(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

SECTION 271500
HORIZONTAL MEDIA INFRASTRUCTURE

(REV. 09-30-2024-TAB)

PART 1 GENERAL

1.01 SUMMARY

A. Provide a Structured Cabling System (SCS) for the purpose of supporting voice, data and video communications at various locations within the Houston Airport System. The Houston Airport System (HAS) has established Systimax as the standard for cabling infrastructure installations. *(Designer to provide a detailed summary of all work to be performed)*

B. Related Work:
1. Section 270553: Identification and Labeling of Communication Infrastructure
2. Section 271045: Restroom Monitoring System
3. Section 271100: Communication Cabinets and Equipment Rooms
4. Section 271300: Backbone/Riser Media Infrastructure
5. Section 270528: Interior Communication Pathways
6. Section 270543: Exterior Communication Pathways
7. Section 270526: Telecommunications Grounding and Bonding
8. Section 272100 Data Communication Network Equipment
9. Section 272200: PC, Laptop and Server Equipment

1.02 SUBMITTALS

A. Qualifications: Demonstrate compliance with requirements of Paragraph 1.05A below.

B. Manufacturers' data, including part numbers, cut sheets and detailed descriptions, for all proposed equipment.

C. Cable inventory data shall be submitted for all fiber, copper, and coaxial cabling and termination equipment. Reference Specification 270553 for the Inside and Outside plant spread sheets. Information shall be provided on a CD.

D. Shop Drawings to be submitted and approved before implementation is started. Shop Drawings to be submitted in accordance with Specification 01340.

E. Record Drawings: Furnish CAD drawings, following format in Section 01340, of completed work including cable numbers. Refer to Specification 270553 for labeling conventions. Contractor's on-site Building Industry Consulting Services International (BICSI) Registered Communications Distribution Designer (RCDD) supervisor shall review, approve and stamp all shop drawings, coordination drawings and record drawings.

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

F. Include spares list to be approved by HAS IT Project Manager for approval.

G. Cable Testing and Reports.
1. Submit Testing Plan prior to beginning cable testing.
2. Submit certified test reports of Contractor-performed tests in accordance with paragraph 3.04. of this document.
3. Electronic and hardcopy versions of test reports shall be submitted together and clearly identified with cable identification. Test results must be in both PDF and original raw format of approved tester.
4. Test reports shall be reviewed, approved and with a stamped cover letter by the Contractor's on-site RCDD.

H. Product data for all termination and test equipment to be used by Contractor to perform work.
1. Equipment shall be calibrated with traceability to National Institute of Standards and Technology (NIST) requirements.
2. Contractor shall include copy of calibration and certification that equipment calibration meets NIST standards and has been calibrated at least once in the previous calendar year.
3. Test equipment data shall be reviewed, approved and stamped by the Contractor's on-site RCDD prior to submitting.
4. Refer to 3.04. in this document for test equipment requirements.

I. Submit Technology Implementation Plan in accordance with 1.07 below.

J. Submit Cable Pulling Plan, as follows:
1. Indicate the installed backbone conduit layout in schematic format, including junction boxes and distances between junction boxes.
2. Indicate contents of each conduit.
3. Indicate the cable pulling calculations, conduit fill ratios and actual cable runs and tensions.
4. Cable Pulling Plan shall be reviewed, approved and stamped by the Contractor's on-site RCDD prior to submittal.
5. Installation of cabling shall not commence prior to approval of the pulling plan and calculations by the Architect/Engineer.

K. Submit installation plan indicating:
1. Equipment and personnel
2. Materials and staging area
3. Start and completion dates
4. Locations, including floor, room and building
5. Installation plan shall be reviewed, approved and stamped by the Contractor's on-site RCDD prior to submitting.

1.03 PROJECT CONDITIONS

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating units without field measurements. Coordinate supports, adjacent construction, and fixture locations to ensure actual dimensions correspond to established dimensions.

C. Maintain temperature of between 64 degrees Fahrenheit and 75 degrees Fahrenheit and between 30 and 55 percent humidity in areas of active electronic system work.

1.04 REFERENCES

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

B. Specific reference in specifications to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean the latest printed edition of each in effect two weeks prior to the date of the Bidding Documents unless the document is shown dated.

C. Conflicts.
1. Between referenced requirements: Comply with the one establishing the more stringent requirements.
2. Between referenced requirements and contract documents: Comply with the one establishing the more stringent requirements.

D. References.
1. ANSI/TIA/EIA-568-D, Commercial Building Telecommunications Wiring Standards
2. ANSI/TIA/EIA-569-B Commercial Building Standard for Telecommunications Pathways and Spaces
3. ANSI/TIA/EIA 607-B -Commercial Building Grounding and Bonding Requirements
4. International Standards Organization/International Electromechanical Commission (ISO/IEC) DIS11801, January 6, 1994
5. Underwriters Laboratories (UL®) Cable Certification and Follow Up Program
6. National Electrical Manufacturers Association (NEMA)
7. American Society for Testing Materials (ASTM)
8. National Electric Code (NEC®) Latest Issue
9. National Electrical Safety Code (NESC) Latest Issue
10. Institute of Electrical and Electronic Engineers (IEEE)
11. UL Testing Bulletin
12. American National Standards Institute (ANSI) X3T9.5 Requirements for UTP at 100 Mbps

13. SYSTIMAX Structured Cabling Systems, Performance Specifications, Latest Issue
14. SYSTIMAX Structured Cabling Systems, Components Guide, Latest Issue
15. BICSI Telecommunications Distribution Methods Manual (TDMM) Latest Issue
16. Rural Utilities Service (RUS) Section 1755

