

Division 27 – COMMUNICATION/DATA, PATHWAYS, AND WIRING

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Voice, Data, and Fiber Cable Product materials
- B. Voice, Data, and Fiber Cable Execution directions

1.2 RELATED SECTIONS

- A. Section 16111 – Conduit
- B. Section 16130 – Boxes

1.3 RELATED DOCUMENTS

- A. Drawings and general provision of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.4 SYSTEM DESCRIPTION

- A. A cable system consisting of copper cables, and fiber backbone cables, routed between various telecommunications outlets and their designated telephone rooms, and between the primary telephone room (MDF) and intermediate telephone rooms (IDF's), as shown on the Drawings.

1.5 CONTRACTOR DELIVERABLES/PRELIMINARY MEETINGS

- A. In the bid response, the Contractor shall provide a complete and itemized list of products intended for use, warranty documentation for the products chosen, and credentials for the personnel who will lead this project.
- B. Prior to shop drawing submittals, an Initial Planning Meeting will be held for the Contractor and the Owner to clarify all requirements (systems, services, distribution methods, etc.), to identify responsibilities, and to schedule the events that will transpire during the implementation of the project.
- C. At the subsequent Product and Design Meeting, the Contractor will bring product submittals for each component of the proposed system, and be prepared to ask any questions related to installation. No material shall be ordered or installed until reviewed and approved by the Owner and Designer.

1.6 QUALITY ASSURANCE

- A. The Contractor shall be a firm with at least 5 years of experience of successful installation experience with projects utilizing unshielded twisted pair cabling (UTP), Category 5E and Category 6 in compliance with EIA/TIA-568.
- B. The Contractor shall have a permanent service organization with an office located within thirty miles of project site.
- C. The firm must have an RCDD on staff. In addition, the lead technician MUST be BICSI certified at the Technician Level prior to leading the installation of cabling on the project. The same technician must be the lead technician for the duration of the project or be replaced by a technician with the same credentials.
- D. The Contractor shall utilize certified cable technicians with approved manufacturer-specific certification.
- E. The Contractor shall perform all installation work according to the principles outlined in:
 - 1. ANSI/TIA/EIA-568B: "Commercial Building Telecommunications Cabling Standard"

2. ANSI/TIA/EIA-569: "Commercial Building Standard for Telecommunications Pathways and Spaces"
 3. ANSI/TIA/EIA-606: "Administration Standard for Telecommunications Infrastructure of Commercial Buildings"
 4. NFPA 70: "National Electrical Code"
 5. BICSI Telecommunication Distribution Methods Manual
 6. IEEE Bonding and Grounding Best Practices
 7. And generally accepted industry practices
- F. The Contractor shall provide materials that are NRTL (Nationally Recognized Testing Laboratory) listed and labeled, as defined in the "National Electrical Code," Article 100 and FCC Regulations, "Title 47 of the Code of Federal Regulations", Part 68, Chapter 1.

1.7 GENERAL REQUIREMENTS

- A. The Contractor shall provide any necessary screws, anchors, clamps, tie wraps, distribution rings, miscellaneous grounding and support hardware, etc. necessary to facilitate the installation of the system in a neat and orderly fashion.
- B. It shall be the responsibility of the Contractor to furnish any special installation equipment or tools necessary to properly complete the system. This may include, but is not limited to, tools for terminating, testing, and splicing copper cables, jack stands for cable reels, and/or cable winches.

1.8 WARRANTY/REPAIR SERVICE

- A. The Contractor shall provide a two (2) year warranty for both products and labor.
- B. The Contractor must provide repair service within sixteen business hours for routine service, and within eight business hours of notification for outages deemed by the Owner to be an Emergency, which includes but is not limited to outages of more than five stations or a critical emergency service station.

