEAST 16" (406mm) FROM ANY OBSTRUCTION.

[3] THESE DIMENSIONS MUST BE MAINTAINED TO MEET WHEELCHAIR ACCESSIBILITY REQUIREMENTS AND STILL COMPLY WITH ANSI REQUIREMENTS STATED ABOVE.

[4] DO NOT USE REGULAR PIPE SEALANT, IF NECESSARY, USE DOW CORNING 832 SEALANT. PLACING 5 SMALL BEADS ON THE MALE

5. DIMENSIONS MAY VARY BY ±1/2" (13 mm).

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ECN NO.	REVISED PER ECN: 5241	BY: VWC
DRAWN: D.O	DATE: 07/96	CHK'D.: VWC
APPROVED: FV	DATE: 11/23/17	

MODEL(S)
8309WC BARRIER-FREE SHOWER AND EYE/FACE WASH

PART NUMBER 0002067461.D
REVISION 21

SCALE: 1:18 | DRAWING TYPE: INSTALLATION | SIZE: A | SHEET 1 OF 1

SECTION 27 00 00 - COMMUNICATIONS

PART 1 - GENERAL

GENERAL

1.01 SUMMARY

A. This project requires the Contractor to furnish, label, test, document, and warrant a Structured Cabling System (SCS) in conformance with this specification for the facilities of the Kern Community College District (KCCD).

B. Construction drawings and all provisions of other Contract Divisions, if issued in conjunction with this specification, shall apply to this Division 27 specification. Coordination of work and resolution of conflicts between project documents issued by others such as Architects, Civil Engineers, Electrical/Mechanical Engineers, Plumbing Engineers, Civil Engineers, etc. and this Division 27 specification with its conjoined construction drawings shall be the responsibility of the Contractor.

C. The list of Division 27 section specifications that may be included as part of this Division 27 specification set includes, but is not limited to, the following:

1. Section 27 06 00 - Schedules for Communications
2. Section 27 05 26 - Grounding and Bonding for Communications Systems
3. Section 27 05 29 - Hangers and Supports for Communications Systems
4. Section 27 05 33 - Conduits and Backboxes for Communications Systems
5. Section 27 05 36 - Cable Trays for Communication Systems
6. Section 27 05 41 - Fire Stopping for Communications Systems
7. Section 27 11 00 - Communications Equipment Room Fittings
8. Section 27 11 13 - Communications Entrance Protection
9. Section 27 11 16 - Communications Cabinets, Racks, Frames, and Enclosures
10. Section 27 11 19 - Communications Termination Blocks and Patch Panels
11. Section 27 15 13 - Communications Copper Horizontal Cabling
12. Section 27 15 43 - Communications Faceplates and Connectors
13. Section 27 15 53 - Communications Cable Plant Testing

Note: If a specific Division 27 specification section listed above is not included in the Division 27 specification set issued for this project, the work of that section is not required for this project.

D. KCCD Information Technology Team: The KCCD Information Technology Team assigned a project manager for all aspects of this project and that project manager shall be referenced here-in-after as the KCCD Information Technology Project Coordinator (ITPC). At all phases

of this project, address all requests for information (RFI), all correspondence, and all required submittals to the assigned ITPC. If there is a change in the assignment of the ITPC or the ITPC determines a temporary designate, those changes will be given to the contractor in writing.

E. Progress Review Meetings: During the execution phase of this project the selected Contractor shall be prepared to attend weekly progress review meetings with the assigned ITPC or his/her designate.

1.02 QUALITY CONTROL

A. The Contractor shall have a current State of California C-7 license.

B. All work shall be performed in a neat and workmanlike manner (also see Division 01).

C. Product, materials, and equipment provided by the Contractor shall be of the quality specified.

D. All materials furnished under this contract shall be new and of a regularly manufactured line, currently in production at the time of installation.

E. Codes: (Most recent editions with addenda/TSB, etc.) All materials, installation, and workmanship shall comply with the applicable requirements and codes addressed within the following references:

1. National Electrical Manufacturers Association (NEMA).
2. NFPA 70, National Electrical Code (NEC).
3. ANSI/IEEE C2, National Electrical Safety Code (NESC).
4. FCC Rules and Regulations.
5. Local, county, state, and federal regulations and codes in effect as of the bid submission date.

F. Standards: (Most recent editions with addenda/TSB, etc.) All materials, installation, and workmanship shall comply with the applicable requirements and standards addressed within the following references:

1. ANSI/TIA-568.1-D, Commercial Building Telecommunications Infrastructure Standard
2. ANSI/TIA-568-C.2, Balanced Twisted-Pair Telecommunications Cabling and Components Standard
3. ANSI/TIA-568.3-D, Optical Fiber Cabling and Components Standard
4. ANSI/TIA-568-C.4, Broadband Coaxial Cabling and Components Standard
5. ANSI/TIA-569-D, Telecommunications Pathways and Spaces
6. ANSI/TIA-570-C, Residential Telecommunications Infrastructure Standard
7. ANSI/TIA-606-B, Administration Standard for Telecommunications Infrastructure

8. ANSI/TIA-607-C, Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
9. ANSI/TIA-758-B, Customer Owned Outside Plant Telecommunications Infrastructure Standard
10. ANSI/TIA-4966, Telecommunications Infrastructure Standard for Educational Facilities
11. BICSI - Telecommunications Distribution Methods Manual (TDMM)
12. BICSI - Outside Plant Design Reference Manual (OSPDRM)
13. BICSI - Wireless Design Reference Manual (WDRM)
14. All products shall be Underwriters Laboratories (UL) listed, or other nationally recognized testing laboratory acceptable to KCCD listed for the application intended.

G. Where conflicts exist from one code or standard to another, the code or standard to adhere to will be decided by the ITPC or his/her designate.

1.03 WARRANTIES

A. The Contractor shall provide a one (1) year material and labor warranty on all the work the Contractor has performed.

B. The Contractor shall provide the SCS system manufacturer's 25-year materials and link performance certification warranty for all new cable installed by the Contractor in his execution of the work of this specification.

1.04 MATERIAL SUBSTITUTIONS

A. All requests for substitutions of products shall be made and approved or disallowed during the stated bid period for this project - see Division 01.

B. Three (3) hard copies and a URL reference of all proposed product substitution documentation are required. Proposed product substitution documentation shall contain, at a minimum, the following:

1. The product manufacturer's performance specifications cut sheet(s).
2. If existing, the manufacturer's installation instructions and/or installation recommendations for that product.

C. Acceptance of proposed substitutions is at the discretion of the ITPC. Allow 10 working days for review and final decision.

D. Substitutions must comply with the warranty requirements specified above.

1.05 SUBMITTALS

A. Required submittals upon award of contract.

1. A complete network drop numbering plan set in KCCD drop numbering format in printed and electronic format (Autocad is preferred).

2. Mock-ups of each type of network drop faceplate to be furnished for this project. Each drop mock-up shall contain the following:

    a. Full load of required connectors with eighteen inches (18") of connector type appropriate specified cable terminated on each connector.

    b. Required drop faceplate labeling to include faceplate icons as required by these Division 27 Specifications and the accompanying construction drawing set.

3. Manufacturers' cut sheets for all products to be supplied by the Contractor in response to these Division 27 specification sections.

4. Listed fire stop system documentation - reference Section 27 05 41 - Fire Stopping for Communication Systems.

5. A copy of the Contractor's C-7 license.

6. A copy of testing personnel certification(s) that show they are properly trained in the use of the testing equipment that will be employed by the contractor - reference Section 27 15 53 - Cable Plant Testing.

7. Testing device(s) calibration documentation.

8. Copies of Contractor's Structured Cabling System (SCS) manufacturer's authorized vendor/installer Certification document(s).

B. Required submittals prior to final acceptance.

1. Two (2) sets of CDs or DVDs of the as-built drawings (AutoCAD or AutoCAD Lite Rev 2014 or later) - reference Section 27 15 53 - Cable Plant Testing.

2. Two (2) sets of CDs or DVDs of cable plant testing documentation - reference Section 27 15 53 - Cable Plant Testing.

3. Two (2) sets of CDs or DVDs of all fire stop pictures reference Section 27 05 41 - Fire Stopping for Communication Systems.

4. Two (2) copies of required warranties.

PART 2 - PRODUCTS

2.01 SECTION 27 06 00 - SCHEDULES FOR COMMUNICATIONS

A. It is recommended that the reader examine Section 27 06 00 - Schedules for Communications before continuing.

B. Section 27 06 00, Schedules for Communications presents the KCCD's pre-approved Product/Material Listing by Division 27 Section number. In this specification set product/material shall be specified by reference to the Product/Materials Schedule contained in Section 27 06 00.

C. The Contractor shall supply a complete and functioning system; if a product/material required for this project is not listed in Section 27 06 00 - Schedules for Communications, Products and Materials Schedule, it shall be furnished by Contractor with submittal approval by the ITPC or his/her designate.

D. The Product and Materials Schedule allows for "or equal" substitutions. When "or equal" product/material is substituted, the "or equal" product/material submitted shall be equivalent in every way to the product/material listed in Section 27 06 00 - Schedules for Communications, the Products and Materials Schedule - see Material Substitutions above. All products that the Contractor would like to submit as an “or equal” product must be submitted and approved by the ITPC or his/her designate.

2.02 QUANTITIES

Determining quantity of any given required item or product shall be the Contractor's responsibility using this specification and accompanying drawing set.

2.03 DEFINITION

In this Division 27 specification, the term "Furnish" shall mean "provide and install."

PART 3 - EXECUTION

3.01 COORDINATION

A. The Contractor shall coordinate the work specified in this Division 27 specification with the work of the other trades involved in this project.

B. The Contractor shall coordinate with Division 26 - Electrical concerning provision and installation of the following:

1. Conduit and cable tray pathway for communications.

2. Wall penetrations and floor coring for communications.

3. Backboxes for communications.

4. Telecommunications Space Power placement of communications.

5. Grounding and bonding for communications.

C. All questions and issues regarding coordination and construction element phasing shall be directed to the ITPC or his/her designate.

D. The Contractor shall coordinate their work so there shall be no disruption to any occupants of the KCCD campus unless coordinated and approved by the ITPC or his/her designate. Any necessary disruption shall be scheduled a minimum of 4 weeks in advance of its occurrence and affected parties shall be notified in writing of date, time, and planned duration of the disruption.

E. The Contractor shall follow all rules, regulations, and instructions stipulated by this specification, general provisions of the Contract, including General and Supplementary Conditions, and Division 01 specification sections, if issued in conjunction with these Division 27 specifications regarding the following:

1. Delivery hours.

2. Delivery locations.

3. Storage.

4. Hazardous Material.

5. Security.

6. Hours of work.

7. Safety.

8. Logistics.

3.02 INTENT OF DRAWINGS AND SPECIFICATIONS

A. Contractor shall keep on the Project site a copy of the Specifications and Drawings, and the same shall be available at all reasonable times for inspection and use by the ITPC or his/her designate and by any other person authorized by the ITPC or his/her designate. Any Drawings listed in the detail Specifications shall be regarded as a part thereof and of the Contract. Anything mentioned in these Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in these Specifications, shall be of like effect as though shown or mentioned in both.

