

## SECTION 270100 - COMMON WORK RESULTS FOR TECHNOLOGY AND COMMUNICATIONS

## PART 1 - GENERAL

## 1.1 SUMMARY

## A. Section Includes

1. This section contains the general requirements that shall be required of any/all Contractors bidding and/or executing any part or parts of these Documents.

## B. General Requirements

1. Drawings and Specifications are to be considered as supplementing each other. Work specified but not shown, or shown but not specified, shall be performed or furnished as though mentioned in both the Specifications and the Drawings.
2. The Contractor shall provide all Technology Systems and Cabling Infrastructure as indicated in the Documents. Should there be any requirements for further subdivision of scope of work, such subdivisions shall be indicated by either notated clarification or schedule on the Drawings.
3. The Contractor shall coordinate with all other trades to assure the execution of these Documents and their intent. Any equipment or devices either not installed, or installed in a fashion other than that indicated by the intent of these Documents, shall be Provided or re-worked so as to become compliant with the intent of these Documents. The financial responsibility for such additional Work or Materials shall be borne solely by the Contractor.
4. The Contractor shall provide all Work required to deliver to the Owner all systems and/or infrastructure, complete and functional, as indicated in these Documents.
5. All Drawings and Specifications shall be considered as complementary to each other. The Contractor shall provide all cabling, equipment, devices, etc. required to fulfill the intent of the design. Items specified, but not drawn, or drawn but not specified shall be considered as being provided as if they had been explicitly called out in both.

## C. Trade Coordination

1. Coordination with all other trades/sub-contractors shall be provided to the maximum extent required to assure compliance with the complete design intent of the entire design team. Coordination drawings are required of the Prime HVAC contractor. Any/all sub-contractors and sub-subcontractors shall provide all required resources and assistance as may be required to facilitate accurate coordination and coordination drawings. Such efforts and resources on the part of the Division 27 and Division 28 Contractors, Sub-contractors and Sub-sub-contractors shall be deemed within the base scope and shall be provided at no additional cost to the Owner, or Owner's Representatives. Refer to coordination

requirements as required under the Mechanical, Electrical and General Trades Specifications.

D. Products Supplied but not installed by the Contractor

1. The Contractor shall coordinate the delivery of items that must be installed by other trades so as to assure timely delivery.
2. The Contractor shall verify lead times of all items required under this heading. Should the delivery of such items be delayed due to the Contractor's efforts, or lack thereof, the Contractor shall bear the burden of compensation to all related trades and for any expedited handling, so as to regain any loss incurred by the project schedule.

E. Products Installed but not Supplied by the Contractor

1. It shall be incumbent upon the Contractor to verify the exact requirements of any system, device, equipment, or Materials supplied to them for installation by others. Any deviations between the Contract Documents and these requirements shall be brought to the immediate attention of the Engineer, and to the other trades as necessary.

F. Devices, equipment, or other infrastructure installed by other contractors in support of this Contractor's efforts

1. It shall be the responsibility of this Contractor, and sub-Contractors and sub-sub-Contractors to coordinate with the other contractors on the project who shall be providing items such as rough in box and conduit to facilitate this Contractor's systems and device to verify the appropriateness and location of these items.
2. This Contractor shall provide any necessary guidance as to the correctness of the information being used by these other contractors. Any item(s) either being provided out of Specification, in the wrong location, or inappropriate for the application shall be:
  - a. intervened upon immediately,
  - b. communicated to the CM/GC for resolution in writing,
  - c. communicated to the Engineer for resolution.
3. Should the Contractor fail to coordinate, intervene and communicate the issue(s) to the aforementioned parties, it shall be the responsibility of this Contractor to correct such issues at the sole burden of this Contractor.
4. Note: It is understood that this Contractor cannot and shall not be held accountable for items of this nature, prior to this Contractor's authorized involvement in this project.

1.2 RELATED SECTIONS

- A. Section 270200 – Communications Demolition
- B. Section 270524 – Communications Firestopping
- C. Section 270526 – Grounding and Bonding for Communications Systems

- D. Section 270528 – Pathways for Communications Systems
- E. Section 271100 – Communications Equipment Rooms Fittings
- F. Section 271323 – Communications Optical Fiber Backbone Cabling
- G. Section 271513 – Communications Copper Horizontal Cabling
- H. Section 275113 – Public Address Systems
- I. Section 275123 – Intercom Systems
- J. Section 275313 – Wireless GPS Clock Systems
- K. Section 280513 – Conductors and Cables for Electronic Safety and Security
- L. Section 281300 – Access Control System
- M. Section 281600 – Intrusion Detection System
- N. Section 282300 – Video Surveillance
- O. Division 1 – General Requirements
- P. Division 2 – Earthwork
- Q. Division 7 – Firestopping
- R. Division 9 – Finish Painting
- S. Division 11 – Equipment
- T. Division 14 – Conveying Systems
- U. Division 25 – Mechanical
- V. Division 26 – Electrical

### 1.3 REFERENCES

- A. The provisions of these specifications along with all Drawings, Alternates, Addenda, Bulletins, RFP's, or other related documents shall be considered an integral part of the scope of work for this/these Contractor(s). These Documents along with the Division 1 and other related division's documentation shall be examined by this Contractor and any/all sub-contractors prior to submission of their bid.

### 1.4 DEFINITIONS

- A. The Definitions contained within shall be the basis of the definitions required for this Scope of Work. Additional definitions shall be found in any given Specification Section that pertains to that Specification Section.