PART 2 - PRODUCTS

2.0 GENERAL

- A. All like items of products provided must be new and of the same manufacturer and meet the performance requirements for that item as shown in this specification or industry standards, whichever is more stringent.
- B. All system components must be selected and installed as a complete systems-solution, providing a manufacturer's certified warranty for a minimum of five years.
- C. Approved systems solutions manufacturers are:

1. Essex Cable	Ortronics Station Outlets	Ortronics Patch Panels
2. Commscope Cable	Uniprise Station Outlets	Uniprise Patch Panels
3. General Cable	Panduit Station Outlets	Panduit Patch Panels
- D. Return air plenum environments are indicated on the drawings. All cables shall meet or exceed the appropriate flame retardant requirement for the area in which they are installed (NEC type-requirements).

2.1 STATION CABLE

- A. All station cables shall be CAT 6, 4-pair, UTP, non-stranded, and colored green, unless otherwise specified.
- B. Further, cables that will be placed in conduit in slab on grade must be water-blocked, indoor-outdoor rated and suitable for underground service.
- C. All cables shall be composed of 24 AWG solid copper conductors. All cables shall be Underwriter's Laboratories (UL) listed type MPR, MPP, CMR, and CMP. Cable shall also support IEEE 802.3, 10BASE-T, and IEEE 802.5 standards.

- D. Approved manufacturers are Essex, Commscope, and General.

2.2 TELECOMMUNICATIONS STATION OUTLETS

- A. Standard Wall Station Outlet: Each standard wall faceplate shall be four (4) position, brushed stainless steel, mounted on single gang outlet box, to accommodate RJ45 jacks. Each standard wall faceplate shall contain two (2) CAT 6 compliant RJ45 modular jacks, color-coded red and ivory, to accommodate two cables, plus two blank inserts.
- B. Data-only Outlet: Each data-only faceplate shall be six (6) position, brushed stainless steel, mounted on single gang outlet box, to accommodate RJ45 jacks. The exact number of jacks and cables for each data-only outlet will be marked by subscript next to the jack designation on the plans. CAT 6 compliant RJ45 modular jacks will be colored-coded gray, with blank inserts in spare positions.
- C. **As specified for smaller installations,** each data-only outlet faceplate shall be six (6) position, brushed stainless steel, mounted on single gang outlet box, to accommodate RJ45 jacks. The exact number of jacks and cables for each data-only outlet will be marked by subscript next to the jack designation on the plans. In this case, CAT 6 compliant RJ45 modular jacks will be colored-coded red or ivory, corresponding to the patch panel where terminated, with blank inserts in spare positions.
- D. Floor Outlet: Unless otherwise specified, each floor outlet faceplate shall contain two (2) CAT 6 compliant RJ45 modular jacks, to accommodate RJ45 jacks. Each floor outlet faceplate shall contain two CAT 6 compliant RJ45 modular jacks, color-coded red and ivory, to accommodate two cables.
- E. **For libraries, use this rather than D.** Floor Outlet: Each floor outlet faceplate shall contain the prescribed number of CAT 6 compliant RJ45 modular jacks, as shown on the plans, to accommodate RJ45 jacks, which will be colored gray, and have blank inserts in spare positions.
- F. Modular Systems Furniture Outlet: Each modular systems furniture outlet shall be two (2) position and shall contain two (2) CAT 6 compliant RJ45 modular jacks, color-coded red and ivory, to accommodate two cables. The faceplates for modular furniture outlets shall be sized to fit standard furniture knockouts, typically 2.71" x 1.38", shall be matched to furniture raceway color as closely as possible, and shall have an extended profile so that jack inserts are external to the furniture raceway.
- G. Wireless Access Point Outlet: Each access point outlet shall consist of a single CAT 6 cable, terminated in an RJ45 jack, to be left in the ceiling with a 30' service loop. Cables will be terminated in the Special-Use patch panel, with RJ45 modular jack inserts, colored green.
- H. Voice-only Outlet: Each voice-only faceplate shall be a 630B-type one-position, brushed stainless steel fitted with wall-mount studs, mounted on single gang outlet box, to accommodate one jack and one cable.
- I. Approved station outlet manufacturers are Ortronics, Uniprise, or Panduit, as specified in 2.0.C.