B. It shall be the duty of Contractor to see that the provisions of these Specifications are complied with in detail irrespective of the inspection given the work during its progress by the ITPC or his/her designate. Any failure on the part of Contractor to observe the Specifications will be sufficient cause for the rejection of the work at any time before its acceptance.

C. The ITPC or his/her designate will furnish from time to time, such detail drawings, drawings, profiles, and information as the ITPC or his/her designate may consider necessary for Contractor's guidance to insure the proper and adequate execution of the Contract. Contractor shall comply with such detail drawings, drawings, profiles and information.

D. DO NOT USE drawing scale to determine exact dimensions or exact location. Scaled drawings are still to be considered diagrammatic and scale should be used for estimates only. If exact lengths or location placement dimensions are required, the drawings will specifically show those dimensions or placement coordinates.

3.03 INSTALLATION

Furnish all required materials, equipment, and tools necessary to properly complete the work of these specifications including, but not limited to, tools for pulling and terminating the cables, mounting hardware, ladders, lift equipment, cable ties, bolts, anchors, clamps, hangers, kits of consumables, lubricants, technician communication devices, cable testing equipment, stands for cable reels, cable wenches, etc.

3.04 EXAMINATION

A. The Contractor is responsible for examining existing conditions and comparing them with drawings and specifications and notifying the ITPC or his/her designate of any discrepancies.

B. The Contractor is responsible for coordinating with the ITPC or his/her designate to address, adjust, and resolve any discrepancies found before commencing work.

C. If a discrepancy between existing conditions and these drawings and specifications is found after commencing work, stop any work that in the Contractor's opinion is affected by the found discrepancy. It shall then be the Contractor's responsibility to resolve all issues caused by the found discrepancy before commencing work in work areas affected by the discrepancy.

3.05 VERIFICATION

A. It is incumbent upon the Contractor to verify that the installation and materials used have been inspected before they are 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 and approved.

B. After installation, test, certify, and provide required warranties for the Structured Cabling System installed per the requirements of this specification.

3.06 ADJUSTMENTS

The Contractor is responsible for coordinating and documenting with the ITPC or his/her designate the change order process. Coordinate specific needed forms and procedures for change orders with the ITPC or his/her designate.

3.07 LABELING

The Contractor is responsible for labeling and documenting all aspects of the installed infrastructure. The Contractor will not receive acceptance or final payments until the ITPC agrees that labeling and documentation is completed for the project.

KCCD has multiple college campuses and many individual buildings throughout the District. A labeling standard is required to develop a consistent database of infrastructure and networking documents. Since there are “Administration Buildings”, “Agriculture”, and “Campus Center” buildings on multiple campuses, it is important to develop unique labeling scheme that identifies individual buildings, TRs, and cable drops identified for each unique college and campus. Please refer to the ITPC to confirm codes and alphas for the particular college, campus, and buildings that you are working with. The following labeling standard has been developed and the Contractor will follow the labeling standard in all aspects of the work.

A. Labeling elements:

Labeling Element	Digits	Symbol
College Designator	1	C
Site Name (Campus or standalone building site name)	1	X
Building (3 digit alpha code for the building)	3	BBB
MDF or IDF (1st digit = floor, 2nd digit = a,b,c,etc)	2	##
Patch panel (1st digit = P, 2nd digit = patch panel #)	2	P@
PP jack (the jack number 01-48 on the patch panel)	2	$$

B. Labeling examples:

Using two existing buildings on the Bakersfield College campus as an example, we will demonstrate how the labeling elements would be used to uniquely identify and label infrastructure. The Bakersfield College designator is “B”. Site name for the Bakersfield College main campus is “C”. The alpha designation for the Administration building is “ADN”. The alpha designation for the Campus Center is “CCR”.

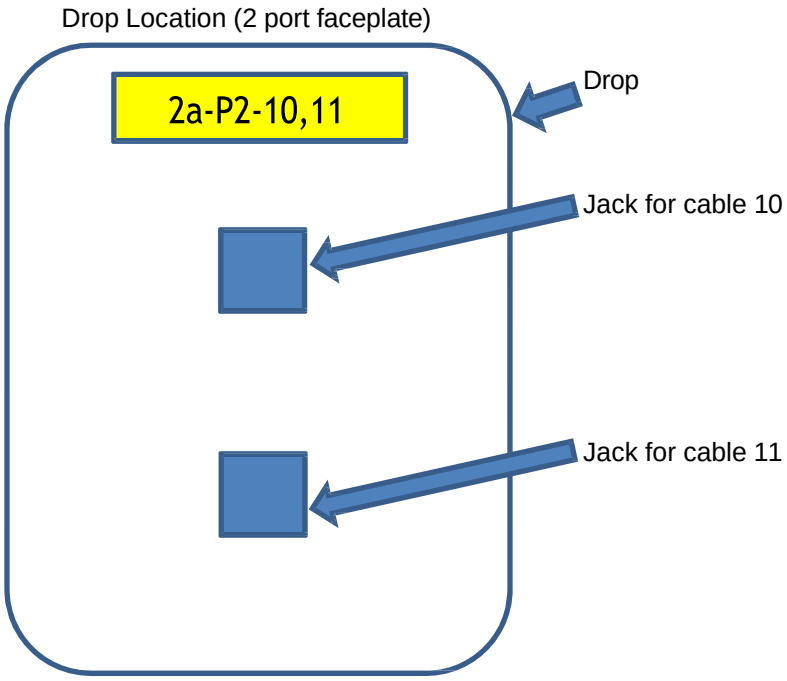
C. The label affixed to both ends of an outside plant fiber optic cable that feeds from the Administration building (TR 1a) to the Campus Center (TR 1a) would look like the following: BC-ADN-1a-BC-CCR-1a. Then the contractor would affix details of the cable such as copper count, fiber count, cable type, etc.

D. The label affixed to both ends of a riser cable that feeds from the Campus Center (TR 1a) to the Campus Center (TR 2a) would look like the following: BC-CCR-1a-BC-CCR-2a. Then the contractor would affix details of the cable such as copper count, fiber count, cable type, etc.

E. The label affixed to both ends of an individual data cable on a KCCD campus would look like the following: CX-BBB-##-P@-$$. This would clearly identify this cable to a unique college, building, TR, patch panel, and jack. An example using the Campus Center building second floor TR might be: BC-CCR-2a-P2-10, so this would be a cable connected to patch panel #2, jack 10, in TR 2a of the Campus Center building on college B (Bakersfield College), site name C (Main campus).

F. Each patch panel in the TR would be labeled with a patch panel number only (P1, P2, P3, etc). The manufacture jack labeling, numbers 01-48, would be used to indicate the jack number of the cables connected to the patch panel.

G. An as-built floor plan of the coverage area of the TR will be mounted inside each TR by the Contractor. The floor plan will show the rooms and drop locations fed by the TR. The physical drop faceplate and the drop location on the as-built floor plan will be labeled with the TR identification, patch panel, and jack number for each cable fed by the TR. An example of a typical 2 port drop location with two cables connected to ports 10 and 11 on patch panel 2 in TR 2a is shown below:



3.08 LIST OF REQUIRED AS-BUILT DRAWINGS

A. As stated under "Submittals" above, as-built drawing files shall be "AutoCAD" or "AutoCAD Lite" 2014 or later release.

B. The list of required as-built drawings is as follows:

1. All cabling drop faceplate locations with identification for each jack at that drop.

2. Two-inch (2”) and larger conduit pathways to include conduit size label.

3. Pull box locations.

4. Two-inch (2”) and four-inch (4”) J hook runs indicated by a line series of “x”s.

5. MDF/IDF layout labeled per current construction drawing field mark-ups.

6. Rack elevation labeled per current construction drawing field mark-ups.

7. Backbone copper and fiber schematic drawings with labeling information.

8. Updated outside plant drawings showing pathway, manholes, and pullboxes.

C After review of as-built drawings by the ITPC or his/her designate be prepared to make any required corrections for final submittal.

3.09 ACCEPTANCE

The project specified by this specification shall be considered completed and signed off as completed by the ITPC contingent upon the following:

1. All punch lists have been completed and signed as complete by the ITPC or his/her designate.

2. Required cable plant testing has been executed and required test result documentation has been submitted and approved by the ITPC or his/her designate - Refer to Section 27 15 53 - Communications Cable Plant Testing.

3. Any required adjustments to as-built drawings have been completed, submitted, and approved as complete by the ITPC or his/her designate.

4. Required warranty documentation has been submitted and approved as complete by the ITPC or his/her designate.

END OF SECTION

SECTION 27 05 26 - GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all services, labor, materials, tools, and equipment required for the complete and proper installation of communication bonding required by these specifications and related construction drawings.

B. Division 26 - Electrical specifications and accompanying drawings are particularly applicable to this section of this Division 27 specification.

C. The specification sections of this Division 27 that are particularly applicable to this section include, but are not limited to, the following:

1. Section 27 00 00 - Communications
2. Section 27 06 00 - Communications Schedules
3. Section 27 11 00 - Communications Equipment Room Fittings
4. Section 27 11 13 - Communications Entrance Protection
5. Section 27 11 16 - Communications Cabinets, Racks, Frames, and Enclosures
6. Section 27 11 19 - Communications Termination Blocks and Patch Panels.

1.02 QUALITY CONTROL

Comply with Section 27 00 00 - Communications.

1.03 WARRANTIES

Comply with Section 27 00 00 - Communications.

1.04 MATERIAL SUBSTITUTIONS

Comply with Section 27 00 00 - Communications.

1.05 SUBMITTALS

Comply with Section 27 00 00 - Communications.

1.06 COORDINATION

Comply with Section 27 00 00 - Communications.

PART 2 - PRODUCTS

2.01 QUANTITY DETERMINATION

Comply with Section 27 00 00 - Communications.

2.02 BUSBARS

Furnish all required telecommunications grounding system busbars - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Bonding."

2.03 BONDING CONDUCTORS

Furnish all required 6 AWG green thermoplastic insulated stranded copper wire - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Bonding."

2.04 BONDING CONDUCTOR TERMINATIONS

A. Furnish all required two-hole compression lugs: Color coded to appropriate cable, high conductivity wrought copper, electro tin plated - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Bonding."

B. All bonding compression lugs and other bonding hardware shall be Underwriters Laboratories (UL), or other nationally recognized testing laboratory acceptable to ###, listed for the application intended.

PART 3 - EXECUTION

3.01 GENERAL

The contractor shall comply with all requirements as listed in ANSI/TIA/EIA-STD-607-A “Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications” whether shown on the drawings or not.

3.02 INSTALLATION

A. Install busbars per manufactures instructions and at locations shown on the accompanying drawings. If locations are unclear, clarify location with ITPC before installing.

