

**SECTION 270010**

**GENERAL COMMUNICATIONS REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section and to all following sections within Division 27.

**1.2 DESCRIPTION OF WORK**

- A. This Division requires providing complete functioning systems, and each element thereof, as specified, indicated, or reasonably inferred, on the Drawings and in these Specifications, including every article, device, or accessory (whether or not specifically called for by item) reasonably necessary to facilitate each system's functioning as indicated by the design and the equipment specified. Elements of the work include, but are not limited to, materials, labor, supervision, supplies, tools, equipment, transportation and utilities.
- B. Division 27 of these Specifications, and Drawings numbered with prefixes TA generally describe these systems, but the scope of the Communications Work includes all such Work indicated in all of the Contract Documents, including, but not limited to: Instructions to Bidders; Proposal Form; General Conditions; Supplementary General Conditions; Architectural, Structural, Mechanical, Plumbing, Electrical and Telecommunications Drawings and Specifications; and Addenda.
- C. Drawings are graphic representations of the Work upon which the Contract is based. They show the materials and their relationship to one another, including sizes, shapes, locations, and connections. They also convey the scope of Work, indicating the intended general arrangement of the equipment, fixtures, outlets and cabling without showing all of the exact details as to elevations, offsets, and other installation requirements. Use the Drawings as a guide when laying out the Work and to verify that materials and equipment will fit into the designated spaces, and which, when installed per manufacturers' requirements, will ensure a complete, coordinated, satisfactory and properly operating system.
- D. Specifications define the qualitative requirements for products, materials, and workmanship upon which the Contract is based.

**1.3 ABBREVIATIONS**

- A. ADA            Americans with Disabilities Act
- B. AFF            Above Finished Floor
- C. AHJ            Authority Having Jurisdiction
- D. ANSI           American National Standards Institute
- E. ASTM          American Society for Testing and Materials
- F. BICSI          Building Industry Consulting Service International
- G. EIA            Electronic Industries Alliance
- H. ETL            Electrical Testing Laboratories, Inc.
- I. FCC            Federal Communications Commission
- J. FM             Factory Mutual
- K. GE             Grounding Equalizer (Formerly the TBBIBC)
- L. IEEE          Institute of Electrical and Electronic Engineers
- M. LED          Light Emitting Diode
- N. NEC           National Electric Code
- O. NESC          National Electrical Safety Code
- P. NEMA          National Electrical Manufacturers Association

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- Q. NFPA National Fire Protection Association
- R. NRTL Nationally Recognized Testing Laboratory
- S. OEM Original Equipment Manufacturer
- T. OFCI Owner Furnished Contractor Installed
- U. OSHA Occupational Safety and Health Administration
- V. OSP Outside Plant
- W. RCDD Registered Communications Distribution Designer
- X. TBB Telecommunications Bonding Backbone
- Y. TGB Telecommunications Grounding Bus-bar
- Z. TIA Telecommunications Industries Association
- AA. TMGB Telecommunications Main Grounding Bus-bar
- BB. UL Underwriters Laboratories
- CC. UON or UNO Unless Otherwise Noted

1.4 QUALITY ASSURANCE

- A. Execute all Work under this Division in a thorough and professional manner by competent and experienced workmen duly trained to perform the Work specified.
- B. Qualifications – refer to individual Division 27 sections for specific Personnel and Contractor Qualifications.
- C. Install all Work in strict conformance with all manufacturers' requirements and recommendations, unless these Documents exceed those requirements. Install all equipment and materials in a neat and professional manner, aligned, leveled, and adjusted for satisfactory operation.
- D. Unless indicated otherwise on the Drawings, provide all material and equipment new, of the best quality and design, free from defects and imperfections and with markings or a nameplate identifying the manufacturer and providing sufficient reference to establish quality, size and capacity. Provide all material and equipment of the same type from the same manufacturer.
- E. Unless specified otherwise, manufactured items of the same types specified within this Division shall have been installed and used, without modification, renovation, or repair for not less than one year prior to date of bidding for this Project.
- F. Comply with the current applicable codes, ordinances, and regulations of the authority or authorities having jurisdiction, the rules, regulations and requirements of the service providers serving the project and the Owner's insurance underwriter.
- G. Drawings, specifications, codes and standards are minimum requirements. Where requirements differ, the most stringent apply.
- H. Should any change in drawings or specifications be required to comply with governing regulations, notify and receive written approval from the District prior to submitting bid.
- I. All equipment and installations shall meet or exceed minimum requirements of ADA, ANSI, ASTM, IEEE, NEC, NEMA, NFPA, OSHA, UL, and the State Fire Marshall.
- J. Execute work in strict accordance with the best practices of the trades in a thorough, substantial, workmanlike manner by competent workmen. Provide a competent, experienced, full-time Project Manager who is authorized to make decisions on behalf of the Contractor.
- K. Warranty Requirements
  - 1. Refer to Division 1 and General Conditions for Warranties.
  - 2. Warrant each system and each element thereof against all defects due to faulty workmanship, design or material for a period of 12 months from date of Substantial Completion, unless specific items are required to carry a longer warranty in these Construction Documents or manufacturer's standard warranty exceeds 12 months. Remedy all defects, occurring within the warranty period(s), as stated in the General Conditions and Division 1.

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3. The above warranties shall include labor and material. Make repairs or replacements without any additional costs to the Owner.
4. Perform the remedial work promptly, upon written notice from the Owner.
5. At the time of Substantial Completion, deliver to the Owner all warranties, in writing and properly executed, including term limits for warranties extending beyond the one year period, each warranty instrument being addressed to the Owner and stating the commencement date and term.