1.05 QUALITY ASSURANCE

A. Submit written proof that the following experience requirements are being met.
   1. Contractor Qualifications
      a. The contractor shall be certified by the manufacturer of the products, adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels in provisioning this Project.
      b. Must be supervised on-site by a BICSI RCDD. Must demonstrate knowledge and compliance with all BICSI, TIA/EIA, UL, and NEC methods, standards and codes.
      c. All members of the installation team shall be certified by the manufacturer as having completed the necessary training to complete their part of the installation. Resumes of the entire team shall be provided along with documentation of completed training courses.
      d. The contractor shall provide five references for projects of equivalent scope, type and complexity of work completed within the last five years.
      e. The contractor who is installing the cabling infrastructure shall be a certified and currently registered Elite Systimax Infrastructure Solution Provider capable of issuing a numbered registration certificate for the entire cable system.
      f. The contractor who is installing the cabling infrastructure shall have the following Systimax certifications:
         SP3321 - SYSTIMAX SCS Design & Engineering
         SP/ND3361 - SYSTIMAX SCS Installation and Maintenance
         SP7700 – COMMSCOPE Cabling for Smart Buildings
      g. The following certification is an approved substitution for the SP3321 and the SP/ND3361
         SP3351 – SYSTIMAX SCS MasterClass D&E and I&M Recertification
      h. Cable splicing personnel shall have a minimum of five years splicing experience and shall have completed a minimum of five major splicing projects.
   2. Manufacturer’s hardware experience: All components shall be produced by manufacturers who have been regularly engaged in the production of telecommunications cabling components of the types to be installed in this project for a period of five years.

B. Materials and equipment: Equipment shall be rated for continuous operation under the ambient environmental temperature, humidity, and vibration conditions encountered at the installed location. The equipment shall meet the following requirements:
   1. Interior controlled environment: 60 to 100 degrees F dry bulb and 20 to 90 percent relative humidity, non-condensing.

2. Interior uncontrolled environment: 0 to 130 degrees F dry bulb and 10 to 95 percent relative humidity, non-condensing.
3. Exterior environments: Minus 30 degrees to 130 degrees F dry bulb, and 10 to 100 percent relative humidity, condensing.
4. Hazardous environment: All system components located in areas where fire or explosion hazards may exist because of flammable gas or vapors, flammable liquids, combustible dust, or ignitable fibers or flyings, shall be rated and installed according to Chapter 5 of the NFPA 70 and as shown.

C. Standard products:
1. Equipment and materials shall be standard products of a manufacturer regularly engaged in the manufacture of telecommunications cabling products and shall be the manufacturer's latest standard design in satisfactory use for at least one year prior to bid opening.
2. Items of the same classification shall be identical. This requirement includes equipment, modules, assemblies, parts, and components.

1.06 CONTRACTOR'S DUTIES

A. Contractor's RCDD shall provide all calculations and analysis to support design and engineering decisions as specified in the Submittals section.

B. Provide and pay for all labor, supervision, tools, equipment, test equipment, tests and services/programming to provide and install a complete inside and outside plant fiber and copper infrastructure system. Pay all required sales, gross receipts, and other taxes.

C. Secure and pay for plan check fees, permits, fees, and licenses necessary for the execution of Work as applicable for the project.

D. Give required notices.

E. Comply with all codes, ordinances, regulations, and other legal requirements of public authorities that bear on performance of Work.

1.07 PROCUREMENT

A. Procure equipment specified in this document as dictated by the timeline in Appendix A "Technology Implementation Schedule" in order to ensure that the technology is acquired in a timely fashion, but not outdated by the installation date.

B. Submit a copy of Appendix A "Technology Implementation Schedule" as a part of the equipment submittals required elsewhere in this document. Complete the columns headed "Quantity", "Purchasing Lead Time", "Start Date or Dependent", and "Installation Duration".

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

C. The "Procurement Lead Time" shall be expressed in days or weeks, and shall include time required for the contractor's personnel to order and receive the material. Substantiation may be required.

D. "Start Date or Dependent" and "Installation Duration" should be an accurate estimate based upon known facts in the project. Substantiation may be required.

E. The Contractor shall not purchase any materials requiring submittals until the owner approves the product submittal and the Technology Implementation Schedule for that material.

F. The Contractor shall not purchase any materials requiring submittals until the date established by the owner as the Purchasing Authorized Date. The Purchasing Authorized Date will be reflected in the "Purch Auth" column of Appendix A as a part of the Submittal Review process.

1.08 MAINTENANCE AND SUPPORT

A. System Assurance: The System Assurance shall cover the failure of the wiring system to support the application which it was designed to support, as well as additional application(s) introduced in the future by recognized standards or user forums that use the ANSI/TIA/EIA 568 or ISO/IEC IS 11801 component and link/channel specifications for cabling, for a twenty-year period.

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

C. Support Availability: The Contractor shall commit to make available local support for the product and system during the Warranty period.

1.09 EXTENDED WARRANTY

A. The Extended Product Warranty shall meet all manufactures specification to ensure against product defects, that all approved cabling components exceed the specifications of ANSI/TIA/EIA 568 and ISO/IEC IS 11801, exceed the attenuation and NEXT requirements of ANSI/TIA/EIA 568 and ISO/IEC IS 11801 for cabling links/channels, that the installation will exceed the loss and bandwidth requirements of ANSI/TIA/EIA 568 and ISO/IEC IS 11801 for fiber links/channels, for a twenty year period. The warranty shall apply to all passive SCS components.

B. The Extended Product Warranty and the System Assurance shall cover the replacement or repair of defective products and labor for the replacement or repair of such defective products.

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

1.010 DELIVERY AND STORAGE

A. Equipment shall be delivered in original packages with labels intact and identification clearly marked.

B. Equipment shall not be damaged in any way and shall comply with manufacturer's operating specifications.

C. Equipment and components shall be protected from the weather, humidity, temperature variations, dirt, dust, or other contaminants. Equipment damaged prior to system acceptance shall be replaced at no cost to the City.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to SYSTIMAX SCS and other manufacturers as referenced in this document. However, substitutions for Systimax products are not permitted.

2.02 GENERAL

A. Provide all cabling, terminating hardware, adapters, and cross-connecting hardware necessary to interconnect all system equipment including equipment located in the Main Distribution Facility (MDF) and the Intermediate Distribution Facilities (IDFs).

2.03 COPPER CABLE GENERAL REQUIREMENTS

A. Manufacturer Qualifications: ISO 9001 Certified and included in the Underwriters Laboratories LAN Certification and Follow-up Program.