## B. Definitions:

1. Acceptance – The term “Acceptance” shall mean the Owner’s notification to the Contractor that the work, as defined herein, has been Furnished and Installed in accordance with the Contract Documents. Furthermore, the Contractor has completed, documented, and submitted all requisite documentation both to the Owner and any other required Company or Organization to achieve all warranties, certifications, or other related documents.
2. Construction Manager (CM) – The term “Construction Manager” shall mean the company, including staff, responsible for the construction and commissioning of the new and/or renovated building(s) as defined within the scope of this project.
3. Contract Documents – The term “Contract Documents” shall mean all Drawings, Specifications or other related documents representing the scope of the project. Such Documents shall include, but not be limited to, sketches, addenda, change orders, proposal requests and architectural supplemental instructions released under the scope of this project.
4. Contractor – The term “Contractor” shall refer to the Technology Contractor and shall include all of the Technology Contractor’s sub-contractors, and their sub-contractors. The term Contractor shall indicate the Electrical Contractor for those items that are described as being furnished and/or installed by the Electrical Contractor in the “Scope Clarifications” on the Drawings.
5. Drawings – All graphic and/or pictorial portions of the Contract Documents which are used to represent the design and scope of the project. These include, but are not limited to, plans, details, sections, elevations, diagrams, and schematics
6. Electrical Contractor (EC) – The term “Electrical Contractor” shall mean the contractor or contractors responsible for providing the scope of work described in the electrical drawings and specifications.
7. Furnish – The term “Furnish” shall mean to supply and deliver to the project job site, ready for unloading, unpacking, assembly, installation, and other related work.
8. Install – The term “Install” shall mean all work related to the unloading, unpacking, placing, anchoring, bracing, cabling and other related work.
9. Low Voltage Equipment Room (LVER) – The term “Low Voltage Equipment Room” shall mean the space containing the equipment and enclosures supporting those low voltage systems not accounted for in the telecommunications system. In some cases, the LVER may be co-located with the Telecommunications Room.
10. Materials – The term “Materials” shall mean all products, supplies, and components, provided by the Contractor to be incorporated into work as described within these Documents.
11. Owner – The term “Owner” shall mean the company or organization for whom the work is being performed and shall include any/all duly appointed representatives of the company or organization.

12. Project Manager – The term “Project Manager” shall mean the person from either the Owner or Contractor who shall be the sole point of contact.
13. Provide – The term “Provide” shall mean to furnish and install.
14. Specifications – The term “Specifications” shall mean that portion of the Contract Documents that consists of the written requirements for all Materials, equipment, systems, installation standards, means and methods for the Work whose scope is defined herein.
15. Sub-Contractor – The term “Subcontractor” shall mean any person, persons, organization or companies providing the Contractor with any portion of the Work required by the Scope of these Documents.
16. Telecommunications Room (TR) – The term “Telecommunications Room” shall mean the space containing the equipment and enclosures supporting the Telecommunications Systems. In some cases, the Telecommunications Room may be co-located with the Low Voltage Equipment Room.
17. Technology Contractor – The term “Technology Contractor” shall mean the Contractor responsible for providing the Work required to provide the entire scope of work described in these Contract Documents. Such scope does not include those portions of the Work that is indicated within these Documents as being provided by the Electrical Contractor.
18. Work – the term “Work” shall mean all contractual obligations including, but not limited to, Project Management, Materials, labor, equipment, testing and documentation required by these Documents. Such obligations may include all or any part of the scope described herein.

## 1.5 ACTION SUBMITTALS

### A. General:

1. It is the assumption of the Engineer that items not provided with any given submission shall be submitted in a later time. Until such time as missing or incomplete submission is otherwise resolved, any/all related materials shall be considered as Not Approved.
2. Any indication of items not required on the submission shall be construed as being done as a convenience of the Contractor and shall not act as a modification to the Design Intent.
3. Any variations or deviations from the Specifications and Drawings, unless approved in writing by the Engineer, is the sole responsibility of the Contractor. The Contractor shall clearly indicate all variations or deviations on any/all submissions. The Contractor shall further notify the Engineer of the variation or deviation in writing at the time of the submission.
4. The Contractor, by virtue of these specifications, understands and acknowledges that any changes that might occur during the any of the submittal phases shall not be construed to be a change order, and does not authorize the Contractor to pursue additional compensation. The submittals shall be used to express the understanding of the scope of the contract to the Engineer.

5. The Contractor shall refer to the other Specification Sections within this Document for additional requirements with regard to submittals and submittal processes. The Contractor shall fully comply with those requirements. Should any requirement listed in any subsequent section be in conflict with these requirements, the Contractor shall notify the Engineer in writing within the RFI window providing as much time as possible for an accurate response. Should the Contractor fail to provide such notification, the Owner/Engineer reserves the right to require either or both of the submission requirements to be met.

B. Product Data:

1. As required.
2. Refer to each Division 27 and/or 28 Specification Section for system specific requirements.
3. Product data sheets shall be reviewed for general compliance with the Contract Documents, not for dimension accuracy, quantities, etc. Once the submittals have been approved and returned to the Contractor, they shall be used for procurement of the Materials required. It is the responsibility of the Contractor to assure accurate procurement. Submittal review shall not be used to alleviate the Contractor from responsibility for errors and omissions during the procurement of these Materials.
4. Product information that is required under the various sections of these Documents shall include all pertinent data required to ascertain acceptability of the product. This information shall include, but is not limited to, exact dimensions, color, model number, and performance criteria.
5. Product data sheet utilized containing multiple products shall clearly delineate the product information to be reviewed.
6. Separate product data sheets shall be used for each product submission. Use of a single product data sheet for more than one product is not acceptable.
7. All product information shall bear the Contractor's approval stamp.
8. Any submission not bearing the approval stamp of the Contractor, or not being clearly indicative or containing multiple products on a single product data sheet shall be returned without processing.
9. Contractor is advised NOT to proceed with procurement or installation without reviewed and approved Product Data Submittals. Should the Contractor proceed, Contractor acknowledges that they do so at their own risk. Furthermore, Contractor may be required to remove, replace and/or rework entirety with no additional compensation.

C. Shop Drawings:

1. Reviewed and stamped by Project Manager.
2. All Shop Drawings shall bear the Contractor's approval stamp. Any submission not bearing the approval stamp of the Contractor shall be returned without processing.