**1.5 CODES, REFERENCES, AND STANDARDS**

- A. Execute all Work in accordance with, and comply at a minimum with, National Fire Protection Association (NFPA) codes, state and local building codes, and all other applicable codes and ordinances in force, governing the particular class of Work involved, for performance, workmanship, equipment, and materials. Additionally, comply with rules and regulations of public utilities and municipal departments affected by connection of services. Where conflicts between various codes, ordinances, rules, and regulations exist, comply with the most stringent. Wherever requirements of these Specifications, Drawings, or both, exceed those of the above items, the requirements of these Specifications, Drawings, or both, shall govern. Code compliance, at a minimum, is mandatory. Construe nothing in these Construction Documents as permitting work not in compliance, at a minimum, with these codes. Bring all conflicts observed between codes, ordinances, rules, regulations and these documents to the District's and Design Consultant's attention in sufficient time, prior to the opening of Bids, to prepare the Supplementary Drawings and Specifications Addenda required to resolve the conflict.
- B. If the conflict is not reported timely, prior to the opening of bids, resolve the conflict and provide the installation in accordance with the governing codes and to the satisfaction of the District and Design Consultant, without additional compensation. Contractor will be held responsible for any violation of the law.
- C. Obtain timely inspections by the constituted authorities having jurisdiction; and, upon final completion of the Work, obtain and deliver to the Owner executed final certificates of acceptance from these authorities having jurisdiction.
- D. All material, manufacturing methods, handling, dimensions, methods of installation and test procedures shall conform to industry standards, acts, and codes, including, but not limited to the following, except where these Drawings and Specifications exceed them:
- E. The references to the following codes, references and standards represent the most current and up-to-date revisions or printing as of the issue of this document including all sections, parts and their addenda. The Contractor is responsible for following the correct revision or printing (UON):
  1. ANSI/TIA/EIA-569-C – "Commercial Building Standard for Telecommunications Pathways and Spaces"
  2. NFPA 70 – National Electrical Code (NEC)
  3. IEEE National Electrical Safety Code (NESC)
  4. Americans with Disabilities Act (ADA) of 1990, as amended

**1.6 DEFINITIONS:**

- A. Whenever used in these Specifications or Drawings, the following terms shall have the indicated meanings:
  1. AHJ - The local code and/or inspection agency (Authority) Having Jurisdiction over the Work.
  2. As Directed - means as directed by the District, or his representative.
  3. Communications Room - means the location of a floor-serving facility for housing telecommunication equipment, cable terminations, and cross-connect wiring, as well as those for audio video systems and potentially other low-voltage systems such as security and fire alarm (electronic safety and security). This room is recognized in ANSI/TIA/EIA-569 as the transition point between the telecommunications horizontal (station) pathway facilities and the backbone (riser) pathway facilities.

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4. Concealed - means embedded in masonry or other construction, installed behind wall furring or within drywall partitions, or installed within hung ceilings.
5. Conditionally Approved – the manufacturer has been found reputable by the design professional, but the design professional has not verified that the product offering by manufacturer meets to all specification requirements. Contractor shall adhere to submittal review process for final approval on products.
6. Design Consultant - Where referenced in this Division, “Design Consultant” is the Design Professional for the Work under this Division, and is a Consultant to, and an authorized representative of, the District, as defined in the General and/or Supplementary Conditions. When used in this Division, it means increased involvement by, and obligations to, the Design Professional, in addition to involvement by, and obligations to, the “District”.
7. Furnish - “To supply and deliver to the project site, ready for unloading, unpacking, assembling, installing, and similar operations.”
8. Furnished by Owner (or Owner-Furnished) or Furnished by Others: “An item furnished by the Owner or under other Divisions or Contracts, and installed under the requirements of this Division, complete, and ready for the intended use, including all items and services incidental to the Work necessary for proper installation and operation. Include the installation under the warranty required by this Division.
9. Install - “To perform all operations at the project site, including, but not limited to, and as required: unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, testing, commissioning, starting up and similar operations, complete, and ready for the intended use.”
10. NRTL - Nationally Recognized Testing Laboratory, as defined and listed by OSHA in 29 CFR 1910.7 (e.g., UL, ETL, CSA, etc.), and acceptable to the Authority having Jurisdiction (AHJ) over this project. Nationally Recognized Testing Laboratories and standards listed are used only to represent the characteristics required and are not intended to restrict the use of other NRTL’s that are acceptable to the AHJ, and standards that meet the specified criteria.
11. Provide - “To furnish and install complete, and ready for the intended use.”
12. Submit - means submit to District for review.
13. Substitution: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor. Substitutions include Value Engineering proposals.
  - a. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - b. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.
14. Value Engineering: A systematic method to improve the “value” of goods and services by using an examination of function. Value, as defined, is the ratio of function to cost. Value can therefore be increased by either improving the function or reducing the cost. The goal of VE is to achieve the desired function at the lowest overall cost consistent with required performance.
15. Wet Location - means a pathway that does not protect cables from moisture levels that are beyond the intended operating range of “inside” premises cable.
  - a. For example: Slab-on-grade construction where pathways are installed underground or in concrete slabs that are in direct contact with soil (e.g., sand and gravel) is considered a “wet location.”
  - b. Also refer to the:
    - 1) Telecommunications Distribution Methods Manual (TDMM) for definitions of Wet locations