2.04 COPPER HORIZONTAL CABLING

A. Manufacturer: SYSTIMAX SCS XL7– XX71.

B. Manufacturer: SYSTIMAX GigaSPEED X10D– XX91B (unshielded CAT 6A).

C. Manufacturer: SYSTIMAX GigaSPEED X10D– 2291B (shielded CAT 6A).

D. All horizontal cabling shall meet or exceed the ANSI/EIA/TIA-568 Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted Pair Cabling Components.

E. Cables shall be marked as UL verified with a minimum of Category 6 rating.

F. All horizontal cabling shall be color-coded as follows to differentiate between tenant and owner cabling. All voice circuits will be terminated on patch panels. All horizontal cabling will terminate on patch panels. All tenant and specialty circuits will be cross connected to multi-pair cabling as required.
   1. Green – HAS Data. (This applies to all HAS devices needing data cabling)
      a. IP Cameras
      b. Wireless Access Points (APs) – (Requires two CAT 6A unshielded data cables for 802.11ACv2)
      c. Access Control Panels
      d. IP Phones
      e. High resolution video/video extenders – (CAT 6A shielded data cables)
      f. Etc.
   2. Yellow – Tenant Data
   3. Red – Special circuits, including Automated External Defibrillation (AED) Circuits

G. High performance (71 Series) Category 6 UTP, 4 Pair cabling shall be utilized to provide the signal medium from the individual workstation location to the IDF(s) unless denoted otherwise on the drawings. This cabling shall be installed in accordance with the contract drawings and shall adhere to the specifications listed below:
   1. 4 pair UTP
   2. 23 AWG Solid Bare Copper
   3. Cable jacket shall comply with NEC Article 800 for use as a plenum cable and shall be UL and c (UL) Listed Type CMP.
   4. Cable shall terminate on 8 pin modular jack at each outlet.

H. The high performance Category 6 UTP cable shall be of the traditional round design with mylar separator tape between pairs 2/3 and 1/4. The cable shall support Voice, Analog Baseband Video/Audio, Fax, Modem, Switched-56, T-1, ISDN, RS-232, RS-422, RS-485, 10BASE-T Ethernet, Token Ring, 100Mbps TP-PMD, 100BASE-T Ethernet, 155 Mbps ATM, AES/EBU Digital Audio, 270 Mbps Digital Video, 622 Mbps 64-CAP ATM and emerging high-bandwidth applications, including 1 Gbps Ethernet, gigabit ATM, as well as all 77 channels (550 Mhz , single swept margin) of analog broadband video.

I. The high performance Category 6 cables shall meet or exceed the electrical characteristics set by the manufactures specifications.

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

J. The high performance Category 6 cable shall be specified to 550 MHz and shall meet the guaranteed swept margin as set by the manufacture.

K. High performance (91 Series) Category 6A UTP or F/UTP, 4 Pair cabling shall be utilized to provide the signal medium from the individual workstation location to the IDF(s) unless denoted otherwise on the drawings. This cabling shall be installed in accordance with the contract drawings and shall adhere to the specifications listed below:
1. 4 pair UTP
2. 23 AWG Solid Bare Copper
3. Cable jacket shall comply with NEC Article 800 for use as a plenum cable and shall be UL and c (UL) Listed Type CMP.
4. Cable shall terminate on 8 pin modular jack at each outlet.

L. Systimax part numbers for Plenum-rated Horizontal Cabling are as follows:

Product Number	Color	COM code	Qty per Unit
2071E YEL C6 4	Yellow	700210123	W1000
2071E SGR C6 4	Green	700210164	W1000
2071E RED C6 4	Red	700210263	W1000
CAT 6A UTP		**Used for WAPs**	
2091B YEL C6A 4	Yellow	760107276	W1000
2091B GRN C6A 4	Green	760107219	W1000
2091B RED C6A 4	Red	760107243	W1000

2.05 VIDEO COAXIAL CABLE (MATV)

A. Manufacturer: CommScope or approved equivalent.

B. The shielded, plenum RG-11 cable shall be used where the horizontal run is greater then 350 feet or specified in the Contract Drawings.
1. Shall consist of a 14-AWG solid-copper conductor. The cable shall be UL and (UL) Listed for Fire Safety and ISO 9001 Certified.
2. CommScope part number – 2287K WHRL RG11 QD 1000 4103304/10
3. Must use compression type connectors from IDEAL part number:
   a. IDEAL F connector - #89-011

4. The copper cable shall meet or exceed the electrical specifications set by the manufacture.

C. The Quad shielded, plenum RG-6 cable shall be used as horizontal where specified in the Contract Drawings.
   1. Shall consist of an 18-AWG solid-copper conductor. The cable shall be UL and (UL) Listed for Fire Safety and ISO 9001 Certified.
   2. CommScope part number – 2227V WHRL RG6 QD 1000 4112704/10
   3. Must use compression type connectors from IDEAL part number:
      a. IDEAL F connector - RG6-F-XR-RTQ #92-651
      b. IDEAL BNC connector - RG6-INSITE-BNC #89-048(security camera install only)
   4. The copper cable shall meet or exceed the electrical specifications set by the manufacture.

2.06 SECURITY CABLES

A. Manufacturer: CommScope or approved equivalent.

B. RG-6(for analog cameras) cable shall be used as horizontal where specified in the Contract Drawings. This cable supplies both video and power media.
   1. Shall consist of an 18-AWG solid-copper conductor. The cable shall be UL and (UL) Listed for Fire Safety and ISO 9001 Certified.
   2. CommScope part number – 5654
   3. Must use compression type connectors from IDEAL part number:
      a. IDEAL F connector - RG6-F-XR-RTQ #92-651
      b. IDEAL BNC connector - RG6-INSITE-BNC #89-048(security camera install only)
   4. The copper cable shall meet or exceed the electrical specifications set by the manufacture.

