

## **Division 16 – Electrical Equipment**

### **16010 – General Electrical Provisions**

1. Does the electrical design comply with the National Electric Code, latest Florida Atlantic University approved edition; IES Lighting Standards, and State Fire Marshal requirements including NFPA codes?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
2. Does the telecommunications design comply with the University's standards?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
3. Has it been specified that all conductors, bus bars, pull wires, etc. shall be of copper? Conductors 600 volts and below shall have THHN insulation.  
(Specific drawing sheet #/specification page # \_\_\_\_.)
4. Has all electrical wiring been specified to be stranded copper with appropriate insulation per NEC?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
5. Has wire insulation been specified to comply with the following color coding?  
(Specific drawing sheet #/specification page # \_\_\_\_.)

120/208 3 PH		277/480 – 3PH	
Phase A	Black	Phase A	Brown
Phase B	Red	Phase B	Orange
Phase C	Blue	Phase C	Yellow
Neutral	White	Neutral	Gray
Ground	Green	Ground	Green

6. Has it been specified that all electrical panels shall have easy access? All panels shall have exterior identification and all breakers shall be numbered and identified as to area served by a plastic covered index. Circuit breaker panels shall be lockable, specification grade with full size copper busses braced for maximum available fault current, bolt-on breakers, ground bar and isolated ground bar.  
(Specific drawing sheet #/specification page # \_\_\_\_.)
7. Has it been specified that all junction boxes and pull boxes shall be identified with permanent markings indicating panel designation and circuit number?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
8. Has it been specified that all junction boxes and pull boxes for fire alarm safety systems shall be color-coded red?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
9. Has a watt hour meter been provided for each building?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
10. Has it been specified that the connected electrical load in any building shall be corrected to 95 percent power factor or above, using automatically controlled capacitors, where required?  
(Specific drawing sheet #/specification page # \_\_\_\_.)

11. Has it been specified that the electrical feed will be from a campus 12,470 volt circuit? (Provide an SF6 gas sectionalizing switch to which the campus circuit is brought).  
(Specific drawing sheet #/specification page # \_\_\_\_.)
12. Has it been specified that high voltage primary feeders shall be paper-insulated, lead-covered, with neoprene jacket (P.I.L.C.N.J.)?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
13. Has it been specified that the transition from the P.I.L.C.N.J. feeders shall be made at the building site through a transition to Type E.P.R. cable?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
14. Has it been specified to provide an automatic starting diesel fueled generator to pick up the building emergency panel through an automatic transfer switch in the event of power failure? The generator should have an hour meter and an automatic "exerciser" in its control system. The electrical capacity shall be sufficient to operate at least one elevator. Building emergency generators must be connected to all building data gathering panels used for HVAC control through a computer.  
(Specific drawing sheet #/specification page # \_\_\_\_.)
15. Has it been specified that the emergency generator will be turned over to FAU with contractor-supplied full fuel and coolant tanks, and with all lubricants at required levels?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
16. Has it been specified that from the campus underground communications duct and manhole system, the Contractor will provide conduits into the buildings for telephone, clocks and bells, instructional television, fire alarm, and HVAC control and monitoring?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
17. Has it been specified to provide reduced voltage starters for all motors that are 15 horsepower and larger?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
18. Has it been specified that soft-start controls shall be provided for all motors 50 horsepower and larger?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
19. Has it been specified that high efficiency and high power factor motors shall be used in all cases where available for a particular application? Variable speed drives shall be considered during design for all motors over 10 horsepower, for energy savings; and if found to be cost effective, shall be installed.  
(Specific drawing sheet #/specification page # \_\_\_\_.)
20. Has the following been specified for general requirements?  
(Specific drawing sheet #/specification page # \_\_\_\_.)
- a. All conduits and raceways shall be provided with a grounding conductor size per NEC table 250-95, or 250-95, regardless of whether the grounding conductor is required by code or not except for service entrance conduits.
  - b. Minimum size wiring for emergency system power and lighting wire shall be #10 AWG.