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- 2) In regards to work in this Division, Damp Locations (as defined by the NEC) are to be considered Wet Locations, and appropriately-rated cables are required for those areas/pathways.
  - 16. (\*) – Where appearing in product part or model numbers; shall represent wild card character to be filled in by the contractor to meet required specifications.
  - B. The terms "approved equal", "equivalent", or "equal" are used synonymously and shall mean "accepted by or acceptable to the Design Consultant as equivalent to the item or manufacturer specified".
  - C. The term "approved" shall mean labeled, listed, or both, by an NRTL, and acceptable to the AHJ over this project.
- 1.7 COORDINATION
- A. Coordinate with other Divisions for Communications work to be included but not listed in Division 27 or indicated on Communications Drawings.
  - B. Visit the site and ascertain the conditions to be encountered in installing the Work under this Division, verify all dimensions and locations before purchasing equipment or commencing work, and make due provisions for same in the bid. Failure to comply with this requirement shall not be considered justification for omission, alteration, and incorrect or faulty installation of any of the Work under this Division or for additional compensation for any Work covered by this Division.
  - C. Refer to Communications Drawings and Divisions of the other trades and to relevant equipment drawings and shop drawings to determine the extent of clear spaces. Follow these drawings as closely as the actual construction and the work of other trades will permit. Provide all offsets, fittings, and accessories, required to clear equipment, beams and other structural members which may be required but not shown on the Drawings.
  - D. Provide materials with trim that will fit properly the types of ceiling, wall, or floor finishes actually installed.
  - E. Maintain a project manager, as specified by the Quality Assurance sections of these specifications, on the jobsite at all times to coordinate this Work with other trades so that various components of the Communications systems are installed at the proper time, fits the available space, allows proper service access to all equipment, and meets all required codes and standards.
  - F. Carry on the Work in such a manner that the Work of the other trades will not be handicapped, hindered, or delayed at any time.
  - G. Work of this Division shall progress according to the "Construction Schedule" as described in Division 1 and as approved by the District. Cooperate in establishing these schedules and perform the Work under this Division, in a timely manner in conformance with the construction schedule so as to ensure successful achievement of all schedule dates.
  - H. Carefully check space requirements with other trades to insure that equipment can be installed in the spaces allotted.
  - I. Refer to Coordination requirements in specific sections for additional information.
  - J. Examine and compare the Contract Drawings and Specifications with the Drawings and specifications of other trades, and report any discrepancies between them to the District and obtain written instructions for changes necessary in the work. Install and coordinate the work in cooperation with other related trades. Before installation, make proper provisions to avoid interferences.
  - K. Wherever the work is of sufficient complexity, prepare additional detail drawings to scale to coordinate the work with the work of other trades. Detailed work shall be clearly identified on the Drawings as to the area to which it applies. Submit these drawings to the District for review. At completion include a set of these drawings with each set of Record Drawings.
  - L. Before commencing work, examine adjoining work on which this work is in any way affected and report conditions, which prevent performance of the work. Become thoroughly familiar with actual existing conditions to which connections shall be made or which shall be changed or altered.

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- M. Adjust location of conduits, terminal blocks, equipment, etc., to accommodate the work to prevent interferences, both anticipated and encountered. Determine the exact route and location of each conduit prior to fabrication.
  - 1. Right-of-Way: Lines which pitch shall have the right-of-way over those which do not pitch. For example: condensate, steam, and plumbing drains normally have right-of-way. Lines whose elevations cannot be changed have right-of-way over lines whose elevations can be changed.
  - 2. Provide offsets, transitions and changes in direction of conduit as required to maintain proper headroom and pitch on sloping lines.
- N. In cases of doubt as to the work intended, or in the event of need for explanation, request supplementary instructions from the District.

**1.8 MEASUREMENTS AND LAYOUTS**

- A. The Drawings are schematic in nature, but show the various components of the systems approximately to scale and attempt to indicate how they are to be integrated with other parts of the Work. Figured dimensions take precedence to scaled dimensions. Determine exact locations by job measurements, by checking the requirements of other trades, and by reviewing all Contract Documents. Correct, at no additional costs to the Owner, errors that could have been avoided by proper checking and inspection.

**1.9 SUBMITTALS**

- A. Refer to Division 1 and General Conditions for general submittal requirements in addition to requirements specified herein. Refer to individual Division 27 Sections for additional submittal requirements. Unless otherwise noted, it is acceptable to submit electronic, PDF files.
- B. Submittals and shop drawings shall not contain the firm name, logo, seal, or signature of the Engineer. They shall not be photocopies of the work product of the Engineer. If the Contractor desires to use elements of such product, the license agreement for transfer of information obtained from the Engineer must be used.
- C. Separate submittals according to individual specification sections. Only resubmit those sections requested for resubmittal.
- D. Unless noted otherwise within each individual section, submittals shall be provided for approval in four distinct phases.
  - 1. Pre-bid
    - a. UON, submittals required prior to the due date for the submission of bids include:
      - 1) Product substitutions, approved alternate or equivalent requests to be reviewed for approval (Prior to Bid) and as described within Substitutions paragraph of this section
      - 2) Alternate personnel credentials to be reviewed for approval
      - 3) As required by individual sections in this Division
  - 2. Bid
    - a. UON, submittals required at the time of the submission of bids include:
      - 1) Bid Response Forms
      - 2) Contractor Qualifications (Previous project references)
        - a) Provide a list of projects (no less than 2) of similar size, scope and type in which the Bidder has performed in a capacity comparable to the size, scope and type outlined in the Construction Documents. Provide the project name, relevant project information for comparison evaluation, and contact names with telephone numbers of each such project.
        - b) Copies of certificates indicating current compliance with requirements of the Quality Assurance paragraphs of each section.
          - i) Certificates or letters indicating factory-authorized dealer status for all major components specified.

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- 3) Personnel Qualifications
    - a) Copies of certificates indicating current compliance with requirements of the Quality Assurance paragraphs of each section.
    - b) On-site system project manager
      - i) Identify by name and include contact information (e-mail, cell phone number, and mailing address).
      - ii) Include list of 2 recent projects under his/her charge, including Project Name, building owner (company or entity), completion date, and a reference contact including name, title, and phone number.

Example:   Gymnasium Expansion  
                  Shelbyville School District  
                  Completed: May 2013  
                  Michael Smith, IT Director  
                  913-742-5000  
                  mrclient@owner.com
  - 4) Voluntary Bid Alternates
  - 5) As required by individual sections in this Division
3. Pre-construction
- a. UON, submittals required after the award of the project to the winning bidder and prior to starting construction.
  - b. Submit the following items after the notice to proceed:
    - 1) Division of Labor amongst sub-contractors. Including:
      - a) Company Name
      - b) Address
      - c) Name of project manager for this project, including:
        - i) E-mail
        - ii) Telephone number
    - 2) Schedule - A progress schedule, based on project final completion date and working backwards. Schedule shall include specific dates based on current completion date and shall include duration and milestones for at least the following:
      - a) Off-site items under the scope of this work including: Shop drawings.
      - b) On-site items under the scope of this work including: completion of equipment buy-out, completion of shop fabrication, rack installation, preliminary field testing of system, system programming, system commissioning, and system first use.
      - c) On-site items under the scope of other work affecting this system including: completion of primary low voltage conduit, completion of secondary low voltage conduit, completion of AC power, completion and securable rack room, completion of ceiling (enough to install components).
      - d) System commissioning (as applicable), including quiet time on site.
    - 3) Personnel and Contractor Qualifications for work pertaining to the following specification section:
      - a) Division 27 Section "Audio Video Systems"
    - 4) Equipment List - A typed list, indexed by Specification section, of products specifically identified by part number (no wild card characters) within each specification section in this Division. Products shall be listed in the same order as in the specification. List shall include length of manufacturer warranty if beyond one year.
    - 5) Manufacturers' Cut-sheets:

