

## **SECTION 27 01 00 -BASIC COMMUNICATIONS REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. All drawings and general provisions of Contract, including all General and Supplementary Conditions, Division 1 Specification Sections, and Instructions to Bidders apply to this section and all other sections of Division 26 and 27.

#### **1.2 SCOPE OF WORK**

- A. Include in bid all labor, materials, tools, plant, transportation, excavation, training, equipment, insurance, temporary protection, permits, taxes and all necessary and related items required to provide complete and operational systems shown and described
- B. The division 26 and 27 documents include work that is part of the cabling prime contract or the combined electrical cabling contract.
- C. References to codes and Standards called for in the Contract Documents mean the latest edition, amendment and revisions to the codes and standards in effect on the date of these Contract Documents.
- D. Minimum composition requirements and/or installation methods for the following materials and work are included in this section:
  - 1. Miscellaneous Supports
  - 2. Access Doors and Panels
  - 3. Fire Stopping
  - 4. Flashing and Sealing
  - 5. Cutting and Patching
  - 6. General cable requirements

#### **1.3 REGULATIONS AND CODE COMPLIANCE**

- A. All work and materials shall conform to and be installed, inspected and tested in accordance with the governing rules and regulations of federal, state and local governmental agencies. The following is a list of codes and standards that will apply to this project:
  - 1. New York State Uniform Fire Prevention and Building Code.
  - 2. New York State Energy Conservation Construction Code.
  - 3. New York State Department of Labor Rules and Regulations.
  - 4. New York State Department of Health.
  - 5. Federal Occupational Safety and Health Administration - OSHA.
  - 6. National Life Safety Code, NFPA 101.
  - 7. National Electrical Code, NFPA 70.
  - 8. Local Codes and Ordinances for the town of Greece
  - 9. NEMA Standards
  - 10. Underwriters Laboratory (UL)
  - 11. Factory Mutual and/or Owner's Insurance Carrier
  - 12. International Standards Organization (ISO)

13. New York State Education Department - "Manual of Planning Standards"
14. ANSI/TIA/EIA - Building Telecommunications Standards
15. BICSI Telecommunications Distribution Methods Manual
16. IEEE Standards
17. IETF RFCs
18. Federal Communications Commission

#### **1.4 LICENSING & PERMITS**

- A. The Contractor shall hold a license to perform the work as issued or recognized by the Town of Greece.
- B. Apply for and obtain all required permits and inspections, include costs for all fees and charges within bid.
- C. Refer to Division 1 sections for additional requirements.

#### **1.5 GLOSSARY**

ADA	Americans with Disabilities Act
AIA	American Institute of Architects
ANSI	American National Standards Institute
ASTM	American Society for Testing Materials
BICSI	Building Industry Consulting Services International
EIA	Electronic Industries Association
ELFEXT	Equal Level far end cross talk
FCC	Federal Communications Commission
FEXT	Far end cross talk
FM	Factory Mutual Insurance Company
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IRI	Industrial Risk Insurers
ISO	International Standards Organization
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NEXT	Near end Cross Talk
NYBFU	New York board of Fire Underwriters
NYS/DEC	New York State Department of Environmental Conservation
NYS/UFBC	New York State Uniform Fire Prevention and Building Code
OSHA	Occupational Safety and Health Administration
PSELFEXT	Power sum equal level far end cross talk
TIA	Telecommunications Industry Association
UFPO	Underground Facilities Protective Organization
UL	Underwriter's Laboratories, Inc.

## 1.6 DEFINITIONS

Approved / Approval	Written permission to use a material or system.
As Called for	Materials, equipment including the execution specified/shown in the contract documents.
Code Requirements	Minimum requirements.
Concealed inside walls, above ceilings, in slabs or below	Work installed in pipe and duct shafts, chases or recesses, grade.
Design Equipment	Refer to the article, BASIS OF DESIGN.
Design Make	Refer to the Article, BASIS OF DESIGN.
Equal or Equivalent	Equally acceptable as determined by Owner's Representative.
Exposed	Work not identified as concealed.
Final Acceptance certified	Owner acceptance of the project from Contractor upon by Owner's Representative.
Furnish	Supply and deliver to installation location.
Furnished by Others	Receive delivery at job site or where called for and install.
Inspection	Visual observations by Owner's site Representative.
Install ready	Mount and connect equipment and associated materials for use.
Labeled	Refers to classification by a standards agency.
Make	Refer to the article, BASIS OF DESIGN.
Or Approved Equal	Approved equal or equivalent as determined by Owner's Representative.
Owner's representative	The Prime Professional
Prime Professional	Architect or Engineer having a contract directly with the Owner for professional services.
Provide	Furnish, install and connect ready for use.
Relocate	Disassemble, disconnect, and transport equipment to new locations, then clean, test, and install ready for use.
Replace	Remove and provide new item.