- c. Power and lighting equipment schedules and panelboard schedules shall be provided on the plans and not in the specifications.
  - d. Installation details shall be provided to facilitate a quality and well thought out installation.
  - e. Special consideration shall be given to the resulting aesthetics where electrical equipment and conduit must be installed exposed to view outside of equipment or storage rooms. Consideration shall be given to soffits and/or placement (such as in the all/ceiling corner) so as to minimize the negative impact on the aesthetics of the facility. This may require the addition of special notes and/or showing conduit on the plans all the way back to the panel it originates from in lieu of the traditional home run arrow. Electrical equipment and conduit shall be painted to match the adjacent surface where exposed in finished spaces.
21. Has it been indicated that vending areas shall be supplied with electrical outlets at 4'-0" intervals along walls against which vending machines will be located, each outlet shall be a quadriplex on a separate 120V/20amp circuit?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  22. Have hallway areas been supplied with electrical outlets a minimum of every 50 feet to accommodate building maintenance equipment?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  23. Has the building fire alarm and HVAC systems been tied into the campus control center?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  24. Do electrical design drawings and specifications clearly define the responsibilities for interconnections of elevator fire and smoke detectors into the building fire alarm system?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  25. Are outside utility outlets required around the building to support outside maintenance efforts?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

**16100 - Electrical and Communication Manholes**

General

1. Are the inside dimensions of electrical manhole walls 7'-0" x 7'-0" or 8'-0" octagonal?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
2. Are the inside dimensions of telephone manhole walls 7'-0" x 7'-0" or 8'-0" octagonal?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
3. Are manhole duct entrances indented at least 4" and provided with carbon bell ends? (This will also apply when galvanized steel conduit is indicated).  
(Specific drawing sheet #/specification page #\_\_\_\_.)
4. Are grounds provided in accordance with the code requirements?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

5. Is the minimum clearance from the centerline of the lowest duct entrance to the floor of the manhole 2'-0"?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
6. Is the thickness of the concrete walls 8" for the top and bottom of the manhole, and 6" for the sump walls from manholes?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
7. Have pre-cast concrete manholes been specified, with design and wall thickness determined by manufacturer?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
8. Are 3" cast iron pipes connecting sumps of adjacent telephone and electrical manholes provided to facilitate pumping water from manholes?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
9. Is the flat entrance/exit duct face on the inside of the manhole at each corner a minimum of 1'-6" wide?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
10. Are the cable racks used for electrical circuits heavy duty galvanized racks?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
11. Are the hooks used for communication circuits 12" lengths or approved substitutes?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
12. Do the rack backs in telephone manholes extend from ceiling down 4'-0"?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
13. Is the manhole hardware compatible in each manhole?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
14. Is the hardware type provided equal to existing? (If not, replace with new hardware plus new quantities as scheduled).  
(Specific drawing sheet #/specification page #\_\_\_\_.)
15. Has it been specified that each manhole shall contain pulling irons located in the walls not less than 6" above or below and opposite the conduits entering the manhole? Irons shall be fabricated from bent steel bars and shall be hot-dip zinc-coated after fabrication.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
16. Clocks, if required for the project, shall not be a building master clock system. Battery-operated 12-inch diameter analog clocks as listed in the FAUCCG Division 13 – Special Construction shall be provided.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
17. Has it been specified that switches and controls for lights, heat, ventilation, windows, draperies, fire alarm boxes and all other essentials shall be located at 48" above finished floor? In addition, they should also meet the latest ANSI and ADA standards for the handicapped.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
18. Has it been specified that convenience electrical outlets shall be specification grade, rated for 20 amps and provided as specified in the N.E.C. and mounted 16" above finished floor, unless otherwise specified? In addition, quadruplex outlets shall be