3. Refer to each Division 27 and/or 28 Specification Section for system specific requirements.
4. Include all system schematic, interconnect or other wiring diagrams complete.
5. Include any/all custom fabricated devices, equipment, cable harnesses, etc. with complete dimensions, finish information, cabling and connectivity, etc.
6. Include any proprietary or custom installation requirements for review. Such submissions are for review only, and do not require approval by the Engineer as it is a specific requirement of these specifications that all Materials, equipment and devices be installed per the manufacturer's suggested installation procedures.
7. Where appropriate, all Shop Drawings shall be drawn to scale with all scale information clearly indicated on the submission.
8. Shop Drawings shall be reviewed for general compliance with the Contract Documents, not for accuracy of design or quantity of device. Once the submittals have been approved and returned to the Contractor, they shall be used for installation. It is the responsibility of the Contractor to assure accurate and complete design. Submittal review shall not be used to alleviate the Contractor from responsibility for errors and omissions during the design or installation of the Scope of Work.
9. All Shop Drawings shall contain a complete title block with clear indication of system(s) represented and Contractor providing submission.
10. Contractor is advised NOT to proceed with procurement or installation without reviewed and approved Shop Drawing Submittals. Should the Contractor proceed, Contractor acknowledges that they do so at their own risk. Furthermore, Contractor may be required to remove, replace and/or rework entirety with no additional compensation.

D. Samples and Mockups:

1. As required.
2. Refer to each Division 27 and/or 28 Specification Section for system specific requirements.
3. The Owner/Engineer reserves the right to require samples of any/all Materials for the purpose of clearly determining acceptability of same. The Engineer shall be free to perform any test destructive or otherwise on any/all Materials submitted.
4. Samples, where not custom assemblies, shall be off the shelf product obtained from distribution, the source of which may be randomly selected by the Engineer. No product shall come directly from manufacturing without the express written consent of the Engineer.
5. Mockups shall be constructed in the field under actual field conditions, unless explicitly required otherwise by the Engineer in writing. Such mockups shall be made available to the Engineer for review and comment either in the field or at the Engineer's office, at the Engineer's discretion. Such comments shall be utilized to review and potentially modify the design as necessary, prior to installation.

6. Submit all samples required in a timely fashion, based on request from Engineer, or as specified herein. All samples must be submitted prior to installation, unless specifically authorized in writing. The Contractor shall provide the sample with sufficient time for examination and review without impacting the production schedule.
7. All samples submitted to the Engineer for review and/or approval shall become the property of the Engineer without the expectation of return. Should a cost be associated with a sample, it shall be the responsibility of the Contractor to bear the cost. At the conclusion of said examination and review the Engineer reserves the right to discard or keep any sample or return the sample to the Contractor for disposal.

## 1.6 QUALITY ASSURANCE

### A. Project Management

1. The Prime Contractor for this Division shall provide a Project Manager who, in addition to the requirements listed elsewhere in these Documents shall possess a current RCDD. Said certification shall remain current from the time of the submission of the copy during bidding and bid review through the project close out. This requirement shall not be fulfilled by a sub-contractor, sub-sub-contractor, vendor, manufacturer or manufacturer's rep. The RCDD must be a full time regular employee of the Contractor, and must be on the payroll at the time of the submittal of the bid form.
2. Should the scope of this either not require any structured cabling, or have multiple contracts let as a function of the method of bidding, each Contractor shall provide a person whose role shall fulfill that of the Project Manager described herein. For additional requirements of these persons, refer to the various section of the Specification.
3. The Contractor shall provide a Project Manager whose responsibility is the accurate and timely execution of this project. The PM shall have a minimum of five (5) years experience, of this five (5) years experience, a minimum of two (2) years experience shall be as a field installation technician, and a minimum of two (2) years shall be the management of projects and personnel consistent with this project.
4. The Project Manager shall be assigned to the project from the time of Contract Award until Project Close Out, including any time that may be required to resolve final punch list items.
5. The PM shall be the sole point of contact by the Engineer, Owner, CM, or other related personnel, for the duration of the project.
6. The PM shall be responsible for all reports and accountability of the Contractor to be supplied to the Engineer, Owner, CM or other related personnel.
7. Should the PM fail to execute his responsibilities as outlined herein, the Engineer, or Owner, shall retain the right to require the Contractor to provide a replacement for the PM. This replacement shall be approved in advance by the Engineer.
8. Should the Contractor not be able to provide a suitable PM, or if required, a replacement PM, the Owner shall retain the right to terminate the Contract Agreement with the Contractor.



## B. Subcontractors

1. Where necessary, the Contractor may utilize qualified, and as applicable, certified Subcontractors. The Contractor shall prove the qualifications of the Subcontractor to the Owner and Engineer prior to executing any agreements either written or verbal. Such methods of proof shall be at the discretion of the Owner, and may include, but not be limited to, submissions of the same documentation as listed under the Contractor's Qualifications.
2. The Owner reserves the right for any reason to reject any Subcontractor. The Contractor shall then be required to provide an acceptable replacement Subcontractor. The qualifications of said replacement shall also be subject to verification prior to any agreement, written or verbal.
3. The Owner reserves the right to have a Subcontractor removed from the Project. Should removal of a Subcontractor be required, any replacement shall be subject to the aforementioned qualifications verification.
4. All Subcontractors must exist to provide viable outcome to the project. No Subcontractor may serve the sole purpose of providing Project Management, or providing a necessary certification only, e.g. A Project Manager shall not be Subcontractor may not serve the sole role of providing an RCDD to fulfill certification requirements.
5. No personnel employed by distributors, manufacturers representatives or other distribution channel organizations may be utilized for the provision of any required certifications, whether compensated financially or otherwise, e.g. A manufacturers Technical Support staff member may not be utilized to supply a required RCDD.