C. RG-6(for analog cameras) cable shall be used as horizontal OUTDOOR use where specified in the Contract Drawings.
   1. Shall consist of an 18-AWG solid-copper conductor. The cable shall be UL and (UL) Listed for Fire Safety and ISO 9001 Certified.
   2. CommScope part number – 5720
   3. Must use compression type connectors from IDEAL part number:
      a. IDEAL F connector - RG6-F-XR-RTQ #92-651
      b. IDEAL BNC connector - RG6-INSITE-BNC #89-048(security camera install only)
   4. The copper cable shall meet or exceed the electrical specifications set by the manufacture.

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D. Composite Cables: Cable between controlled portals and IFPs shall consist of multiple conductor bundles affixed together via a central spline. The conductor bundles shall consist of the following:
1. 4C, 18 AWG 16/30 STR, shielded
2. 3P, 22 AWG 7/30 STR, shielded
3. 2C, 22A AWG 7/30 STR, shielded
4. 4C, 22 AWG 7/30 STR, shielded
5. The composite access control cable shall be Honey Well Genesis 3295 or approved equivalent.

E. 4 CONDUCTOR CABLE (for use with dry contact devices including door position switches, duress alarm switches, etc.
1. 4 stranded (7 x28) tinned copper conductors
2. Nominal O.D.: .217”
3. Belden 9444 or approved equivalent

2.07 FIBER PATCH CORDS

A. Manufacturer: SYSTIMAX Solutions ONLY. If required see specification 271300. *(designer to specify the specific connector type for all equipment type for any give project. LC is HAS connector standard. Designer also to provide specific length need for install)*

2.08 COPPER HARDWARE TERMINATION STANDARDS - Real Time Infrastructure Management - Intelligent Patch Panel System

A. All horizontal data cables to terminate on iPatch panel.

B. Systimax Solution iPatch Intelligent Fiber Optic Patching System as follows:

Product Number	**Description**
Fiber Shelves (19 inch rack-mountable) and accessories	
760209940	HD-1U - 1U sliding fiber shelf(holds four modules)
760148502	360-LP-STACK-SPT
760109470	12-LC-LS-AQ-Pigtails
760109496	12-LC-SM-BL-Pigtails
760109504	12-LCA-SM-GR-Pigtails

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

Copper Patch Panels - Cat 6	
760201137	360-iP-1100-E-GS3-1U-24 - 360 iPatch/imVision(enabled) 24 port panel
760201111	360-iP-1100-E-GS3-2U-48 - 360 iPatch/imVision(enabled) 48 port panel
760152561	360-IPR-1100-E-GS3-1U-24 - 360 iPatch/imVision(ready) 24 port panel
760152579	360-IPR-1100-E-GS3-2U-48 - 360 iPatch/imVision(ready) 48 port panel
Copper Patch Panels - Cat 6A	
760152587	360-IPR-1100-E-GS6-1U-24 - 360 iPatch/imVision(ready) 24 port panel
760152595	360-IPR-1100-E-GS6-2U-48 - 360 iPatch/imVision(ready) 48 port panel

C. Modular Patch Cords *(Designer to specify correct length for all patch cords*
   1. Manufacturer: Systimax SCS-GS8E
   2. Provide Category 6, Modular Patch Cords for each installed port designated as “Data” in the Drawings.
   3. All cords shall conform to the requirements of ANSI/TIA/EIA 568 Commercial Building Telecommunications Cabling Standard, Horizontal Cabling Section, and be part of the UL® LAN Certification and Follow-up Program. Cords shall be equipped with an 8 pin modular connector on each end and shall conform to the length(s) specified on the detailed drawing. All Category 6 cordage shall be round, and consist of 23-AWG copper, stranded conductors, tightly twisted into individual pairs and shall meet or exceed the electrical specifications set by the manufacture.

   4. UTP Patch cord lengths will be deployed as follows:

Length	Location/Application
3 ft	MDF, IDF, Computer Room, and Lab
5 ft	MDF, IDF, Computer Room, and Lab
7 ft	MDF, IDF, Computer Room, and Lab
9 ft	MDF, IDF, Computer Room, Office, Cubicle, or Lab
15 ft	Office, Cubicle, or Lab

   5. Copper patch cord part numbers are as follows:

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

CAT 6 patch cords		
Product Number	Length	Material ID
CPC3312 -3ft	3FT	CPC3312-04F003
CPC3312 -5ft	5FT	CPC3312-04F005
CPC3312 -7ft	7FT	CPC3312-04F007
CPC3312 -9ft	9FT	CPC3312-04F009
CPC3312 -15ft	15FT	CPC3312-04F015

NOTE: 15 ft. UTP patch cords shall be used at the workstation only.

CAT 6A UTP patch cords		
Product Number	Length	Material ID
CPCSSX2-3ft	3FT	CPCSSX2-04F003
CPCSSX2-5ft	5FT	CPCSSX2-04F005
CPCSSX2-7ft	7FT	CPCSSX2-04F007
CPCSSX2-9ft	9FT	CPCSSX2-04F009
CPCSSX2-15ft	15FT	CPCSSX2-04F015

D. Hybrid RJ45 to 110 Patch Cords. *Designer to specify correct length for all patch cords)*

1. Manufacturer: Systimax 119P2PS
2. As required provide Category 6, Hybrid Patch Cords for each assigned data/voice port on the patch panel. Cords shall RJ45 connector on one end and 110GS on the other end. Cords shall be provided in appropriate lengths to accommodate all tenant voice or specialty ports as shown in detailed drawings. All Category 6 cordage shall be round, and consist of 24-AWG copper, stranded conductors, tightly twisted into individual pair and shall meet or exceed the Category 5e specifications.
3. Hybrid patch cords shall conform to the TIA 568B wiring scheme.
4. Hybrid patch cords shall be provided for each installed port designated as “Tenant Voice or Specialty jack” in the drawings.
5. Hybrid patch cord single pair part numbers are as follows(last 3 digits designates length): *(Designer to specify correct length for all patch cords)*

Length	Material ID
8FT	CPC8662-03F-008
10FT	CPC8662-03F-010

6. Hybrid patch cord 4 pair part numbers are as follows(last 3 digits designates length): *(Designer to specify correct length for all patch cords)*

