1 General

.1 Communication/Data System Requirments

.a The selection of all Data and Communications systems shall be confirmed by Wake County at the schematic design phase.

.b Coordinate Cable TV and internet providers for each facility type with Wake County.

.c Where future expansion is planned in the initial design of a facility the Engineer shall provide adequate additional capacity and connection points in the electrical design. The additional capacity shall be clearly noted in the equipment schedules. At locations where freestanding furniture is to be served by conduits in slab on grade, additional floor boxes/conduits shall be installed for future growth.

.d All points for future connections shall be clearly shown and labeled on the drawings with the capacity (Kw, etc.) that is available at each connection point.

.e A cable system consisting of copper cables, and fiber backbone cables shall be routed between the Main Distribution Frame (hereafter MDF) and Intermediate Distribution Frame (hereafter IDF), and between various outlets and their designated IDF.

.f A voice/data network with Cat 6 copper station cable shall be provided throughout all projects.

.g BICSI Rules require that each multi-story building must have one MDF and at least one IDF on each floor.

.h IDF's must be stacked vertically, in the core of the building, so that no station extends more than 100 cable meters (or 328 feet) from the nearest IDF, including all patching lengths. Vertical footprint of room and walls shall align on each floor.

.i Access to the MDF and IDF's must be from a publicly accessible interior corridor, with some exceptions as approved by FD&C or GSA.

.j MDF and IDF's shall be designed and sized to handle equipment for Voice and Data Communications, Cable TV, Security and Fire Systems only. Electrical, HVAC and other mechanical systems shall not reside in MDF/IDF's.

.k MDF/IDF's must not be used for storage of department supplies or maintenance materials.

.l MDF/IDF's must be of sufficient size. BICSI rules require that an IDF serve no more than 10,000 square feet of floor space. However, Wake County will permit TR's to serve more than 10,000 square feet if no cable length exceeds 250 feet. IDF's should be sized to serve assignable square footage as follows:

1. Up to 5,000 square feet 8' x 8'
2. 5,000 to 10,000 square feet 8' x 11'
3. Larger than 10,000 square feet 8' x 11'

.m Because security, fire and other systems require additional space in MDF's, MDF's for Wake County buildings should be sized to serve assignable square footage as follows:

1. Up to 10,000 square feet 8' x 8'
2. 10,000 – 25,000 square feet 8' x 13'
3. 25,000 – 100,000 square feet 11' x 13'
4. More than 100,000 square feet 13' x 16'

.n MDF/IDF's should be accessed via a single 3' x 7' door, opening out and doors shall be equipped with badge access.

.o All walls of MDF/IDF's are to be paneled with ¾" fire-retardant plywood, mounted with the smooth side out, and painted with light-colored fire retardant paint. The "fire retardant" label should be left unpainted.

.p VCT flooring is to be provided in all MDF/IDF's. A light color is preferred.

.q BICSI rules require that MDF/IDF's maintain:

1. Temperature between 64 and 75 degrees F.
2. Humidity range of 30% to 55%.
3. 24/7 HVAC with positive pressure and a minimum of one air change per hour.

4. Temperature controlled exhaust fans may be used only in TR's that will serve fewer than 48 stations at capacity.

.r MDF/IDF's must have a horizontal electrical strip mounted to the ladder rack above the data racks, which should extend the length of the rack installation and contain a minimum of three dedicated 20-amp outlets per rack. Each MDF/IDF should also have at least two separate duplex convenience outlets, at 18" AFF, for tools and test equipment.

.s All network equipment must be connected to a UPS. Depending on building size and use, MDF/IDF outlets will be connected to a central building UPS. If central UPS is not available, the equipment will be connected to a rack-mounted stand-alone UPS, which will be purchased by Information Services and monitored by General Services.

.t All MDF/IDF's must be equipped with a ¼" x 4" x 8" copper grounding buss bar, with lugholes, connected to building ground.