Review                      A general contractual conformance check of specified products.

Roughing                  Pipe, duct, conduit, equipment layout and installation.

Satisfactory              As specified in contract documents.

Refer to Division 1 sections for further definitions.

## **1.7 BASIS OF DESIGN**

- A. The contract documents are prepared on basis of one manufacturer as "design make," even though other manufacturers' names are listed as acceptable makes. If Contractor elects to use one of the listed makes other than "design equipment," submit detailed drawings, showing that the proposed equipment from an acceptable manufacturer meets or exceeds the specifications of the design make.

## **1.8 INTENT OF DRAWINGS**

- A. The drawings are diagrammatic, unless detailed dimensioned drawings are included. Drawings show approximate locations of equipment, and fixtures. Exact locations are subject to the approval of the Owner's Representative.

## **1.9 SUBMITTALS**

- A. Provide (5) sets or electronic files for all devices, cabling, and equipment in division 27 specifications.

## **1.10 QUALITY ASSURANCE**

- A. Manufacturers of equipment shall be firms regularly and currently engaged in the production of equipment and accessories provided. Unless otherwise noted the equipment provided for this project needs to have been in satisfactory and efficient operation on at least three (3) installations for not less than three (1) year.
- B. Suppliers of equipment must have factory trained and authorized personnel for the service of all equipment provided.
- C. Apply and install materials, equipment, and specialties in accordance with manufacturer's written instructions. Conflicts between the manufacturer's instructions and the contract documents shall be referred to the Owner's Representative for resolution.
- D. The contractors installers shall have been regularly engaged in the installation, termination and testing of the all equipment, cabling and devices called for in this contract for a minimum of (5) five years
- E. The contractor shall engage the services of a qualified installer for the installation of access panels and cutting and patching work.

## **PART 2 - PRODUCTS**

### **2.1 EQUIPMENT AND MATERIAL MINIMUM REQUIREMENTS**

- A. Provide Materials That Meet the Following Minimum Requirements:
1. Materials shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less, in accordance with NFPA 255.
  2. All equipment and material for which there is a listing service shall bear a UL label.
  3. Electrical equipment and systems shall meet UL Standards and requirements of the N.E.C. This listing requirement applies to the entire assembly. Any modifications to equipment to suit the intent of the specifications shall be performed in accordance with these requirements.
  4. Equipment shall meet all applicable FCC Regulations
  5. All materials, unless otherwise specified, shall be new and be the standard products of the manufacturer. Used equipment or damaged material will be rejected.
  6. The listing of a manufacturer as "acceptable" does not indicate acceptance of a standard or catalogued item of equipment. All equipment and systems must conform to the Specifications and meet the quality of the design make.
  7. Materials used in this contract shall meet the N.Y.S. Fire, Gas and Toxicity Requirements and be listed in the directory of approved products filed under Article 15 Part 1120 of the New York State Fire Prevention and Building Code for use in New York State.

### **2.2 SUBSTITUTIONS**

- A. The Materials, products and equipment described in the Bidding Documents establish a standard of required quality, functions, dimensions and appearance that must be met by any proposed substitution.
- B. Proposed substitutions must be submitted in writing to the Architect and Engineer a minimum of ten (10) days after the award of contract. Each request shall include the name of the proposed material equipment being substituted, cut sheets, installation drawings, performance and test data, warranties and location of three (3) similar installations with reference names of Owner or Facility personnel responsible for maintaining equipment. At that time the equipment will be evaluated and if determined to be acceptable.

- C. Requests for substitution shall be made only by a Bidder. Requests for substitution from sales representatives, vendors or suppliers are unacceptable and will not be considered.
- D. Under no circumstances shall the Architect and Engineer be required to prove that an item proposed for substitution is not equal to the specified item. The contractor shall submit evidence to support the equality of the proposed substitute. The Architect and Engineers decision shall be final and without further recourse.
- E. Should the proposed substitution be rejected, the contractor shall provide the specified item.