## 1.7 INFORMATIONAL SUBMITTALS:

- A. Qualification Data: **Required with bid response.** As defined within this Section and all Division 27 and 28 Sections.

NOTE: any/all qualification materials shall be in effect prior to bid submission. All qualifications requirements shall be maintained throughout the duration of the Contract. The Owner reserves the right examine and investigate the legitimacy of the qualifications materials and disqualify any bidder or bidder's sub-contractor or sub-sub-contractor based on the unacceptable status of these requirements. Should any Contractor, sub-Contractor or sub-sub-Contractor violate any of the qualifications criteria during the duration of the Contract, the Owner reserves the right to require replacement with a qualified replacement at no penalty or additional cost to the Owner.

## B. Other Data and Information:

1. As required.
2. Refer to each Division 27 and/or 28 Specification Section for system specific requirements.

## 1.8 CLOSE OUT SUBMITTALS

- A. Operations and Maintenance Manuals

## B. As-Built Documentation:

1. Provide electronic copies of all field markups scanned into Portable Document File (pdf) format.
2. Provide electronic copies of all plans, diagrams, elevations, etc. created in the same format as the original design documents completed. Files shall be unlocked, without password, and editable by the Owner in a valid copy of the original software.

## C. Test Results:

1. As required.
2. Refer to each Division 27 and/or 28 Specification Section for system specific requirements.

## D. Maintenance Data:

1. As required.
2. Refer to each Division 27 and/or 28 Specification Section for system specific requirements.

## E. Maintenance Materials and Attic Stock

1. The Contractor shall supply to the Owner, at the time of demonstration and training, all spare parts as required within these Documents. In addition to those items required elsewhere in these Documents, the Contractor shall provide a minimum of 10%, but not less than one complete item, of all expendable and/or replaceable items utilized for installation of the systems and equipment required in these Documents, such as fuses and filters.
2. The Contractor shall provide all spare parts in a means of containment that shall provide for an organized and protected storage of such Materials in close proximity to where they would be required.
3. The Contractor shall provide a complete and comprehensive list of all maintenance materials and attic stock supplied.

## F. Warranty Statements and Submissions:

1. As required.
2. Refer to each Division 27 and/or 28 Specification Section for system specific requirements.

G. Failure to provide required Close Out Submissions may impede the final acceptance by the Owner, delay commencement dates for warranty coverages and delay final payments and retention release.

## 1.9 OPERATIONS AND MAINTENANCE MANUALS

- A. The Contractor shall furnish four copies of Operations and Maintenance (O&M) Manuals prior to application for final payment.

- B. The O&M Manuals shall be bound individually in a three ring binder that shall have sufficient space so as to allow the Owner to add materials to these.
- C. The O&M Manual shall be identified and organized as follows:
1. Cover/Outside of Binder
    - a. The cover shall consist of a plastic sheeting installed by the binder manufacturer that shall allow 8.5" x 11" sheets to be installed in both the front and back of the binder, as well as the width of the spine by 11" on the spine of the binder.
    - b. The front of the binder shall contain the following information laser printed on a minimum of 32lb. stock paper. This information shall be centered horizontally on each line. All names shall be in a font twice the size of the subsequent information. The information shall be as follows:
      - 1) The Project name, address, phone number and logo of the Owner
      - 2) The date of Owner's acceptance
      - 3) The Engineer's name, address, phone number and logo
      - 4) The Contractor's name, address, phone number and logo
    - c. The back of the binder shall contain the name of the prime contractor in Arial 10 pt. centered along the bottom of the page.
    - d. The Spine of the binder shall contain the words "Technology Systems Operations and Maintenance Manual". Should the manual require more than one binder, each binder shall be labeled with "Volume (number) of (number)". All printing shall be large enough for easy recognition, and a minimum of ½".
  2. Inside
    - a. The inside of the binder(s) shall be divided into an index and one section for each system and/or specification section.
    - b. Each section and subsection shall be separated by a manufactured tabbed divider sheet which clearly indicates the name or number of the section on the tab. Section tabs shall be easily discernable from subsection tabs, and shall have a more prevalent visual appearance than subsections.
    - c. Where multiple volumes are required, the index shall be organized as follows:
      - 1) The complete index shall be included in each volume.
      - 2) The index shall be organized so as to group the contents of each volume.
      - 3) Each group shall be clearly indicative of the volume in which it is contained.
      - 4) The header of the index shall clearly indicate the volume in which you are currently viewing the index.
    - d. Each section shall include subsections that shall be logically organized, and, where applicable, shall include but not be limited to the following information:
      - 1) A copy of the manufacturer's warranty, including effective dates of commencement and completion of warranty coverage, and contact information for the manufacturer(s)
      - 2) The system's project specific installation diagrams, both electronic and hard copies, including all field modifications occurring during the installation process, i.e. record drawings for that system.
      - 3) Manufacturer's Data Sheets
      - 4) Manufacturer's Installation, Operations and Maintenance Instructions
      - 5) Suggested Spare Parts List, and project specific maintenance requirements
      - 6) Startup, commissioning and field test results electronic copies, both electronic and hard copies

Note: All electronic documentation shall be recorded onto CR-ROM in a format either readily accessible to Microsoft Office, AutoCAD or Adobe Acrobat Reader, or through an application specific viewing software for the testing device utilized for the testing of the system or infrastructure. The Contractor shall provide either on the CD or on a standalone CD and applications specific reading software that may be required at no additional cost to the Owner. Should said software be licensed on a per seat basis, the Contractor shall provide a minimum of a four seat license, on for each copy of the manual.