B. Provide all bonding as specified by these Division 27 specifications and the conjoined construction drawings. In particular make sure, when present in a Telecommunication Room (TR), that the following elements are bonded:

1. Metallic equipment racks.

2. Cable shields.

3. All metal raceways and cable trays.

C. Bonding conductors shall be continuous and routed in as direct a route as possible to the point of termination while adhering to the following: No bonding conductor shall vertically traverse a wall except at wall corners.

D. Clean ground bars prior to terminating bonding conductors.

3.03 EXAMINATION

Comply with Section 27.00 00 – Communications.

3.04 LABELING

A. Reference construction drawings accompanying this Division 27 specification.

B. Comply with Section 27.00 00 – Communications.

C. Label all telecommunications bonding conductors as close as possible to the termination points with an ANSI/TIA/EIA 606 compliant label for bonding.

3.05 AS-BUILT DRAWINGS

Comply with Section 27 15 53 - Communications Cable Plant Testing.

Comply with Section 27 00 00 – Communications.

END OF SECTION

SECTION 27 05 29 - HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all services, labor, materials, tools, and equipment required for the complete and proper installation of equipment supports, cable supports, and fastening hardware as called for in these specifications and conjoined construction drawings.

B. Those specification Sections of this Division 27 that are particularly applicable to this Section include, but are not limited to, the following:

1. Section 27 00 00 - Communications
2. Section 27 06 00 - Schedules for Communications
3. Section 27 05 41 - Fire Stopping
4. Section 27 11 00 - Communications Equipment Room Fittings

1.02 QUALITY CONTROL

Comply with Section 27 00 00 - Communications.

1.03 WARRANTIES

Comply with Section 27 00 00 - Communications.

1.04 MATERIAL SUBSTITUTIONS

Comply with Section 27 00 00 - Communications.

1.05 SUBMITTALS

Comply with Section 27 00 00 - Communications.

1.06 COORDINATION

Comply with Section 27 00 00 - Communications.

PART 2 - PRODUCTS

2.01 QUANTITY DETERMINATION

Comply with Section 27 00 00 - Communications.

2.02 J-HOOKS

A. Furnish all required four-inch (4"), two-inch (2") and one-inch (1") J-Hooks - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Pathway."

B. Comply with drawings for approved installation methods.

2.03 SURFACE MOUNT RACEWAY

Furnish all required surface mount cable raceway - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Pathway."

2.04 PIECE PARTS AND ACCESSORIES

Furnish all other piece parts, accessories, hanger rods, clamps, required to properly install per this specification section and the conjoined construction drawings required J-Hooks, and surface mount raceway.

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall comply with requirements as listed in ANSI/TIA-569-B “Commercial Building Standard for Telecommunications Pathways and Spaces” whether shown on the drawings or not.

B. The Contractor shall make field adjustments and resolve conflicts between construction drawings, specifications, and field conditions before beginning any J-Hook and/or surface mount raceway installation.

3.02 INSTALLATION

A. Install all J-Hooks, surface mount raceway and associated components per manufacturer’s specifications, instructions, and recommendations. Do not exceed 80% of manufacturer’s fill and load factors.

B. Fasten hanger rods, conduit clamps, and other applicable supporting hardware to the building structure using expansion anchors, beam clamps, or powder actuated fastening systems. Do not use spring clips.

C. Do not fasten supports to piping, ductwork, mechanical equipment, lay-in ceiling support wires and grid, or conduits.

D. Do not drill into structural steel and concrete members without written authorization a structural engineer or the ITPC.

E. In areas where cable tray or conduit is not provided, support the cable with cable hangers. Cable hanger to cable hanger center-to-center separation shall be a maximum of five (5) feet. Cable bundles shall be at all times at least six (6) inches above any lay-in ceiling tiles. Cable support hangers shall be placed in as straight a line as possible.

3.03 EXAMINATION

Comply with Section 27.00 00 – Communications.

3.04 LABELING

A. Reference construction drawings accompanying this Division 27 specification.

B. Comply with Section 27.00 00 – Communications.

3.05 AS BUILT DRAWINGS

Comply with Section 27 15 53 - Cable Plant Testing.

3.06 VERIFICATION

Comply with Section 27.00 00 – Communications.

3.07 ADJUSTMENTS

Comply with Section 27.00 00 – Communications.

END OF SECTION

SECTION 27 05 33 CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. All provisions of Division 00, Division 01, Division 26 (or 1995 CSI Master Format Edition Division 16) - Electrical apply to work specified in Division 27 and this Section of Division 27.

B. With the exception of the work listed in item 1.01, C of this section, the work of this 27 05 33 section is to be furnished by others. Resolve any conflicts with the ITPC or his/her designate.

C. Refer to the drawing symbol list for reference to specific locations that shall require the installation of a 4-11/16 x 4-11/16 backbox, chase nipple, bushing, and a single gang mud ring.

PART 2 - PRODUCTS

Furnish all required 4-11/16 x 4-11/16 backboxes, chase nipples, bushings, and a single gang mud rings.

PART 3 - EXECUTION

A. The contractor shall comply with requirements as listed in ANSI/TIA-569-B “Commercial Building Standard for Telecommunications Pathways and Spaces” whether shown on the drawings or not.

B. The contractor shall make field adjustments and resolve conflicts between construction drawings, specifications, and field conditions before beginning any installation.

END OF SECTION

SECTION 27 05 36 - CABLE TRAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all services, labor, materials, tools, and equipment required for the complete and proper installation of equipment room fittings as called for in these specifications and accompanying drawings.

B. Those specification Sections of this Division 27 that are particularly applicable to this Section include, but are not limited to, the following:

1. Section 27 00 00 - Communications
2. Section 27 06 00 - Communications Schedules
3. Section 27 05 26 - Grounding and Bonding for Communications Systems
4. Section 27 11 13 - Communications Entrance Protection
5. Section 27 11 16 - Communications Cabinets, Racks, Frames, and Enclosures
6. Section 27 11 19 - Communications Termination Blocks and Patch Panels.
7. Section 27 15 13 - Communications Copper Horizontal Cabling

C. Division 16 - Electrical also has sections that maybe applicable to this section of the Division 27 - Communications specification set.

D. Division 28 - Electronic Safety and Security also has sections that maybe applicable to this section of the Division 27 - Communications specification set.

1.02 QUALITY CONTROL

Comply with Section 27 00 00 - Communications.

1.03 WARRANTIES

Comply with Section 27 00 00 - Communications.

1.04 MATERIAL SUBSTITUTIONS

Comply with Section 27 00 00 - Communications.

1.05 SUBMITTALS

Comply with Section 27 00 00 - Communications.

1.06 COORDINATION

Comply with Section 27 00 00 - Communications.

PART 2 - PRODUCTS

2.01 QUANTITY DETERMINATION

Comply with Section 27 00 00 - Communications.

2.02 CABLE TRAY

A. Furnish all required cable tray - see Section 27 06 00 - Schedules for Communications, ### Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, “Telecom Room."

B. Furnish all required of the following:

1. Butt Splices;
2. Triangle Wall Brackets;
3. Junction Splices;
4. Wall Angle Support Kits;
5. Cable Tray Elevation Kits;
6. Single Earthquake Brackets;
7. Waterfall upper trays;
8. Horizontal Cable Managers;
9. Upper Tray Cable Managers;
10. ANSI/TIA/EIA STD-607-A Compliant Bonding Tags.

C. See Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Telecom Room."

2.03 CABLE TRAY PIECE PARTS AND ACCESSORIES

Furnish all other piece parts and accessories to complete the accompanying construction drawing set communications room layouts. Use only manufacturer-supplied and/or manufacturer-provided hardware.

PART 3 - EXECUTION

3.01 GENERAL

The Contractor shall make field adjustments and resolve conflicts between accompanying construction drawings, specifications, and field conditions before beginning cable tray and/or vertical cable manager installation.

3.02 INSTALLATION

A. Install all cable tray and associated components per manufacturer’s instructions as required for a seismic zone four (4) location.

B. Cable tray shall be supported at intervals of no greater than every four (4) feet.

C. Follow cable tray elevations and layout patterns that are specified in the accompanying construction drawings as closely as field conditions will permit. Any proposed deviations, including those caused by field conditions, must be approved by the ITPC or his/her designate.

3.03 EXAMINATION

Comply with Section 27.00 00 – Communications.

3.04 ADJUSTMENTS

Comply with Section 27.00 00 – Communications.

3.05 AS BUILT DRAWINGS

Comply with Section 27 15 53 - Communications Cable Plant Testing.

3.06 ACCEPTANCE

Comply with Section 27.00 00 – Communications.

END OF SECTION

SECTION 27 05 41 - FIRE STOPPING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all services, labor, materials, tools, and equipment required for the complete and proper installation of fire stopping for communications systems as called for in these specifications and conjoined construction drawings.

B. Those specification Sections of this Division 27 that are particularly applicable to this Section include, but are not limited to, the following:

1. Section 27 00 00 - Communications

2. Section 27 06 00 - Communications Schedules

3. Section 27 11 13 - Communications Entrance Protection

4. Section 27 15 13 - Communications Copper Horizontal Cabling

5. Section 27 15 23 - Communications Optical Fiber Horizontal Cabling

C. A through-penetration is created when a cable tray, cable, conduit, or sleeve passes through an opening in a fire-rated wall or floor. The opening offers a path for fire and smoke to spread. A fire stop is a special sealing system designed and tested to restore the fire integrity of the barrier.

D. The Structured Cabling System (SCS) Contractor shall provide fire stops for any cable tray system or riser system utilized by the SCS and the CATV distribution system cabling as required by the latest National Electrical Code (NEC).

E. Fire stopping of openings or penetrations between floors, through rated fire and smoke walls, existing or created by the Contractor for SCS and CATV distribution system cable pass-through shall be the responsibility of the Contractor.

F. Fire stopping system material and its application shall be accomplished in a manner that is acceptable to ITPC or his/her designate as well as local fire and building Inspector of Record (IOR) over this work.

1.02 QUALITY CONTROL

A. Comply with Section 27 00 00 - Communications.

B. Fire stop system installation must meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.

1.03 WARRANTIES

Comply with Section 27 00 00 - Communications.

1.04 MATERIAL SUBSTITUTIONS

Comply with Section 27 00 00 - Communications.

1.05 SUBMITTALS

A. Comply with Section 27 00 00 - Communications.

B. In addition to compiling with Section 27 00 00 - Communications, the Contractor shall make the following submittals:

1. Submit material safety data sheets provided with product when it is delivered to the job-site;

2. Provide certification from the fire stopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants;

3. Submit Underwriters Laboratories (UL) listed (or other nationally recognized testing laboratory acceptable to KCCD listed) system documentation for each type of application.

1.06 COORDINATION

A. Comply with Section 27 00 00 - Communications.

B. Deliver fire stopping products to the project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying project and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to the project; curing time; and mixing instructions for multi-component materials.

C. Coordinate delivery of materials with the scheduled installation date to allow minimum storage time at the job site.

PART 2 - PRODUCTS

2.01 QUANTITY DETERMINATION

Comply with Section 27 00 00 - Communications.

