

CONSTRUCTION DESIGN STANDARDS

For



UNIVERSITY

OF

LOUISIANA
L a f a y e t t e

Produced and Distributed by:

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DIVISION 1 GENERAL

A. Contact Personnel

The following is a list of University contacts for various disciplines:

Facility Management Director	William Crist	337-482-2001
Construction Management	John Wales	337-482-2001
Plumbing, Electrical & HVAC	Terry Jenkins	337-482-2001
Landscaping and Grounds	Mike Hess	337-482-2001
Campus Safety & Elevators	Joey Pons IV	337-482-2001
Telephone and Data / Information Networks	Stephen Mahler	337-482-6418
Housing	Lisa Landry	337-482-6471
Parking and Transit	Simon Broussard	337-482-6858
Cajun Card Access System	Lucien Gastineau	337-851-2273

B. Room Numbering

Before the commencement of construction documents, the architect shall submit to the UL Lafayette Facility Management for review, a room numbering layout that will serve as a record for both the construction documents as well as for the ordering of room signage for the construction project.

C. Barricades

The contractor shall install fences and/or barricades as necessary for the protection and safety of pedestrian, vehicular traffic and vegetation. **Perimeter should be a site proof fence.** Fences shall be detailed and shown on the contract documents. These barriers shall be maintained for the duration of the project. Special care must be taken to provide barricades which comply with ADA (will warn blind students).

D. Access, damage to existing structures and traffic restrictions

The Contractor shall be permitted access to the site at the University's convenience. The Contractor shall be responsible for any repair and/or replacement of existing lawns, ditches, concrete sidewalks or gutters, fencing or any other structures damaged by the Contractor's operations. The Contractor shall conduct a pre-construction site survey with a UL Lafayette Facility Management representative so that any such elements then needing repair or which is already damaged in any manner may be properly identified, described, and recorded with the UL Lafayette Facility Management. If no such damage is recorded, then any structures over which the Contractor has crossed during construction which are later found to be damaged shall be considered to have been so damaged by him and shall be repaired and/or replaced by the Contractor as necessary to return them to their original condition to the satisfaction of UL Lafayette Facility Management at no cost to the University. The University shall designate areas for parking. The construction operations of the Contractor may not cause any obstruction to the free flow of traffic on the streets of the campus without the prior authority of the University..

E. Toilets

The Contractor shall provide and maintain temporary toilets as necessary for use of workmen unless otherwise noted. Locate toilets where directed, and keep toilets in sanitary condition.

F. Temporary Utilities

The Contractor shall connect to existing UL Lafayette facilities for the temporary use of electricity and water for the duration of the project. All costs associated with the connections shall be the responsibility of the Contractor. Coordinate all connections with Facility Management. The Contractor is responsible for obtaining telephone service from a local provider for the job shack and job site. All costs associated with telephone service shall be the responsibility of the Contractor.

G. Removal of Trash and Debris

The Contractor shall not permit trash and debris to accumulate in the building or the ground in the vicinity of the building. He shall establish and maintain a regular daily routine for removing trash and debris and hauling it away from the premises. The University shall have first salvage rights to any

material or equipment removed from Campus buildings.

The Contractor is responsible for the clean-up and disposal of all trash and construction debris relating to this project. University dumpsters shall **not** be used for the disposal of debris. Should the Contractor dispose of any debris into University facilities, the cost of removal will be billed to the Contractor.

H. Project Termination

At the termination of the project, provide UL Lafayette Facility Management with one reproducible copy of the drawings of the subject project, verifying that it conforms to all as-built conditions. Also provide the university with a complete set of the plans on disk in Autocad version 12 - 14.

I. All Products must be asbestos free!

J. Custodial Services

Designer shall include adequately sized custodial closets on every floor of the facility. Closets shall contain a floor sink and two 16" deep shelves.

K. No flower beds or vegetation of any kind shall be placed against the building. Entire building perimeter shall be surrounded by a brick or paved plaza of at least fifteen (15) feet in width.

L. ADA compliance must be adhered to, including automatic door openers at all accessible entrances.

M. New and existing buildings shall be designed for a 0.2 water column positive pressure. Coordinate with the mechanical consultant.

N. Visual clutter shall be minimized. Coordinate the location, type and colors of various site materials such as bicycle racks, trash cans, site lighting, benches and signage.

O. Building Names shall be installed on the exterior of the building, and visible from all pedestrian and vehicular points of access. Signs shall be rectangular in size, with 10" minimum dark bronze lettering and an off-white, textured aluminum background to match the type installed throughout the campus.

P. The building exterior finish shall be at least 85% red brick and glass. Red brick shall match the existing type throughout the campus. Only a small portion shall consist of stone and / or plaster.

Q. Submit the completed ASHRAE 90.1 Code compliance form along with the Design Development Phase submittal to indicate compliance with **Louisiana Commercial Building Energy Code**. This includes compliance with the Building Envelope, Mechanical and Electrical requirements.

R. Project must comply with ACT R.S. 25:900.1 - Provide 1% of the project budget (on projects in excess of \$2 million) for **art work** within the facility.

S. All workers on the site must behave and be dressed appropriately. No university apparel, except **UL Lafayette apparel**, may be worn while working on this campus.

DIVISION 2 SITEWORK

A. Termite treatment shall be provided on sub-grade full under concrete slab. Provide 2 year bonded guarantee for material and installation with an optional renewal warranty.

B. Contractor shall be held responsible for providing earth surfaces finished to give **positive gravity drainage** away from the buildings and walks in area of new construction. Finished slopes shall be free from irregularities, hollows, or depressions.

- C. All barrier fencing shall be industrial grade, black, ornamental aluminum fencing to match the type at Legacy Park Apartments.**
- D. Ground floor slab elevations** shall be above adjacent streets, parking lots and at or above the 100 year flood plain. **Confirm final finish floor elevation with University personnel prior to completion of Construction Document phase.**
- E.** The University has several **card access gated parking lots**. Any additional card access controllers must be compatible with the existing system. Further information can be obtained from the Department of Parking and Transit.
- F. Steel pipe bollards** are required adjacent to buildings where service vehicles back in to load/unload.
- J. Existing Vegetation**
1. Before a new structure is designed to be located on university property, the UL Lafayette Facility Management Grounds Manager shall be consulted. An Autocad inventory of all campus trees is available for this consultation.
 2. Structures should not be located within twenty (20) feet of tree driplines unless a variance is granted by the Grounds Manager. Special preservation techniques shall be employed when variances are granted for construction near campus trees.
 3. A temporary fence shall be constructed completely around designated trees or other vegetation for protection during construction. The exact location of the fencing shall be located and detailed on the construction documents. No activity of any kind shall occur within the fenced in areas. This includes the storing of materials, supplies, and excavated soil, as well as, the parking or travel of any vehicle or equipment.
 4. Trenching necessary for utilities shall be designated to avoid crossing within the drip line of trees. Contact the Grounds Manager for special techniques needed for performing this work.
 5. Pruning which is necessary to facilitate any type of construction shall be performed by a licensed Arborist approved by the UL Lafayette Facility Management Grounds Manager.
 6. Instead of providing planting material in existing flower beds, the university prefers that beds be provided with hardwood mulch and a manually operated underground irrigation system for coverage throughout the bed.
- K. New Vegetation**
1. All landscape plans must be designed by a Landscape Architect. **Before a new building is designed** on university property, the Landscape Architect shall consult with the UL Lafayette Facility Management Grounds Manager. An Autocad inventory of all campus trees is available for this consultation.
 2. No flower beds or vegetation of any kind shall be placed against the building. Entire building perimeter shall be surrounded by a brick or paved plaza of at least fifteen (15) feet in width.
 3. All flower beds (both new and existing) shall contain no planting material. Provide hardwood mulched beds with a manually operated underground irrigation system for coverage throughout the bed.
 4. All new trees shall conform with the university master landscaping plan. Contact the UL Lafayette Facility Management Grounds Manager for details relative to this master plan.
- L.** All projects requiring **material storage on the job site** shall have an approved staging area determined prior to construction. This site shall be shown on the contract documents.