2.3 RISER CABLE

- A. The Contractor shall furnish one (1) CAT 3 unshielded 24 AWG 25-pair solid conductor copper voice riser cable from the primary telephone room (MDF) to each intermediate telephone room (IDF).
- B. Cable shall be plenum-rated as required for plenums, and riser-rated in all other locations. Cable shall meet or exceed the EIA/TIA Commercial Building Telecommunications Wiring Standard.
- C. Further, any cable that will be placed in conduit in a slab on grade must be water-blocked, plenum-rated and suitable for indoor/outdoor service (OSP).
- D. Approved manufacturers are Essex, Commscope and General, as described in section 2.0.C.

- E. The Contractor shall furnish six 4-pair CAT 6 unshielded 24 AWG solid conductor copper cables, colored yellow, between the primary telephone room on each floor, and every other telephone room on that floor, for network interconnection.
- F. In addition, for any two-story building, the Contractor shall furnish six 4-pair CAT 6 unshielded 24 AWG solid conductor copper cables, colored yellow, between the primary telephone room on first floor and the intermediate telephone room on the second floor, for network interconnection.

2.4 PATCH PANELS

- A. STANDARD station cables shall be terminated on 19" rack-mounted 48-port CAT 6 angled patch panels, with 110 crossconnect terminations, wired in the T568B configuration. The first jack of each outlet (red) will be terminated on the first patch panel, designated for red jacks. The second jack of each outlet (ivory) will be terminated on a corresponding second patch panel designated for ivory jacks. The Contractor shall provide sufficient quantity of patch panels in each telephone room to terminate all station cables shown on plans, plus 20% spare capacity for future station jacks.
- B. Data-only cables, for most installations, will be terminated on dedicated data-only patch panels. Those data-only patch panels shall be 19" rack-mounted CAT 6 angled 48-port patch panels, with 110 crossconnect terminations, wired in the T568B configuration. The Contractor shall provide sufficient quantity of data-only patch panels in each telephone room to terminate all data-only station cables shown on plans, plus 20% spare capacity for future station jacks.
- C. Data-only cables, as specified for smaller installations, shall be terminated on the patch panels designated Red or Ivory, beginning with port 48 and numbering backwards.
- D. Special-use cables such as cables between the MDF and IDF's, cables serving wireless access points and other special-use cables shall be terminated in rack-mounted 12-port or 24-port patch panels (depending on project size), which accept 6-port jack module inserts for the purpose of color coding jack inserts to indicate use.
- E. In each MDF and TR the contractor shall supply one 24-port CAT 5E flat patch panel, with 110 crossconnect terminations, wired in the T568B configuration with one pair per port for the purpose of connecting the telco interface to the rack. The contractor shall also supply one (1) 25-pair amphenol connector (single-ended male) for each patch panel, length to be determined by the distance to the telco interface.
- F. Riser cables shall be terminated on 19" rack-mounted CAT 5E 48-port flat patch panels, with 110 crossconnect terminations, one pair per port.
- G. Both ends of the CAT 6 cables between the MDF and other telephone rooms shall be terminated in rack-mounted 24-port angled patch panels, which accept 6-port jack module inserts. The patch panel must be equipped with sufficient CAT 6 RJ45 jack modules to terminate the required CAT 6 cables. The module inserts must be yellow or have yellow jacks to easily distinguish use.
- H. All hardware shall meet or exceed the reliability, attenuation, and NEXT requirements of TIA-568B. The panels shall be able to accommodate 500 repeated insertions without incurring permanent deformation, and shall pass the reliability test of no more than one contact failure in 10000 connections. The panels shall be able to accommodate 24 AWG cable conductors, and be Underwriter's Laboratories (UL) listed.

2.5 FIBER CABLE

- A. The Contractor shall supply one 24-strand interlocked armored multi-mode fiber optic cables between the MDF and each TR, with 50/125-micron fibers. Cables shall be tight-buffered, OFCP or OFCR as required by the particular installation. If fiber optic cable is to be run in dedicated conduit, the interlocked armored requirement is not necessary.