- provided for each telephone and television equipment backboard provided.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
19. Have quadriplex outlets been provided at all work stations, i.e., office desk, telephone, computer, etc.?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
20. Has it been specified where floor service, electrical, telephone or similar outlets are used? All should be of a flush mounted type with flush carpet plates.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
21. Has it been specified that all thermostats shall have tamper-proof covers and shall be mounted on steel mounting boxes which are securely attached to the internal wall structure?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
22. Has it been specified that all dry type transformers shall have 220 degree C insulation or better and shall have guaranteed sound levels of: 0-9 KVA - 40 Db; 10-50 KVA – 45 Db; 51-150 KVA - 50 Db; 151- 300 KVA - 55 Db; 301-500 KVA - 60 Db?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
23. Has it been specified that both the 277/480V and 120/208V electrical mains shall have surge protection provided by a surge protector?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
24. Has it been specified that direct burial electrical wiring for exterior lighting, and the like, shall not be used unless University Facilities Planning Project Manager approves in writing? Underground electrical wiring shall be installed in approved PVC conduit with conduit encased in concrete. A plastic "tell-tale" marking tape shall be installed 12" above all direct buried electric cable.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
25. Has it been specified that all conduit used to connect secondary electrical service to outbuildings and/or building sections shall be rigid metal (no plastic) and shall be bonded to the building entrance ground system?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
26. Has it been specified that PVC conduit shall not be used above grade either interior or exterior?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
27. Has it been specified that each building electrical main shall be provided with a qualified ground rod(s)? Ground rods shall be driven with a power driver as required. Additional rods shall be added if required to achieve a 25 OHM reading using the three point test method (150 foot depth require maximum). Multiple rods shall be used as necessary to obtain 25 OHMs. In addition, all manhole ground rods shall be connected by approved exothermic welding. Each rod shall be tested in the presence of the University's representative. A written record of the test results shall be prepared and signed by the Contractor's and University's representatives and submitted to the Architect/Engineer.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
28. Has it been specified that all ground rods, except for telephone backboards, shall be exothermically welded?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

- 29. Has it been specified that all large spaces wired for TV cable shall have conduit and outlet at the "front" of the space? (Verify locations with the University's Facilities Planning Project Manager).  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- 30. Has it been specified that all empty conduits shall contain a polyolefin pull line-JET LINE #232 or approved equal, with engraved metal tag at each end indicating conduit designation?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- 31. Has it been specified that oil-type transformers (PCB free) installed within buildings or pad mounted outside are preferred? If dry-type are used, they shall be kept away from mechanical rooms, steam pipes, hot water pipes, and the like. All transformers, switches, and other electrical equipment are to be PCB free and labeled as such.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- 32. Has it been specified that oil-type transformers shall be provided with a 3-position switch for 1) Source A, 2) Open, and 3) Source B? Do not provide a loop type switch  
(Specific drawing sheet #/specification page #\_\_\_\_.)

**16141 – Wiring Devices**

Has the following been specified for switching?

- 1. Classrooms and all instructional spaces: Double Switching (two level lighting).  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- 2. Light fixtures on emergency branch circuits shall be controlled with a separate red toggle switch via an emergency relay.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- 3. Corridors: Pilot light switches located in custodial spaces or keys switches located within the corridors.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- 4. Group Toilet Light Fixtures: Shall be controlled by a pilot light switch located in the custodian room.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- 5. Toilet Exhaust System: Individual toilet exhaust fans in rooms without windows shall be connected to the toilet lighting circuit and switch through a five (5) minute time delay relay.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- 6. Outdoor lighting shall be divided into three (3) categories and shall be provided with separate branch and circuit controls as stated below:  
(Specific drawing sheet #/specification page #\_\_\_\_.)   
  - a. Parking lot and bus loop area lighting
  - b. Walkway and canopy lighting
  - c. Security lighting
- 7. Emergency Lighting shall be controlled by a separate switch via override relays for

automatic operation upon failure of normal power.  
(Specific drawing sheet #/specification page #\_\_\_\_.)

