

# **Facility Design Standards & Specifications**

Louisiana State University

Issued by:  
Office of Facility Services  
May 2014

The Design Standards and Specifications presented herein are intended to assist architects, engineers, design professionals, contractors and LSU staff in understanding the preferences of the University in the development, construction, maintenance and repair of facilities. These standards are to be used in the design and construction of new and remodeled buildings, site enhancements and infrastructure on the LSU-Baton Rouge Campus.

These standards are intended to be used as guidelines and **NOT SPECIFICATIONS**; therefore, the legal responsibility for project document preparation shall continue to reside with the Design Professional.

LSU's intent is to build cost effective buildings and infrastructure without restricting the Design Professional's latitude for innovation. Architects and other designers are encouraged to propose innovative and cost-effective variations that meet or exceed the Design Standards. However, any deviation must be brought to the attention of the Planning, Design & Construction department for review prior to incorporation into the project

**CONDITIONS TO THE CONTRACT:**

The designer is responsible for using the most up-to-date information required by LSU for the following front end documents: This information is to be obtained through the LSU Office of Procurement Services:

**Instructions to Bidders**

**Bid Form**

**General Conditions**

**Special Conditions, with Insurance**

**Supplements**

**Contractor's Affidavit**

**EEOC Clause and Assurance**

**Affirmative Action Compliance**

## **A. Introduction**

1. This text comes from the Louisiana State University Design Guidelines. The original document can be located on the Facility Services website at [www.lsu.edu/ofs](http://www.lsu.edu/ofs)

## **B. Preface**

1. A beautiful campus is appreciated for its architectural cohesiveness, careful attention to exterior space, and the pleasing environment it affords. It engenders pride and respect, it fosters social interaction. It is perhaps the single most important element in creating the image of the institution. A beautiful campus develops incrementally and is the result of consistent and sensitive use of building and plant materials, the control of building mass and scale, the careful development of open spaces, and the attention given to detail in both buildings and landscapes.

To ensure the development of an aesthetically pleasing campus, design professionals working for Louisiana State University must be sensitive to the campus environment in which their projects are built. This document establishes principles of architecture and landscape architecture as design vocabularies and sets forth requirements and policies that must be adhered to by design professionals working for the University.

## **C. Architecture Vocabulary**

### **1. Context and Character**

The architectural appearance and overall aesthetic quality of the Baton Rouge campus are important university and community resources that should be highly valued. The sense of unity found in the textures and colors, the roof forms and arcades of the Quadrangle—elements derived from the Italian Renaissance—are distinctively LSU and must be maintained and continued in future development. The intent is to provide a unified visual identity for the campus, which is home to three autonomous institutions: LSU A&M, the LSU Agricultural Center, and the Hebert Law Center.

New buildings and spaces must provide a variety of experience and yet reflect the existing heritage and graciousness of the older architecture. Building elements must exhibit permanence, a human scale, visual richness, and pleasing proportion. In order to maintain an architectural connection with the Quadrangle, building materials must have finishes and colors that are compatible with those already on campus.

The massing of new buildings must have a scale and an articulation of form that establishes ties to the older campus, reflecting an understanding of the architectural tradition. This coordination will be enhanced through a series of courtyards and the careful linking and progression of spaces. Courtyard

landscaping, trees, planting, and paving materials also assist in providing the tie between the old and the new and serve as key unifying elements. Arcades are to be used to connect buildings, not only to protect people from the elements but also to provide a symbolic and functional connection to the other parts of the campus. The resulting combination of buildings and open spaces will create settings that are friendly and useful for all who experience them.

## 2. Building Massing and Scale

The design of original campus buildings was influenced by the dictates of natural ventilation. The resulting narrow building forms and courtyards are just as useful today in creating pleasing buildings and spaces in which to learn and work as they were when the campus was dedicated in 1926. New technology should be an equally positive design influence.

A consistent scale of new development will be obtained by controlling the heights of the buildings. In general, buildings must range between thirty and sixty-five feet in overall height, depending on their function and location. Large scaled elements that give the appearance of undifferentiated massiveness and great bulk detract from the character of the campus and will not be approved. Ostentatious or overly prominent building forms and designs that are out of harmony with their environment will not be accepted. Building forms must reflect their use, site, and surrounding environment, as well as their place in time.

Buildings have a strong influence on the quality and character of the visual environment. Therefore, the building shape and scale should be of a human dimension. Large, flat, unarticulated building facades look imposing to the pedestrian, are the result of inherently bad building design, and are unacceptable additions to the campus.