## **2.3 FACTORY-ASSEMBLED PRODUCTS**

- A. Provide maximum standardization of components to reduce spare part requirements.
- B. Manufacturers of equipment assemblies which include components made by others shall assume complete responsibility for final assembled unit.
  - 1. All components of an assembled unit need not be products of same manufacturer.
  - 2. Constituent parts which are alike shall be product of a single manufacturer.
  - 3. Components shall be compatible with each other and with the total assembly for intended service.
  - 4. Contractor shall guarantee performance of assemblies of components, and shall repair or replace elements of the assemblies as required to deliver specified performance of the complete assembly.
- C. Components of equipment shall bear manufacturer's name or trademark, model number and serial number on a name plate securely affixed in a conspicuous place, or cast integral with, stamped or otherwise permanently marked upon the components of the equipment.
- D. Major items of equipment which serve the same function must be the same make and model. Exception will be permitted if performance requirements cannot be met.

## **2.4 COMPATIBILITY OF RELATED EQUIPMENT**

- A. Equipment and materials installed shall be compatible in all respects with other items being furnished so that a complete and fully operational system will result.

## **2.5 SPECIAL TOOLS**

- A. If any part of equipment requires a special tool for assembly, adjustment or maintenance thereof and such tool is not readily available on commercial tool market, it shall be furnished by the Contractor.

## **2.6 LIFTING ATTACHMENTS**

- A. Provide equipment with suitable lifting attachments to enable equipment to be lifted in its normal position. Lifting attachments shall withstand any handling conditions which might be encountered without bending or distortion of shape, such as rapid lowering and braking of load.

## **2.7 MISCELLANEOUS SUPPORTS**

- A. Metal bars, plates, tubing, etc. shall conform ASTM standards:
  - 1. Steel plates, shapes, bars, and grating - ASTM A 36
  - 2. Cold-Formed Steel Tubing - ASTM A 500
  - 3. Hot - Rolled Steel Tubing - ASTM A 501
  - 4. Steel Pipe - ASTM A 53, Schedule 40, welded
- B. Metal Fasteners shall be Zinc-coated (type, grade and class as required)

## **2.8 GENERAL CABLE REQUIREMENTS**

- A. Interior Backbone optical fiber cables included in this project, passing through two or more floors shall be suitable, listed and marked for use in a riser or plenum application. Riser cable shall minimally be CMR or OFNR rated per the 1999 National Electric Code and shall meet all local and state codes.
- B. All Category 3 backbone cables, Category 5 and Enhanced Category 5 horizontal cables shall be minimally rated for use in plenum application and CMP rated per the 1999 National Electric Code.
- C. Exterior copper backbone cables shall be twisted 24 AWG, contain a corrugated aluminum shield and be CMP rated unless installed in conduit in which case CMR will be acceptable.
- D. Exterior cables shall be jel-filled.

## **2.9 FIRE STOPPING**

- A. Fire-stopping for Openings Through Fire and Smoke Rated Walls and Floor Assemblies shall be listed or classified by an approved independent testing laboratory for "Through-Penetration Fire-Stop Systems." The system shall meet the requirements of "Fire Tests of Through-Penetration Fire-Stops" designated ASTM E814.
- B. All fire stopping materials must be putty or pillow type suitable for future reentry. Foam sealants are not acceptable.
- C. Design Make: Nelson Electric Inc. Flameseal II Putty FSP repenatrable putty bars

and Ceramic fiber bags

D. Acceptable Manufacturers:

1. Dow Corning
2. International Protective Coatings
3. Thomas & Betts
4. Carborundum.

### **Part 3 - EXECUTION**

#### **3.1 SHOP DRAWINGS/PRODUCT DATA/SAMPLES**

- A. Submit Shop Drawings on all items of equipment and materials to be furnished and installed. Submission of Shop Drawings and samples shall be accompanied by a transmittal letter, stating name of project and contractor, number of drawings, titles, and other pertinent data called for in individual sections. Shop Drawings Shall Be Dated and Contain: Name of project; name of prime professional; name of prime contractor; description or names of equipment, materials and items; and complete identification of locations at which materials or equipment are to be installed. Incomplete submittals will not be accepted. All products specified in a individual Division 27 section shall be submitted at the same time. Number each submittal. Indicate deviations from contract requirements on Letter of Transmittal. Corrections or comments made on the Shop Drawings during the review do not relieve Contractor from compliance with requirements of the drawings and specifications. The Contractor is responsible for confirming and correcting all quantities; checking electrical characteristics and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.

#### **3.2 WORKMANSHIP AND WARRANTY**

- A. Workmanship shall meet or exceed industry standards and be fully guaranteed for one full year from final acceptance.
- B. Cable integrity and associated terminations shall be thoroughly inspected , fully tested and guaranteed as free from defects, transpositions, opens-shorts, tight kinks, damaged jacket insulation etc.
- C. All labor must be thoroughly competent and skilled, and all work shall be executed in strict accordance with the best practice of the trades.
- D. The Contractor shall be responsible for and make good, without expense to the Owner, any and all defects arising during the warranty period that are due to imperfect materials, appliances, improper installation or poor workmanship.