8. Other spaces such as reading area, cafeteria, etc. shall have multi-level switching capabilities.  
(Specific drawing sheet #/specification page #\_\_\_\_.)

9. Have all 208/220V outlets been identified with User Groups?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

**16425 – Distribution Switchboards**

1. Has the following been specified for normal power distribution systems?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

Receptacle outlets dedicated for computers (communication outlets) shall be connected to non-linear electrical panels. These non-linear panels shall not feed any other loads. Non-linear panels shall have 200% rated neutral bus bars, the neutral feeder conductor shall be rated at 200% of phase conductors, and dry-type step down transformers (480 volts/208-120 volts) feeding non-linear panels shall be K-13 type.

2. Has the following been specified for surge suppression for power distribution equipment?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

All distribution panels for computer loads and electronic lighting shall be provided with surge suppression devices.

**16460 -Transformers**

.01 Has a transformer with the following requirements been specified?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

Liquid filled: Mineral Oil  
Proper KVA rating  
Primary volt:: 13200 Delta - 96 KV BIL  
Secondary volt: 480Y/277 - 30 KV BIL  
Standard: 60 Hertz  
Impedance: 3.5% - 7.5% Tolerance  
Conductor: Copper windings  
Temp: 120 degrees insulation class  
66 rise over 30 avg-40 max amb  
Taps: 2-2 ½ % TA Above and Below.  
Altitude: Std. 3300 feet maximum  
56 DB sound level

Modifications:

High Voltage-Dead Front  
#4 to 4/0 Incoming cable  
15 KV Class 800 Amp Bushings  
Six One-Piece Bushings (600A NLB)  
Three External Mov 18 KV Arrestors  
Under Oil Switch Three Position Source A Open Source B, 600A  
Fuses: Cartridge Type Weak Link – Bay-O-Net

Low Voltage Bushings: Epoxy  
 Tin Plated Copper Material  
 4 Hole Bushing Spade

Accessories:

Substation Accessory Group Included  
 1inch Drain Valve With 3/8inch Sampler  
 Dial Type Thermometer  
 Liquid Level Gage  
 Pressure Vacuum Gage  
 Standard Pressure Relief Valve  
 Nitrogen Test Port  
 Paint Color Munsell #7.0GY-329/1.5

**16500 – General Lighting Considerations**

1. Has it been specified that fluorescent fixtures shall include electronic ballasts and be lamped with low energy consumption tubes such as T8? Alternate designs (full spectrum "T10; day lighting with dimming ballasts; lighting controls) should be considered with the life-cycle cost analysis computer program input. See notes in Division 15001.  
 (Specific drawing sheet #/specification page #\_\_\_\_.)
  
2. Has it been specified that light fixtures in stairways should be above the landings and not above the steps?  
 (Specific drawing sheet #/specification page #\_\_\_\_.)
  
3. Has it been specified that emergency lighting shall be provided at all exits and in all stairways, hallways, mechanical rooms, elevators, etc. in accordance with the State Fire Marshal's requirements?  
 (Specific drawing sheet #/specification page #\_\_\_\_.)
  
4. Has it been specified that security lighting and parking lot lighting shall be included in the building design?  
 (Specific drawing sheet #/specification page #\_\_\_\_.)
  
5. Has it been specified that no lights are to be used that require scaffolding for re-lamping?  
 (Specific drawing sheet #/specification page #\_\_\_\_.)
  
6. Has it been specified that when emergency lighting is required in an interior classroom, a bypass will be provided to permit darkening of the room when visual aids are being used?  
 (Specific drawing sheet #/specification page #\_\_\_\_.)
  
7. Has it been specified that exterior walkway and security lighting shall be provided and controlled by both a 7-day time clock and a photoelectric switch connected in series?  
 (Specific drawing sheet #/specification page #\_\_\_\_.)
  
8. For all FAU campuses except those in Broward County, has it been specified that exterior walkway and security lighting shall be Kim VL-series luminaries, 17" diameter, post top mount for single fixtures, high pressure sodium lamp, dark bronze finish round aluminum pole? For Broward campuses has the Architect/Engineer verified existing fixtures and specified to match?