M. Concrete Walks

1. Recommended width of concrete walks shall be 15'.
2. All concrete walks shall be reinforced with fiber mesh or an approved alternate.
3. Concrete walks shall have a minimum depth of 5" and have a non-slip surface finish.
4. All walks shall meet the latest ADAG and NFPA requirements.

N. Parking Lots

1. The general design to maximize use of parking areas on the UL Lafayette campus is to employ a 90 degree parking space 9 feet wide and 18 feet long and a bay width of 60 feet for a double bay and 42 feet for a single bay.
2. Handicapped spaces must comply with the latest ADA standards.
3. Layout of all parking areas must be approved by the Department of Parking and Transit before implementation.
4. Tree plantings should be included in all new parking lots. Tree wells in parking lots are not recommended. It is required that a ten (10) foot planting strip be located between each bay of double loaded parking bays. Tree locations should be arranged in order to minimize the visual impact of parking lots. Concrete curbs should be installed on the perimeter of all parking edges.
5. Light standard locations should be considered relative to tree plantings in order to avoid dark areas in parking lots.

O. New and existing buildings should be constructed with permanently installed **bicycle racks** to provide adequate bicycle storage for the anticipated type and occupancy count for the building (i.e. high student usage would require more than high research or administration usage).

P. **All streets and driveways** must meet highway standards for construction and maintain a minimum width of 24' for two way traffic and 12' for one way traffic. Signage and other traffic control devices should conform to the Manual on Uniform Traffic Control Devices.

Q. **Trash Dumpsters** shall be located in accessible areas and incorporated into the building site design.

R. **Trash Containers** shall be provided adjacent to building entrances and areas of outdoor gathering spaces. UL Lafayette standard is installed at Legacy Park Apartments.

S. **Cigarette Dispensers** shall be Rubbermaid RCP 9W30, Black Tuscan style type. These shall be mounted at least 25' from any building entrances.

T. Conform with the State of Louisiana, Office of Facility Planning & Control standards for space design:

Graduate Assistant Office	9' x 9'
Faculty Office	9' x 12' (Typical Office)
Professor's Office	12' x 12' (Supervisor, Manager)
Department Head's Office	12' x 15' (Ass't VP, Ass't Dean)
Vice-President, Dean's Office	12' x 18'
President's Office	15' x 21'

Additional space guidelines shall conform to the following:

Shared Office	80 square feet per person
Reception w/ seating	10 square feet per person
Conference	17 square feet per person
Resource Center	20 square feet per person

DIVISION 3 CONCRETE

- A. Plain and reinforced concrete work to comply with the latest A.C.I. code.

DIVISION 4 MASONRY

- A. UL Lafayette requires the use of "red" brick to match adjacent buildings.

DIVISION 5 METALS

- A. All exterior steel ladders, stairways, landings, supports, etc. shall be hot-dipped zinc coated (Galvanized). Where the architectural appearance is of great significance, alternate finishes may be considered.

DIVISION 6 WOODS and PLASTICS

- A. Exterior wood shall be chemical pressure treated where in contact with the ground and exposed to weathering.

DIVISION 7 THERMAL and MOISTURE PROTECTION

- A. All roofing details shall conform to the NRCA (National Roofing Contractors Association) Roofing and Waterproofing Manual.
- B. All sheet metal details shall conform to the SMACNA (Sheet Metal and Air Conditioning Contractors National Association) Architectural Sheet Metal Manual.
- C. Designer must adhere to the State of Louisiana, Office of Facility Planning Roof Standards.
- D. Minimum slope on flat roof reroofing shall be 1/4".
- E. All roof metal work shall be 16 oz. copper unless otherwise noted.
- F. **Roofing contractor shall respond within 24 hours to leak repair requests by the University.**
- G. The University discourages the use of skylights, sloped glazing and glass atriums.
- H. Exterior masonry caulking shall be a high performance gun-grade polyurethane sealant successfully tested for joint movement of +/- 50%.
- I. Roof hatches shall be a minimum 3' - 0" X 3' - 0", galvanized metal with 1" rigid insulation. Provide hold open arm and one point spring latch with pad locking provisions.
- J. **Careful pre-planning must be made to allow for easy maintenance access to the roof for repairs.**
- K. Exterior wall insulation shall be a minimum R-19 and ceiling/roof insulation R-30.
- L. Batt insulation is preferred to blown insulation. Where insulation is installed in roof areas, wire mesh will be used to support the batts within the roof rafters.

DIVISION 8 DOORS and WINDOWS

A. Doors

Interior doors should generally be 1 3/4" solid wood core doors or insulated, raised panel, metal doors. Particle core will not be accepted. Sliding wood doors shall not be used. All doors shall be at least 36" wide. All door frames shall be metal.

All classroom doors, stairwell doors, and corridor doors shall have vision panels (5" x 20").

Exterior aluminum doors should be equal to Kawneer "350" with a minimum bottom rail of 6 1/2" and side and top rails of 3 1/2".

B. Finish Hardware and Specialties

ADA compliance must be adhered to, including automatic door openers at all accessible entrances.

Contractor shall provide test certification of automatic door operation.

Provide 1" electrical conduit from the telephone/data room to all exterior doors to allow for the installation of card accessed locks and/or telephone intercoms.

Contractor shall furnish all locks, construction cores, lock cylinders, levers, conversion kits, service equipment, and spare parts. All material must be compatible the BEST LOCK system in order to guarantee continuity in the university's existing system.

With reference to new buildings the locks and cylinders must be able to accept BEST cores.

With reference to remodeling of existing buildings (including additions to existing buildings) the locksets shall be changed throughout the building to conform with the BEST system.

All cylinders and cores to be interchangeable with Best (figure 8, seven pin) interchangeable cores. Contractor shall furnish permanent, uncombined cores along with two blank keys for each lockset. UL Lafayette will handle the keying of all locks.

The University standard lock is a heavy duty mortise lockset with one piece escutcheon trim and screwless lever assembly.

Hardware schedules must be approved by the University prior to fabrication. The University shall retain a copy of the final hardware schedule for its file. The University's copy shall include catalogue cuts for each item of hardware, along with a parts availability list.

All equipment rooms shall be lockable.