#### 1.10 QUALITY ASSURANCE

##### A. Qualifications

1. The Contractor shall be fully qualified, trained and certified to perform the Work indicated on these drawings.
2. The Contractor shall have been active in the bidding, being awarded and executing work consistent with that which is indicated on these Documents for a minimum of five (5) years. Any deviation from this requirement is at the sole discretion of the Engineer. Requests for such deviations shall be submitted in writing a minimum of two weeks prior to the bid submission. Approval of such requests shall be in writing from the Engineer. A copy of this approval shall be submitted with the bid.
3. The Contractor shall have completed a minimum of three projects of like scope and complexity within the past two years. Project names and references, including, but not limited to, contact name and phone numbers of personnel with whom the Contractor has directly interacted shall be provided to the Engineer upon request. The Engineer reserved the right to contact any/all references provided to verify their accuracy and legitimacy. Any negative references shall be duly noted and considered when determining the Contractors qualifications or lack thereof.
4. The Contractor shall maintain an installation staff whose sole function is that of installing the systems or infrastructure indicated on the drawings. The Contractor shall not utilize any installation personnel that have been provided by any temporary staffing or placement agency. Only personnel qualified and experienced in the installation of the system or infrastructure for which they are installing, may perform the installation work.
5. The Contractor shall not utilize any apprentice or trainee personnel for the installation or termination of cabling or equipment unless under the direct supervision of a qualified technician.
6. The Contractor shall maintain a local presence, within fifty miles, which shall include, but not be limited to, warehousing of Materials, an office with support personnel, Project Management personnel, and a service department having a stock of replacement parts consistent with, at a minimum, the spare parts required by this project.
7. The Contractor shall be fully insured and bondable as referenced within these Documents.
8. The Contractor shall have staff with the ability, if required, to be assigned solely to this project for its duration.

9. The Contractor shall provide a list of all personnel indicated as being required to be assigned to this project during the process of bid submission and review. Should the Contractor fail to provide the list of personnel during this time period, the Owner reserves the right to consider the Contractor as being not fully responsive.

B. Regulatory Requirements

1. Incumbent on the execution of these Documents is the requirement that all work adhere to and be compliant with all codes and regulations. These codes and regulations include, but are not limited to the latest revisions (or the applicable revisions) of:
  - a. FCC Part 15 – Radiation Limits
  - b. FCC Part 22 – Public Mobile Service
  - c. FCC Part 68 – Connection of Terminal Equipment to the Telephone Network
  - d. FCC Part 76 – Cable Television Service
  - e. NESC – The National Electric Safety Code
  - f. NFPA 70 – The National Electric Code
  - g. NFPA-70E – Standard for Electrical Safety Requirements for Employee Workplaces
  - h. NFPA-72 – National Fire Alarm Code
  - i. NFPA-75 – Protection of Electronic Computer Data Processing Equipment
  - j. NFPA-101 – Life Safety Code
  - k. NFPA-297 – Guide on Principles and Practices for Communications Systems
  - l. OBC – The Ohio Building Code
2. Consistent with the expectation of quality workmanship executed in a neat and workman like fashion, all installation, labor and materials shall be provided such that they are compliant with the latest revision of the following standards:
  - a. ANSI/TIA/EIA 568 – Commercial Buildings Telecommunications Cabling Standard
  - b. ANSI/TIA/EIA 569 – Commercial Building Standard for Telecommunications Pathways and Spaces
  - c. ANSI/TIA/EIA 606 – Administration Standard for the Telecommunications Infrastructure of Commercial Building
  - d. ANSI/TIA/EIA 607 – Commercial Building Grounding and Bonding Requirements for Telecommunications
  - e. BICSI TDMM – Telecommunications Distribution Methods Manual

Note: The standards, codes and regulations listed above are only a partial listing. Any/all industry standards, codes and regulations that are applicable to the scope of the Work required shall be considered as a specific requirement of this project.
3. The Contractor shall become fully aware of all plenum vs. non-plenum areas, and shall provide the required Materials and labor to fulfill said code requirements.
4. The Contractor shall become fully aware of all fire rated and smoke rated walls, and shall provide the required Materials and labor to fulfill said code requirements.
5. The Contractor shall completely versed in the all applicable codes and shall comply fully with all codes and regulations, including, but not limited to any potential deviations from same due to interpretations by the Authority Having Jurisdiction.

C. Certifications

1. As indicated in the various sections of these Specifications, all Contractors responsible for the provision of any of these systems shall possess certifications acknowledging the expertise of both the Contractor firm and the personnel assigned to the project. Such certifications shall be current, and remain current for the duration of the project. Should any personnel lose the associated certification, the Owner/Engineer reserves the right to require that said personnel be replaced with competent, certified personnel. The Owner/Engineer reserves the right to review, qualify and refuse for any reason, any suggested replacement personnel.
2. As indicated elsewhere in these Documents, all certifications must be submitted to the Engineer for approval AT TIME OF BID FORM SUBMISSION, unless the certified personnel are a member of a sub-contractor or sub-sub contractor. In such cases, the prime Contractor shall submit any required certifications a minimum of two weeks prior to declaration of sub-contractors or sub-sub-contractors. Submissions of certifications of sub-contractors and sub-sub-contractors shall be used as one of the key criteria in determining the qualifications of the sub-contractor and sub-sub-contractor. The Owner/Engineer reserves the right to disqualify a sub-contractor or sub-sub-contractor based on these certification submissions.

D. Pre-installation Meetings

1. The Contractor's Project Manager shall attend pre-installation meetings at which time the Engineer shall review scope and design intent to assure proper execution and provision of the appropriate Materials. Such meetings shall be scheduled with the Engineer and Owner two weeks prior to the notice to proceed, to allow sufficient time for the Contractor and Engineer to determine a mutually agreed upon time and location.

E. Installation Requirements

1. All Contractors responsible for the installation of devices, cabling and equipment for the project shall be required to install all devices, cabling and equipment in a neat and professional manner, including but not limited to, dressing all cabling, mounting all devices and equipment square, routing all cabling consistent with the lines of the building, providing wire management to neatly route cabling, adequately recessing equipment that is to be recessed, and properly attaching devices and equipment to walls or other structure.
2. The final discretion as to compliance with this requirement shall be that of the Engineer and Owner mutually. Any devices, cabling and equipment not found to be installed in this fashion shall be reworked to the mutual satisfaction of the Owner and Engineer at no additional cost to the Owner or Engineer.