- B. In multi-story buildings, the Contractor shall also supply one 12-strand interlocked armored single-mode fiber optic cable between the MDF and each TR. If fiber optic cable is to be run in dedicated conduit, the interlocked armored requirement is not necessary.
- C. Approved manufacturers are Corning, Commscope, General and Mohawk.

2.6 FIBER TERMINATION EQUIPMENT

- A. Fiber cables shall be terminated in rack-mounted black metal, fiber optic enclosures, capable of handling no less than 24 ports. In each telephone room, the Contractor shall supply sufficient quantity of enclosures to terminate all specified fiber cables.
- B. Each enclosure shall be equipped with sufficient 12-fiber, duplex LC-style adapter panels to terminate all specified fibers.
- C. Acceptable models are Corning, Ortronics, Panduit and Systemax.

2.7 EQUIPMENT RACKS

- A. Unless otherwise specified, two EIA standard (7' x 19") black aluminum equipment racks are required for each telephone room. All equipment racks shall be capable of supporting 600 pounds, with type B universal mounting rail pattern.
- B. Vertical wire management shall be provided on each side of racks, with one unit between racks. Vertical wire managers shall be black 7-foot, double-sided (front and rear) units, with finger openings, hinged front cover, and all brackets and connectors necessary for a complete system.
- C. The basis of design product is Chatsworth 30095-703. Substitutions may only be submitted for approval during the pre-bid process.
- D. Each equipment rack shall be equipped with one rack-mounted horizontal power strip, providing at least six (6) 20 ampere, 120-volt receptacles, having a cord at least 10' long. In cases where 20 ampere receptacles are not available in the telephone room, power strips with 15 ampere receptacles may be substituted (field verify).
- E. Each rack shall be equipped with one 2RU section of horizontal wire management, with hinged cover, which matches the vertical wire manager.

2.8 PATCH CORDS

- A. The Contractor shall supply factory-prepared eight (8)-conductor modular CAT 6 molded boot patch cords with male RJ45 connector on each end, for connection to patch panels. Patch cords shall have a T568B wiring/pin configuration. Patch cords shall be seven (7) feet long, and colored yellow.
- B. The Contractor shall provide one patch cord for each station outlet, plus an additional 30% for future growth.
- C. The Contractor shall supply factory-prepared eight (8)-conductor modular CAT 5E or CAT 6 molded boot patch cords with male RJ45 connector on each end, for connection to voice patch panels. Patch cords shall have a T568B wiring/pin configuration. Patch cords shall be seven (7) feet long, and colored grey.
- D. The Contractor shall supply one voice patch cord for each station outlet, plus an additional 20% for future growth.
- E. For library buildings, patch cords for connection at the station end to equipment will be provided by the owner.

2.9 CABLE SUPPORTS

- A. The contractor will provide and install horizontal ladder rack in each telephone room. The installation is intended to support cables across the longest wall of the closet, and to connect each equipment rack to the wall. For buildings with 1-2 stories, the ladder rack

shall be 12" wide of tubular steel, with rungs 9" on center. For buildings with more than two stories, the ladder rack shall be 18" wide of tubular steel, with rungs 9" on center.

B. Acceptable product is Hoffman Model LSS12BLK, or equivalent.

2.10 HANGERS

A. The Contractor shall use approved J-hooks or other CAT 6-rated cable support hangers in ceiling void.

2.11 LABELS

A. All Labels used to mark cables, faceplates, patch panels and distribution hardware shall be of the self-laminating type, and shall be machine-printed with black ink on white background. Labels will have pressure sensitive, permanent acrylic-type adhesive. All labels will be uniform in size using the same font size on letters and numbers throughout. Label printing will be 1/8" minimum in block style.