Products:

- A. Manufacturer - UL Lafayette uses the "BEST LOCK" system throughout the campus. All hardware must be compatible with the BEST system.
- B. Provide silencers on all hollow metal door frames.
- C. Dust Door Strikes: Where pairs of doors occur and thresholds are not required, automatic flush bolts #10402 and regular flush bolts are required, the bottom bolts shall be furnished with dust proof strikes #1040-18 and 487-B and 489-B respectively.
- D. Wrought Box Strikes: Wrought box strikes shall be provided for all locks.
- E. Curved Lip Strikes: curved lip strikes shall be provided for all locks which have latching bolts excepting those doors which are equipped with astragals. Two inch straight lip strike to match existing will be required for new locksets specified in wood frames.
- F. Locksets: Locksets and latchsets shall be lever type (ADAG approved) which will accept BEST interchangeable cores.
- G. Closers: The UL Lafayette standard is Dorma # 7605-PS-4-PA-SNI-AL. Closers shall be adjusted to meet ADAG push/pull and delay requirements.
- H. Exit devices: The University prefers the use of pad type panic devices where possible. Acceptable products are Von Duprin 9827 NL and 9827 DT at double doors and Von Duprin 98 NL for single doors. Use removable mullions on double

door sets. Do not use concealed vertical rod types.

No hold open closers or fusible link closers are allowed.

J. Hinges: The university prefers the use of full mortised pivot hinges similar to Hager # 495, 496 & 497.

K. Finish: Finish shall be as follows:

Door Closers, thresholds, door bottoms, mullions & sound seals - Manufacturer's standard brushed aluminum

Push plates, pull plates, kickplates - Stainless steel (US32D)

Panic bolts, locksets, misc. items and butts - Dull chrome (US26D)

Provide five year warranty on closures, locksets and panic devices.

Certification: Architectural Hardware Consultant shall inspect complete installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions. Provide 3 copies of certificates to Architect.

C. Windows

1. Windows shall be energy efficient, bronze tinted, insulated glass with low "E" coating to improve thermal performance.
2. Special glazing for impact resistance (lexan) and sound abatement (laminated glass) shall be specified as needed.
3. All windows located in restrooms, locker rooms or dressing rooms shall have obscure glass.
4. Windows shall **not** be operable, unless approved by Facility Management.
5. Match the pre-finished single-hung windows that are installed throughout the campus.

DIVISION 9 FINISHES

UL Lafayette requires the use of durable, low-maintenance finish materials throughout all facilities. The following is a breakdown of finishes required. Any deviations from this must be approved by UL Lafayette Facility Management Director.

A. Corridors, Lobbies and other high traffic areas:

Floor	Terrazzo
Base	Terrazzo or Painted CMU
Walls	Painted Plaster or CMU
Ceiling	Acoustical Tile

B. Offices, Classrooms, Labs, Conference Rooms:

Floor	Vinyl Tile
Base	Rubber Cove (4" only)
Walls	Painted Plaster, CMU or Sheetrock
Ceiling	Acoustical Tile or Painted Sheetrock

C. Restrooms:

Floor	Ceramic Tile
Base	Ceramic Tile

Walls	Ceramic Tile to 60" AFF minimum and Painted Sheetrock above.
Ceiling	Acoustical Tile with All Aluminum Grid or Painted Sheetrock

D. Telephone / Data Rooms:

Floor	Vinyl Tile or Sealed Concrete
Base	Rubber
Walls	Painted fire retardant gray (all sides and edges) 3/4" Plywood
Ceiling	Acoustical Tile

All telephone/data equipment room walls shall be covered with three-quarter inch (3/4") indoor grade plywood to a height of eight (8') or to the ceiling, whichever is lower. All plywood backboards must be painted with two coats of nonconductive, fire-retardant paint. Due to dusting characteristics of concrete, all such interior surfaces shall be painted or tiled and finished in a light color to increase illumination. Paint should be free from turpentine.

E. Painting

1. Paint coatings to be the top grade manufactured by Benjamin Moore, Devoe, Sherwin Williams or approved equals.
2. Flat paint is not allowed except on ceilings and on unusual areas as approved by the University.
3. Interior wood doors shall receive a natural or stained finish.
4. All colors must be approved by UL Lafayette Facility Management prior to submission to the Contractor.
5. Industrial coatings are to be used in corrosive environments when applicable.
6. **Paints containing lead are not permitted.**
7. Epoxy paint is not permitted.

F. Acoustical tile ceilings shall be non-directional, 2' x 2' only. No 2' x 4' ceiling grids are allowed. The university stocks Armstrong - 1728 Fine Figured non-sag ceiling tile. USG Radar Clima Plus may also be used as a substitute. In wet areas use Armstrong ALPrelude Plus XL, 15/16" aluminum exposed grid, White, baked-on paint finish, grid as scheduled with minimum 12 gauge aluminum hang wires, with Ceramaguard #605, Lay-in ceiling tile.

G. Carpet is not recommended. When used, the university prefers a high quality, 28 ounce, solution dyed, level loop carpet installed using the glue down method. In executive office areas a 36 ounce, cut-pile carpet installed over 1/4" thick, 8 pound rebond pad w/ reinforcing mesh (Lifetime Warranty).

DIVISION 10 SPECIALTIES

A. Room numbering signage - Before the commencement of construction documents, the architect shall submit to UL Lafayette Facility Management for review, a room numbering layout that will serve as a record for both the construction documents as well as for the ordering of room signage for the construction project.

B. Designer must submit samples of the proposed signage to UL Lafayette Facility Management for approval **BEFORE** final specifications are prepared.

B. The University prefers metal trim **bulletin** and **dry erase boards**.

C. The University requires floor supported head rail braced **toilet partitions**. Partitions and doors shall be solid plastic with the color continuous throughout the product.

D. The **toilet paper, paper towel & soap dispensers** will be provided by the University and

installed by the contractor.

- E. **Mirrors** should be provided with theft-proof locking device.
- F. Unless codes provide otherwise, the University prefers **fire extinguishers** rather than fire hoses. Fire extinguisher cabinets shall be provided in corridors only. Fire extinguishers for general purpose shall be ABC multi-purpose dry chemical. Cabinets shall be semi-recessed, lockable with break-glass doors.

DIVISION 11 EQUIPMENT

- A. Approximately ten percent (10%) of all fixed table arm auditorium or classroom seats in each room shall be left handed.

DIVISION 12 FURNISHINGS

- A. Mini Blinds shall be provided at all windows throughout the facility.

DIVISION 13 SPECIAL CONSTRUCTION

- A. Pre-engineered steel building wall and roof panels shall have a 20 year non-prorated warranty on the finish coating.

DIVISION 14 CONVEYING SYSTEMS

- A. **The type of elevator** to be used shall be Otis, Thyssen, Dover, Montgomery, Vertical Express, Elevator Controls, Motion Controls, or be a model approved by UL Lafayette Facility Management, capable of being adequately serviced in the area of the project. Oil hydraulic elevators should not be used when total travel exceeds 40' vertically. Operation and maintenance manuals, diagnostic books, complete wiring diagrams and parts catalogs shall be delivered to the University prior to final acceptance of the project.
- B. **Elevator maintenance** including all labor and materials shall be specified for a one-year period from the date of final building acceptance. **The elevator contractor must respond to normal call backs within 1 hour & entrapments within ½ hour during this warranty period.**
- C. **All elevator plans & specifications** must be reviewed and approved by an Elevator consultant (State's Consultant) hired by the State of Louisiana, Division of Administration, Office of Risk Management. To identify this person, contact (225) 342-8500 or **Error! Hyperlink reference not valid..** All elevator plans and specifications must be compliant with ASME A17.1. Before the University will accept the elevator as constructed, the State's Consultant must inspect and accept the elevator as constructed in compliance with all applicable sections of ASME A17.1, and any applicable State and other codes.
- D. **Contractor shall provide** the university with the appropriate diagnostic equipment necessary to identify and troubleshoot all programmable controller diagnostic trouble codes including software, hardware, cables, dongles, security keys & all documentation.
- E. **Contractor shall provide** a laminated schematic of the elevator drawings on the wall of the elevator equipment room. These drawings shall include a complete set of wiring diagrams for every elevator circuit and printed circuit board.
- F. **Elevator shall contain** a ADA approved, hands-free two-way communication system which shall be wired directly into the first floor communications room.