2.02 FIRE STOP PUTTY AND MINERAL WOOL

A. Furnish all required fire stop putty - see Section 27 06 00 - Schedules for Communications, KCCD Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Fire Stop."

B. Furnish all required fire stop mineral wool - see Section 27 06 00 - Schedules for KCCD Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Fire Stop."

2.02 FIRE STOP READY SLEEVES

Furnish all required fire stop; one-inch (1"), two-inch (2"), and four-inch (4") fire stop Ready Sleeves - see Section 27 06 00 - Schedules for Communications, KCCD Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Fire Stop."

PART 3 - EXECUTION

3.01 GENERAL

A. Verify that openings are ready to receive the work of this section. Sequence work to permit fire stopping materials to be installed after adjacent and surrounding work is complete.

B. The Contractor shall make field adjustments and resolve conflicts between construction drawings, specifications, and field conditions before beginning fire stop system technology installation(s).

C. If a proposed fire stop system technology requires even minor modification(s) to the certified system to accommodate some particular through-penetration field condition, do not make or install modified fire stop system before submitting to ITPC or his/her designate an illustration drawing of the modifications approved by the IOR.

3.02 INSTALLATION

A. The Contractor shall be responsible for fire stopping all penetrations that support SCS cable and CATV distribution system cable.

B. As part of the work of this section, it shall be the responsibility of the Contractor to fire stop any penetrations created by or for the SCS and left unused.

C. Environmental requirements

1. Do not install fire stopping when ambient or substrate temperatures are outside limits permitted by fire stopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

2. Ventilate fire stopping per the fire stopping manufacturer's instructions by natural means or where there is inadequate means, forced air circulation.

3. During installation, provide masking and drop cloths to prevent fire stopping materials from contaminating any adjacent surfaces.

4. Do not use materials that contain flammable solvents.

D. Preparation

1. Clean out openings and joints immediately prior to installing fire stopping to comply with specifications, recommendations, and instructions of the fire stopping manufacturer.

2. Remove all foreign materials from surfaces of openings and joint substrates and from penetrating items that could interfere with adhesion of fire stopping.

3. Clean openings and joint substrates and penetrating items to produce clean, sound surfaces capable of developing the optimum bond with fire stopping. Remove loose particles remaining from the cleaning operation.

E. Labeling

When the fire stop system has been installed, place a manufacturers label next to the system. The label shall contain at a minimum the following items:

1. UL rating (or other nationally recognized testing laboratory acceptable to KCCD rating) and any other pertinent certification information.

2. The date the fire stop system was installed.

3. Name of Contractor who installed the fire stop system.

4. Comply with Section 27.00 00 - Communications.

F. Protection

1. Protect fire stopping during and after the curing period from contact with contaminating substances or form damage resulting from construction operations or other causes so that they are without deterioration or damage at the time of substantial completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated fire stopping immediately and install new materials to produce fire stopping complying with specified requirements.

2. The Contractor shall take pictures of all fire stopping installations. The picture shall include the fire stop, label, and indicate the location for each penetration.

3. Keep areas of work accessible until inspection and sign off by the IOR.

3.03 EXAMINATION

Comply with Section 27.00 00 - Communications.

3.04 AS BUILT DRAWINGS

Comply with Section 27 15 53 - Cable Plant Testing.

3.05 VERIFICATION

Comply with Section 27.00 00 - Communications.

3.06 ADJUSTMENTS

Comply with Section 27.00 00 - Communications.

END OF SECTION

27 06 00 Schedules for Communications

Kern Community College District (KCCD) Master Pre-Approved Product, Material, or Manufacturer List Index

Important Notes

1. SUBMITTALS REQUIRED - See specifications, Section 27 00 00, PART 1 - GENERAL, SUBMITTALS.
2. Any submittal of an "or equal" product must contain the product manufacturer's performance specifications cut sheet for that product.
3. Items not showing manufacturer and part # shall be furnished by the Contractor with submittal approval by the KCCD Information Technology Team.
4. Not all items listed are necessarily required for this project
5. If Line #s appear not to be sequential, those items have been removed since they are not required for this project.

Line #	Division 27 Section Number	Division 27 Section Name	Approved Manufacturer	Part #	As Specified, Or Equal	Description
1	27 05 26	Grounding and Bonding	Cooper B-Line	SB47902	Or Equal	Two-hole compression lugs
2	27 05 26	Grounding and Bonding			Or Equal	6 AWG, green insulation, bonding wire
3	27 05 26	Grounding and Bonding	Panduit	LTYK	Or Equal	J-STD-607-A Compliant Bonding Tag
4	27 05 26	Grounding and Bonding	Cooper B-Line	SB6693/4X10 1/2	Or Equal	Grounding Strap
5	27 05 29	Pathway	Cooper B-Line	BCHR64	Or Equal	4" J-Hook
6	27 05 29	Pathway	Cooper B-Line	BCHR32	Or Equal	2" J-Hook
7	27 05 29	Pathway	Cooper B-Line	BCHR21	Or Equal	1" J-Hook
8	27 05 29	Pathway	Panduit	LD-3	Or Equal	Surface Mount raceway
9	27 05 29	Pathway	Panduit	LD-5	Or Equal	Surface Mount raceway
10	27 05 29	Pathway	Panduit	LD-10	Or	Surface Mount raceway

					Equal	
11	27 05 29	Pathway	Panduit	T-70	Or Equal	Surface Mount raceway
12	27 05 29	Pathway			Or Equal	4 11/16 x 4 11/16 x 2.75" d Box with 1 gang mud ring
13	27 05 26	Grounding and Bonding	Apache Grounding/Erico Inc.		Or Equal	Submit products you propose to use
14	27 05 26	Grounding and Bonding	Copperweld, Inc.		Or Equal	Submit products you propose to use
15	27 05 26	Grounding and Bonding	Erico, Inc.		Or Equal	Submit products you propose to use
16	27 05 41	Fire Stop	3M	MP+	Or Equal	Fire stop putty
17	27 05 41	Fire Stop			Or Equal	Mineral wool
18	27 05 41	Fire Stop	Specified Technology, Inc.	FS100	Or Equal	1" Ready Sleeve
19	27 05 41	Fire Stop	Specified Technology, Inc.	FS200	Or Equal	2" Ready Sleeve
20	27 05 41	Fire Stop	Specified Technology, Inc.	FS400	Or Equal	4" Ready Sleeve
21	27 05 41	Fire Stop	Specified Technology, Inc.	FP200	Or Equal	2" Intumescent Firestop Plug
22	27 05 41	Fire Stop	Specified Technology, Inc.	FP400	Or Equal	4" Intumescent Firestop Plug
23	27 11 00	Communications Equipment Room Fittings	Cooper B-Line	SB17U12BFB	Or Equal	12" Cable Runway
24	27 11 00	Communications Equipment Room Fittings	Cooper B-Line	SB168CBZ	Or Equal	Heavy Duty Butt Splice
25	27 11 00	Communications Equipment Room Fittings	Cooper B-Line	SB21312KFB	Or Equal	Triangular Runway Wall Support Kit

27 06 00 Schedules for Communications

Kern Community College District (KCCD) Master Pre-Approved Product, Material, or Manufacturer List Index

Important Notes

1. SUBMITTALS REQUIRED - See specifications, Section 27 00 00, PART 1 - GENERAL, SUBMITTALS.
2. Any submittal of an "or equal" product must contain the product manufacturer's performance specifications cut sheet for that product.
3. Items not showing manufacturer and part # shall be furnished by the Contractor with submittal approval by the KCCD Information Technology Team.
4. Not all items listed are necessarily required for this project
5. If Line #s appear not to be sequential, those items have been removed since they are not required for this project.

Line #	Division 27 Section Number	Division 27 Section Name	Approved Manufacturer	Part #	As Specified, Or Equal	Description
26	27 11 00	Communications Equipment Room Fittings	Cooper B-Line	SB165BZ	Or Equal	Runway 90 degree junction Splice Clamp and Kit
27	27 11 00	Communications Equipment Room Fittings	Cooper B-Line	SB211312FB	Or Equal	Runway Wall Angle Support Kit
28	27 11 00	Communications Equipment Room Fittings	Cooper B-Line	SB227E3FB	Or Equal	Runway Stand-Off Kit
29	27 11 00	Communications Equipment Room Fittings	Cooper B-Line	SB212712AFB	Or Equal	Runway Center Support hanger Kit
30	27 11 00	Communications Equipment Room Fittings	Chatsworth	15275-01	Or Equal	Waterfall upper tray
31	27 11 00	Communications Equipment Room Fittings	Chatsworth	35441-702	Or Equal	2 U Horizontal Cable manager
32	27 11 00	Communications Equipment Room Fittings	Chatsworth	13183-719	Or Equal	2U Upper Tray Cable Manager
33	27 11 00	Communications Equipment Room Fittings	Chatsworth	15215-715	Or Equal	8' 6" Vertical Cable Manager
34	27 11 00	Communications Equipment Room Fittings	Chatsworth	40099-715	Or Equal	8' 10" Vertical Cable Manager
35	27 11 00	Telecom Room	Chatsworth	40098-703	Or	7' 6" Vertical Cable Manager

					Equal	
36	27 11 00	Telecom Room	Chatsworth	40099-703	Or Equal	7' 10" Vertical Cable Manager
37	27 11 13	Telecom Room			Or Equal	One-hundred (100) pair BET technology
38	27 11 13	Telecom Room			Or Equal	5 pin, solid-state technology protectors
39	27 11 00	Communications Equipment Room Fittings	Cooper B-Line Systems		Or Equal	
40	27 11 00	Communications Equipment Room Fittings	Panduit Corp.		Or Equal	
41	27 11 00	Communications Equipment Room Fittings	Unistrut Corp		Or Equal	
42	27 11 16	Communications Cabinets, Racks, Frames, and Enclosures	APC NETSHELTER SX 48U / 4 post open racks		Or Equal	
43	27 11 16	Communications Cabinets, Racks, Frames, and Enclosures			Or Equal	
44	27 11 16	Communications Cabinets, Racks, Frames, and Enclosures				
45	27 11 19	Communications Termination Blocks and Patch Panels	CommScope Systimax		Or Equal	CAT 6A 48 port patch panels
46	27 11 19	Communications Termination Blocks and Patch Panels	CommScope Systimax		Or Equal	CAT 6 48 port patch panels
47	27 11 19	Communications Termination Blocks and Patch Panels	CommScope Systimax		Or Equal	Singlemode Fiber optic patch panels with SC connectors
48	27 11 19	Communications Termination Blocks and Patch Panels	CommScope Systimax		Or Equal	Multimode Fiber optic patch panels with SC connectors
49	27 11 19	Communications Termination Blocks and Patch Panels	CommScope Systimax		Or Equal	2 port Drop Faceplates

27 06 00 Schedules for Communications

Kern Community College District (KCCD) Master Pre-Approved Product, Material, or Manufacturer List Index

Important Notes

1. SUBMITTALS REQUIRED - See specifications, Section 27 00 00, PART 1 - GENERAL, SUBMITTALS.
2. Any submittal of an "or equal" product must contain the product manufacturer's performance specifications cut sheet for that product.
3. Items not showing manufacturer and part # shall be furnished by the Contractor with submittal approval by the KCCD Information Technology Team.
4. Not all items listed are necessarily required for this project
5. If Line #s appear not to be sequential, those items have been removed since they are not required for this project.