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- a) At a minimum all cut-sheets shall contain the following:
  - i) The manufacturers' name and logo somewhere on the page.
  - ii) Identification of all parts, pieces, and equipment. Items shall be specific or highlighted in such a manner that the product(s) being considered are clearly identifiable and distinguished from all other materials, parts or equipment that may be on the cut-sheet.
  - iii) Clear identification of all accessories, additional parts, or derivations of the product being submitted.
  - iv) Sufficient detail for reviewer to identify all required information, such as size, weight, color, NRTL listings, approval or certification information, and other necessary identifying information to confirm product meets specifications.
- b) Cut-sheets are to be in the same order as in the specification.
- c) "Cut-sheet" as used herein, indicates a concise engineering data sheet. Manufacturer's operating guide (owner's manual), quick start guide, or similar are not acceptable.
- d) Equipment list and Manufacturers' Cut-sheets shall be submitted and reviewed before any equipment and material is purchased.
- 6) Samples – refer to individual sections for exact sample requirements.
  - a) Samples requested shall be physical examples that represent materials, equipment or workmanship and establish standards by which the work will be judged. Contractor or Manufacturer shall cover return shipping if sample is to be returned.
- c. Submit the following items sufficiently prior to installation of each respective portion of work:
  - 1) Shop Drawings
    - a) For the Audio Video Systems and associated Common Work such as pathways, boxes, and firestopping.
      - i) Refer to Division 27 Sections "Common Work Results for Communications" and "Audio Video Systems" for exact shop drawing requirements.
  - d. As required by individual sections in this Division
- 4. Project Completion
  - a. UON, submittals that are required after the substantial completion but prior to project closeout include:
    - 1) Record Drawings
      - a) As defined in Record Drawings paragraph within this section
    - 2) Operation and Maintenance Data
      - a) As defined in Operation and Maintenance Data paragraph within this section
    - 3) Project Test Reports
      - a) As defined within specific sections of this Division.
    - 4) Cable Databases (as applicable)
    - 5) Warranty Certificate(s)
      - a) For products and systems with manufacturer warranties beyond 1 year.
    - 6) Lead Installer / Project manager letter with signature stating the project has been installed in accordance with referenced industry standards and contract documents.
    - 7) As required by individual sections in this Division

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- E. Refer to Division 1 for acceptance of electronic submittals for this project. For electronic submittals, Contractor shall submit the documents in accordance with the procedures specified in Division 1. Contractor shall notify the District and Design Consultant that the shop drawings have been posted. If electronic submittal procedures are not defined in Division 1, Contractor shall include the website, user name and password information needed to access the submittals. For submittals sent by e-mail, Contractor shall copy the District and Design Consultant's designated representatives. Contractor shall allow the Design Consultant review time as specified above in the construction schedule. Contractor shall submit only the documents required to purchase the materials and/or equipment in the electronic submittal and shall clearly indicate the materials, performance criteria and accessories being proposed. General product catalog data not specifically noted to be part of the specified product will be rejected and returned without review.
- F. Provide submittals in sufficient detail so as to demonstrate compliance with these Contract Documents and the design concept.
- G. Transmit submittals as early as required to support the project schedule. Allow for two weeks Design Consultant review time, plus to/from review and processing time via the District, plus a duplication of this time for resubmittals, if required. Transmit submittals as soon as possible after Notice to Proceed and before construction starts.
- H. No part of the work shall be started in the shop or in the field until the shop drawings and samples for that portion of the work have been submitted and accepted.
- I. Before transmitting submittals and material lists, verify that the equipment submitted is mutually compatible with and suitable for the intended use. Verify that the equipment will fit the available space and allow ample room for maintenance. If the size of equipment furnished makes necessary any change in location, or configuration, submit a shop drawing showing the proposed layout.
- J. The Contractor is not relieved of the responsibility for dimensions or errors that may be contained on submissions, or for deviations from the requirements of the Contract Documents. The noting of some errors but overlooking others does not grant the Contractor permission to proceed in error. Regardless of any information contained in the shop drawings, product data and samples, the Contract Documents govern the work and are neither waived nor superseded in any way by the review of shop drawings, product data and samples.
- K. Submittals shall contain the following information. Submittals not so identified will be returned to the Contractor without action:
  - 1. The project name
  - 2. The applicable Specification Section and paragraph
  - 3. The submittal date
  - 4. The submitting (sub-)contractor's company name and the project manager's name and contact information.
- L. Each submittal package shall be transmitted independently, each under its own transmittal, and clearly stating the contents of the submittal (i.e. "Equipment List", "Manufacturers' Cut-sheets", etc.). Piecemeal submittals will not be reviewed.
- M. Include dimensional data for roughing in and installation and technical data sufficient to verify that equipment meets the requirements of the Contract Documents. Include wiring and service connection data.
- N. The Design Consultant's checking and subsequent acceptance of such submittals shall not relieve the Contractor from responsibility for deviations from Drawings or Specifications unless he has, in writing, called the Design Consultant's and District's attention to such deviations at the time of submission, and secured written acceptance; nor shall it relieve the Contractor from responsibility for errors in dimensions, details, sizes of members, or quantities; or for omissions of components or fittings; or for not coordinating items with actual building conditions and adjacent work.