DIVISION 15 MECHANICAL

A. GENERAL

Consultants shall explicitly follow all applicable criteria listed. Any variation from these criteria must be approved by UL Lafayette Facility Management.

1. Cooling towers shall be induced draft, cross-flow design with the fan driven by a geared speed reducer (no belt drives). Fan motors shall be controlled by a variable speed drive.
2. Water chillers shall be of a high pressure design using HFC-134A. Chillers up to 200 tons shall be screw design and above 200 tons shall be centrifugal. Chillers shall be as efficient as possible with a NPLV no greater than 0.5 kw/ton.
3. All zones shall be clearly marked on supply ducts at air handling units.
4. Air handlers shall be fitted with drain clean-outs.
5. All air handlers and pumps shall have safety drip pans complete with piping to drains. Each A/H unit drain shall be piped separate from its drip pan drain.
6. Filters shall be throw-away pleated high efficiency type. Permanent type not acceptable.
7. Air handler access panels shall be removable bolt-on hinged and gasketed type.
8. All duct work shall be galvanized metal gauges of acceptable to SMACNA standards (Duct board is not acceptable).
9. Spacial consideration shall be given in equipment room sizing and equipment positioning to assure adequate clearance for each of shaft and bearing removal and replacement and etc. A minimum three feet (3') clearance shall be provided all around all equipment to provide accessible work area. **All mechanical equipment shall be drawn to scale on the plans in all phases of the work.**
10. Simplified valving instructions shall be provided on a durable chart in the equipment room and all corresponding valves shall have numbered permanent tags.
11. All air diffusers shall have proper design and locations as to evenly distribute air to all parts of the room.
12. Three complete sets of equipment manuals and "as built" control diagrams shall be supplied to UL Lafayette Facility Management.
13. All insulated piping shall have a vinyl jacket color coded to the ASHRAE standards. All piping and conduit shall be painted in accordance with the ASHRAE piping color code.
14. All piping shall be clearly labeled for identity and flow direction on straight pipe runs, close to valves and adjacent to all change-in-directions, or where pipes pass through walls or floors.
15. All new buildings shall be connected to the campus central chilled water loop system when possible. Size coils on 45⁰F chilled water and a ten degree temperature rise. Use two-way water valves on air units with a 5% building flow, bypass at worst case condition. Install a two-way valve with pressure control at building entrance. Chillers shall be interlocked with the chilled water pumps, condenser water pumps, and pressure differential switch so that no chiller can operate if water is not flowing.
16. Air handler fan curves shall be supplied to UL Lafayette Facility Management.
17. Provide double doors and / or roll-up doors on equipment rooms.
18. Sewer lift pumps are to be avoided if possible. If it cannot be avoided, they shall be of a design acceptable to UL Lafayette Facility Management.

19. All air handlers shall have dial-type thermometers and pressure gauges on supply and return lines.
20. Use of fan-coil units is not allowed.
21. Sleeve bearings on cooling towers are not acceptable.
22. Sleeve bearings and center bearings on A/H units are not acceptable.
23. Testing and Balance

All work performed by the balancing agency shall be done in accordance with "National Standards for Field Measurements and Instrumentation, total system balance Volume 1, Number 81226", published by the Associated Air Balance Council. Follow all FP & C guidelines.
24. Low pressure duct work shall be hardcast sealed or equal.
25. All control air lines shall be hard drawn copper.
26. Starting of all large motors must be coordinated with the University so as not to add to the peak occurring between the hours of 8:00 a.m. and 4:00 p.m.
27. Areas requiring special environmental control should be discussed with UL Lafayette Facility Management on a case-by-case basis.
28. Identify major mechanical equipment (AHU's, pumps, motor starters, valves, etc.) with permanent tag or nameplate.
29. Put similar functions on an AHU. That is, don't mix labs and offices.
30. Do not mix air streams to achieve temperature control except for special areas.
31. Use variable frequency controls on variable speed drives.
32. All utility lines to be minimum of 24" below grade and all high voltage electrical shall be encased in red concrete.
33. Non-metallic underground utility line shall be equipped with a tracer wire.
34. All HVAC control systems shall be Direct Digital Control tied to campus energy management system.
35. Chillers' minimum chiller efficiency shall be discussed with UL Lafayette Facility Management on a case by case basis.
36. All AHU's shall have re-heat capability for humidity control.
37. When determining cooling needs for Telecommunication / Data rooms, size for a room with internal volume of 1-1/2 times the volume of the equipment room. Communications Room will require cooling even when the building is in the heat mode. In general, the temperature (after installing communications equipment) should be no less than 50 degrees Fahrenheit and no greater than 78 degrees Fahrenheit. The room shall be well ventilated and maintain a humidity of less than 70% (noncondensing).
38. At least ten pipe diameters distance must be maintained between the flow meter and nearest pipe fitting.
39. Designer must provide an analysis of energy efficiency of natural gas versus electricity for building heating and cooling. This should be submitted in the Schematic Design Phase.
40. Fresh air shall be supplied to air handler units according to Article 62 of the latest ASHRAE standards.
41. New and existing buildings shall be designed for a 0.2 water column positive pressure. Coordinate with the architectural consultant.

42. Air handlers shall be double-wall construction.

B. Specifications for energy efficient motors

1. Motors shall have minimum and nominal full load efficiency which will meet or exceed the values listed in attached table when tested in accordance with NEMA test standards MG112.53a, IEEE Test Procedure 112. Method B, using accuracy improvement by segregated loss measurements. The minimum efficiency shall be guaranteed.
2. Motors to have Class B insulation. Motors to be drip-proof for indoor applications and totally enclosed fan-cooled for outdoor applications.
3. Power factor on all motors 3 Hp and larger to be minimum of 90%. Use capacitors if necessary.
4. Motors controlled by VFD's shall be rated for inverter duty.

C. Energy Management Control System

1. Scope

The energy management and automatic temperature control (EM/ATC) system shall be an extension/expansion of the existing UL Lafayette EM/ATC network that currently serves the various campus buildings. The system additions shall be fully integrated with the existing data communications network to further utilize the capability of the network, to insure uniformity and standardization of the equipment and to preclude the purchase of additional and/or redundant systems. No EM/ATC system(s), which cannot directly interface with the existing network, peer to peer communication bus, operator workstations, operating software, programming software and application software will be accepted. The system shall be complete in every respect and shall include all labor, materials, equipment, engineering, supervision, hardware and software programming required for a complete and operational system.

All temperature control shall be accomplished via direct digital control (DDC) with electronic sensors and electronic actuators, unless specifically noted otherwise. The EM/ATC system shall include electrical interlocking of motor starters and other equipment supplied as part of the heating, ventilation, and air conditioning systems.

Bids for the equipment shall be limited to that manufactured by Johnson Controls or Siemens only - NO EXCEPTIONS.

Single source responsibility of the EMS manufacturer shall include calibration and checkout of the stand-alone subsystems, as well as, the complete operation of the integrated system.