Line #	Division 27 Section Number	Division 27 Section Name	Approved Manufacturer	Part #	As Specified, Or Equal	Description
50	27 11 19	Communications Termination Blocks and Patch Panels	CommScope Systimax		Or Equal	4 port Drop Faceplates
51	27 11 19	Communications Termination Blocks and Patch Panels	CommScope Systimax		Or Equal	6 port Drop Faceplates
52	27 11 19	Communications Termination Blocks and Patch Panels	CommScope Systimax		Or Equal	CAT 6A data jacks
53	27 11 19	Communications Termination Blocks and Patch Panels	CommScope Systimax		Or Equal	CAT 6 data jacks
54	27 13 00	Cable	CommScope Systimax		Or Equal	Blue CAT 6A data cable
55	27 13 00	Cable	CommScope Systimax		Or Equal	Blue CAT 6 data cable
56	27 13 00	Cable	CommScope Systimax		Or Equal	Single mode fiber optic cable
57	27 13 00	Cable	CommScope Systimax		Or Equal	50 micron fiber optic cable
58	27 13 00	Communications Backbone Cabling	CommScope Systimax		Or Equal	
59	27 15 13	Communications Copper Horizontal	CommScope		Or	

		Cabling	Systimax		Equal	
60	27 15 43	Communications Faceplates and Connectors	CommScope Systimax		Or Equal	

SECTION 27 11 00 - COMMUNICATIONS EQUIPMENT ROOM FITTINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all services, labor, materials, tools, and equipment required for the complete and proper installation of equipment room fittings as called for in these specifications and accompanying drawings.

B. Those specification Sections of this Division 27 that are particularly applicable to this Section include, but are not limited to, the following:

1. Section 27 00 00 - Communications
2. Section 27 06 00 - Communications Schedules
3. Section 27 05 26 - Grounding and Bonding for Communications Systems
4. Section 27 11 13 - Communications Entrance Protection
5. Section 27 11 16 - Communications Cabinets, Racks, Frames, and Enclosures
6. Section 27 11 19 - Communications Termination Blocks and Patch Panels.
7. Section 27 15 13 - Communications Copper Horizontal Cabling

C. Division 16 - Electrical also has sections that maybe applicable to this section of the Division 27 - Communications specification set.

D. Division 28 - Electronic Safety and Security also has sections that maybe applicable to this section of the Division 27 - Communications specification set.

1.02 QUALITY CONTROL

Comply with Section 27 00 00 - Communications.

1.03 WARRANTIES

Comply with Section 27 00 00 - Communications.

1.04 MATERIAL SUBSTITUTIONS

Comply with Section 27 00 00 - Communications.

1.05 SUBMITTALS

Comply with Section 27 00 00 - Communications.

1.06 COORDINATION

Comply with Section 27 00 00 - Communications.

PART 2 - PRODUCTS

2.01 QUANTITY DETERMINATION

Comply with Section 27 00 00 - Communications.

2.02 CABLE TRAY

A. Furnish all required cable tray - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, “Telecom Room."

B. Furnish all required of the following:

1. Butt Splices;
2. Triangle Wall Brackets;
3. Junction Splices;
4. Wall Angle Support Kits;
5. Cable Tray Elevation Kits;
6. Single Earthquake Brackets;
7. Waterfall upper trays;
8. Horizontal Cable Managers;
9. Upper Tray Cable Managers;
10. ANSI/TIA/EIA STD-607-A Compliant Bonding Tags.

C. See Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Telecom Room."

2.03 EQUIPMENT RACK VERTICAL CABLE MANAGERS

Furnish all required vertical cable managers; see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Telecom Room."

2.04 EQUIPMENT RACK HORIZONTAL CABLE MANAGERS

Furnish all required horizontal cable managers; see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Telecom Room."

2.05 CABLE TRAY & CABLE MANAGER PIECE PARTS AND ACCESSORIES

Furnish all other piece parts and accessories to complete the accompanying construction drawing set communications room layouts. Use only manufacturer-supplied and/or manufacturer-provided hardware.

PART 3 - EXECUTION

3.01 GENERAL

The Contractor shall make field adjustments and resolve conflicts between accompanying construction drawings, specifications, and field conditions before beginning cable tray and/or vertical cable manager installation.

3.02 INSTALLATION

A. Install all cable tray, vertical cable managers, horizontal cable managers, and associated components per manufacturer's instructions as required for a seismic zone four (4) location.

B. Cable tray shall be supported at intervals of no greater than every four (4) feet.

C. Follow cable tray, vertical cable manager, and horizontal cable manager elevations and layout patterns that are specified in the accompanying construction drawings as closely as field conditions will permit. Any proposed deviations, including those caused by field conditions, must be approved by the ITPC or his/her designate.

3.03 EXAMINATION

Comply with Section 27.00 00 – Communications.

3.04 ADJUSTMENTS

Comply with Section 27.00 00 – Communications.

3.05 AS BUILT DRAWINGS

Comply with Section 27 15 53 - Communications Cable Plant Testing.

3.06 ACCEPTANCE

Comply with Section 27.00 00 – Communications.

END OF SECTION

SECTION 27 11 13 – ENTRANCE PROTECTION FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all services, labor, materials, tools, and equipment required for the complete and proper installation of outside plant cable (OSP) Building Entrance Terminal (BET) protection and termination for copper cabling as called for in these specifications and related drawings.

B. Coordinate location of entrance protection with KCCD Information Technology Project Coordinator (ITPC).

C. Division 26 - Electrical specifications and accompanying drawings are particularly applicable to this section of this Division 27 specification.

D. The specification sections of this Division 27 that are particularly applicable to this section include, but are not limited to, the following:

1. Section 27 00 00 - Communications
2. Section 27 06 00 - Communications Schedules
3. Section 27 11 00 - Communications Equipment Room Fittings
4. Section 27 11 16 - Communications Cabinets, Racks, Frames, and Enclosures
5. Section 27 11 19 - Communications Termination Blocks and Patch Panels.

1.02 QUALITY CONTROL

Comply with Section 27 00 00 - Communications.

1.03 WARRANTIES

Comply with Section 27 00 00 - Communications.

1.04 MATERIAL SUBSTITUTIONS

Comply with Section 27 00 00 - Communications.

1.05 SUBMITTALS

Comply with Section 27 00 00 - Communications.

1.06 COORDINATION

Comply with Section 27 00 00 - Communications.

PART 2 - PRODUCTS

2.01 QUANTITY DETERMINATION

Comply with Section 27 00 00 - Communications.

2.02 MANUFACTURES

There is no preferred manufacturer.

2.03 MATERIALS AND FABRICATION

A. BET technology to include fusible link.

B. Protector technology: 5-Pin, 300V, 350 mA.

C. Miscellaneous parts and material required to complete a successful installation of the BET technology, such as splice case and associated hardware

PART 3 - EXECUTION

3.01 GENERAL

Comply with Section 27 00 00 - Communications.

3.02 INSTALLATION

A. Copper outside plant cabling

1. Install a Building Entrance Terminal protector unit for every 100 pairs of OSP entrance cable or entrance tie cable as specified in the drawings.

2. Mount the protector units in columns of not more than three units, with the top surface of the upper-most unit 6 feet A.F.F. Use mounting hardware recommended by the manufacturer.

3. Bond all protectors in each BET together using 1/0 AWG (6 AWG allowed) ground wire, in daisy chain style. Connect a segment of ground wire from the top unit to the Telecommunication Grounding Buss Bar in the telecommunications room. Install 100 5-pin protector units for each protector terminal.

4. Splice entrance cable or entrance tie cable to 26 AWG protector terminal fuse cable pigtails. Secure the splice case vertically on the TR wall as shown on the contract drawings.

5. The Contractor shall bond the shield of each OSP cable to the Telecommunication Grounding Buss Bar (TGBB) provided at the entrance facilities using 1/0 AWG copper wire.

6. At the termination end of multi-pair OSP cables, the Contractor shall provide six feet of managed service slack.

7. Label Building Entrance Terminals according standards listed in section 270000.

B. Test all terminated pairs of each copper backbone cable segment from the BET output field through the installed protector for the following:

1. Continuity to remote end.

2. Shorts between any two or more conductors.

3. Transposed pairs.

4. Reversed pairs.

5. Split pairs.

6. Grounded conductor.

7. Shield continuity.

3.03 EXAMINATION

Comply with Section 27.00 00 – Communications.

3.04 LABELING

A. Reference construction drawings accompanying this Division 27 specification.

B. Label all OSP and telecommunications bonding conductors as close as possible to the termination points with an ANSI/TIA/EIA 606 compliant label for bonding.

C. Comply with Section 27 00 00 – Communications.

3.05 AS-BUILT DRAWINGS

Comply with Section 27 15 53 - Communications Cable Plant Testing.

Comply with Section 27 00 00 – Communications.

END OF SECTION

SECTION 27 11 16 - COMMUNICATIONS CABINETS, RACKS, FRAMES, AND ENCLOSURES

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all services, labor, materials, tools, and equipment required for the complete and proper installation of communication cabinets, racks, frames and enclosures as called for in this Section of the Division 27 specifications and accompanying construction drawings.

B. Those specification Sections of this Division 27 that are particularly applicable to this Section include, but are not limited to, the following:

1. Section 27 00 00 - Communications
2. Section 27 06 00 - Communications Schedules
3. Section 27 05 26 - Grounding and Bonding for Communications Systems
4. Section 27 11 00 - Communications Equipment Room Fittings
5. Section 27 11 13 - Communications Entrance Protection
6. Section 27 11 19 - Communications Termination Blocks and Patch Panels.
7. Section 27 15 13 - Communications Copper Horizontal Cabling
8. Section 27 15 53 - Cable Plant Testing

C. Division 16 - Electrical also has sections that maybe applicable to this section of the Division 27 - Communications specification set.

D. Division 28 - Electronic Safety and Security also has sections that maybe applicable to this section of the Division 27 - Communications specification set.

1.02 QUALITY CONTROL

Comply with Section 27 00 00 - Communications.

1.03 WARRANTIES

Comply with Section 27 00 00 - Communications.

1.04 MATERIAL SUBSTITUTIONS

Comply with Section 27 00 00 - Communications.

1.05 SUBMITTALS

Comply with Section 27 00 00 - Communications.

1.06 COORDINATION

Comply with Section 27 00 00 - Communications.

PART 2 - PRODUCTS

2.01 QUANTITY DETERMINATION

Comply with Section 27 00 00 - Communications.

2.02 CABINETS

A. Furnish all required cabinets - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Telecom Room."

B. Furnish all required piece parts and hardware to construct and outfit the cabinets as shown on the construction drawing set accompanying this specification.