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- O. The work described in shop drawing submissions shall be carefully checked by all trades for clearances (including those required for maintenance and servicing), field conditions, maintenance of architectural conditions and coordination with other trades on the job. Each submitted shop drawing shall include a certification that related job conditions have been checked by the Contractor and each Subcontractor and that conflicts do not exist.
- P. Maintain a complete set of reviewed and stamped shop drawings and product data on site. Track any changes to show on the Record Drawings and Operation and Maintenance Manuals.
- Q. Inadequate or incomplete shop drawings, product data and/or samples will not be reviewed and will be returned to the Contractor for resubmittal.

**1.10 ELECTRONIC DRAWING FILES**

- A. In preparation of shop drawings or record drawings, Contractor may, at their option, obtain electronic drawing files in AutoCAD or DXF format from the Engineer for a shipping and handling fee of \$200 for a drawing set up to 12 sheets and \$15 per sheet for each additional sheet. Contractor shall request and complete the Electronic File Release Agreement form from the Engineer. Send the form along with a check made payable to Henderson Engineers, Inc. Contractor shall indicate the desired shipping method and drawing format on the attached form. In addition to payment, District's written authorization and Engineer's release agreement form must be received before electronic drawing files will be sent.

**1.11 SUBSTITUTIONS**

- A. Refer to Bid documents, General and Supplementary Conditions and Division 01 Specification Sections for limitations and restrictions on substitutions in addition to requirements specified herein.
- B. For products, materials, equipment, or systems for which this Division specifically identifies, the Contractor shall use it as the basis for their bid. However, if the Contractor feels a substitute is appropriate for consideration they may submit, as required in these documents prior to bid, for approval by the Design Consultant.
- C. Materials, products and equipment described in the Bidding Documents establish a standard of required function, performance, dimension, appearance and quality to be met by the proposed substitution.
- D. The base bid shall include only the products from manufacturers specifically named in the drawings and specifications.
- E. Request for Substitution:
  - 1. Complete and send the Substitution Request Form attached at the end of this section for each material, product, equipment, or system that is proposed to be substituted.
  - 2. The burden of proof of the merit of the proposed substitution is upon the proposer.
  - 3. Unless stated otherwise in writing to the Engineer by the Contractor, Contractor warrants to the Engineer, and Owner the following:
    - a. Proposed substitution has been fully investigated and determined to meet or exceed the specified Work in all respects.
    - b. Proposed substitution is consistent with the Contract Documents and will produce indicated results, including functional clearances, maintenance service, and sourcing of replacement parts.
    - c. Proposed substitution has received necessary approvals of authorities having jurisdiction.
    - d. Same warranty will be furnished for proposed substitution as for specified Work.
    - e. If accepted substitution fails to perform as required, Contractor shall replace substitute material or system with that originally specified and bear costs incurred thereby.
    - f. Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.
- F. Substitution Consideration:

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1. No substitutions will be considered unless the Substitution Request Form is completed and attached with the appropriate substitution documentation.
2. No substitutions will be considered with receipt of Bids, unless the District and Design Consultant have received from the Bidder a written request for approval to bid a substitution at least ten calendar days prior to the date for receipt of Bids, and have approved the substitution request.
3. Indicate revisions required to adapt substitutions including revisions by other trades. Substitutions that increase the cost of the work of related trades are not permitted.
4. If the proposed substitution is approved prior to receipt of Bids, such approval will be stated in an Addendum. Bidders shall not rely upon approvals made in any other manner, including verbal. Acceptance of substitute equipment manufacturers does not relieve Contractor of the responsibility to provide equipment and materials which meet the performance as stated or implied in the Contract Documents.

**1.12 OPERATION AND MAINTENANCE DATA**

- A. Refer to Division 1 and General Conditions for Operation and Maintenance Data requirements in addition to requirements specified herein.
- B. Prior to Substantial Completion of the project, furnish to the District, for Design Consultant's review, and for the Owner's use, the following Division 27 items:
  1. An electronic transmittal containing the following in PDF file format:
    - a. Equipment List of all installed components
    - b. Manufacturers' Cut-sheets for all installed components
    - c. Manufacturers' installation, operation, service and maintenance data, including all literature supplied with each item of equipment
    - d. Equipment Warranties, guarantees, serial numbers, etc.
    - e. As applicable, all Network documentation, including a list of all active devices connected to the network along with their respective MAC and IP addresses, and passwords
    - f. PDF versions of all system test results
    - g. Project specifications
    - h. Copy of Record Drawings, per Record Drawings paragraph requirements
    - i. Copies of all Shop Drawings not reflected in the above items, including any physical details or other "as installed" items
    - j. Local contacts complete with address and telephone number, for equipment, apparatus, and system components furnished and installed under this Division of the specifications
  2. An electronic transmittal containing the following in raw file format:
    - a. All system software code, as applicable
    - b. Raw file format system test results
  3. As applicable under Division 1, physical printed copies for the Owner's use shall conform to the following:
    - a. Provide electronic PDF file in a three-ring, loose-leaf, hard-back notebook form (binder), divided and tabbed. Utilize clear plastic overlays on the front and spine and create insert with all applicable project and binder information.
    - b. Subdivide major system categories into separate volumes.
    - c. Provide a Table of Contents for each volume.
    - d. Include all raw file format content on electronic media (USB stick or equivalent)
- C. Instruct the Owner's permanent personnel in the proper operation of, startup and shutdown procedures and maintenance of the equipment and components of the systems installed under this Division.
- D. Refer to individual sections in this Division for additional requirements.

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**1.13 APPROVED EQUIVALENTS**

- A. For specific products, materials, equipment, or systems for which this Division specifically identifies the Contractor shall use as the basis for their bid. Where the term approved equivalent or equal is listed the contractor may submit documentation for review by the Design Consultant for approval. The Design Consultant's acceptance or rejection is final.

**1.14 VOLUNTARY ALTERNATE BIDS**

- A. Voluntary alternate bids will be accepted provided they are included in conjunction with a valid base bid or bid approved as an acceptable substitution by the Design Consultant.