- (Specific drawing sheet #/specification page #\_\_\_\_.)
9. Has it been specified that the electrical system shall be 277/480 V, 3 phase, 4 wire, with a 120/208 V, 3 phase, 4 wire subfeeder? All mains and feeders shall be protected by circuit breakers rated for the bolted fault short circuit current calculations and data for the building shall be provided to the Physical Plant Director.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
10. Has it been specified that quantity and quality of lighting shall be provided in compliance with the IES (Illuminating Engineers Society) standard?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
11. Have lighting levels been designed and noted on the drawings? Safety and security concerns must be addressed by the A/E. The University's Green and Sustainable practices require that the designer only light exterior areas as required for safety and comfort. Do not exceed 80 percent of the lighting power densities for exterior areas and 50 percent for building facades and landscape features as defined in ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section, without amendments. (The following minimum lighting levels from the 1987 IES Lighting Handbook were the guidelines prior to the incorporation of the Green and Sustainable practices and are included for reference comparison only.) Safety, security, and activity levels may require that these levels be increased for proper quality and comfort of lighting.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- a. Roadways 0.6 av. maintained footcandles, 6 to 1 uniformity ratio (avg. to min.)
  - b. Open parking 0.6 avg. maintained footcandles on pavement 4 to 1 uniformity ratio (avg. to min.)
  - c. Pedestrian ways 0.6 avg. maintained footcandles, 4 to 1 uniformity ratio (avg. to min. includes sidewalks, bikeways, exterior stairways)
12. Has it been specified that outdoor lighting shall be high pressure sodium, pericline square type fixtures, pole mounted where possible?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
13. Has it been specified that exit signs shall be L.E.D. type?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
14. Has the following been specified? Avoid using incandescent light fixtures unless it is absolutely necessary in such areas as stage and theatrical lighting. In these areas however, down light fluorescent PL, and general purpose fluorescent fixtures shall be provided for non-performance hours. Extensive use of compact fluorescent is highly recommended.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
15. Has high-efficiency fluorescent lighting or other energy-efficient lighting been specified?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
16. Has a 5 percent THD filter been specified on all lighting fixtures?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

17. Has building lighting been designed to minimize energy consumption and to comply with all maximum energy requirements as outlined in ASHRAE/IESNA 90.1-2004? (Specific drawing sheet #/specification page #\_\_\_\_.)

**16530 – Exterior Lighting and Lamps**

Have the following Florida Atlantic University exterior lighting standards been specified or shown on the drawings? (Specific drawing sheet #/specification page #\_\_\_\_.)

- a. EMCO decolume deca/decw AZM mount parking lots only dark bronze + pole
- b. GE power door luminair M-400A2 street lighting only Aluminum only + pole
- c. KIM VL/VLA luminair for walkway lighting only dark bronze + pole
- d. KIM compact floodlights (GFL) for ground and sign lighting dark bronze + pole
- e. KIM wall director for wall up and down lighting dark bronze + pole
- f. KIM PGL1HP / PGL 2/3 for parking garages only dark bronze + pole
- g. Do not exceed 30' all poles

**16700 – General Telephone & Computer Systems Guidelines**

Note: It is recognized that telecommunications/data system technology is rapidly changing. The intent of the following Guidelines is to provide early identification of the needs; promote discussion and agreement early in the design process; and to assure the Project budget contains sufficient budget for these needs. The following represents the minimum. Universities are encouraged to develop their own telecommunications standards. In any event, the discussions, decisions and budget must be provided early in the design process.