2.03 RACKS

A. Furnish all required 4-post equipment racks - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Telecom Room."

B. Furnish all required piece parts and hardware to construct and outfit the equipment racks as shown on the construction drawing set accompanying this specification.

PART 3 - EXECUTION

3.01 GENERAL

A. Before anchoring cabinets, racks, or frames to floor, wall, or overhead runway/cable tray in any telecom room, review their in place layout with the ITPC, or his/her designate. When they give approval of in place layout, proceed with anchoring.

B. The Contractor shall comply with all SCS bonding requirements as listed in ANSI/TIA/EIA-STD-607-A “Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications” whether shown on the accompanying drawings or not.

3.02 INSTALLATION

A. Install all cabinets, racks, frames, and enclosures per manufacturers’ installation specification, instructions, and recommendations as required for a seismic zone four (4) location.

B. Bond all cabinets, racks, frames, and enclosures to the Telecommunication Grounding Buss Bar (TGBB) using 6 AWG Green thermoplastic insulated stranded copper wire.

3.03 LABELING

A. Comply with Section 27 00 00 - Communications.

B. Before labeling any equipment rack or cabinet confer with the ITPC and his/her designate to determine label content and placement.

3.04 AS BUILT DRAWINGS

Comply with Section 27 15 53 - Communications Cable Plant Testing.

END OF SECTION

SECTION 27 11 19 - COMMUNICATIONS TERMINATION BLOCKS AND PATCH PANELS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all services, labor, materials, tools, and equipment required for the complete and proper installation of communication blocks and patch panels as called for in this section of the Division 27 specifications and conjoined construction drawings.

B. The specification sections of this Division 27 that are particularly applicable to this section include, but are not limited the following:

1. Section 27 00 00 - Communications
2. Section 27 06 00 - Communications Schedules
3. Section 27 11 13 - Communications Entrance Protection
4. Section 27 15 13 - Communications Copper Horizontal Cabling
5. Section 27 15 53 - Cable Plant Testing

C. Division 28 - Electronic Safety and Security also has sections that maybe applicable to this section of the Division 27 - Communications specification set.

1.02 QUALITY CONTROL

Comply with Section 27 00 00 - Communications.

1.03 WARRANTIES

Comply with Section 27 00 00 - Communications.

1.04 MATERIAL SUBSTITUTIONS

Comply with Section 27 00 00 - Communications.

1.05 SUBMITTALS

Comply with Section 27 00 00 - Communications.

1.06 COORDINATION

Comply with Section 27 00 00 - Communications.

PART 2 - PRODUCTS

2.01 QUANTITY DETERMINATION

Comply with Section 27 00 00 - Communications.

2.02 COPPER TERMINATION BLOCKS

A. Furnish all 110 (or approved equal) termination block fields required to terminate the copper backbone (riser) cabling and the voice cross-connect system cabling - Reference Section 27 15 13 - Communications Horizontal Cabling.

B. Furnish all required 110 system (or approved equal) C4 and C5 termination blocks.

C. Furnish all required pair grouping 110 (or approved equal) termination block label strips.

D. See Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Telecom Room."

2.03 COPPER PATCH PANELS

A. Furnish all patch panels required to support the TR terminations of the horizontal cabling.

B. Furnish all patch panels required to support the voice cross-connect system - Reference Section 27 15 13 - Communications Horizontal Cabling.

C. See Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Telecom Rm."

2.04 BACKBONE FIBER PATCH PANELS

A. Furnish all required wall mount fiber patch panels - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product Material Category "Fiber."

B. Furnish all required rack mount fiber patch panels - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product Material Category, "Fiber."

C. Furnish all fiber patch panel piece parts required for the termination of SMF and MMF optical fiber backbone cables and complete build-out of associated fiber patch panels including blank fill plates - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product Material Category, "Fiber."

D. SMF fiber connectors: Furnish all required SMF connector "Pigtails" - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product Material Category, "Fiber."

E. MMF fiber connectors: Furnish all required MMF connector "Pigtails" - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product Material Category, "Fiber."

PART 3 - EXECUTION

3.01 INSTALLATION

A. Copper backbone termination.

1. Mount 110 (or approved equal) termination fields per manufacturer's specifications, instructions, and recommendations. Use accompanying construction drawing set to determine mounting locations and configurations.

2. Backbone cables are to be routed neatly on overhead cable runway to block termination locations. For cable management from cable runway to block termination and the dressing of cable at the blocks, follow manufacturer’s specifications, instructions, and recommendations and standard industry practices.

3. Terminate all riser backbone cables per manufacturer’s specifications, instructions, and recommendations.

4. At the termination end of multi-pair riser cables, the Contractor shall provide 15 feet (15') of managed service slack.

5. If removal of the cable jacket is required to facilitate routing of ARMM or plenum backbone cable into the blocks, the exposed cable pairs shall be fully covered with black or gray plastic tape, neatly lapped to prevent gaps.

6. Install five (5) pair and four (4) pair 110 I.D. strips for backbone cabling as required per the construction drawing set accompanying this Division 27 specification.

B. Cable drop horizontal cable termination.

1. Install one (1) 48-port patch panel for every 48 horizontal UTP data cables.

2. Mount patch panels per the construction drawing set accompanying this Division 27 specification. Note: See Section 27 11 00 - Communications Equipment Room Fittings.

3. Each patch panel shall have a 2RU horizontal manager placed both above and below the panel.

4. Horizontal cables are to be routed neatly on overhead cable runway to equipment racks; exit cable runway into equipment rack vertical cable management and proceed to the patch panels.

5. Cable termination.

a. Cables on the left side of the patch panel shall enter from the left side vertical cable manager. Cables on the right side of the patch panel shall enter from the right side vertical cable manager. Cables shall not cross the center line of the patch panel.

b. Terminate cables using the 8-pin jack, T568-B four (4) pair termination standard and comply with manufacturer's termination practices, specifications, instructions, and recommendations.

C. Voice cross-connect system termination.

1. 110 or approved equal cable end termination.

a. Mount 110 (or approved equal) termination fields per manufacturer's specifications, instructions, and recommendations. Use accompanying construction drawing set to determine mounting locations and configurations.

b. 110 or approved equal C4 blocks shall be used for all but the last position on each twenty-five (25) pair row of a 110 one hundred (100) pair field and C5 blocks for the last five (5) pair positions in each twenty-five (25) pair row.

2 Patch panel end terminations.

a. Install one (1) 48-port patch panel for every 48 UTP data cables terminated at the voice cross-connect systems 110 blocks.

b. Mount patch panels per the construction drawing set accompanying this Division 27 specification. Note: See Section 27 11 00 - Communications Equipment Room Fittings. Each patch panel shall have a 2RU horizontal manager placed both above and below the panel.

c. Terminate cables using the 8-pin jack, T568-B four (4) pair termination standard and comply with manufacturer's termination practices, specifications, instructions, and recommendations.

D. Fiber backbone cable termination.

1. Install at the locations indicated on the construction drawing set and per manufacturer's specifications, instructions, and recommendations the wall mount and rack mount optical fiber patch panels.

2. Fiber backbone cables are to be routed neatly on overhead cable runway to patch panel termination locations. For cable management from cable runway to patch panel termination and the dressing of cable at the patch panel termination, follow manufacturer’s specifications, instructions, recommendations, and standard industry practices.

3. Before terminating fiber backbone cable neatly install twenty-five feet (25') of service loop slack on Telecommunication Room wall near location where backbone cable is to be terminated. Diameter of service loops shall be eighteen inches (18").

4. Terminate fiber backbone cable by fusion splicing the appropriate connector "Pigtail" to the backbone cable. Comply with manufactures specifications, instructions, and recommendations.

5. Fiber connector "Pigtail" splicing: Use only fusion splicing to splice fiber connector pigtails to fiber backbone cable. No other splicing methodology shall be allowed.

3.02 EXAMINATION

Comply with Section 27.00 00 – Communications.

3.03 ISP/OSP BACKBONE COPPER 110 TERMINATION BLOCK LABELING

A. Comply with Section 27.00 00 – Communications.

B. 110 block cable ID label shall be as follows:

1. Label shall be KCCD generated cable number - from Telecommunications Room (TR) number - cable pair count per 25 pairs (1-25, 26-50, etc.).

2. 'From' KCCD building Telecommunications Room (TR) number for ISP riser or 'From' KCCD building number for OSP cable.

3. Cable pair count per 25 pairs (1-25, 26-50, etc.)

C. See ITPC or his/her designate to obtain KCCD generated cable number.

D. Pair call-out labeling: Pair call-out labeling shall designate every fifth (5th) pair consecutively through total pair count of the cable terminated on the block but not including the first (1st) and twenty-fifth (25th) pairs of each twenty-five (25) pair field bundle: Example for fifty (50) pair cable -- 5, 10, 15, 20, 30, 35, 40, 45.

E. All labels shall be machine/printer created labels. Hand labeling is not acceptable unless approved in writing as acceptable by the ITPC or his/her designate.

3.04 HORIZONTAL COPPER PATCH PANEL LABELING

A. Comply with Section 27.00 00 – Communications.

B. Label placement.

1. Label each patch panel with a patch panel number. P1 for patch panel 1, P2 for patch panel 2, etc.

2. Modular jack assignment number and TR patch panel port number shall be the same number.

C. All labels shall be machine/printer created labels. Hand labeling is not acceptable unless approved in writing as acceptable by the ITPC or his/her designate.

3.05 BACKBONE FIBER PATCH PANEL LABELING

A. Comply with Section 27.00 00 – Communications.

B. Each backbone fiber patch panel shall have a header label.

C. Header Label format and content shall be as follows:

1. KCCD generated cable number. See ITPC or his/her designate to obtain KCCD generated cable number.

2. 'From' KCCD building Telecommunication Room (TR) number for ISP riser or 'From' KCCD building number- TR number for OSP cable.

3. Fiber strand type designation and strand count. SM (single mode) XX; MM (multi-mode) XX where XX = strand count. If cable is a hybrid make sure both strand type counts are accounted for in header label.

D. Fiber Patch Panel Port Labeling: Label each fiber patch panel port with the strand count terminated on the port.

E. All labels shall be printed labels. Hand labeling is not acceptable unless approved in writing as acceptable by the ITPC or his/her designate.

3.06 VOICE CROSS-CONNECT SYSTEM LABELING

A. The 110-Blocks shall be labeled “Voice Cross-Connect to Rack #_ Panel #__”. Each cable shall be numbered from 01-48 on the 110-block Designation Strips.

B. The patch panels on the racks shall be labeled “Voice Cross-Connect Rack #_ Panel #__”. Each modular jack shall be numbered from 01-48 on each panel.

3.07 TESTING

Comply with Section 27 15 53 - Communications Cable Plant Testing.

3.08 AS-BUILT DRAWINGS

Comply with Section 27 15 53 - Communications Cable Plant Testing.

3.09 ADJUSTMENTS

Comply with Section 27.00 00 – Communications.