D. Plumbing Requirements

1. Only ball valves are acceptable. Gate valves can only be used on 2" or smaller pipe.
2. Each restroom shall have valves on hot and cold water supply branches.
3. Other branch lines on hot and cold water shall have accessible valves.
4. Each floor shall have a main valve on hot and cold water.
5. Each floor shall have at least one other section valve on main branch.
6. All hot water lines shall have adequate insulation (fiberglass with foil covering).
7. All sewer piping underground below building floors and foundations shall be schedule 40 PVC. Soil line 5'-0" or more away from building/structure may be schedule 40 PVC pipe with WV fitting unless otherwise restricted by code or local government ordinances.
8. Clean-outs to be installed at each restroom on soil stacks and main drains. Clean-outs shall be installed at horizontal 1/4 bends on main drains, at drain terminals, and at 75 feet intervals on main drain.
9. Floor drains shall be installed with perforated, hinged covers.

10. Catch basins shall have cast iron grates a minimum size of 24" X 24".
11. Storm drain lines shall be connected to storm sewers at manholes or catch basins.
12. All gas pipe shall be installed with branch valves and main valves to each floor. Valves shall be installed at connection to all appliance and fixtures.
13. UL Lafayette does not have, and does not desire to maintain, a master meter situation, therefore, each building designed on this project shall have a separate gas meter. Any multi-building connection to the project gas meter must be piped above ground.
14. All air handler drains shall be PVC or copper pipe with WV fittings. All condensate drains located in air plenums shall be copper.
15. Waste stacks shall be installed within 10 feet of air handler units to provide drainage connections from units and secondary pans.
16. All air handler drains shall be installed with clean-outs on traps, 1/4 bends, and waste stacks.
17. All air handler secondary pans shall be elevated a minimum of 4" above grade to provide sufficient grade on drain lines.
18. All air handler drain lines shall be a minimum size of 1-1/2" I.D.
19. All fire hydrants shall be installed with valves.
20. All fire main valves shall be installed with adjustable valve service boxes.
21. All valve service boxes shall have enlarged bases.
22. All urinals shall be individual type, vitreous china with water saving flush valve for water conservation, except where indicated otherwise by the University.
23. Install a meter on all gas & water lines to all University buildings.
24. Provide an analysis of energy efficiency of natural gas versus electricity for domestic hot water in the Schematic Design Phase. Check FP & C regulations regarding domestic hot water in academic/office facilities, as hot water may not be allowed.

E. PUMPS

1. General
 - A. Pumps to 50 HP shall be end suction with mechanical seals.
 - B. Pumps over 50 HP shall be horizontal split case with mechanical seals.
 - C. Hot water circulators shall be Thrush, Bell and Gossett or Armstrong.
 - D. Pump selection shall not exceed 75% of rated capacity with all pumps.
 - E. All pumps shall include spare seals or packing.
 - F. Provide temperature and pressure gauges on supply and return lines of hot water, chilled water, and condenser water pumps.
2. Condensate Pumps:
 - A. Consult with UL Lafayette Facility Management when used.
3. Sump Pumps:
 - A. Sump pumps shall be equipped with float switches.
 - B. Sump pumps shall have minimum 2" discharge at pump.
 - C. Sump pumps shall be equal to Hydromatic.
 - D. No vertical type sump pumps shall be use. Type shall be submersible.
 - E. Sump pumps shall be minimum 1/2 HP designed for 190 F water and 3/4" solids.

4. Sewer Pumps:

- A. Consult with UL Lafayette Facility Management before using any sewer pumps.
- B. Sewage pumps shall be surface mount self-priming equal to Ghorman-Rupp or Hydromatic.
- C. Submersible pumps shall be equal to Hydromatic or Weil.
- D. Check valves and gate valves shall be installed on all discharge lines.
- E. If vertical sewage pumps are used with permission from the University, necessary room shall be allowed for removal of pump.
- F. Install equipment above pumps to facilitate removal.
- G. If vertical pumps are installed in pits, connections shall be above the pit--no connection in pits.

F. Specifications for Design and Installation of Water Treatment Equipment.

WATER TREATMENT EQUIPMENT:

The Contractor shall furnish and install one (1) conductivity controller complete with interconnecting wiring, two (2) electronic chemical metering pumps, one (1) 1" contract meter, and one (1) solenoid bleed valve with necessary interconnecting wiring, tubing and piping.

CONDUCTIVITY CONTROLLER:

The controller shall be microprocessor based: menu driven industrial type conductivity controller with relay activation on/off control outputs. 0-20,000 microsiemen control range displayable a 16 character, backlit LCD display. Additionally adjustable high/low alarm points with output relays and 4-20 ma output.

The controller shall provide four programmable, non-concurrent operational modes for inhibitor feed using either feed as percent of bleed, feed and bleed with limit timer, percent of time, or water meter triggered feed.

The controller shall provide two independent programmable biocide feed functions programmable in cycle modes of 1 to 4 weeks. Additionally, an adjustable pre-bleed function based on time or conductivity and programmable lockout feature shall be provided for each individual biocide feed. LMI model DC-450011A3.

CHEMICAL FEED PUMPS:

Chemical metering pumps shall be positive displacement Liquifram type pumps. Output volumes shall be adjustable while pumps are in operation from zero to maximum capacity of 24 gpd. Adjustment shall be by readily accessible knobs, one for changing stroke length and the other for changing stroke frequency. Both knobs are to be located opposite the liquid end. On-off switch shall be integral with frequency control. Chemical pumps shall be capable, without a hydraulically backed diaphragm, of injecting chemicals against pressures up to 110 psi. The pump drive shall be totally enclosed with no exposed moving parts Microprocessor electronic pulser shall be fully encapsulated. Electronics shall be housed in rear of the pump for maximum protection against chemical spillage. Maximum power consumption shall not exceed 22 watts per hour under full speed and maximum pressure conditions. To eliminate need for pressure relief valve, Liquifram shall automatically stop pulsing when discharge pressure exceeds 110 psi. Pump housing shall be of chemical resistant glass fiber reinforced thermoplastic. All exposed fasteners shall be stainless steel. Calces shall be cartridge type and renewable by replacing only the cartridge. Pump head and fittings shall be of PVDF construction. Model; AA151-498-SI.

A total of 16 feet of polyethylene tubing shall be provided per pump complete with compression connections. A foot valve with integral one piece strainer shall be provided for the suction lines, and an injection check/back pressure valve with 12" NPT male connection for the injection point. The injection check valve shall incorporate a dilating orifice which prohibits scale formation and accumulation of crystalline deposits.

The chemical feed pumps shall be as manufactured by Liquid Metronics Division (LMI Milton Roy, Model number AA151-498-SI (110 psi) capable of pumping a maximum of 1 gallon per hour of chemical or approved equal. (Total of two (2) required).

Chemical feed pump shall be compatible with the remote programmable controller and shall be of same manufacture.

4. Chill water and Hot water Heating Recirculating Systems

All closed recirculating water systems shall have installed a bypass feeder for the application of necessary chemical treatments.

A. Feed System

The by-pass feeder shall include all necessary piping and shut-off valves for installation to each closed recirculating water system.

B. Feed Unit

By-pass feeder shall have minimum capacity of five gallons, and be equipped with an inlet and outlet of 3/4" NPT size.

Feeder shall have a fill opening on top and be capable of complete draining once installed.

Feeder shall be designed for maximum pressure of 200 psi and maximum temperature of 212 F.

C. Feeder Installation

By-pass feeder shall be installed into the piping near the circulating pump with connections made into the suction side and the discharge side of the pump.