### 3.3 PROTECTION OF PERSONS AND PROPERTY

- A. Contractor shall assume responsibility for Construction Safety at all times and provide, as part of contract, all trench or building shoring, scaffolding, shielding, dust/fume protection, mechanical/electrical protection, special grounding, safety railings, barriers, and other safety feature required to provide safe conditions for all workmen and site visitors.

### 3.4 STORAGE AND PROTECTION OF MATERIALS

- A. Store Materials on dry base, at least 6" above-ground or floor. Store so as not to interfere with other work or obstruct access to buildings or facilities. Provide waterproof/windproof covering. Remove and provide special storage for items subject to moisture damage. Protect against theft or damage from any cause. Replace items stolen or damaged, at no cost to Owner.
- B. Refer to Division 1 sections for additional requirements.

### 3.5 ROUGH-IN

- A. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, etc. Verify final locations for rough-ins with field measurements and with the equipment being connected. Verify exact location and elevations at work site prior to any rough in work. **DO NOT SCALE PLANS.** If field conditions, details, changes in equipment or shop drawing information require a significant change to the original documents, contact the owners representative for approval before proceeding.
- B. All equipment locations shall be coordinated with other trades to eliminate interference with required clearances for equipment maintenance and inspections.
  - 1. Coordinate work with other trades and determine exact routing of all cable tray, hangers, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Verify with Owner's Representative exact location and mounting height of all equipment in finished areas, such as equipment racks, communication and electrical devices. Coordinate all work with the architectural reflected ceiling plans and Architecture.
  - 2. Before roughing for equipment furnished by Owner or in other contracts, obtain from Architect and other Contractors, approved roughing drawings giving exact location for each piece of equipment. Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment. Obtain written authorization from the owners representative or other contractor for any "rough ins" that, due to project schedule, are required before approved coordination drawings are available. Any work installed without written authorization or approved coordination drawings, causing a conflict will be relocated by the electrical contractor at no expense to the Owner.

3. For equipment and connections provided in this contract, prepare roughing drawings as follows:
    - a) New equipment: Obtain equipment roughing drawings and dimensions, then prepare rough-in drawings.
  4. Where more than one trade is involved in an area, space or chase, all shall cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements. In general, ductwork shall be given preference except where grading of piping becomes a problem, followed by piping then electrical wiring and communications. If, after installation of any equipment, piping, ducts, conduit, and boxes, it is determined that ample maintenance and passage space has not been provided, rearrange work and/or furnish other equipment as required for ample maintenance space. Any changes in the size or location of the material or equipment supplied, which may be necessary in order to meet field conditions or in order to avoid conflicts between trades, shall be brought to the immediate attention of the Owner's Representative and approval received before such alterations are made.
- C. Provide easy, safe, and code mandated clearances at equipment racks and enclosures, and other equipment requiring maintenance and operation.
- D. The Contractor shall be responsible for all required locations, cutting, patching, coring and associated work for the complete cabling system at no additional cost to the Owner.

### **3.6 CUTTING AND PATCHING**

- A. All cutting patching and installation of sleeves for cabling work shall be by the Division 26 contractor. The Division 27 contractor shall identify all required sleeve locations for the Division 26 contractor, prior to the division 16 contractor beginning the raceway work.

### **3.7 CONCEALMENT**

- A. Conceal all contract work above ceilings and in walls, below slabs, and elsewhere throughout building

### **3.8 FIRE-STOPPING**

- A. Fire-stopping for Openings Through Fire and Smoke Rated Wall and Floor Assemblies:
  - 1. Provide materials and products listed or classified by an approved independent testing laboratory for "Through-Penetration Fire-Stop Systems." The system shall meet the requirements of "Fire Tests of Through-Penetration Fire-Stops" designated ASTM E814.
  - 2. Provide fire-stop system seals at all locations where cables pass through sleeves in rated partitions and floors.
  - 3. The minimum required fire resistance ratings of the wall or floor assembly shall be maintained by the fire-stop system. The installation shall provide an air and watertight seal.
  - 4. The methods used shall incorporate qualities which permit the easy removal or addition cables without drilling or use of special tools. The product shall adhere to itself to allow repairs to be made with the same material and permit the vibration, expansion and/or contraction of any items passing through the penetration without cracking, crumbling and resulting reduction in fire rating. Provide the following ratings:
    - a) Floors - 3 Hours
    - b) Corridor walls - 1-2 hours
    - c) Smoke Partitions - 1 hour
  - 5. Use firestop pillows for cable tray penetrations.