**1.15 SPARE PARTS**

- A. Provide to the Owner the spare parts specified in the individual sections of this Division.
- B. Obtain the Owner's or Owner's representative's written acceptance when the specified spare parts for that section are delivered.

**1.16 RECORD DRAWINGS**

- A. Refer to Division 01 and General Conditions for Record Drawings in addition to requirements specified herein.
- B. Maintain on a daily basis a set of jobsite work prints of the Issued for Construction Drawings, reflecting an accurate dimensional record of deviations between work shown on Drawings and that actually installed.
  - 1. Record dimensions clearly and accurately to delineate the work as installed; suitably identify locations of all equipment by at least two dimensions to permanent structures.
  - 2. Pay particular attention to those items that require locating for servicing. This includes, but is not limited to, above-ceiling items such as:
    - a. Backbone cable and conduit routing
    - b. Pullbox and junction box locations
  - 3. Record all wire labeling information.
- C. At the completion of the project, obtain reproducible electronic copies of the final Drawings and incorporate changes noted on the jobsite work prints onto these drawings. These changes shall be done electronically in AutoCAD and saved to PDF and AutoCAD 2007 dwg format. Mark each sheet "Record Drawing", along with the date, and deliver these Record Drawings to the District.
  - 1. Drawings shall utilize the Contractors title block and include specific information indicating the system design was by the Design Consultant.

**1.17 DELIVERY, STORAGE AND HANDLING**

- A. Refer to Division 1 and General Conditions for Delivery, Storage and Handling in addition to requirements specified herein.
- B. Deliver equipment and material to the job site in their original containers with labels intact, fully identified with manufacturer's name, make, model, model number, type, size, capacity and Underwriter's Laboratories, Inc. labels and other pertinent information necessary to identify the item.
- C. Deliver, receive, handle and store equipment and materials at the job site in the designated area and in such a manner as to prevent equipment and materials from damage and loss. Store equipment and materials delivered to the site on pallets and cover with waterproof, tear resistant tarp or plastic or as required to keep equipment and materials dry. Follow manufacturer's recommendations, and at all times, take every precaution to properly protect equipment and material from damage, including the erection of temporary shelters to adequately protect equipment and material stored at the Site. Equipment and/or material which becomes rusted or damaged shall be replaced or restored by the Contractor to a condition acceptable to the District and Design Consultant.
- D. Be responsible for the safe storage of tools, material and equipment.

**1.18 TEMPORARY FACILITIES**

- A. Refer to Division 1 and General Conditions for Temporary Facilities requirements.

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- B. Temporary Utilities: The types of services required include, but are not limited to, electricity, telephone, and internet. When connecting to existing franchised utilities for required services, comply with service companies' recommendations on materials and methods, or engage service companies to install services. Locate and relocate services (as necessary) to minimize interference with construction operations.

**1.19 PROJECT CONDITIONS**

- A. Conditions Affecting Work In Existing Buildings: The following project conditions apply:
1. The Drawings describe the general nature of remodeling to the existing building; however, visit the Site prior to submitting bid to determine the nature and extent of work involved.
  2. Schedule Work in the existing building with the Owner.
  3. Perform certain demolition work prior to the remodeling. Perform the demolition that involves Communications systems, equipment, raceways, equipment supports or foundations and materials.
  4. Remove articles that are not required for the new Work. Unless otherwise indicated, remove each item removed during this demolition from the premises and dispose in accordance with applicable federal, state and local regulations.
  5. Relocate and reconnect Communications facilities that shall be relocated in order to accomplish the remodeling shown in the Drawings or indicated in the Specifications. Where communications equipment or materials are removed, cap unused raceways below the floor line or behind the wall line to facilitate restoration of finish.
  6. Obtain permission from the District for channeling of floors or walls not specifically noted on the Drawings.
  7. Protect adjacent materials indicated to remain. For Work specific to this Division, install and maintain dust and noise barriers to keep dirt, dust, and noise from being transmitted to adjacent areas. Remove protection and barriers after demolition operations are complete.
  8. Locate, identify, and protect Communications services passing through demolition area and serving other areas outside the demolition limits. Maintain services to areas outside demolition limits. When services shall be interrupted, provide temporary services for affected areas.

**PART 2 - PRODUCTS**

**2.1 EQUIPMENT AND MATERIALS**

- A. Use only products listed for their intended use by a NRTL, except products for which no relevant standards exist.
- B. Where products are required to be NRTL listed, classified, approved or otherwise each individual item shall bear the NRTL mark by permanent means.
- C. Provide products and materials that are new, clean, free of defects, and free of damage and corrosion.
- D. Products and materials shall not contain asbestos, PCB, or any other material, which is considered hazardous by the Department of Environmental Protection or any other authority having jurisdiction.
- E. As directed by the District, replace materials of less than specified quality and relocate work incorrectly installed.
- F. Refer to individual sections for labeling requirements.
- G. Install materials and equipment with qualified trade people.
- H. Maintain uniformity of manufacturer for equipment used in similar applications and sizes.
- I. Follow manufacturer's instructions for installing, connecting, and adjusting equipment. Provide a copy of such instructions at the equipment during installation.

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- J. Where factory testing of equipment is required to ascertain performance and attendance by the Owner's representative is required to witness such tests, associated travel costs and subsistence shall be paid for by the Contractor.
- K. Equipment capacities, ratings, etc., are scheduled or specified for job site operating conditions. Equipment sensitive to altitude shall be de-rated with the method of de-rating identified on the submittals.
- L. Enclosures for Communications Infrastructure equipment installed in mechanical equipment rooms shall be NEMA type 1 gasketed. Enclosures for communications Infrastructure equipment installed outdoors shall be NEMA type 3R.
- M. If products and materials are specified or indicated on the drawings for a specific item or system, use those products or materials. If products and materials are not listed in either of the above, use first class products and materials, subject to approval of product data submittal.
- N. Ship and store all products and materials in a manner that will protect them from damage, weather and entry of debris. If items are damaged, do not install, but take immediate steps to obtain a replacement. Repairs of damaged goods will only be permitted with prior written permission of the Owner/Design Consultant.
- O. Part numbers and product codes in these specifications are correct as of the time of writing. Manufacturers may, however, change part numbers and product codes on short notice. In cases where part numbers or product codes differ from technical specifications for a particular product, provide products meeting the minimum technical specifications of the products in the specifications. Notify the Owner/Design Consultant of any product code and or part number changes on the material list submittal.