Where inlet and outlet piping is located, there shall be 3/4" shut-off ball valve between connections to piping.

Feeder shall be installed across the circulating pump where discharge side of pump connects to inlet, forcing chemical treatment through outlet into suction side of pump.

D. General Sampling Points

Sampling points shall be installed on all manual and continuous blowdown lines on steam boilers, boiler feed water pumps, condensate pumps and receiver tanks, deaerator heating units, condenser water circulating pumps, chill water circulating pumps, and hot water heating circulating pumps.

Sample points to be fitted with pet cock or ball valve.

If temperature of water being sampled is greater than 100F, sample shall be provided as stated in Section F.2.i.

DIVISION 16 ELECTRICAL

A. General

1. See Division 1 for general information.
2. Provide 3 bound sets of Operation and Instruction manuals. Include submittal data on power centers, transformers, meters, lights, fire alarm system, sound systems, telephone equipment, etc.
3. Use the following guidelines for lighting design.

Corridor	20-30 F.C.
Offices	50-70 F.C.
General	50-70 F.C.
Accounting (Close Work)	70-90 F.C.
Classrooms	50-70 F.C.
General	50-70 F.C.
Auditorium Type	50-70 F.C. (Have multi-levels available)

Drafting	90-120 F.C.
Labs	90-120 F.C.
General	50-70 F.C.
High Intensity	90-120 F.C.

4. Use copper wire, buss bars, panel boards and transformers.
5. Provide 30% spare spaces in each panel (minimum of 6).
6. Provide full buss bars in spare spaces of distribution gear.
7. Provide typewritten panel directory in all distribution panels.
8. Provide multiple lighting levels (with switching) in labs, and classrooms.
9. Take special care in designing lighting systems where video display tubes are used. Contact Information Networks for input on design.
10. Avoid using incandescent or mercury lamps.
11. Provide 2 sets of spare fuses for each size.
12. Tie fire alarm systems into central station monitoring system as directed by UL Lafayette Facility Management.
13. When providing emergency power, use a generator. Do not use small battery powered UPS systems scattered around the building. When using generators, they are to be natural gas, air cooled (or self-contained liquid cooling). Consult with UL Lafayette Facility Management before the commencement of design on the need to provide an emergency generator.
14. Permanently label all equipment.
15. Meter all electrical service (both energy and power).
16. Due to the increasing amount of emphasis on high technology, all classrooms shall be designed to be future computer labs. Provide one circuit for every 125 square feet within each classroom.
17. Submit the completed ASHRAE 90.1 Code compliance form along with the Design Development Phase submittal to indicate compliance with Louisiana Commercial Building Energy Code.
18. Provide 1" electrical conduit from the telephone/data room to all exterior doors to allow for the installation of card accessed locks and/or telephone intercoms.
19. Provisions shall be included in the design for Security Cameras, Card Access and Code Blue call boxes.
20. The University requires the installation of atomic controlled electronic clocks. These clocks shall be installed in all hallways, classrooms, lounges, break rooms, and lecture rooms. Consult with UL Lafayette Facility Management for more details.

B. Specifications of Primary Cable

1. Primary cable shall be provided with a 40 year warranty.
2. Consult with UL Lafayette Facility Management for cable information.
3. The cable is to be tested and measured by manufacturer at time of construction per standards listed above for insulation rating, material thickness, length, etc. Each reel is to be tested individually. This information is to be supplied to UL Lafayette for approval prior to shipment. Failure to receive this information will be

sufficient grounds to refuse shipment.

4. Fire proof all high voltage cable (including splices) exposed in manholes and cable cabinets.
5. No splices shall be allowed. All junctions shall be in an above ground sectionalizer.

C. Panelboards

Consult UL Lafayette Facility Management when needed.

D. High Voltage Switches

Consult UL Lafayette Facility Management when needed.

E. Dry Type Transformers

Consult UL Lafayette Facility Management when needed.

F. Liquid Pad Mount Distribution Transformer

Consult UL Lafayette Facility Management when needed.

G. Conductor Specifications

All conductors shall be designed to meet code. Consult UL Lafayette Facility Management when needed.

H. Lighting

Fluorescent lamps shall be cool white and energy efficient. 48" and 96" lamps are to be T-5 or T-8 using manufacturer's premium energy efficient electronic type ballast.

Fluorescent lamps shall be electronic rapid start, series sequences, high power factor type. Fluorescent ballast shall be Class P, should rated A, and shall be provided with an automatic thermal cutout device to deactivate the ballast when it is overheated. Fluorescent ballast shall be ETL certified as meeting CBM specifications. Ballast shall limit inrush current to value less than steady operating current.

Incandescent lighting is not to be used. Justification for specialty use is required.

Each fixture shall be supported independently from the building structure.

Foot candle design levels shall be submitted on new installations.

Where HID lighting is to be primary source of light, a percentage shall have quartz restrike capability.

Lenses for fluorescent fixtures shall be injection molded acrylic prismatic lenses.

The University prefers flexibility in switching of lighting on new installation for energy conservation.

Occupancy sensors shall be used wherever practical.

Rigid steel conduit or intermediate metal conduit shall be used for all primary voltage feeders, all switchboard, buss duct, panelboard and motor feeders, conduit exposed to weather, embedded in concrete slabs and conduit run underground except where non-metallic conduit is specified.

EMT shall be used for branch circuit and control wiring and branch circuits from telephone backboards where these runs are not underground, embedded in concrete or exposed to weather.

Non-metallic conduit shall be for all underground conduit runs larger than 1-1/2" trade size. Non-metallic conduit for
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high voltage shall be encased in red concrete a minimum of 36" deep and spaced using spacer bars, for both vertical and horizontal spacing. Outside, above ground conduit shall be rigid.

Where dimming is required, provide electronic fluorescent dimming ballast to eliminate the need for dimmed incandescent downlights.

Exterior lighting is generally to be high pressure sodium.

Parking lot light fixtures shall be 400 watt, 208 volt high pressure sodium with integral ballast equal to Lithonia catalog number KVE3SYM208RPV04DFLP1. Color shall be bronze.

Parking lot light poles shall be twenty-five (25) foot round tapered aluminum poles designed for a minimum wind load of 100 mph. Poles shall be equal to Lithonia catalog number RTA257ET35DDB. Color shall be bronze. Poles shall be set on a round, concrete footing that extends 36" above grade.

I. Safety Switches

NEMA 1 general purpose enclosure unless otherwise noted, metal nameplate front cover mounted containing switch type, catalogue number and HP ratings (both standard and time delay fuses); handle padlockable in the "off" position; visible blades; nonteasible, positive quick-make, quick break mechanisms; Underwriter's Laboratories listed, HP rated meeting Federal Specifications WS-865C NEMA specs K51-1969. Fusible switch shall be NEMA type ND and fuseless switches shall be NEMA type LG.

J. Fuses

Motors shall be fused at 125% full load current with dual element time delay Class K5 fuses. Provide one spare set to owner for each installation.

Toggle switches for control of fractional HP motors shall be manual full voltage starter with overload protection and pilot light.

K. Emergency Lighting

1. For new construction, emergency power for "Exit" signs and egress illumination shall be by central energy generator. The code specified transfer and duration shall be met.
2. For renovations to existing buildings, the preferred emergency lighting power source is by central generator pack natural gas fueled, air cooled, with appropriate non-manual transfer switches and duration as code specified. As an alternate, where "emergency lighting systems" do not exist in a building, individual battery powered units are to be considered.