PART 3 – EXECUTION

3.1 TELEPHONE ROOMS

- A. Prior to working in the telephone rooms, the Contractor shall ensure that, at a minimum, a #6 AWG green insulated copper grounding conductor has been provided.
- B. The ladder racks shall be placed according to the telephone room layout, and securely fastened to the wall and the equipment racks to support the weight of cables.
- C. In each closet, the equipment racks shall be bolted to the floor and top-braced by connection to the ladder rack.
- D. Each equipment rack and each section of ladder rack shall be properly bonded to an approved building ground.
- E. Electrical outlet strips should be installed in the middle of each rack. The power cord will be securely connected to the electrical outlet provided for that purpose, routing the power cord over the top of the rack, or routed through the channel to the UPS.
- F. D-rings are to be installed in telephone rooms to protect cables in transition.

3.2 COPPER CABLE INSTALLATION

- A. Layouts for all telephone rooms will be provided by the Owner, and must be received by the Contractor before work can begin. The approved closet layout should be posted in each closet.
- B. In all wiring closets, install cables parallel and at right angles to walls. Bundle, lace and train the conductors to terminal points with no excess. Use wire distribution spools at points where cables are fanned or conductors turned.
- C. Terminate conductors of cables on terminal block using tools recommended by terminal block manufacturer.
- D. All cables shall be run concealed in accessible ceiling space, unless otherwise indicated by the owner, or on the plans. No exposed copper cable will be permitted, unless written authorization is secured from the engineer.
- E. Cables shall be routed along the most direct path between the outlet and the wiring closet, however all paths shall run parallel and perpendicular to corridors. Diagonal routing shall not be permitted. All cable shall be routed in a neat and orderly manner, using installed cable tray or ladder rack whenever possible.
- F. It is imperative that all cables are properly secured to the building structure at intervals as required to prevent sagging between supports, as per NEC 800. Cables must be supported

every four to five feet, and may not rest on ceiling tiles, nor be secured to improper structures such as ceiling grid or conduits. Only J-Hooks or hangers approved for CAT 6 cable may be used.

- G. Cables must not be spliced between the normal terminations of runs.
- H. Cable shall be installed without damaging conductors or jacket. The Contractor shall ensure that the manufacturer recommended maximum pulling tensions and cable bends of the specified distribution cables are not exceeded. Failure to follow the appropriate guidelines will require the Contractor to provide, in a timely fashion, the additional material and labor necessary to properly rectify the situation. This shall also apply to any and all damages sustained to existing cables by the Contractor during the implementation.
- I. The Contractor shall pull cables simultaneously where more than one is being installed in the same raceway or at the same location. Use pulling compound or lubricant where necessary. Compound used must not damage conductor or insulation. Use pulling methods that will not damage cable or raceway, including fish tape, cable, rope, and wire-cable grips.
- J. Cable routing shall avoid contact or close proximity to power lines, conduits, lighting fixtures, and other potential sources of interference, and shall not share the same conduit, channel or sleeve with any electrical apparatus.
- K. To facilitate future rearrangements, a three-foot (3') service loop shall be allowed for cables in the wiring closet, with slack routed neatly on the ladder rack. Cables installed in raceways from ceiling space to outlet boxes, shall have a 12" repair loop above the ceiling, at transition from horizontal to vertical drop. Cables installed for cubicles shall be placed with a 5" slack loop in the raceway.
- L. The amount of cable jacket removed from the end of cables shall be kept to a minimum. Never remove the jacket more than specified by the manufacturer to achieve manufacturer certification. The Contractor shall maintain the twist integrity of each cable pair up to the point of termination.
- M. The Contractor will make every effort to install cables to maintain numerical order in a clockwise sequence around each floor, according to the numbering scheme provided by the Owner.
- N. On the patch panels and punchdown blocks, sequential, numerical order shall be maintained. Numbering shall be from left to right and from top to bottom with consecutive numbers, skipping no spaces.
- O. The Contractor shall properly fire stop all penetrations through fire-rated walls with an approved material to restore the original fire rating.
- P. Wake County reserves the right to reject workmanship that does not meet this requirement.