.u MDF/IDF's must be lighted to provide a minimum of 50-foot candles, measured at 3' above the floor, on both sides of the racks.

.v MDF/IDF's shall be equipped with deep-channel data racks (7' x 19" x 6.5"), which are to be floor- and top-braced, with a minimum 3' working clearance on both sides of the rack. Wall-mounted racks will be acceptable for MDF/IDF's that serve fewer than 48 stations at capacity. Racks will hold equipment that extends an additional 14" to the rear.

.w Basket-type cable tray must be provided across two dimensions of the MDF, and each IDF.

.x Wire basket cable tray must be provided along major corridors on each floor, and between each IDF on a floor. Tray routes should be shown on Design Development drawings.

.y All segments of ladder rack and each equipment rack must be properly grounded.

.z Ceiling height of MDF/IDF's must be at least 8' 6". False ceilings are not preferred.

.aa Layout for equipment in IDF's may be obtained from Wake County Telecom, and will be posted when finalized.

.bb Based on end use, it is desirable that all buildings up to 30,000 sq feet be served with two 4" conduits and one 2" conduit to the property line. Buildings larger than 30,000 sq feet may be served with a total of four 4" conduits, located in such a way as to provide dual service entry in the future. In each case, four 1" inner ducts should be placed in at least one of the 4" conduits.

.cc All station cable will be in conduit, either homerun to the IDF or stubbed up from the jack to the ceiling plenum.

.dd Plans shall show the planned routing of station cables, and whether they will be served by conduit in slab-on-grade, via ceiling void, or other access.

.ee Junction boxes and conduit shall be color coded as indicated in the Wake County Conduit and Box Color Chart in Division 26.

.ff Exposed raceways and/or conduits are unacceptable outside of MDF/IDF rooms.

.gg Conduits shall use compression fittings only. Screw fittings are not acceptable.

.hh Preferred communication symbols are as follows:

Standard Voice/Data Outlet	Data-Only Outlet with # of cables	Voice Only Outlet	Floor outlet Voice/Data
			

.2 Public Address and Mass Notification System Requirements

.a Public Address Systems shall be installed as required by the owner. Where installed, system shall be building wide and integrated into the fire alarm system.

.b Where future expansion is planned in the initial design of a facility the Engineer shall provide adequate additional capacity and connection points in the electrical design. The additional capacity shall be clearly noted in the equipment schedules.

.c Public address system shall tie-in to the fire alarm system for building announcement and alarms.

.d All points for future connections shall be clearly shown and labeled on the drawings with the capacity that is available at each connection point.
.e Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters.
.f No cable shall contain un-terminated elements. Make terminations only at outlet and terminals.
.g Cable shall be brought to room temperature before de-reeling.
.h Splice cable shall not be allowed between termination, tap, or junction points.
.i Suspend speaker cable not in a wire way a minimum of 8" above ceiling by cable supports.
.j Cable shall not be run through structural members or be in contact with pipes, ducts or other building systems.
.k Junction boxes and conduit shall be color coded as indicated in the Wake County Conduit and Box Color Chart in Division 26.
.l Equipment name plates (preferable metal) with raised or depressed images for permanent attachment shall list the following:
1. Manufacturer, product name, model number, and serial number.
2. Capacity, operating and power characteristics, and essential data
3. Labels of tested compliances.

.m Exposed raceways and/or conduits and cables are unacceptable.
.n Conduits shall use compression fittings only. Screw fittings are not acceptable.
.o Conduits from MDF rooms to IDR rooms shall be continuous.
.p In general, individual conduits from devices are routed above ceiling and terminated. Plenum rated cable is installed and then routed via J-hooks to ladder racks round throughout the facility.