1.11 DELIVERY STORAGE AND HANDLING

A. Packing, Shipping and Handling

1. The Contractor shall provide appropriate personnel to perform all packing shipping and handling.
2. The Contractor shall accept full liability for all Materials handled until such equipment and devices have been installed, tested and accepted by the Owner.

B. Storage and Protection

1. All Materials required for the project, but not having sufficient storage space on site, shall be stored at a secured location under the control of the Contractor.
2. Materials being stored on site, shall be secured by the Contractor until such time as they are required in the field.
3. Damage to any of the aforementioned Materials, shall be the financial responsibility, until such time that the Owner has accepted the installation.
4. Any additional security to assure the safety and security of these Materials shall be born by the Contractor at no additional expense by the Owner.

C. Waste Management and Disposal

1. All refuse and debris generated by the Contractor shall be the responsibility of the Contractor to provide appropriate means by which to dispose of such scrap Materials. The Contractor shall provide all required containers and vehicles to dispose of properly, at no additional cost to the Owner.
2. The Contractor shall clean all debris created by the Contractor caused by the process of providing any of the Materials within the Documents, and dispose of the resultant debris in an appropriate fashion.

1.12 PROJECT/SITE CONDITIONS

- A. The Contractor shall visit the Site prior to submission of their bid proposal to familiarize themselves with the existing conditions. Such conditions may affect the scope of work or the effort required to fulfill the intent of the design. Additional compensation due to lack of familiarization with these existing field conditions shall not be acceptable and shall not be honored.

1.13 SEQUENCING

- A. The Contractor shall participate in all meeting necessary to assure the proper execution and sequencing of the installation.

1.14 SCHEDULING

- A. All scheduling shall be coordinated with the master project schedule, and adapted as changes in the master schedule occur. Any deviations from the posted Master Schedule shall be approved by the Owner/Engineer or approved representative.
- B. A copy of the schedule and any subsequent deviations shall be submitted to the Engineer at least once a week.
- C. The Contractor shall derive an initial schedule of completion that shall be the basis of coordination with the CM and the other trades on the project.

- D. Upon execution of an agreement with the Contractor, the Contractor shall schedule a meeting with the CM, and any other required trades to re-work the schedule to be consistent with the expectations of the overall project. It shall be the responsibility of the PM to perform weekly reviews of the schedule with the CM to modify the schedule and subsequent Work requirements and logistics to remain coordinated with the overall effort of the Project. Should the PM be unable to maintain this coordination for reasons of lack of Material availability or other external reason, it shall be the responsibility of the PM to immediately notify the Engineer and Owner, or Owner's approved representative, so that appropriate action may be taken.
- E. The PM shall keep written track of all progress of the project, including, but not limited to, Material orders and procurement, mobilization, staffing requirements and installation status. This progress shall be tabulated and submitted to the Engineer on a weekly basis. The format of this table shall be submitted to the Engineer for approval, and shall be in Excel 2000, or greater, format.
- F. Should Sub-Contractors be utilized on the project, their information shall be incorporated both in the scheduling projects and status reports.
- G. Any changes to the schedule must be mutually agreed upon and shall be submitted in writing to the Engineer immediately upon the identification of the need to make said changes. Once the schedule has been changed any future adjustments, including those which would re-establish the original schedule, shall also be submitted in writing to the Engineer.
- H. All Work shall be scheduled and completed within the normal progress of the project. Any additional work required by other trades that may be caused by the scheduling of this Contractor, shall be borne solely by the Contractor.

#### 1.15 WARRANTY

- A. All Systems, equipment, Materials and devices shall carry a minimum of a two year warranty. As indicated elsewhere in these documents, individual sections shall require warranty periods in excess of this length of time.
- B. All warranties shall begin at the time of acceptance by the Owner of the entire project.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. All Base Bid submissions shall be derived from the provision of the Materials specified, or the alternatives listed.
- B. All materials shall be new and U.L. Labeled for the Application.
- C. For any Materials drawn or specified as being supplied by a single manufacturer, the Contractor shall provide said Materials as Drawn or Specified.
- D. All manufacturers of the systems and infrastructure indicated shall verify to the satisfaction of the Contractor, Owner and Engineer that the systems and infrastructure as indicated on the Documents will function properly and perform as specified under the conditions indicated on these Documents.



All parameters of the systems and infrastructure, including but not limited to, weight, dimensions, environmental conditioning, power, etc. shall be verified prior to shop drawing submittals.

- E. All Materials shall be provided so as to fully enable the Owner to be afforded the maximum warranties available. This includes, but is not limited to, furnishing the Materials through manufacturers approved supply and distribution methods, and 100% of the installation, termination and commissioning, i.e. testing and documentation, by certified installation contractors where applicable.

## 2.2 MATERIAL SUBSTITUTIONS

- A. No substitutions for the Materials specified shall be permitted without a formal written request for Material substitution.
- B. Material substitutions, unless specifically indicated in writing by the Owner, Architect or Construction Manager in the Division 1 Specifications, or other governing front end documents, shall occur no later than two weeks prior to bid submission. The response to the request for substitution shall be returned no later than seventy two hours prior to the bid due date.
- C. Material Substitution requests shall be assembled with information for both the specified item and the proposed item assembled in such a manner so as to make the comparison of the like parameters readily available and discernable. The Engineer reserves the right to reject any submission that does not comply with this requirement.
- D. The Owner/Engineer reserves the right to deny any/all product substitution requests for any reason.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Site Verification of Conditions
  - 1. Visit the site of the work and become familiar with the conditions affecting the installation. Submission of a proposal shall presuppose knowledge of such conditions and no additional compensation shall be allowed where extra labor or materials are required because of ignorance of these conditions.
  - 2. Extra costs which might result from deviations from the Drawings, so as to avoid interferences, shall be considered a "Job Condition", and no additional compensation shall be considered applicable. In the event that such interferences occur in course of the Work, due to an error, omission, or oversight by the Contractor, no additional compensation shall be allowed. Interferences that may occur during the course of construction shall be brought to the immediate attention of the Architect and Engineer, and the Architect and Engineer's decision, confirmed in writing, shall be final.