3.10 ACCEPTANCE

Comply with Section 27.00 00 – Communications.

END OF SECTION

SECTION 27 15 13 - COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all services, labor, materials, tools, and equipment required for the complete and proper installation and termination of new horizontal cabling as specified in this section of the specifications.

B. The horizontal link portion of the cabling system specified in this section extends from the modular jack termination of the cable at the drop faceplate to its patch panel modular jack termination in its assigned telecommunication room (TR). It also applies to the voice cross-connect system described below.

C. All specifications and conjoined construction drawings issued as part of the construction documentation for this project are applicable to this Division 27 and this section. Those specifications that are particularly applicable to this section include, but are not limited to, the following:

1. Division 26 (or 1995 CSI Master Format Edition Division 16) – Electrical
2. Division 15 Mechanical
3. Section 27 00 00 - Communications
4. Section 27 06 00 - Schedules for Communications
5. Section 27 05 29 - Hangers and Supports for Communications Systems
6. Section 27 05 41 - Fire Stopping for Communications Systems
7. Section 27 11 00 - Communications Equipment Room Fittings
8. Section 27 11 19 - Communications Termination Blocks and Patch Panels
9. Section 27 15 43 - Communications Faceplates and Connectors
10. Section 27 15 53 - Communications Cable Plant Testing

1.02 QUALITY CONTROL

Comply with Section 27 00 00 - Communications.

1.03 WARRANTIES

Comply with Section 27 00 00 - Communications.

1.04 MATERIAL SUBSTITUTIONS

Comply with Section 27 00 00 - Communications.

1.05 SUBMITTALS

Comply with Section 27 00 00 - Communications.

1.06 COORDINATION

Comply with Section 27 00 00 - Communications.

PART 2 - PRODUCT

2.01 QUANTITY DETERMINATION

Comply with Section 27 00 00 - Communications.

2.02 HORIZONTAL CABLE

Furnish all required horizontal cable - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Horizontal Cable."

2.03 VOICE CROSS-CONNECT CABLING

Furnish all horizontal cable required to support the voice services cross-connect system - Reference: 271119-Blocks & Patch Panels.

PART 3 – EXECUTION

3.01 GENERAL

A. All cable runs shall be installed per manufacturer's installation instructions.

B. Cable installation is “home-run” between the modular jack termination of the cable at the faceplate drop to the patch panel modular jack termination in its assigned TR.

1. Each cable shall be installed without any splices.

2. Each cable shall be installed without intermediate termination points unless approved by KCCD or his/her designate in writing.

C. The total length of any horizontal station cable from the modular jack termination of the cable at the drop faceplate to the patch panel modular jack termination in its assigned TR shall not exceed ninety meters (90m) - two hundred ninety-five feet (295’) - unless approved by KCCD or his/her designate in writing.

3.02 CEILING TILE

A. Ceiling tile shall be removed as necessary for the cable installation and put back in place without damaging or soiling any of the tiles or supporting framework.

B. Ceiling tile shall be handled so no fingerprints or marks are left on the tiles, and the tiles are not damaged in any way.

C. The Contractor is responsible for the cost of repair or replacement of any tile or ceiling tile support/framework hardware that is damaged or soiled by the Contractor.

3.03 HORIZONTAL CABLE PLACEMENT

A. No cable shall run unsupported by conduit, cable tray, hangers, or other specified support for distances greater than five feet (5’).

B. No cable shall be attached to the suspended ceiling structure or laid directly on the ceiling tiles or hard lid as a means of support, and the bottom of a cable or cable bundle shall be minimum of six inches (6") above the ceiling tile grid.

C. No cable or cable bundle shall be supported by or attached by any means to fire sprinkler heads, delivery system hardware, environmental sensor system hardware, or the exterior of any conduit, ladder rack, or cable tray. Cable shall be supported by systems specifically installed for cable support.

D. Where cable being installed is not enclosed in conduit or cable tray, cross all electrical power circuit transport at right angles.

E. Where discontinuity of cable trays or conduit pathway occurs that causes cable or cable bundle to sag vertically three inches (3") or more, support the cable or cable bundle over the discontinuity using hangers, brackets, hooks, rings, and other applicable supporting devices specified in Section 27 05 29 - Hangers and Supports for Communications Systems.

F. During placement of cable runs, do not exceed manufacturer's maximum pulling tension or minimum bend radius limits.

G. Do not bundle cables in cable trays.

H. Do bundle two (2) or more cables with plenum-rated Velcro ties that are snug but which do not deform the cable geometry as follows:

1. Whenever cables in cable trays leave the cable tray and enter/exit distribution conduit.

2. Wherever cables enter a TR. Maintain bundling with the TR.

I. Manage slack to avoid excess cable or kinking.

J Pull new pulling string through all conduits while placing new horizontal cable. Leave a pulling string in the utilized conduits for future use.

K. Do not roll or store cable reels without an appropriate underlay.

L. Cables with jackets that are chaffed, burned, have exposed internal conductor insulation, or have any bare copper (shiners) shall be replaced.

M. Maintain the following clearances from EMI sources:

1. Unshielded power lines or equipment less than or equal to 5 kVA near cable in open or non-metal pathway: twelve inches (12").

2. Unshielded power lines or equipment greater than 5 kVA near cable in open or non-metal pathway: twenty-four inches (24").

3. Unshielded power lines or equipment less than or equal to 5 kVA near cable in grounded metal pathway: six inches (6").

4. Unshielded power lines or equipment greater than 5 kVA near cable in grounded metal pathway: twelve inches (12").

5. Power lines enclosed in grounded metal conduit less than or equal to 5 kVA near cable in grounded metal pathway: three inches (3").

6. Power lines enclosed in grounded metal conduit greater than 5 kVA near cable in grounded metal pathway: six inches (6").

7. Fluorescent fixtures near cable in open or non-metal pathway: twelve inches (12").

8. Fluorescent fixtures near cable in grounded metal conduit: six inches (6").

9. Motors or transformers near cable in non-metal pathway: forty-eight inches (48").

10. Motors or transformers near cable in grounded metal pathway: thirty-six inches (36").

11. Radiating coaxial cabling: six inches (6”).

N. After cable installation is complete, tested, and, if necessary, repairs made, install all required fire stopping. The ITPC or his/her designate will not accept the installation as completed until all required fire stopping has been installed and accepted as complete. See Section 27 05 41 – Fire Stopping.

3.04 VOICE CROSS-CONNECT CABLE PLACEMENT

A. This cabling system connects 48-port patch panel(s) in each rack to 110 blocks installed adjacent to the voice backbone or riser cable 110 terminations in each TR.

B. One cable shall be used for each modular jack in the patch panels. Modular jack counts are based on copper backbone/riser pair counts. Example: A 100-pair copper riser cable would require two (2) 48-port patch panels, a total of ninety-six (96) modular jack positions, and four (4) one hundred (100) pair 110 blocks - Reference: 271119-Blocks & Patch Panels.

C. Bundle voice cross-connect cables separately from horizontal data cables. Do not mix with horizontal data cables.

D. Test cable as for station cabling - Reference Testing below.

3.05 TERMINATION

Comply with Section 27 11 19 - Communications Termination Blocks & Patch Panels and Section 27 15 43 - Communications Faceplates and Connectors.

3.06 EXAMINATION

Comply with Section 27.00 00 – Communications.

3.07 LABELING

A. Comply with Section 27.00 00 – Communications.

B. Label placement: Attach a label to both ends of each cable six inches (6") from the cables termination at the drop and TR patch panel port.

C. All labels shall be machine created labels. Hand labeling is not acceptable.

3.08 TESTING

Comply with Section 27 15 53 - Communications Cable Plant Testing.

3.09 AS-BUILT DRAWINGS

Comply with Section 27.00 00 – Communications.

3.10 VERIFICATION

Comply with Section 27.00 00 – Communications.

3.11 ADJUSTMENTS

Comply with Section 27.00 00 – Communications.

3.12 ACCEPTANCE

Comply with Section 27.00 00 – Communications.

END OF SECTION

SECTION 27 15 43 - COMMUNICATIONS FACEPLATES AND CONNECTORS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all services, labor, materials, tools, and equipment required for the complete and proper installation of new faceplates and proper termination of new connectors specified in this section of the Division 27 specifications and accompanying construction drawings.

B. The specification sections of this Division 27 that are particularly applicable to this section include, but are not limited to, the following:

1. Section 27 00 00 - Communications
2. Section 27 06 00 - Communications Schedules
3. Section 27 05 33 - Conduits and Backboxes for Communications Systems
3. Section 27 11 19 - Communications Termination Blocks and Patch Panels
4. Section 27 15 13 - Communications Copper Horizontal Cabling
5. Section 27 15 53 - Cable Plant Testing

1.02 QUALITY CONTROL

Comply with Section 27 00 00 - Communications.

1.03 WARRANTIES

Comply with Section 27 00 00 - Communications.

1.04 MATERIAL SUBSTITUTIONS

Comply with Section 27 00 00 - Communications.

1.05 SUBMITTALS

Comply with Section 27 00 00 - Communications.

1.06 COORDINATION

Comply with Section 27 00 00 - Communications.

PART 2 - PRODUCTS

2.01 QUANTITY DETERMINATION

Comply with Section 27 00 00 - Communications.

2.02 FACEPLATES

Furnish all required faceplates - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Faceplates."

2.03 CONNECTORS

Furnish all required UTP data modular jacks - see Section 27 06 00 - Schedules for Communications, KCCD Master Pre-Approved Product/Material/Manufacturer List Index, Product/Material Category, "Modular Jacks."

PART 3 - EXECUTION

3.01 GENERAL

For all cable types, connector installation execution shall comply with connector manufacturer's installation specifications, instructions, and recommendations.

3.02 EXAMINATION

Comply with Section 27.00 00 – Communications.

3.03 FACEPLATE LABELING

A. Comply with Section 27.00 00 – Communications.

B. Modular Jack Labels and Placements: Each drop faceplate modular jack position shall be labeled with its complete modular jack number which includes the Telecommunication Room (TR), patch panel, number, and the jack number.

C. All labels shall be machine created labels, clearly legible, black letters on white background.

3.04 TESTING

Comply with Section 27 15 53 - Communications Cable Plant Testing.

3.05 AS-BUILT DRAWINGS

Comply with Section 27 15 53 - Communications Cable Plant Testing.

3.06 VERIFICATION

Comply with Section 27.00 00 – Communications.

3.07 ADJUSTMENTS

Comply with Section 27.00 00 – Communications.

3.07 ACCEPTANCE

Comply with Section 27.00 00 – Communications.

END OF SECTION

SECTION 27 15 53 - COMMUNICATIONS CABLE PLANT TESTING PART

1 - GENERAL

1.1 SUMMARY

A. Provide all labor, materials, tools, field-test instruments and equipment required for the complete testing, identification and administration of the work called for in the Contract Documents.

B. In order to conform to the overall project event schedule, the cabling contractor shall survey the work areas and coordinate cabling testing with other applicable trades.