.3 Codes & Standards

.a Comply with applicable provisions of the most recent "North Carolina Building Code: Electrical Code".
.b Comply with NFPA Codes and Standards.
.c Comply with ANSI/TIA/EIA-568B, 569, 606: "Commercial Building Telecommunications Cabling Standard", Commercial Building Standard for Telecommunications Pathways and Spaces", Administration Standard for Telecommunications Infrastructure of Commercial Buildings".
.d Comply with OSHA electrical standards and workmanship.
.e Comply with applicable requirements of NEMA Standards.
.f Comply with BICSI Telecommunication Distribution Methods Manual.,
.g Comply with IEEE Bonding and Grounding best practices.
.h All materials installed must meet NRTL (Nationally Recognized Testing Laboratory) listed and labeled as defined in the National Electric Code and FCC regulations.

2 Products

.1 Communication/Data Equipment Selection

.a Refer to Division 27 supplemental specifications for "Communication, Pathways, and Wiring" project requirements, execution, and required documentation.
.b The current cable standard shall be plenum rated Cat 6 UTP copper station cable. Infrastructure requirements must accommodate future data and communication installation requirements. The following guidelines should be used:
1. Use 1" station conduit, terminated in a double gang box, for typical stub-up conduit or for straight runs, with no more than two 90 degree bends.
2. Use a 1-1/4" station conduit, terminated in a 4 and 11/16ths box, for individual station runs that have no more than three 90 degree bends.
3. User larger conduits (1-1/2" or 2") for runs that will have more than three 90-degree bends.

4. Modular furniture or counter locations, which will be served by a common raceway, require (at least) one 1" whip for every two work stations.
5. Every wall plate must be served with an individual conduit.

.c Junction boxes, conduit, etc. shall be color-coded as indicated in the Wake County Conduit and Color Box Color Chart Supplement in Division 26.

.d Refer to Division 27 Supplement – Communications/Data, Pathways, and Wiring Section.

.2 Public Address and Mass Notification Systems Equipment Selection

1. PA system install as approved by owner. Where utilized, system shall be building wide.
2. Interlock PA system with fire alarm system for audio and alarms.
3. System shall connect any zone to any available signal channel, selectively control sound from microphone outlets and other inputs, and reproduce high-quality sound.
4. "All-call" feature shall connect the all-call sound signal simultaneously to all zones regardless of zone or channel switch settings.
5. System shall match input and output impedances and signal levels at signal interfaces. Provide matching networks where required.
6. Outlets shall be three-pole, polarized , locking-type, microphone receptacles in single-gang boxes. Equip wall outlets with brushed stainless-steel device plates and floor outlets with gray tapered rubber or plastic cable nozzles and fixed outlet covers.
7. Outlet boxes shall be not less than 2" wide, 3" high, and 2-1/2" deep.
8. All outlets to be concealed or flush mounted.
9. Color code conductors.
10. Conductors shall be jacketed, twisted pair and twisted multipair, untinned solid copper.
11. Insulation for wire in conduit shall be Thermoplastic, not less than 1/32 " thick, and microphone cables shall be neoprene jacketed, not less than 2/54" thick over shield. Shield No. #4 AWG, tinned, soft-copper strands formed into a braid or approved equivalent foil.
12. For devices or units mounted outdoors, in damp locations, or where exposed to weather, install consistent with requirements of weatherproof ratings.

3 Communication/Data Testing Requirements

.1 Communications/Data Testing

.a All copper and fiber cables are to be tested. Refer to Division 27 supplemental specifications for Communication, Pathways, and Wiring testing requirements. Sample testing shall not be permitted. The owner shall be given opportunity to witness any tests.

.b The initial computer-generated tests results, including failures shall be submitted to the owner both in printed and electronic formats. After all deficiencies have been corrected, contractor to retest and submit the results to the owner in both formats.

.2 Public Address and Mass Notification Systems Testing

.a Perform operational tests, acoustic coverage tests, and power output test. The owner shall be given opportunity to witness any tests.

.b Prepare a report of final speaker-line matching, transformer-tap settings, and signal ground-resistance measurement certified by installer.