### **3.9 WATERPROOFING**

- A. The contractor shall seal all foundation penetrating conduits and sleeves to eliminate the intrusion of moisture and gases into the building.
- B. Conduits with cables shall be permanently sealed by firmly packing the void around the cable with oakum and capping with 2 inches of hydraulic cement or waterproof duct seal.
- C. Spare conduits shall be plugged with expandable plugs.

### **3.10 SUPPORTS**

- A. Provide required supports, beams, angles, hangers, rods, bases, braces, and other items to properly support contract work. Supports shall meet the approval of the Owner's Representative. Modify studs, add studs, add framing, or otherwise reinforce studs in metal stud walls and partitions as required to suit contract work. If necessary, in stud walls, provide special supports from floor to structure above. For precast Panels/Planks and Metal Decks, support communication work as determined by manufacturer and Owner's Representative. Provide heavy gauge steel mounting plates for mounting contract work. Mounting plates shall span two or more studs. Size, gauge, and strength of mounting plates shall be sufficient for equipment size, weight, and

desired rigidity.

### **3.11 GENERAL INSTALLATIONS REQUIREMENTS**

- A. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed
- B. Coordinate ordering and installation of all equipment with long lead times or having a major impact on work by other trades so as not to delay the job or impact the construction schedule. Pay close attention to equipment that must be installed prior to building enclosure.
- C. Where mounting heights are not detailed or dimensioned, install systems, materials and equipment to provide the maximum headroom possible.
- D. Set all equipment to accurate line and grade, level all equipment and align all equipment components.
- E. Provide all scaffolding, rigging, hoisting and services necessary for erection and delivery of equipment and apparatus furnished into the premises. These items shall be removed from premises when no longer required.
- F. No equipment shall be hidden or covered up prior to inspection by the owners representative. All work that is determined to be unsatisfactory shall be corrected immediately.
- G. All work shall be installed level and plumb, parallel and perpendicular to other building systems and components.
- H. Install access panels or doors where units are concealed behind finished surfaces.

### **3.12 UTILITY COMPANY SERVICES**

- A. Provide all trenching and installation for raceway system from the Utility pole as designated by the ISP. Electrical contractor will furnish and install the conduit.
- B. The data cabling contractor shall be responsible for the coordination of cable TV service with Spectrum.

### **3.13 PAINTING**

- A. The data Cabling Contract Includes the following :
  - 1. Painting required for touch-up of surfaces damaged due to the installation of division 27 work.
  - 2. Painting as required to repair finish of equipment furnished.
  - 3. Refer to Section 099000-Painting for general description of materials and methods
  - 4. Painting as called for on Division 27 Drawings.

### **3.14 ADDITIONAL ENGINEERING SERVICES**

- A. In the event that the Consultant is required to provide additional engineering services as a result of substitution of equivalent materials or equipment by the Contractor, or changes by the Contractor in dimension, weight, power requirements, etc., of the equipment and accessories furnished, or if the Consultant is required to examine and evaluate any changes proposed by the Contractor for the convenience of the Contractor, then the Consultant's expenses in connection with such additional services shall be paid by the Contractor and may be deducted from any moneys owed to the Contractor.
- B. In the event that the Consultant is required to provide additional engineering services as a result of Contractor's errors, omissions or failure to conform to the requirements of the Contract Documents, or if the Consultant is required to examine and evaluate any changes proposed by the Contractor solely for the convenience of the Contractor, then the Consultant's expense in connection with such additional services shall be paid by the Contractor and may be deducted from any monies owed to the Contractor.

### **3.15 TEMPORARY FACILITIES**

- A. Refer to Section 015000 for additional requirements.

### **3.16 CLEANING**

- A. It is the Contractor's responsibility to keep clean all equipment provided under this contract for the duration of the project. Keep the premises free from an accumulation of waste material or rubbish caused by his operations. The facilities require an environment of extreme cleanliness, and it is the Contractor's responsibility to adhere to the regulations. After all tests are made and installations completed satisfactorily:
  - 1. Thoroughly clean entire installation, both exposed surfaces and interiors.
  - 2. Remove all debris caused by work.
  - 3. Remove tools, surplus, materials, when work is finally accepted.

### **3.17 RECORD DOCUMENTS**

- A. Prepare and provide record documents in accordance with Section 017300 and requirements of Section 270000 Sections.

**END OF SECTION**

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