**PART 3 - EXECUTION**

**3.1 FEES AND PERMITS**

- A. Secure and Pay all required fees and obtain all required permits related to the Communications Infrastructure installation.
- B. Pay royalties or fees in connection with the use of patented devices and systems.

**3.2 SELECTIVE DEMOLITION**

- A. Refer to Division 1, Division 2, and General Conditions for Selective Demolition requirements in addition to the requirements specified herein.
- B. Examine the site to observe existing conditions before submitting a bid.
- C. General: Demolish, remove, demount, and disconnect abandoned communications materials and equipment indicated to be removed and not indicated to be salvaged or saved.
- D. Schedule demolition in advance. Schedule work to avoid disruption of normal operations.
- E. Materials and Equipment to Be Salvaged:
  - 1. Communications Infrastructure equipment to be removed that is in good working order shall be carefully removed and offered to the Owner. Items rejected by the Owner shall be removed from the project site and legally and properly disposed of.
  - 2. Remove, demount, and disconnect existing communications materials and equipment indicated to be removed and salvaged, and deliver materials and equipment to the location designated for storage.
- F. Reconnect circuits serving equipment required to remain in service to other cable termination fields, patch panels or splices as indicated on the Drawings or as appropriate. Provide additional cable and termination hardware where there is insufficient available capacity in remaining existing equipment for reconnection.
- G. Remove existing conduit and wire back to the Communications Equipment room, unless a specific extent of removal is indicated on the Drawings.
- H. Communications Materials and Equipment: Demolish, remove, demount, and disconnect the following items:

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1. Inactive and obsolete raceways, fittings, supports and specialties, equipment, wiring, controls, fixtures, and insulation:
  - a. Raceways and outlets embedded in floors, walls, and ceilings may remain if such materials do not interfere with new installations. Cut embedded raceways to below finished surfaces, seal, and refinish surfaces as specified or as indicated on the Architectural finish Drawings. Remove materials above accessible ceilings. Cap raceways allowed to remain.
  - b. Perform cutting and patching required for demolition in accordance with Division 1, General Conditions and "Cutting and Patching" portion of this Section in Division 27.

### 3.3 EXISTING CONDITIONS

- A. Existing conditions indicated on the Drawings are taken from the best information available from the Owner, existing record drawings, and from limited, in-situ, visual site observations; and, they are not to be construed as "AS BUILT" conditions. The information is shown to help establish the extent of the new Work.
- B. Verify all actual existing conditions at the project site and perform the Work as required to meet the existing conditions and the intent of the Work indicated.

### 3.4 EXISTING SERVICES

- A. Existing Communications Infrastructure services not specifically indicated to be removed or altered shall remain as they presently exist.
- B. Where existing services interfere with new construction, alter or reroute such existing equipment to facilitate new construction after obtaining written permission from the District. Notify in writing giving two weeks advance notice or planned alteration prior to altering any existing condition is required.
- C. Schedule and coordinate with the Utility Company, and with the District all connections to, relocation of, or discontinuation of normal services from any existing service provider line. Include all premium time required for all such work in the Bid.
- D. Preserve continuity of service of existing facilities (related to damage or alteration due to new construction). Unauthorized alteration to existing equipment shall be corrected without additional cost to the Owner.
- E. Repair all existing utilities damaged due to construction operations to the satisfaction of the Owner or Utility Company without additional cost.
- F. Do not leave utilities disconnected at the end of a workday or over a weekend unless authorized by representatives of the Owner.
- G. Make repairs and restoration of utilities before workmen leave the project at the end of the workday in which the interruption takes place.
- H. Include in Bid the cost of furnishing temporary facilities to provide all services during interruption of normal utility service.

### 3.5 EXAMINATION OF SITE

- A. Prior to the submitting of bids, visit the project site and become familiar with all conditions affecting the proposed installation and make provisions as to the cost thereof.
- B. The Contract Documents do not make representations regarding the character or extent of the sub-soils, water levels, existing structural, mechanical, electrical and Communications installations, above or below ground, or other sub-surface conditions which may be encountered during the work. Evaluate existing conditions, which may affect methods or cost of performing the work, based on examination of the site or other information. Failure to examine the Drawings or other information does not relieve the Contractor of responsibility for satisfactory completion of the work.

### 3.6 WORK IN EXISTING FACILITIES

- A. The Drawings describe the general nature of remodeling to the existing facilities; however, visit the Site prior to submitting a Bid, to determine the nature and extent of Work involved.
- B. Schedule Work in the existing facility with the Owner.

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- C. Certain demolition work shall be performed prior to the remodeling. Perform the demolition that involves Communications systems, fixtures, conduit, wiring, equipment, equipment supports or foundations and materials.
- D. Remove all of these articles that are not required for the new Work. Unless otherwise indicated, each item removed during this demolition shall be removed from the premises and disposed of in accordance with all state and local regulations.
- E. Channel walls and floors as required to produce the desired result; however, obtain permission from the Owner for all channeling not specifically noted on the Drawings.

**3.7 CLEANING**

- A. Avoid accumulation of debris, boxes, loose materials, crates, etc., resulting from the installation of this work. Remove from the premises each day all debris, boxes, etc., and keep the premises clean and free of dust and debris.
- B. Immediately prior to final inspection, make a final cleanup of dirt and refuse resulting from Work and assist in making the premises vacuum clean. Clean all material and equipment installed under this Division.
- C. Clean all fixtures and equipment at the completion of the project. Wipe clean exposed lighting fixture reflectors and trim pieces with a non-abrasive cloth just prior to occupancy.
- D. Remove dirt, dust, plaster, stains, and foreign matter from all surfaces.
- E. Touch up and restore damaged finishes to their original condition.
- F. All Communications Infrastructure equipment shall be thoroughly vacuumed and wiped clean prior to startup and at the completion of the project. Equipment shall be opened for observation by the District as required.