3.3 TELECOMMUNICATIONS STATION OUTLETS INSTALLATION

- A. STANDARD outlets terminated in a four-pair faceplate will contain two CAT 6 4-pair cables, terminated on RJ45 CAT 6 jacks, color-coded red and ivory, plus two blank inserts.
- B. Data-only outlets will contain multiple CAT 6 4-pair cables, with the number of cables denoted by subscript on the plans. All data-only cables will be terminated in CAT 6 RJ45 jacks, color-coded gray.
- C. Voice-only outlets will contain one (1) CAT 6 4-pair cable, terminated on a single RJ11 jack, and mounted in the center of a single-gang, stainless steel 630B-type faceplate fitted with wall-mount brackets. The corresponding cable will be terminated on the gray data-only patch panel in the last available port.
- D. Floor outlets will contain two 4-pair CAT 6 cables, terminated on CAT 6 RJ45 jacks, color-coded red and ivory.

- E. Modular systems furniture outlets will contain two 4-pair CAT 6 cables, terminated on CAT 6 RJ45 modular jacks, color coded red and ivory.
- F. Wireless access point outlets shall consist of a single CAT 6 cable, terminated in an RJ45 jack, to be left in the ceiling, with a 30' service loop.

3.4 FIBER CABLE INSTALLATION

- A. The Contractor shall install fiber backbone cables in a star topology, terminating in the MDF at one end and in each TR at the other end. Each fiber shall be a continuous, uncut length. Cable splicing shall not be permitted.
- B. Each end of the fiber cable shall include a ten-foot (10') service loop to facilitate future rearrangements.
- C. Each fiber optic cable shall be clearly labeled with an indication of the destination telephone room at both ends and at all likely access points. The cable shall be continuously marked at regular intervals with length indications.
- D. The Contractor shall not exceed the manufacturer's requirements for minimum bend radius or maximum tensile load for the cable being installed.
- E. The Contractor shall terminate all fibers of each cable using factory-polished, splice-on connectors.
- F. The total end-to-end attenuation of any connectorized fiber path shall be no greater than 2.0 dB at the 850-nanometer wavelength and 1.4 dB at the 1300 nanometer wavelength.
- G. The Contractor shall replace any existing pull string that is removed.

3.5 LABELING

- A. Station cables shall be labeled within four inches of each end, behind the faceplate and in the wiring closet. Jack numbers shall match exactly at both ends of all cables.
- B. There will be a single label on each STANDARD faceplate. Jack numbers will be comprised of: the floor number, the destination closet, and the assigned station number. Example: Label "4W36" corresponds to a station outlet on the 4th floor, in the "West" IDF, with station number 36. In a standard faceplate, it is understood that the "red" cable will be routed to a port on the "red" patch panel and the "ivory" cable to the "ivory" patch panel. Gray data-only cables will be routed to a gray patch panel.
- C. **When there is only one telephone room:** There will be a single label on each standard faceplate showing the assigned station number. It is not necessary to indicate the MDF room number. In a standard faceplate, it is understood that the "red" cable will be routed to a port on the "red" patch panel and the "ivory" cable to the same number port on the "ivory" patch panel. Gray data-only cables will be routed to a gray data-only patch panel.
- D. Printed labels on the outlet faceplate shall be mounted above the jack positions, so they can be easily read when patch cords are in place.
- E. All backbone cables shall be clearly labeled with an indication of the destination closet at both ends and at all likely access points. The labels shall be placed in conspicuous locations in the vicinity of the termination fields as well as at every pull box or secondary junction point.
- F. All copper patch panels shall be labeled to identify the panel with: the floor number and closet designation, plus "Red, "Ivory", or "Gray". Ex: "4-West-Red" corresponds to a panel on the 4th floor, in the west closet, on the first patch panel.
- G. All fiber enclosures and panels shall be labeled to identify the panel with: the floor number and destination closet.
- H. Numbering on all panels shall be from left to right and from top to bottom, with consecutive numbers, skipping no spaces.