- 1. Where the project includes classrooms and/or distance learning, has the Architect/Engineer determined the requirements from the FAU Learning Resources Dept.? (Specific drawing sheet #/specification page #\_\_\_\_.)
- 2. Has the Architect/Engineer reviewed electrical, telephone, fiber optic, coaxial cable and computer systems requirements with University Facilities Planning Department and the University's Information Resource Management (IRM) Dept.? Locations and sizes of conduits, boxes, cable trays, outlets, etc., will be determined for the Project. The Architect/Engineer's Advanced Schematic submittal shall include a full discussion of these systems. The CM/GC is typically required to provide all conduit, j-boxes, pull boxes, etc., with pull strings for telephone, computer, cable tv, etc., but the wiring and devices for these systems are typically contracted for separately by FAU. All electrical outlets are typically provided by the CM/GC. (Specific drawing sheet #/specification page #\_\_\_\_.)
- 3. For all new and renovated building projects, has it been specified to provide at least the following in the Construction Contract Base Bid:
  - a. Two conduits, minimum 4 inch diameter each, encased in concrete, from existing telecommunications manhole to the basement or first floor

- telecommunications room?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- b. One dedicated telecommunications room per floor; with 3/4" marine plywood terminal backboard. Provide at least one double 110 volt electrical outlet (four receptacles) in each telephone room. These rooms will normally be "stacked" one above the other for ease of wiring. Provide minimum of two conduits, minimum 4 inch diameter each, penetrating the floor slabs, for wiring between rooms. Have all telecommunications rooms been interconnected?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- c. A one inch home run conduit from each phone outlet to the nearest telecommunications room, terminating at the plywood terminal backboard?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- d. Typically, telephone and computer/data wiring will be Cat 5E cable and can be run in the same conduit. If specific requirements dictate otherwise, have separate conduits been specified?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
- e. Telephone and computer/data conduits and outlets shall be provided to all potential spaces and areas. Normally, one 2 gang box, with 4 jack capability, shall be provided for every 100 square feet of usable floor space? A/E shall confirm with FAU's IRM Dept.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
4. Are all telephone equipment areas located at least 3 feet from any electrical power panels?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
5. Are elevators equipped with an elevator emergency intercommunication device located in each elevator cab, connected by a dedicated phone line to the University Police Dept., to be used in case of emergency? Has the A/E coordinated this with the requirements of the FAU CCG's Division 13 – Special Construction?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

**16720 – Fire Alarm Systems**

1. Has it been specified that the Contractor shall furnish all labor and equipment for the complete installation of a fire alarm system?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
2. Has it been specified that the fire alarm equipment shall be manufactured by Simplex, Siemens, Notifier, or approved equal? (The equipment shall be approved by Underwriters Inc., and the system shall comply with codes and regulations; primarily NFPA 72, NFPA 101 and State Fire Marshal Rules).  
(Specific drawing sheet #/specification page #\_\_\_\_.)
3. Has it been specified that the Contractor shall submit a list of all material items giving manufacturer's names and catalog numbers?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
4. Has approval of the list been obtained from the Architect/Engineer?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

5. Is maintenance service available within a reasonable distance of the University and shall stock the manufacturer's standard parts?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
6. Has it been specified that the system shall be a low voltage zoned, non-coded, supervised, and annunciated fire alarm system and that fire alarm pull stations, heat detectors, smoke detectors, door holders and water flow switches shall be connected to electrically supervised zone circuits?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
7. Has it been specified that the fire alarm system and zones shall be tied in with the central fire alarm system? (Contractor shall verify operation of alarm signals between the central plant and local annunciator).  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
8. Has it been specified that the Contractor shall fully instruct representatives of the University in operation and maintenance of the fire alarm system? (The manufacturer of the equipment shall provide the services of a qualified engineer who shall check the installation and function of the system to insure its proper operation).  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
9. Has it been specified that each device shall be tested to insure all functions are operational? Each device and its applicable functions (alarm, annunciation, proper central system indication, fan shutdown, fire damper closings, etc.) shall be separately listed and documentation provided showing all checkouts have been performed.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
10. Has it been specified that the Contractor shall assemble and bind manufacturer's operating and maintenance literature for inclusion in the Maintenance Manual? Maintenance literature shall include wiring diagrams showing point-to-point identification. They are to indicate all wiring labels and physical location of each device on a zone-by- zone basis, including end-of-line resistors. All externally operated equipment shall also be shown, such as fan shutdown equipment and automatic smoke dampers.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
11. Has it been specified that the Contractor will provide as-built drawings of existing fire alarm systems as modified?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
12. Has it been specified that the fire alarm system reports to the University Police Dept? Have both the power cable and signal cable of the fire alarm system been protected with lightning surge arresters? Visual as well as audible alarms shall be provided in visible locations in all corridors and toilet rooms.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
13. Has it been specified that any smoke detectors of the photoelectric type used in the HVAC system or the building alarm system shall have LED (light emitting diode) light source? HVAC smoke detectors and elevator lobby (for elevator recall) shall be wired into the fire alarm system. Fire alarm wiring shall be 19 strands maximum.  
(Specific drawing sheet #/specification page #\_\_\_\_.)