**3.8 DELIVERY, DRAYAGE AND HAULING**

- A. Provide drayage, hauling, hoisting, shoring and placement in the building of equipment specified and be responsible for the timely delivery and installation of equipment as required by the construction schedule. If any item of equipment is received prior to the time that it is required, and provide proper storage and protection until the time it is required. Pay for all costs of demurrage or storage.
- B. If equipment is not delivered or installed at the project site in a timely manner as required by the project construction schedule, then Contractor shall be responsible for resulting disassembly, re-assembly, manufacturer's supervision, shoring, general construction modification, delays, overtime costs, etc. at no additional cost to the Owner.

**3.9 EQUIPMENT AND MATERIAL PROTECTION**

- A. Protect the work, equipment, and material of other trades from damage by work or workmen of this trade, and correct damaged caused without additional cost to the Owner.
- B. Take responsibility for work, materials, and equipment until finally inspected, tested and accepted. Protect work against theft, injury, or damage, and carefully store material and equipment received on site, which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of obstructing material. Cover and protect equipment and materials from damage due to water, spray-on fireproofing, construction debris, etc. Store equipment to moisture damage in dry, heated spaces.
- C. Provide adequate means for fully protecting finished parts of materials and equipment against damage from whatever cause during the progress of the work until final acceptance. Protect materials and equipment in storage and during construction in such a manner that no finished surfaces will be damaged or marred, and moving parts are kept clean and dry. Do not install damaged items; take immediate steps to obtain replacement or repair.

**3.10 ADJUSTING, ALIGNING AND TESTING**

- A. Adjust, align and test all Communications equipment furnished and/or installed under this Division.
- B. Check and test protective devices for specified and required application, and adjust as required.

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- C. Verify that completed wiring system is free from short circuits, unintentional grounds, low insulation impedances, and unintentional open circuits.
- D. Notify the District immediately of all operational failures caused by defective material, labor or both.
- E. Refer to individual Sections for additional and specific requirements.

**3.11 START-UP OF SYSTEMS**

- A. Prior to start-up of Communications systems, check all components and devices, to confirm compliance with manufacturers' recommended installation procedures.
- B. Demonstrate that all equipment and systems perform properly as designed per Drawings and Specifications.
- C. Refer to individual Sections for additional and specific requirements.

**3.12 OPERATING INSTRUCTIONS**

- A. Instruct Owner's operating personnel in proper starting sequences, operation, shutdown, general maintenance and preventative maintenance procedures, including normal and emergency procedures.
- B. Refer to individual Sections for additional and specific requirements.

**3.13 SUBSTANTIAL COMPLETION REVIEW**

- A. Prior to requesting a site observation for "CERTIFICATION OF SUBSTANTIAL COMPLETION", complete the following items:
  - 1. Submit complete Operation and Maintenance Data.
  - 2. Submit complete Record Drawings.
  - 3. Perform all required training of Owner's personnel.
  - 4. Turn over all spares and extra materials to the Owner, along with a complete inventory of spares and extra materials being turned over.
  - 5. Perform start-up tests of all systems.
  - 6. Remove all temporary facilities from the site.
  - 7. Comply with all requirements for Substantial Completion in the Division 1 and General Conditions.
- B. Request in writing a review for Substantial Completion. Give the District at least seven (7) days notice prior to the review.
- C. State in the written request that the Contractor has complied with the requirements for Substantial Completion.
- D. Upon receipt of a request for review, the District will either proceed with the review or advise the Contractor of unfilled requirements.
- E. If the Contractor requests a site visit for Substantial Completion review prior to completing the above-mentioned items, then provide reimbursement to the District and Design Consultant for time and expenses incurred for the visit.
- F. Upon completion of the review, the District and Design Consultant will prepare a "final list" of outstanding items to be completed or corrected for final acceptance.
- G. Omissions on the "final list" shall not relieve the Contractor from the requirements of the Contract Documents.
- H. Prior to requesting a final review, submit a copy of the final list of items to be completed or corrected. State in writing that each item has been completed, resolved for acceptance or the reason it has not been completed.

**3.14 EARLY OCCUPANCY**

- A. Failure to meet the Substantial Completion date can result in the Owner needing to take early occupancy. Complete the systems which are necessary to allow partial early occupancy of the building by original Substantial Completion date.
  - 1. Refer to individual sections for additional requirements.

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- B. Verify and comply with requirements for temporary occupancy with the local Building and Fire Departments.

**END OF SECTION 270010**

**SUBSTITUTION REQUEST FORM**

To Project Engineer: \_\_\_\_\_ Request # (GC Determined): \_\_\_\_\_

Project Name: \_\_\_\_\_

Project No/Phase: \_\_\_\_\_ Date: \_\_\_\_\_

Specification Title: \_\_\_\_\_

Section Number: \_\_\_\_\_ Page: \_\_\_\_\_ Article/Paragraph: \_\_\_\_\_

Proposed Substitution: \_\_\_\_\_

Manufacturer: \_\_\_\_\_ Model No.: \_\_\_\_\_

Address: \_\_\_\_\_ Phone: \_\_\_\_\_

History:  New product  1-4 years old  5-10 years old  More than 10 years old

Differences between proposed substitution and specified Work: \_\_\_\_\_

Point-by-point comparative data attached – REQUIRED BY ENGINEER  
Comparative data may include but not be limited to performance, certifications, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements. Include all information necessary for an evaluation.

Supporting Data Attached:  Drawings  Product Data  Samples  
 Tests  Reports  Other: \_\_\_\_\_

Reason for not providing specified item: \_\_\_\_\_

Similar Installation:  
Project: \_\_\_\_\_ Architect: \_\_\_\_\_

Address: \_\_\_\_\_ Owner: \_\_\_\_\_

\_\_\_\_\_ Date Installed: \_\_\_\_\_

Proposed substitution affects other parts of Work:  No  Yes; explain: \_\_\_\_\_