Length	Material ID
8FT	CPC8312-03F-008
10FT	CPC8312-03F-010

E. Outlets

1. Manufacturer: Systimax

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

2. Systimax MGS400(CAT 6)/MGS600(CAT 6A) Modular GigaSpeed Information Outlets - 8 position/8 conductor non-keyed modular outlets for applications up 1 Gbps and ANSI/TIA/EIA 568 compliant for Category 6 or 6A transmission requirements and be part of the UL® LAN Certification and Follow-up Program.
3. Outlets shall meet or exceed the following electrical and mechanical specifications set by the manufacture.
4. Standard installations shall utilize orange outlets for data. Dust Cover/Blanks shall match faceplate cover.
5. All IMO's (Interactive Media Outlet) shall have at a minimum 4-data ports at each location unless otherwise specified by the contract documents.
6. Systimax Modular GigaSpeed Information Outlets part numbers are as follows:

Product Numbering	# per pack	Color	COM code
MGS400-112	1	Orange	700 206 683
MGS600-112	1	Orange	760 092 379

7. Systimax M-Series Modular Faceplates designed for use with M-Series Modular Information Outlets:

Product Numbering	# of ports	# per pack	Color	COM code
M10L-262	1	1	White	108 258 427
M10LW-262	1 (wall)	1	White	108 258 468
M12L-262	2	1	White	108 168 469
M14L-262	4	1	White	108 168 543

8. Systimax M-Series Modular Surface Mount Box designed for use with one to four M-Series Modular Information Outlets. May be mounted on a flat surface with screws, Box color shall match wall/furniture surface color:

Product Numbering	# of ports	# per pack	Color	COM code
M104SMB-262	4	1	White	107 952 459
M104SMB-270	4	1	Gray	107 952 467

2.09 IDENTIFIERS, LABELS AND LABELING SYSTEM

A. All Identification and Labeling shall follow Specification: 270553–Identification and Labeling of Communication Infrastructure. **Any deviation from the specification must be approved by HAS IT prior to installation.**

1.1 CABLE MANAGEMENT

1.A.1. Horizontal Manager

1.A.1.1. Manufacturer: CPI – 30130-719

1.A.2. Fiber patch cords

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

1.A.2.1. Manufacturer: Panduit – Fiber runner(Applies to all new or to expand existing BDF/MDF/Computer room build outs)

2.11 VIDEO APPLICATIONS SHIELDED TWISTED PAIR SOLUTION

A. Shielded Cable

1. CommScope Shielded Cable, F/UTP Plenum Rated Category 6A, Black Jacket, 1000ft Length

Product Numbering	# per pack	Color	COM code
2291B BK 4/23 R1000 2291B GRN 4/23 R1000	1000ft	Black Green	760171025 760122663

B. Shielded Outlets

1. CommScope Shielded Outlet, Category 6A, F/UTP

Product Numbering	# per pack	Color	COM code
HGS620	1	Silver (F/UTP)	760152801

* If the HGS620 information outlet is to be used at WAO, the depth of any backboxes must be increased.

C. Shielded Patch Panels

1. CommScope Shielded Panel, 1U, 24 Port, F/UTP Flat. imVision / iPatch system preinstalled, ships with 24 shielded outlets

Copper Patch Panels - Cat 6A -Shielded	
760150144	360-IPR-MFTP-E-HD6B-1U-24 – 360 Modular 24 port panel
760151498	360-IPR-MFTP-E-HD6B-1U-48 – 360 Modular 48 port panel

D. High Density M-Series Adapter

1. Systimax High Density M-Series Adapter - White

Product Numbering	# per pack	Color	COM code
HGS-A-MS-WHITE	1	White	760154187

E. Shielded Patch Cords

1. CommScope Shielded Patch Cords, F/UTP, Black Jacket, RJ45-RJ45, 7ft

Product Numbering	# per pack	Color	COM code
PCOSP-6AS-BK-07FT (OSP) G10FP-GR-7FT	1	Black Green	CO11192-01F007 CPCZZK1-01F007

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify raceways, boxes, hand holes and maintenance holes are properly installed following Sections 270528, and 270543.

B. All communication media must be installed in conduit or cable tray unless an alternate method has been approved by HAS/IT.

C. Verify horizontal conduit is minimum 1-inch diameter.

D. Verify backboards are properly installed.

E. Verify telecommunications grounding system is properly installed and tested following Section 270526.

F. Verify liquid-carrying pipes are not installed in or above any IDF/MDF that has active electronic equipment. Do not proceed with installation in affected areas until removed.

3.02 PREPARATION

A. Environmental controlled communication rooms shall maintain temperature of between 64 degrees Fahrenheit and 78 degrees F and between 30 and 55 percent humidity in areas of active electronic system work.

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

B. Cable Splicing: Exact cable routing, splice enclosure locations, distances, elevations, work space and purpose of splice will be governed by actual field conditions. Contractor shall perform field surveys prior to submitting layout drawings.

C. Contractor's on-site RCDD supervisor shall review, approve and stamp all shop drawings, coordination drawings and record drawings.

3.03 INSTALLATION

A. Install work following drawings, manufacturer's instructions and approved submittal data. The number of cables per run, outlet configuration and other pertinent data are included on the drawings.

B. All installation shall be done in conformance with ANSI/TIA/EIA 568 standards, BICSI methods, Industry standards and SYSTIMAX SCS installation guidelines. The Contractor shall ensure that the maximum pulling tensions of the specified distribution cables are not exceeded and cable bends maintain the proper radius during the placement of the facilities. Failure to follow the appropriate guidelines shall require the Contractor to provide in a timely fashion the additional material and labor necessary to properly rectify the situation. This shall also apply to any and all damages sustained to the cables by the Contractor during the implementation.

C. The SCS installation shall comply with all applicable national and local codes pertaining to low voltage cable system installations.

D. The contractor shall adhere to the installation schedule of the general contractor and shall attend all construction meetings scheduled by the general contractor.