### 3.2 INSTALLATION

- A. Coordination

1. The Contractor shall actively participate in the coordination efforts of all trades to assure both the proper execution of these Contract Documents, and the execution of the associated trades. Any deviation from the intent of these Documents caused by these coordination efforts shall be approved in writing by the Engineer prior to execution. The need for such changes shall be brought to the immediate attention of the Engineer for resolution.
2. The Contractor become familiar with the Contract Documents of the other trades, and shall adjust, as necessary, the layout of the associated technology devices, equipment and cabling so as to maintain the intent of the Documents and be compatible with the other trade's Documents.
3. The Contractor shall monitor the progress and Work of all trades that may have impact on the execution of the Documents. The Contractor shall bring attention to all Work by other trades that may have detrimental effect on the outcome of this Contractor to the immediate attention of the CM and the Engineer. Any rework required by lack of action by the Contractor on this behalf shall be borne by the Contractor, and shall be completed so as to be complaint with the original applicable Drawings and Specifications.
4. Devices and equipment not specifically dimensioned and located on the Documents shall be oriented so as to be both aesthetically consistent with the devices, equipment and other architectural elements in its' general proximity, and consistent with the standard practices and workmanship of this types of installation.
5. Do not install in, or attach to, the work of any other trade that is deficient or otherwise incomplete, unless by doing so, the completion of work by the other trades is not impeded or prevented.
6. Do not obstruct access to, or the installation of, other trades.
7. Prior to the commencement of Work, provide the Electrical and Mechanical Contractors with reproducible marked up prints indicating all locations where technology devices and equipment interact with any mechanical, plumbing and electrical equipment. Refer to the Mechanical, Electrical and Architectural specifications for additional requirements.
8. Review the layout of other trades for devices and/or equipment that are to be located within any Telecommunications or Low Voltage Equipment Spaces. Inform the Engineer immediately of any occurrence of this nature. The Owner reserves the right to require the Technology Contractor to rectify any occurrence of this nature that has occurred after execution of the Contract with the Contractor that was not explicitly indicated on the related Contract Documents, the cost of which shall be borne by the Contractor.

B. Wiring Methods

1. Install cables in raceways and cable trays except within consoles, cabinets, desks and counters. Conceal raceway and cables except in unfinished spaces, unless otherwise noted.

C. Firestopping

1. Comply with requirements in Division 07 Penetration Firestopping.

2. Comply with TIA-569-D, Annex A, "Firestopping".
  3. Comply with BICSI TDMM, "Firestopping Systems" Article.
- D. Grounding
1. Install grounding according to BICSI TDMM, "Grounding, Bonding and Electrical Protection" Chapter.
  2. Comply with TIA-607-B and NECA/BICSI-607
- E. Labeling
1. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives and inks used by label printers
  2. All cabling, equipment and related hardware shall be labeled by means of either a machine generated, or pre-printed label designed specifically designed for the application for which it is being utilized. Or, in cases where a device is mounted or installed in a permanent fashion, i.e. permanently attached to structure, provide an engraved phenolic tag. For additional information, refer to the various Specification Sections.
- F. Record Drawings
1. The Contractor shall keep on the job site one complete set of drawings that shall be utilized as an ongoing record of the job. All markings shall be in pen unique colors from those used to create the print. These drawings shall be maintained on a daily basis, and shall indicate all deviations from the Contract Documents. These drawings shall be made available to the Engineer or Owner for review at the jobsite. Should these documents require to be viewed off-site, the Contractor shall make color reproductions prior to transportation from the jobsite, and forward the color reproductions. The Contractor shall remain responsible for the jobsite record mark ups.
  2. At the completion of the project, the mark ups shall be incorporated into the electronic files by the Contractor, and shall be submitted to the Engineer in both hard and electronic copies for approval, along with the original marked up set. The Contractor shall request and receive from the Engineer one copy of the original design files from which the Contractor shall perform the editing to reflect as-built conditions. These edited drawings shall be reviewed for general content and acceptability. Once approved, and returned to the Contractor, the Contractor shall make any necessary corrections, and submit one set, both electronic and hard, to the Engineer and one set, both electronic and hard, to the Owner for the Owner's As-Built record.
  3. Should, for whatever reason, the scope of the Division 27 and/or 28 be, or become, subdivided into multiple bid packages, it shall be the responsibility of the structured cabling contractor to produce, and submit, the Record Drawings. Any other contractor required, due to the subdivision of this package, shall provide the structured cabling contractor with the necessary electronic files necessary to insert this information in the master files, and produce these Record Drawings.

4. All drawings, including but not limited to those submitted to the structured cabling contractor for inclusion in the submission, shall be in native format of those files received by the Contractor from the Engineer. Each system and related cabling shall be on individual layers in AutoCAD, or model categories in Revit. The Contractors shall maintain the title blocks and other graphic representations of the Owner, Architect, Engineer and other Design team members present on the Documents, less the Engineer's State Registration or other certification moniker. Any stamp, certification moniker or company logo of the Contractor, its agent or assigns shall be incorporated only to the extent that it does not exceed the size of corresponding design team member stamp, certification moniker or company logo. Should the Contractor not have the ability to provide the required drafting and/or modelling, either through insufficient skill-set or lack of necessary software, the Contractor may obtain a cost from the Engineer to provide such services.