C. In addition to the tests detailed in this document, the contractor shall notify the ITPC or his/her designate of any additional tests that are deemed necessary to guarantee a fully functional system. The contractor shall carry out and record any additional measurement results at no additional charge.

D. All specifications and conjoined construction drawings issued as part of the construction documentation for this project are applicable to this Division 27 and this section. Those specifications that are particularly applicable to this section include, but are not limited to, the following:

1. Division 26 (or 1995 CSI Master Format Edition Division 16) – Electrical
2. Section 27 00 00 - Communications
3. Section 27 06 00 - Schedules for Communications
4. Section 27 05 29 - Hangers and Supports for Communications Systems
5. Section 27 05 41 - Fire Stopping for Communications Systems
6. Section 27 11 00 - Communications Equipment Room Fittings
7. Section 27 11 19 - Communications Termination Blocks and Patch Panels
8. Section 27 15 43 - Communications Faceplates and Connectors

1.2 SCOPE

A. This Section includes the minimum requirements for the test certification, identification and administration of backbone and horizontal optical fiber cabling.

B. This Section includes minimum requirements for:

1. Fiber optic test instruments
2. Fiber optic testing
3. Identification
    a) Labels and labeling
4. Administration
    a) Test results documentation
    b) As-built drawings

C. Testing shall be carried out in accordance with this document. This includes testing the attenuation and polarity of the installed cable plant with a certifying optical loss test set

(OLTS) and the testing of fiber splices, except for pigtail splicing, with an optical time domain reflectometer (OTDR).

D. Testing shall be performed on each cabling link (connector to connector).

E. All tests shall be documented including OLTS dual wavelength attenuation measurements for multimode and singlemode links and OTDR traces and event tables for multimode and singlemode links.

1. Documentation shall include optical length measurements.

1.3 QUALITY CONTROL

A. Comply with section 27 00 00.

B. Trained technicians who have successfully attended an appropriate training program, which includes testing with an OLTS and an OTDR and have obtained a certificate as proof thereof shall execute the tests. These certificates may have been issued by any of the following organizations or an equivalent organization:

1. Manufacturer of the fiber optic cable and/or the fiber optic connectors.

2. Manufacturer of the test equipment used for the field certification.

C. The ITPC or his/her designate shall be invited to witness and/or review field-testing.

1. The ITPC or his/her designate shall be notified of the start date of the testing phase five (5) business days before testing commences.

2. The ITPC or his/her designate will select a random sample of 5% of the installed links. The ITPC or his/her designate shall test these randomly selected links and the results are to be stored in accordance with Part 3 of this document. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor shall repeat 100% testing at no cost to KCCD.

D. Comply with Section 27 00 00 - Communications.

1.4 MATERIAL SUBSTITUTIONS

Comply with Section 27 00 00 - Communications.

1.5 SUBMITTALS

A. Manufacturers catalog sheets and specifications for fiber optic field-test instruments including Certifying optical loss test sets (OLTS; power meter and source) and optical time domain reflectometer (OTDR).

B. A schedule (list) of all optical fibers to be tested.

C. Sample test reports

D. Comply with Section 27 00 00 - Communications

1.6 ACCEPTANCE OF TEST RESULTS

A. Comply with section 27 00 00.

B. Each cabling link shall be in compliance with the following test limits:

1. Optical loss testing

a) Multimode and Singlemode links

1) The link attenuation shall be calculated by the following formulas as specified in ANSI/TIA-568-C.0.

(i) Link Attenuation (dB) = Cable_Attn (dB) + Connector_Attn (dB) + Splice_Attn (dB)

(ii) Cable_Attn (dB) = Attenuation_Coefficient (dB/km) * Length (Km)

(iii) Connector_Attn (dB) = number_of_connector_pairs * connector_loss (dB)

(iv) Maximum allowable connector_loss = 0.4 dB

(v) Splice_Attn (dB) = number_of_splices * splice_loss (dB)

(vi) Maximum allowable splice_loss = 0.05 dB

(vii) The values for the Attenuation_Coefficient (dB/km) are listed in the table below:

Type of Optical Fiber	Wavelength (nm)	Attenuation coefficient (dB/km)	Wavelength (nm)	Attenuation coefficient (dB/km)
Multimode 62.5/125 µm	850	3.5	1300	1.5
Multimode 50/125 µm	850	3.5	1300	1.5
Single-mode (Inside plant)	1310	1.0	1550	1.0
Single-mode (Outside plant)	1310	0.5	1550	0.5

2. OTDR testing not required if fiber passes required optical loss testing.

a) Reflective events (connections) shall not exceed 0.4 dB.

b) Non-reflective events (splices) shall not exceed 0.05 dB.

C. All installed cabling links shall be field-tested and pass the test requirements and analysis as described in Part 3. Any link that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected link meets performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation in accordance with Part 3.

D. Acceptance of the test results shall be given in writing after the project is fully completed and tested in accordance with Contract Documents and to the satisfaction of KCCD.

PART 2 - PRODUCTS

2.1 OPTICAL FIBER CABLE TESTERS

A. The field-test instrument shall be within the calibration period recommended by the manufacturer.

B. Certifying Optical loss test set (OLTS)

1. Multimode optical fiber light source

a) Provide dual LED light sources with central wavelengths of 850 nm (□30 nm) and 1300 nm (□20 nm)

b) Output power of –20 dBm minimum.

c) The light source shall meet the launch requirements of ANSI/EIA/TIA-455-50B, Method A. This launch condition can be achieved either within the field test

equipment or by use of an external mandrel wrap (as described in clause E.7 of ANSI/TIA-568-C.0) with a Category 1 light source.

d) Acceptable manufacturers

1) Fluke Networks DTX-1800 or Equal.

2. Singlemode optical fiber light source

a) Provide dual laser light sources with central wavelengths of 1310 nm (□20 nm) and 1550 nm (□20 nm).

b) Output power of –10 dBm minimum.

c) Acceptable manufacturers

1) Fluke Networks DTX-1800 or equal

3. Power Meter

a) Provide 850 nm, 1300/1310 nm, and 1550 nm wavelength test capability.

b) Power measurement uncertainty of □ 0.25 dB.

c) Store reference power measurement.

d) Save at least 100 results in internal memory.

e) PC interface (serial or USB).

f) Acceptable manufacturers

1) Fluke Networks (Fluke DTX-1800 or equal).

4. Optional length measurement

a) An OLTS that is capable of measuring the optical length of the fiber shall be used.

C. Optical Time Domain Reflectometer (OTDR)

1. Multimode OTDR

a) Wavelengths of 850 nm (□ 20 nm) and 1300 nm (□ 20 nm).

b) Event dead zones of 3.7 m maximum at 850 nm and 1300 nm.

c) Attenuation dead zones of 10 m maximum at 850 nm and 13 m maximum at 1300 nm.

d) Distance range not less than 2000 m.

e) Dynamic range at least 10 dB at 850 nm and 1300 nm

2. Singlemode OTDR

a) Wavelengths of 1310 nm (□ 20 nm) and 1550 nm (□ 20 nm).

b) Event dead zones of 3.5 m maximum at 1310 nm and 1550 nm.

c) Attenuation dead zones of 10 m maximum at 1310 nm and 12 m maximum at 1550 nm.

d) Distance range not less than 10000 m.

e) Dynamic range at least 10 dB at 1310 nm and 1550 nm

3. Acceptable manufacturers

a) Fluke Networks or equal

2.2 ADMINISTRATION

A. Administration of the documentation shall include test results of each fiber link.

B. The test result information for each link shall be recorded in the memory of the field-test instrument upon completion of the test.

C. The test result records saved within the field-test instrument shall be transferred into a Windows™-based database utility that allows for the maintenance, inspection and archiving of these test records.

PART 3 – EXECUTION

3.1 GENERAL

A. All tests performed on optical fiber cabling that use a laser or LED in a test set shall be carried out with safety precautions in accordance with ANSI Z136.2.

B. All outlets, cables, patch panels and associated components shall be fully assembled and labeled prior to field-testing. Any testing performed on incomplete systems shall be redone on completion of the work.

3.2 OPTICAL FIBER CABLE TESTING

A. Field-test instruments shall have the latest software and firmware installed.

B. Link test results from the OLTS shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC in which the administrative documentation (reports) may be generated.

C. Testing shall be performed on each cabling segment (connector to connector).

D. Testing of the cabling shall be performed using high-quality test cords of the same fiber type as the cabling under test. The test cords for OLTS testing shall be between 1 m and 5 m in length.

E. Optical loss testing

1. Backbone link

a) Multimode backbone links shall be tested at 850 nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A, Method B, One Reference Jumper or the equivalent method.

b) Singlemode backbone links shall be tested at 1310 nm and 1550 nm in accordance with ANSI/TIA/EIA-526-7, Method A.1, One Reference Jumper or the equivalent method.

c) Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

d) Use the One Reference Jumper Method specified by ANSI/TIA/EIA-526-14A, Method B and ANSI/TIA/EIA-526-7, Method A.1 or the equivalent method. The user shall follow the procedures established by these standards or application notes to accurately conduct performance testing.

e) Each fiber link shall be tested in both directions.

F. Polarity Testing

1. Paired duplex fibers in multi-fiber cables shall be tested to verify polarity in accordance with Clause E.5.3 of ANSI/TIA-568-C.0. The polarity of the paired duplex fibers shall be verified using an OLTS.

3.3 TEST RESULTS DOCUMENTATION

A. Test results saved within the field-test instrument shall be transferred into a Windows™-based database utility that allows for the maintenance, inspection and archiving of the test records. These test records shall be uploaded to the PC unaltered, i.e., “as saved in the field-test instrument”. The file format, CSV (comma *separated value), does not provide adequate protection of these records and shall* not be used. PDFs shall not be used

B. The test results documentation shall be available for inspection by KCCD or the ITPC during the installation period and shall be passed to the ITPC within 5 working days of completion of tests on cabling served by a telecommunications room or of backbone cabling. The installer shall retain a copy to aid preparation of as-built information.

C. The database for the complete project, including twisted-pair copper cabling links, if applicable, shall be stored and delivered on CD-ROM prior to the ITPC acceptance of the building. This CD-ROM shall include the software tools required to view, inspect, and print any selection of the test reports.

D. Circuit IDs reported by the test instrument should match the specified label ID.

E. The detailed test results documentation data is to be provided in an electronic database for each tested optical fiber and shall contain the following information

1. The identification of the customer site as specified by the end-user
2. The name of the test limit selected to execute the stored test results
3. The name of the personnel performing the test
4. The date and time the test results were saved in the memory of the tester
5. The manufacturer, model and serial number of the field-test instrument
6. The version of the test software and the version of the test limit database held within the test instrument
7. The fiber identification number
8. The length for each optical fiber
    a) The index of refraction used for length calculation when using a length capable OLTS
9. Test results to include OLTS attenuation link measurements at the appropriate wavelength(s) and the margin (difference between the measured attenuation and the test limit value).
10. The overall Pass/Fail evaluation of the link-under-test for OLTS measurements

END OF SECTION