3.6 ACCEPTANCE TESTING

- A. The Owner shall be given the opportunity to witness testing. The Contractor shall submit a testing schedule at least three (3) business days prior to initial testing.
- B. All copper and fiber cables shall be tested. Sample testing shall not be permitted. All tests shall be performed on the completely installed system, through all terminations, in the system's final state, as it will be turned over to Wake County.
- C. All cables shall be tested for:
 - 1. Continuity [pass/fail]
 - 2. Proper termination sequence [pass/fail]
 - 3. Cable length (measured electronically) [feet]
 - 4. Line attenuation, indicate frequency [dB @ MHz]
 - 5. Signal-to-noise ratio (with active hubs) [dB]
 - 6. Ambient line-noise level [dBm]
 - 7. Shorts between any two or more conductors
 - 8. Crossed pairs, Reversed pairs, Split pairs, and other mis-wirings
 - 9. Bi-Directional near-end crosstalk (NEXT) shall be tested on all six pair combinations in each four pair cable. Tests for NEXT shall be performed from both the work area outlet location and link origination point.
- D. The initial computer-generated test results, including failures, shall be submitted to the Owner, in both printed and electronic formats. All test data shall indicate the date of the test and the name of the persons that performed the test.
- E. The Contractor shall then correct deficiencies indicated by tests and completely retest work affected by such deficiencies. The Contractor shall submit computer-generated retesting results, in both formats.
- F. Test equipment shall include an optical signal source and an optical power meter, both designed specifically for the type of testing required. The manufacturer or an approved calibration service shall have calibrated the test equipment within the past twelve months. The optical signal source and the optical power meter shall be connected to opposite ends of the fiber optic circuit being tested. Loop-back testing shall not be permitted.

3.7 DOCUMENTATION

- A. The Contractor shall submit an electronic copy of equipment warranty documentation to Wake County.
- B. At the conclusion of the project, the Contractor shall furnish two hard copies of as-built floor plans for each floor, clearly indicating each outlet number and location. One copy of these documents shall be posted in each telephone room and the other provided to Wake County Telecommunications.
- C. The Contractor shall also submit this as-built document to the engineer or Wake County in .DWG or .DXF format on CD-ROM or flash drive.
- D. The documentation shall include a spreadsheet (Microsoft Excel compatible format) with information presented in the following format:

Building Name Telecom Room	Wake County Jack Numbers	West Regional Center Room Connected to
3 rd Floor South	3S01	357
5 th Floor North	5N36	End of hall room, lab

Cat6 Wiring Specifications Parts List Below

ITEM DESCRIPTION	PANDUIT/GENERAL PARTS	ORTRONICS/ESSEX PARTS	UNIPRISE/COMMSCOPE PARTS	CHATSWORTH PART
FACEPLATE 4 PORT SG	CFP4SY	OR 403STJ14	UNF-MFM-4P-ST	
FURNITURE BEZEL	CFPL4-1W	OR 40300633	UNF-MF-4P-BK	
BLANKS FOR FACEPLATE	CMB-1W	OR 42100002	UNDC-1W	
JACK CAT 6	CJ688TG	OR TJ600	UNJ600	
PP 48 PORT ANGLED CAT 6	DPA48688TGY	OR PHA66U48	UNP610ANG-48P	
PP 24 PORT ANGLED CAT 6	DPA24688TGY	OR PHA66U24	UNP610ANG-24P	
'GFCI' FRAME	CFG4-1W	NA	NA	
PATCH CABLE 7' YELLOW CAT6	UTPSP7YLY	OR-MC607-04	UNC6-YL-7F	
PATCH CABLE 7' GRAY CAT 5E	UTPCH7Y	OR-MC5E07-08	UNC5-GY-7F	
VERTICAL CABLE MANAGER	NA	NA	NA	CPI 30095-703
HORIZONTAL CABLE MANAGER	NA	NA	NA	CPI 30330-719
CA. 4 PR. IN BOX GREEN CAT6	GENERAL 7131806	ESSEX 77-240-5B	6504-GR	
CA. OSP CAT 6	GENERAL 7136100	ESSEX 04- 001-68	COMMSCOPE 6NF4PLUS	