Description of Operations

- 14. Has it been indicated that actuation of any manual pull station, heat detector, smoke detector, or water flow switch shall initiate a local evacuation alarm within the building, light a zone indicating lamp on the annunciator panel, and transmit a signal over the campus security system indicating the building and zone within that building from which the fire alarm was initiated? Manual pull stations shall be zoned separately for each floor. Water flow switches shall be zoned separately for each switch. The area of the building that each zone covers shall be indicated at the annunciator panel or on a schedule adjacent to the panel. In addition to performing the above function, each air handling unit smoke detector shall shut down its associated fan motor.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
- 15. Has it been provided that the alarm shall continue to sound until the initiating device is reset or silenced by the operation of a switch on the control assembly which will light the trouble light and cause the zone indicator light to remain lit? (The switch should be under lock and key).  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
- 16. Has it been specified that the system shall be totally supervised on the initiating and the indicating circuits for each zone? Trouble on an initiating zone circuit will sound a distinctive tone trouble signal at the control panel assembly and send a signal by the base loop, reporting the alarm or trouble condition and the zone in which it is located to the central alarm receiving facility.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
- 17. Has it been indicated that systems containing automatic extinguishing features should be cross-zoned so that at least two devices must detect fire before discharging the extinguishing agent?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
- 18. Is all wiring #14 AWG stranded copper in dedicated conduit?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
- 19. Has it been indicated that the Contractor is to provide code gauge size terminal cabinets with terminal blocks at all junction points? Do not splice conductors using pressure type connectors. All wiring is to be terminated with spade-type crimp lugs. All wiring will be plainly marked to match as-built drawings. All cabinets will be stenciled "Fire Alarm System".  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
- 20. Has it been indicated that each zone circuit must be megger checked to conduit ground prior to final checkout? The readings must be no less than 10 meg. ohms.  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
- 21. Has it been indicated that all external equipment, such as fan shutdown systems and automatic smoke dampers, are to be wired at the control panel so that they can be left in normal operating configuration during system testing and maintenance?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

**16722 – Emergency Telephones**

- 1. Have emergency telephones been specified for this project?  
(Specific drawing sheet #/specification page #\_\_\_\_.)
  
- 2. Has the location of emergency telephones been coordinated with the FAU Police

Department and FAU Environmental, Health & Safety Department?  
(Specific drawing sheet #/specification page #\_\_\_\_.)

3. Has Ramtech Phone Model R733 been specified? This ensures that the phone comes with a compatible microchip to be integrated into the Siemens system.  
(Specific drawing sheet #/specification page #\_\_\_\_.)

4. Has it been determined if the telephones are to be wall mounted or column mounted? If a column mounted phone, has a PLC-9 steel column been specified? (Powder coated OSHA Yellow with BLUE lettering on four sides. Wording to alternate as follows:  
(Specific drawing sheet #/specification page #\_\_\_\_.)

2 sides – vertical EMERGENCY (front & back sides).  
2 sides - vertical INFO PHONE (left & right sides).

End of Division 16 – Electrical Equipment.