E. Upon structural completion of the communications room(s) and prior to the installation of any communications equipment or supporting devices inside the room, the HAS IT Representative shall consult the Communications Designer in order to:
   1. Perform construction administration activities to compare as-built configuration to the design.
   2. Observe all "not-to-design" compliance issues and issue corrective advisement of actions.
   3. Upon completion of 1 and 2 above, the Communications Designer shall mark with masking tape the general layout of the equipment placement.

F. All communications conduits shall be identified with color coded orange tape marked "Communications" every 50 feet. Tag conduit termination points (to include J-box locations) with the origination, destination and device name (if applicable) location.

G. Vertical Cabinet Installation
   1. All Cabinets shall be properly positioned, leveled, ganged, anchored, grounded and powered.

2. All Cabinets shall be populated as noted in drawings with termination hardware, equipment, proper patch cord lengths, and power outlets.
3. Install and anchor all vertical equipment cabinets to floor following the Drawings and manufacturer's instructions.
4. All cabinets shall be properly ganged in each bay as shown in the Drawings.
5. All cabinet doors shall be configured as shown in the Drawings.
6. All cabinets shall be properly labeled per specification 270553.
7. After final acceptance of the cabinets, coordinate with Owner to replace key/lock with silver barrel on front and back doors.

H. The contractor shall perform all required cross connections of the horizontal cable runs to the backbone cable system. The equipment connections to the data systems shall be performed by the vendors installing and/or maintaining those systems.

I. The contractor is responsible for providing a CD with all the cable/patch panel information in the same format that will be accepted for download in HAS's iPatch/imVision database **1 month** before any patching is completed.

J. The contractor is responsible and must perform the following task associated with the iPatch system:
1. Provide fiber cut sheet depicting fiber port to port or port to equipment connectivity.
2. Label all new devices including the iPatch/imVision Network Manager according to HAS labeling specs.
3. Label all components according to HAS labeling specs.
4. Provide floor plans depicting rooms lay out and outlet locations.
5. Data cabling contractor is to provide and install an iPatch/imVision 48 port copper patch panel for all new network switches/blades that are related to the project. Provide solid conductor patch cables with RJ-45 on one end and terminate the other end on the patch panel. Patch port 1 of the patch panel to port 1 on the switch until all ports on the switch are connected to the patch panel matching the port numbers.

K. The contractor shall provide service loops (slack) for cables terminating in the IDFs. A 6-foot service loop shall be provided above the access ceiling or cable trays unless specified otherwise. This allows for future changes or expansion without installing new cables.

L. The installation contractor shall be responsible for coordination, testing and problem resolution with the system vendors.

M. City inspector or their designated representative shall randomly perform unannounced, on-site reviews during the installation. In addition, this person shall perform a final inspection and a complete review of the test results before the installation is accepted.

N. Upon completion of the installation, Contractor shall prepare as-built documentation of the entire SCS. This documentation shall include:
   1. As-Built Drawings
      a. All drawings shall be provided on disk in a form compatible with AutoCAD Version 14. A complete set of project plans will be provided by the Contractor on CD.
      b. A complete diagram of all terminations in the IDFs.
      c. A complete diagram of all copper, fiber, and coax riser cable.
      d. A complete diagram of all copper, fiber, and coax inter-building cable.
      e. Floor plans showing exact cable routings with each outlet clearly marked with cable number.
      f. A complete diagram of all cable tray, conduits and conduit sleeves.
   2. Documentation
      a. All cable inventory data documentation shall be submitted in designated as specified in specification 270553
      b. Documentation on horizontal cable shall include cable number and length of cable.
      c. Complete cross connect documentation is required. This information will include detailed documentation of all four pairs of each horizontal cable and every pair of all copper riser and inter-building cable and every fiber of fiber optic cable.
   3. As-built Drawings and Documentation shall be reviewed, approved and stamped by Contractor's on-site RCDD.

3.04 POST-INSTALLATION TESTING AND CERTIFICATION

A. Contractor Requirements
   1. Contractor shall provide sufficient skilled labor to complete testing within a reasonable test period.
   2. Contractor shall have a minimum of three years of experience installing and testing structured cabling systems. All installers assigned by the Contractor to the installation shall be certified by the factory to install and test the provided products.
   3. Contractor is responsible for supplying all of the required test equipment used to conduct acceptance tests.
   4. Contractor is responsible for submitting acceptance documentation as defined in 3.04.D below. No cabling installation is considered complete until test results have been completed, submitted and approved as defined in 3.04.D below.
   5. Contractor to insure that the database information for iPatch meets the HAS requirements.

B. Test Procedure
   1. HAS IT Representative reserves the right to be present during any or all testing. Notify HAS IT Representative at least 48 hours prior to beginning test procedures.
   2. Testing shall be of the Permanent Link. However, Contractor shall warrant performance based on Channel performance and provide patch cords that meet channel performance.

3. All cabling not tested strictly in accordance with these procedures shall be re-tested at no additional cost to the Owner.
4. Testing of all copper and fiber wiring shall be performed prior to system(s) cutover.
5. 100% of the installed cabling shall be tested. All tests shall pass acceptance criteria defined in 3.05 below.
6. Cable testing shall be performed by a fully charged tester, and the charging unit shall be disconnected during testing.
7. Any pairs not meeting the requirements of the standard shall be brought into compliance by the contractor at no charge to the City. Complete end-to-end test results shall be submitted to the City.

C. Standards Compliance and Test Requirements
1. Copper Cabling shall meet the indicated performance specifications:
   a. Category 6 Horizontal Cabling shall be tested to the manufactures specification for Category 6 Cabling and SYSTIMAX SCS GigaSpeed System.
2. All test equipment used shall meet the performance specifications defined in 3.04.