L. Fire Alarms

1. A fire alarm which meets the National Fire Protection Association Code #72 for proprietary, auxiliary, local protective signaling system (or subsequent codes) which covers fire alarm system.
2. The alarm selected shall be non-coded, zoned, automatic, low voltage, open circuit, and supervised. Electrical engineer and / or architect shall submit a complete set of the alarm design to UL Lafayette Facility Management for review before bidding this portion of the work.
3. The system shall interface telephone lines to the central station monitoring service designated by UL Lafayette Facility Management.
4. The alarm shall be powered so as to meet NFPA code requirements for back-up power.
5. Subject to appropriate compliance and Underwriters Laboratories Listing, the contractor shall provide fire alarm panel and components made only by Fire Light or Silent Knight, which contain electronics, printed

circuit boards, software, and programming that is accessible and serviceable by any licensed fire alarm contractor. No fire alarm components (including those manufactured by Fire Light or any subsidiary therein) which contain proprietary hardware and/or software will be acceptable.

6. The contractor shall provide at least two (2) copies of the as built drawings for the fire alarm system. These drawings shall provide, at a minimum, the location of the fire panel, communicators and annunciators, all initiating devices, and notification devices.
7. The contractor shall provide training to UL Lafayette Facility Management personnel on the basic operation of the fire alarm, how to silence and reset the alarm, how to identify trouble, supervisory trouble, and alarm conditions, etc.
8. The contractor shall provide two (2) copies of the electronic data used to program the fire alarm. This does NOT include the software used for alarm programming, which is usually made available only to licensed alarm contractors. Rather, this requirement is extended only to the programming data file, which the University may need in the event of a future alarm panel failure.
9. For addressable fire alarms, the contractor shall program the fire alarm panel such that all devices (initiating, notifying, etc.) can be identified on the panel in clear understandable language (ex. "Duct Detector, Air Handler #2, room 202").

M. UL Lafayette Telecommunications Requirements

The following requirements are intended to ensure that the design process for any new construction takes all communication factors into account. Depending on the particular construction project, there may be other requirements. The design process should take into consideration that where utilities such as gas, water, and sewer are for the most part static after the building is constructed; the communications utilities are extremely dynamic. Building design must focus on establishing "pathways" for routing communications media that are expected to change several times during the life of the building. Therefore, these pathways must be readily accessible and reusable.

Contact the UL Lafayette Information and Media Networks (IMN) at 337-482-6418 before beginning design work for a more complete overview of the communications requirements of the project.

The requirements listed here are NOT intended to be a complete set of construction specifications. They are intended only to provide an architect/contractor with a preliminary view of what the typical communications requirements will be for any given construction project.

1. Telecommunications Building Entrance Conduits:

Building telecommunications entrance shall be a minimum of 4 four-inch (4 X 4") entrance conduits.

Conduit shall be clean, dry, and free from obstructions. All conduits shall be designed with long radius turns, no LBs, not more than 270 degrees of turn and/or 250 feet between pull points.

Each conduit shall be well filled before pulls are made in parallel conduits.

Unused conduits shall be sealed at both ends. Used conduits shall be sealed to prevent water, mud and pest intrusion.

Conduits and innerducts shall contain a 1/4" polypropylene pull rope. Other types of pull ropes may be used if approved by IMN. Conduit pulls of media shall include additional innerduct for full utilization of the conduit.

Conduits shall be buried at a minimum of twenty-four (24) inches below grade and shall be topped in orange or natural colored concrete. Concrete surface markers, showing the direction of the run, shall be placed on runs of greater than 50 feet at intervals of 50 feet.

Entry conduits shall extend from the building to a serving manhole or other point designated by IMN.

Contact IMN prior to the preparation of the site plan for requirements concerning manhole placement.

2. Communications Equipment Rooms:

Communications equipment rooms shall be sized according to the number of rooms/workstations and size of the building that they will serve. In general, communications equipment rooms shall be at least eight feet by ten feet (8'x10'), with a minimum ceiling height of 8 feet. The main communications equipment room(s) shall be at least twelve by fourteen feet (12' X 14'). Contact the UL Lafayette IMN prior to the development of floor plans to obtain required communications equipment room sizing.

Each floor shall contain a minimum of one communications equipment room. Communications equipment rooms shall be stacked vertically. In general, communications equipment rooms should be placed centrally in the building within network distance limitations. Central location of equipment rooms reduces the length of cable to each workstation. If there will be more than one communications equipment room per floor, then they shall be equally distributed throughout the floor. Each communications equipment room shall be located away from possible sources of electromagnetic interference such as transformers, contactors, electric motors and/or transmitters. Communications equipment rooms shall be located such that the cable distance from the equipment room to all station terminations served by that room is less than two hundred-twenty feet (220'). The distance between communications equipment rooms shall not exceed three-hundred feet (300'). These distances are expected to be reduced in the near future, confirm with IMN.

Lighting for all communications equipment rooms shall be at least 540 lux (50 footcandles) at a distance of three feet (3') above the floor level. Ceiling lights shall be protected on a separate breaker and be provided with a switch located immediately inside the access door to each equipment room.

If the facility has an emergency power source, connect one centrally located light fixture to the emergency power source bypassing the room light switch.

When determining cooling needs for Telecommunication / Data rooms, size the cooling load for a Communications Room with internal volume of 2 times the volume of the room. **Communications Rooms will require cooling even when the building is in the heat mode.** The extra cooling capacity provides for the additional cooling requirements of some types of communications equipment. In general, the temperature (after installing communications equipment) should be no less than 50 degrees Fahrenheit and no greater than 78 degrees Fahrenheit. The room shall be well ventilated and maintain a humidity of less than 70% (non-condensing).

Communications equipment rooms shall be free of electrical distribution panels, power transformers invertors, air handlers, sinks, wash basins, janitorial storage areas, and any other equipment. Communications equipment rooms shall contain IMN communications equipment only. Passage of non-IMN services through the Communications Room or location of equipment other than telephone and data communications systems in communications rooms (IDFs, MDF) must be approved by IMN. Approval may change room size and conduit requirements. Actual physical layout of equipment placed in communications rooms must be approved by IMN.

All equipment room walls shall be covered with three-quarter inch (3/4") indoor grade plywood to a height of eight (8') or to the ceiling, whichever is lower. All plywood backboards shall be painted with two coats of nonconductive, fire-retardant gray paint. Due to dusting characteristics of concrete, all such interior surfaces shall be painted or tiled and finished in a light color to increase illumination. Paint should be free from turpentine.

Equipment rooms shall contain one double duplex (4 outlets) 120V 20A non-switched receptacle for each four (4) linear feet of wall space. Each receptacle shall be wired to an individual 20A breaker and the breaker panel shall be clearly marked with the word "Communications", and the equipment room number and the receptacle number. Receptacles should be evenly placed around the equipment room, six to twelve inches (6 - 12") from the floor, according to NEC specifications and/or local fire codes. Maintain as much clear backboard as possible.

All communications equipment rooms shall be provided with a common ground system. The communications equipment room ground system shall connect to the main building protective ground at one and only one point. The protective ground connection point shall NOT be made to electrical conduits, power distribution box grounds or neutral busses. The intent is to provide all communications equipment rooms with a common ground which will not

be affected by any other electrical work. The communications equipment room ground system shall consist of a #8 AWG (or larger copper conductor, green insulated ground wire which shall interconnect all equipment rooms. Ground bus bars shall be provided in each equipment room. The wire shall be routed through the equipment room such that additional ground bus bars may be installed when needed. Locate the ground connection point on each backboard as directed by IMN.