G. Codes and Fees

1. The Contractor shall secure and pay for any and all permits and fees required by the execution of this project, including but not limited to, any and all periodic inspections that may be required. At the time of job completion, the Contractor shall turn over to the Owner, at no additional cost, all certificates of inspection, approval and occupancy. Such submission to the Owner shall be a condition of job close out and completion.
2. The Contractor shall provide all necessary notices of progress and completion to all required authorities so as to assure compliance with all codes and regulations.

H. System And Service Shutdown

1. The Contractor shall provide sufficient notice to the Owner and Engineer of any required system or service shutdown. Unless previously agreed to in writing by the Owner and Engineer, such notifications shall occur a minimum of two weeks in advance. The Owner reserves the right to require longer lead times in shutdowns. The Contractor shall review these lead times with the Owner and Engineer prior to commencement of work.
2. Systems and services routed through areas of construction and/or demolition shall be identified in advance and protected during construction. Should any trade be required to perform work that may jeopardize these systems or services the Owner shall be made aware of this jeopardy. The Contractor shall make this known to all trades in writing. A copy of this notification shall be forwarded to the Engineer at the time of distribution.
3. All efforts required for the coordination or performance of these systems or service shutdowns, including but not limited to any premium time compensation, shall not garner additional compensation from the Owner.

3.3 SYSTEM STARTUP

- A. All Work shall include system startup by appropriate personnel. Where applicable, only individuals trained and certified by the manufacturer may authorize and or carry out such system startup. Personnel carrying out such startup shall keep written records of the procedures executed and subsequent results. A copy of such records and results shall be given to the Owner for their records prior to the application for final payment.

### 3.4 REPAIR AND RESTORATION

- A. All cutting and patching in during normal construction, as well as any retrofit construction, necessary for installation of this work shall be the responsibility of this Division. Have cutting done by skilled mechanics as carefully as possible and with as little damage as possible. Do not cut any structural member without specific permission from the Architect.
- B. The Technology Contractor shall assume removing existing ceiling to install new work and replacing with existing or new ceilings as required for installation of all work under this Division. These areas include spaces not only in the new work, but areas in the existing building where the Contractor is required to install new work. Damaged tiles shall be replaced with new tiles. Any tiles removed from the customer stock shall either be replaced with an exact replacement, or the Owner shall be reimbursed for the Owner's full cost of the materials including any shipping costs incurred.

### 3.5 REINSTALLATION

- A. Any equipment removed and relocated, or removed and re-installed shall be cleaned, and retested as if new. Replace any expendable devices or accessories with new replacements, e.g. change out filters.

### 3.6 FIELD QUALITY CONTROL

- A. The Contractor's PM shall remain abreast of project progress and perform periodic walk through of work in progress and/or complete. During such walk thru's, the PM shall prepare internal punch lists indicating all Material or labor inadequacies or inaccuracies. All such items shall be corrected promptly. The Engineer reserves the right to review and/all such internal punch lists at the Engineer's discretion.
- B. The Engineer reserves the right to periodically perform walk thru's. During such times, the Engineer may create punch lists which shall be corrected promptly.
- C. All design work has been engineered so as to be completely compliant with all applicable codes and standards. Should actual field conditions require the non-adherence to any code or standard, the Contractor shall determine an acceptable alternative that will allow the installation to regain compliance, and contact the Engineer immediately to discuss this situation and advise of the alternatives determined by the Contractor.
- D. The Contractor shall inspect all cabling pathways prior to close out, and correct any anomalies that may have occurred, such as pathways inappropriately modified by other trades.

### 3.7 ADJUSTMENTS

- A. All devices and equipment with the capability of tuning, adjustment or calibration shall be set to the desired optimum configuration prior to the Owner training and project completion.

### 3.8 CLEANING

- A. All devices and equipment shall be wiped, swept and, where appropriate, washed to remove all traces of the construction environment. Such cleaning shall include, but not be limited to all points of user interface, racks, cabinets, patch panels, wall fields, equipment, devices, related hardware and

Technology Space floors. All cabling pathways shall be inspected by the Contractor, and any/all debris shall be removed prior to final close out.

- B. All areas subject to personnel traffic by the Contractor shall be completely cleaned.
- C. All areas where the Contractor stores tools and Materials shall be fully cleaned, such that any user will be unable to be aware that the area had been used for the storage of tools and Materials.

### 3.9 DEMONSTRATION

- A. The Owner shall have each system demonstrated to, at a minimum, the Engineer showing the complete operability of the system and/or infrastructure prior to Acceptance by the Owner.
- B. The Owner shall be trained on the systems and infrastructure. For additional training requirements, refer to the various Specifications Sections. All training shall be video taped in its' entirety on standard VHS tape, and turned over to the Owner at no additional cost.

### 3.10 PROTECTION

- A. All existing Materials, equipment, devices, cabling and related hardware remaining in place shall be protected from damage during the construction project. Any Materials, equipment, devices, cabling and related hardware damaged during the course of the project shall be replaced by new items that match exactly, or are greater product. All financial liability for this replacement, including but not limited to, the required labor by a properly certified individual, shall be borne by the Contractor.
- B. All Materials, equipment, devices and related hardware being removed and relocated, in addition to be protect as defined in the previous paragraph shall be stored while waiting to be re-installed, in such a fashion so as to protect the Materials, equipment, devices, and related hardware from damage. Any items requiring replacement shall be replaced by new items that match exactly, or are greater product.
- C. During the course of the project, the Contractor shall, on a regular basis, protect and inspect the work previously completed or in progress. The Contractor shall correct any work that has become unacceptable or below standard. Such corrective measures shall be the financial responsibility of the Contractor until the time of Owner acceptance.

### 3.11 SCHEDULE

- A. The Contractor shall be liable to follow the ongoing construction schedule as defined and managed by the Construction Manager.
- B. The Contractor shall remain abreast of any changes to the schedule and assess the ability to maintain the schedule with the changes indicated. The Contractor shall immediately make the Engineer aware of said changes.

END OF SECTION 270100

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