D. Cable Test Documentation
1. Test reports shall be submitted in hardcopy and electronic format and certified by the contractor's RCDD to be a complete and accurate record of cabling installed. Hand-written test reports are not acceptable.
2. Hardcopy reports are to be submitted in labeled three-ring binders with an attached affidavit verifying passing execution of all tests. Hardcopy summary reports shall contain the following information on each row of the report: circuit ID, test specification used, cable length, date of test, and pass/fail result.
3. Electronic reports shall be submitted on CD in PDF format. Electronic reports shall be accompanied by a Certificate signed by an authorized representative of the Contractor warranting the truth and accuracy of the electronic report. Certificate shall reference traceable circuit numbers that match the electronic record.
4. Hardcopy and electronic reports for each cable route shall be submitted together in one submittal. The submittal description shall include the type of test performed, type of cable, and cable ID (including originating and terminating room numbers) of cable tested. Partial or unclear documentation will be returned without reviewing.
5. Test reports shall include the following information for each cabling element tested:
   a. Wiremap results that indicate that 100% of the cabling has been tested for shorts, opens, miswires, splits, polarity reversals, transpositions, presence of AC voltage and end-to-end connectivity.
   b. For Category 6 cabling: Attenuation, NEXT, PSNEXT, Return Loss, ELFEXT, and PSELFEXT data that indicate the worst case result, the frequency at which it occurs, the limit at that point, and the margin. These tests shall be performed in a swept frequency manner from 1 MHz to highest relevant frequency, using a swept frequency interval that is consistent with TIA and ISO requirements. Information

shall be provided for all pairs or pair combinations and in both directions when required by the appropriate standards. Any individual test that fails the relevant performance specification shall be marked as a FAIL. Test shall also include mutual capacitance and characteristic impedance.

c. Length (in feet), propagation delay, and delay skew relative to the relevant limit. Any individual test that fails the relevant performance specification shall be marked as a FAIL.
d. Cable manufacturer, cable model number/type, and NVP
e. Tester manufacturer, model, serial number, hardware version, and software version
f. Circuit ID number and project name
g. Autotest specification used
h. Overall pass/fail indication
i. Date of test

6. Test reports shall be submitted within seven business days of testing.

E. Test Equipment

1. Test equipment used under this contract shall be from manufacturers that have a minimum of 5 years of experience in producing field test equipment. Manufacturers shall be ISO 9001 certified.
   a. Category 6 – At minimum a Level III tester or submitted and owner-approved equivalent.
   b. Refer to spec section 27 13 00 for fiber testing procedures.
2. All test tools of a given type shall be from the same manufacturer, and have compatible electronic results output.
3. Test adapter cables shall be approved by the manufacturer of the test equipment. Adapters from other sources are not acceptable.
4. Baseline accuracy of the test equipment shall exceed TIA Level III, as indicated by independent laboratory testing.
5. Test equipment shall be capable of certifying Category 6 links.
6. Test equipment shall have a dynamic range of at least 100 dB to minimize measurement uncertainty.
7. Test equipment shall be capable of storing full frequency sweep data for all tests and printing color graphical reports for all swept measurements.
8. Test equipment shall include S-Band time domain diagnostics for NEXT and return loss (TDNXT and TDRL) for accurate and efficient troubleshooting.
9. Test equipment shall be capable of running individual NEXT, return loss, etc measurements in addition to autotests. Individual tests increase productivity when diagnosing faults.
10. Test equipment shall include a library of cable types, sorted by major manufacturer.
11. Test equipment shall store at least 250 Category 6 autotests (in full graphic format) in internal memory, with the option for additional storage card via expansion slot.

12. Test equipment shall be able to internally group autotests and cables in project folders for good records management.
13. Test equipment shall include DSP technology for support of advanced measurements.
14. Test equipment shall make swept frequency measurements in compliance with TIA standards.
15. The measurement reference plane of the test equipment shall start immediately at the output of the test equipment interface connector. There shall not be a time domain dead zone of any distance that excludes any part of the link from the measurement.

3.05 ACCEPTANCE

A. Once all work has been completed, test documentation has been submitted and approved, and HAS IT Representative is satisfied that all work is in accordance with contract documents, the HAS IT Representative will notify Contractor in writing of formal acceptance of the system.

B. Acceptance Requirements
1. Contractor's RCDD shall warrant in writing that 100% of the installation meets the requirements specified under 3.04. "Standards Compliance & Test Requirements" above.
2. HAS IT Representative reserves the right to conduct, using Contractor equipment and labor, a random re-test of up to five percent of the cable plant to confirm documented results. Random re-testing, if performed, shall be at the expense of the City, using standard labor rates. Any failing cabling shall be re-tested and restored to a passing condition at no cost to the City. In the event more than two percent of the cable plant fails during re-test, the entire cable plant shall be re-tested and restored to a passing condition at no additional cost to the Owner.
3. HAS IT Representative may agree to allow certain cabling runs to exceed standardized performance criteria (e.g. length). In this event, such runs shall be explicitly identified and excluded from requirements to pass standardized tests.
4. Acceptance shall be subject to completion of all work, successful post-installation testing which yields 100% PASS rating, and submittal and approval of full documentation as described in 3.04.
5. See Appendix A & B. Acceptance requirements are not limited to these sheets

3.06 DEMOLITION

A. The contractor shall be responsible for maintaining all communications service to areas of the building scheduled to remain in service during the period of renovation.

B. Notify HAS Information Technology (IT) department 30 days prior to the start of demolition work taking place in existing communications rooms. Coordinate removal of equipment and cabling within existing communications rooms with HAS IT.

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

C. Where removal is indicated in Drawings, remove communications cable from termination point back to originating communications room, MDF or tenant communications room. Coordinate removal at terminating blocks and panels with HAS IT. Coordinate removal of cross-connects and patch cables with HAS IT.

D. Ensure systems and circuits are no longer active before removing and prior to the demolition of existing communications rooms. If active circuits exist at time of scheduled demolition, coordinate with HAS IT Representative to reroute or deactivate circuit(s).

E. Demolition and removal of cabling shall not impact the operation of active systems.

F. Unless otherwise noted, discard all removed cable, patch cables and cross-connects. Except where re-routing of cable is specified in Drawings or by Designer, do not reuse cable.

G. Remove all loose unterminated cabling to source found above ceiling, under floor or in wall.

H. Demo all abandoned cable in accordance with NEC 800.25.

3.07 CLEANING

A. Remove all unnecessary tools and equipment, unused materials, packing materials, and debris from each area where Work has been completed unless designated for storage.