Contact the UL Lafayette IMN prior to preparation of communications equipment room plans for backboard layouts and other requirements.

3. Conduit distribution between Equipment Rooms:

A minimum of two four-inch (2 X 4") conduits or sleeves shall connect any communications equipment room(s) with the communications equipment room(s) on adjacent (above and/or below) floors. Stacked rooms may permit 4 X 4" floor cores with sleeves, contact IMN for approval.

A minimum of two four-inch (2 X 4") conduits shall connect any communications equipment room(s) with the other communications equipment room(s) on the same floor.

All conduits shall contain a suitable pull string or wire.

All conduits shall have a bushing on each end to prevent abrasion of cable.

4. Conduit Distribution to Rooms / Workstations:

Each room or workstation shall receive communication outlets. Communication services shall be supplied with a minimum of two (2) outlets (RJ-45) in single-duplex deep receptacle boxes. The receptacle box, proper, shall have a minimum depth of 1-1/8" and approximately 3" x 4 1/2" in size, not including the cover or shroud. Receptacle boxes may be metal or plastic, and consistent with the National Electric Code. Each receptacle box shall be furnished with a two-device cover/shroud of appropriate depth for the particular type of wall construction used.

The cover or receptacle shall have a method of color coding the service, for the end-user, at each receptacle. All top or left outlets shall be the same service division. All bottom or right outlets shall be the same service division. Color coded chips or RJ-45 sockets are required. The upper or left outlet on a duplex face shall be called (but not functionally limited) "telephone". The lower or right outlet on a duplex face shall be called (but not functionally limited) "data". Telephone outlets should be coded with a cool color (blues, greens or off-whites). Data outlets should be coded with warm color (orange, red or yellows).

Layout design shall provide at least one receptacle box for each 100 square feet of floor area, except for restrooms, janitor closets, hallways, passage ways and environmental chambers.

Each receptacle box shall be provided with a minimum of a single three-fourths (3/4") conduit. Home-run conduit from the communications outlet to the communications equipment room shall be used whenever the path between the two locations traverses return air plenum or whenever the ceiling does not consist of lift-out ceiling tiles. Interlocking ceiling tiles, or clip in ceiling tiles do not constitute lift-out ceiling tiles.

All conduit turns shall be sweeping turns, designed for a radius of at least 10 times the inside diameter of the conduit (no "LB"s). Conduit runs shall contain no more than the equivalent of two sweeping 90 degree turns without the installation of a suitably sized pull box. Pull box size shall be dependent on the particular installation but shall be no less than twelve inches by twelve inches (12" X 12") in the plane of the conduits, and no less than six inches (6") deep. Location of all pull boxes shall be shown on drawings furnished by the contractor.

Contact the UL Lafayette IMN prior to the preparation of communications outlet drawings for placement of communications outlets.

5. Communications Service Entrance Cables

Cable of sufficient type and size shall be installed into the main equipment room. Communications service entrance cable types may include telephone cable, fiber optic cable, coaxial video cable, and other types of cables.

Upon examination of the communication needs of the building, the UL Lafayette IMN will designate the point from which communications services shall be provided. Communications service entrance cables shall be installed from the designated point to the main equipment room(s). Contact the UL Lafayette IMN prior to the development of communications plans for requirements concerning communications service entrance cables.

6. Wire Type

All Communications cable shall be Category 5E wire or higher performance. Exceptions must be approved by IMN.

7. Communications Service Cables Between Equipment Rooms

Each communications equipment room shall be provided with feeder cables from the main communications equipment room. Feeder cable sizes will depend on the number of stations to be served and the type of service to be provided at each station. Feeder cable types may include telephone cable, fiber optic cable and other types of cables.

Contact the UL Lafayette IMN prior to design.

8. Communications Service Cables to the Workstations

Each communications outlet shall be provided with distribution cables of the type and size specified by IMN. Distribution cable types may include telephone cable, fiber optic cable, coaxial video cable, and other types of cables.

Contact IMN prior to the preparation of specifications for required sizes and types of distribution cables.

9. Termination of Cables/Wires in Equipment rooms

Telephone feeder cables, distribution cables, OPX cables, etc. shall be terminated on Cat 5E 110-type blocks, attached with standoff. Copper cabling that extends outside the building will terminate at each end in an appropriate protector (e.g., ATT 189 chambers for telephone service).

White metallic (peg / spooly / split D ring) backboards of appropriate size shall be provided for cross-connect cabling.

Contact IMN prior to completion of specifications for cable termination requirements .

10. Termination of Cables/Wire at Receptacle Box

Contact IMN prior to completion of specifications for requirements for termination of cables in receptacle boxes. All cables from information outlets shall be home run to the MDF or IDF. Each outlet shall contain (unless otherwise specified in writing) two Cat 5E RJ-45 sockets, attached to Cat 5E or higher performance plenum cable, using the T568B standard, from the Cat 5E 110 block. Note, the cable terminations will be grouped by size, intended use, floor or area, room number and room part, respectively. There shall be a pattern setup so that the location of the upper or left socket reflects the location of the lower or right socket (on the information outlet). Each Cat 5E cable run shall be installed with full compliance to the Cat 5E standards and practices. We will pay special attention to the twist, bend radius and pull tension sections of the specifications.

11. Elevator Communications

Each elevator shall be installed or upgraded to have a hands-off two way communication device which shall be connected directly from the elevator equipment room to the nearest IDF or MDF communications room.

12. Approval of Equipment Used

Contact IMN prior to the preparation of specifications for approval of cable types, termination hardware, and installation methods to be used.

13. Compressed Video Services

If the building contains compressed video services the system must match existing services. Contact IMN for support in designing these services.

N. Sound Systems, Speaker Intercoms and Paging Systems

1. Specifications for these systems shall be developed as the specific need is determined and the scope as defined by the user agency.
2. Wiring for these systems shall be in appropriately sized conduit.
3. Electronic units used shall be solid state, easily serviced units.
4. Paging systems shall interconnect to the telephone system. Contact Information Networks for interconnect information.

O. Clock System

1. Clocks shall integrate with the UL Lafayette standard system, which is manufactured by BRG Precision Products, 221 W. Market, Derby, Kansas 67037. The current model used is a BRG 425-HX-ITSR-P09-B1-F1 high accuracy stand alone digital clock.
2. All clocks shall be wired directly to the building electrical system for power.
3. Provide clocks at each classroom, auditorium, lounge and lab. Clocks shall also be installed in strategic areas of the corridors. Do not provide clocks in offices.

P. Card Access and Security Cameras Campus Design Standards

1. At a minimum, card access will be installed at all main entries into building. These doors must have some form of electric hardware. Readers should be HID iClass readers.
2. There shall be NO magnetic locks. All door hardware installed must be fail secure.
3. Cameras shall be installed inside building near entries and facing the entry.
4. Additional cameras and card access doors may be added to the project. These additions will be in accordance with the Strategic Security Plan.
5. There should be a climate controlled room available for card access head end equipment and for a network video recorder.
6. Card access equipment purchased must be compatible with Lenel Onguard software.
7. All cameras purchased must be PoE compliant and compatible with Lenel Onguard software.
8. All hardware, hardware locations and wiring should be approved through department of Cajun Card Services. Contact Cajun Card Office at cajuncard@louisiana.edu or 337-482-1318 for more information.