END OF SECTION

APPENDIX A

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

MDF/IDF Check List

This list is intended as a minimum checklist. CM should ensure that the contractor's schedule has built in these components and the necessary buffer period – and associated access restrictions to the communications equipment rooms -- for HAS IT and tenant IT to prepare.

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

1. All communication rooms that will service the area to be opened must be completed. That means a final walkthrough of these areas has been completed. It is not necessary that the entire project achieve substantial completion, but IT cannot install equipment and begin work until the following minimum criteria is met:
    a. Space is built out and clean – free from dust/residues.
    b. Electrical w/UPS as required.
    c. All racks/cabinets installed and mounted. Padlocks eyes have been installed.
    d. Grounding bus bar installed and properly tied to main grounding bus bar in MDF
    e. HVAC functioning properly and is adequately filtering dust. Humidity is controlled.
    f. Door access control is installed (card reader) -or- an approved temporary provision. Simple key access is not permissible.
    g. Lighting is installed and operational.
    h. Cable trays/ladder racks installed and ready to use.
    i. Permanent or temporary signage identifying permanent room number.

2. All cabling necessary to operate the areas to be opened is completed.
    a. Backbone cabling (copper and fiber) from the applicable communication room(s) is installed, tested, labeled, and approved by the inspector and communications design consultant.
    b. Horizontal cabling for all areas to be occupied is installed, tested, labeled, and approved by the inspector and communications design consultant.
    c. Copper cross connects and/or fiber jumpers have been installed per the owner/tenant requirements.
    d. Cable records and redline drawings for installed cables are submitted and approved PRIOR to putting any active circuits on the new cables. Cable records reflect all installed cables **and** any cross connects or jumper assignments installed by the contractor.
    e. All iPatch Panels are programmed and operational.
    f. All jumpers and patch cords specified by the contract are transmitted to the owner for use.
    g. NOTE: cable labels and permanent room numbers need to match. CM needs to be sure to get design team, airport, IT, and CM / contractor reps together to review permanent room numbers prior to contractor installing cable labels.

3. Move-in buffer period needs to be minimum 6 **weeks** for HAS-IT to install/extend services within the area to be occupied prior to occupation of the facility or spaces. Additional time may be necessary if Tenant IT organization is involved, or if contractor has other systems that must be configured/tested which require HAS-IT resources (i.e. cabling or data network connections). This is frequently the case for PA System, television, radio, Fire Alarm, pay telephone, EFSO (Electronic Fuel Shutoff), access control & CCTV, etc.

4. Once HAS-IT accepts a communications equipment room and begins to install/configure equipment in preparation for hosting live applications, this room becomes a restricted area with access to be controlled by HAS-IT. Contractors must be substantially complete with systems inside the communications equipment room so that access is generally not required. Minor punch list and scheduled testing with escort can be arranged, but access will be very limited.

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

5. Other IT-related systems that must be operational, tested, and accepted or approved temporary provisions.
    a. PA System
    b. MATV and/or CNN TV (where applicable)
    c. Fire Alarm
    d. MUFIDS
    e. Pay Telephones (where applicable)
    f. EFSO (where applicable)
    g. Access Control & CCTV (note: must be PROGRAMMED, and approved acceptance test walk through by HAS)
    h. Crash phone (where applicable)
    i. Radio system enhancements (where applicable)
    j. Data Network switch installed and configured.

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

APPENDIX B

(NOTE TO DESIGNER/SPECIFIER: These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer.)

IDF Number:		**Date:**		
Grounding & Bonding:		**YES**	**NO**	**COMMENTS**
	TGB properly installed			
	Proper grounding conductor installed (6AWG min.)			
	Cable trays properly bonded			
	Equipment Racks, Armored Cables & Cabinets properly bonded			
	Conduit properly bonded			
	Cabling properly bonded			
	Splice Cases properly bonded			
Horizontal Cabling:		**YES**	**NO**	**COMMENTS**
	Routing			
	Cables properly supported			
	Pull tensions properly recorded			
	Sheath damage			
	Bend radius observed			
	Pair twist meets spec			
	Proper termination scheme			
	Cable/jack part number meets spec			
	Plenum vs. PVC			
	Properly dressed in tray			
	Properly dressed in cable management			

(NOTE TO DESIGNER/SPECIFIER: These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer.)

	Cables bundled properly			
	Appropriate clearances observed (power)			
	Minimum about of cable exposed at termination			
Backbone Cabling:		**YES**	**NO**	**COMMENTS**
	Fiber strain relief properly applied			
	Routing			
	Cables properly supported			
	Pull tensions properly recorded			
	Sheath damage			
	Bend radius observed			
	Properly dressed in tray			
	Fiber installed in inner duct			
	Properly dressed in termination shelf			
	Any splice cases properly supported			
Room Layout:		**YES**	**NO**	**COMMENTS**
	Room laid out according to project drawings			
	Proper clearances maintained			
	Is the room clean & neat in appearance			
	Liquid carrying pipes within the room			
Pathways:		**YES**	**NO**	**COMMENTS**
	Conduit properly routed & supported			
	Cable Tray properly routed & supported			
	Inner Duct used to route fiber and properly supported			

(NOTE TO DESIGNER/SPECIFIER: These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer.)

Labeling:		**YES**	**NO**	**COMMENTS**
	Grounding conductor			
	End-to-End labeling			
	Pair Count on Splice Case			
	Horizontal Cabling			
	Fiber Optic Cabling			
Other:		**YES**	**NO**	**COMMENTS**
	Appropriate fire stop material in place			
	Cabling test results submitted with proper information			
	Climate controlled environment (Temp. & Humidity)			
	Is the room access controlled			
Copper Cabling:				
	Total Pairs (Riser)			
	Pair Counts			
	Termination Type (66, 110, Protectors..)			
	Termination Location			
Fiber Optic Cabling:				
Single Mode:				
	Total Strands			
	Termination Type (LC, SC)			
	Termination Location			

GUIDELINES

HAS/PDC/Design Division
Houston, Texas

Project Title
Proj./CIP No.

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HORIZONTAL MEDIA INFRASTRUCTURE
271500 - 31

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