## 3. Architectural Character

The architectural character of the buildings and the building materials used must respect the Italian Renaissance heritage of the Quadrangle and should evoke the previously mentioned qualities of permanence, shelter, solidity, rhythm, connection, human scale, unity, and variety, without resorting to clichés. The following criteria apply:

- a. Walls: In most cases, walls should have load-bearing masonry structural expression of materials that embody solidity, texture, and a sense of human scale and proportion. To further enhance the human scale and articulation of some buildings, the thickness of exterior walls should be emphasized to create shadows on the façade. Wall materials designated for use include: stone, concrete, stucco, or brick and must conform to the Design Standards for Louisiana State University.

- b. Roofs: Special attention must be paid to the arrangements and design of the roof and its various elements. Roofs must be organized and designed as carefully as the other primary elements of the building. Equipment must be integrated into the building form or placed within enclosures well integrated with the roofscape. Roof materials designated for use are Spanish-style clay tile blend for sloped roofs and weathering copper for rooftop appetencies, both as specified in the Design Standards for Louisiana State University.

In most cases, the major roof from should be sloped on a 7 in 12 pitch and must have overhangs proportional to the building's size and height. Secondary proportions of buildings with pitched roofs may have flat-roofed areas (with positive drainage) to accommodate mechanical equipment, but such must be visually unobtrusive. Stacks exhaust hoods, and vents must be grouped and incorporated into the architectural composition of the buildings or buildings they serve. Since they are visible from a considerable distance, it is important that they be designed with a high degree of uniformity so that distant image is harmonious and composed.

- c. Openings: In most cases, windows and doors in exterior walls should be recessed to represent a "punched" or "cut-out" expression reminiscent of the Quadrangle or grouped as counterpoint to unbroken wall segments. The placement and proportion of windows must respect solar orientation, views, and day lighting potentials, as well as the historical precedent of the Quadrangle.

Glazing must be clear or bronze-tinted (non-reflective) glass. Operable windows must be used when feasible. Aluminum frame and hollow metal units must be dark bronze. Reflective or shiny materials are usually not permitted. The use of oversized windows, common in older buildings on campus, is encouraged on north facades and in locations that are protected against extreme solar heat gain. Larger openings should be used to signal principal entries, gateways, or atrium features.

- d. Arcades: Arcade must be similar in size and proportion to those surrounding the Quadrangle. They must express the rhythm, proportion, and scale of the Quadrangle arcades and should be approximately 10 to 15 feet in arch width. Articulation or a minor break in rhythm to accommodate entry or end points is acceptable and could be desirable. For example, wider openings may be necessary to allow emergency vehicle passage. Colonnades, pergolas, and arbors can also be used to provide shaded connection.

- e. **Color:** In most cases, the color palette should be within the range of warm earth tones established in the Quadrangle. Walls should be light in color, i.e., sandstone or buff, and roofs should be the LSU red terra-cotta. Over the past decades, materials and finishes have been used to the extent that they have become standard LSU colors. These colors are specified in the Design Standards for Louisiana State University.
- f. **Climate Orientation:** Buildings must be designed to take maximum advantage of micro-climate factors, including sunlight and natural ventilation, to enhance user comfort and energy conservation. When possible, the following must be observed: locate outdoor activity in areas with exposures to optimize available sunshine, incorporate the use of shade devices such as sunscreens, louvers, or façade articulation, and use landscape screening, such as deciduous trees or trellises, to allow control of the sun at various times of the year. During the design review process, a shade/shadow analysis must be submitted; the impact of this analysis must be reflected in landscaping, surrounding activity areas, and building design. The placement and configuration of buildings, exhaust hoods, and stacks must recognize prevailing local winds as well as the fact that wind direction is variable throughout the year. New construction must create open airflow paths and eliminate stagnant air pockets.
- g. **Historic Buildings and Places:** Some buildings and places of historic importance and, as such, require special attention. In work involving these buildings and places, design professionals must satisfy the Secretary of Interior standards and the State of Louisiana standards as well as the requirements of Louisiana State University.
- h. **Architectural Specifications:** See Design Standards for Louisiana State University.

#### **D. Landscape Architecture Vocabulary**

##### **1. Context and Character**

The mature and stately landscape of the LSU campus is an essential component of its image. This landscape has developed over the course of the campus' history and represents a process of growth, maturation, and decline that makes the management and maintenance of landscape a complex endeavor.

The pre-development landscape of the campus was predominantly cropland that had been farmed for sugar cane and other crops since the late eighteenth century. The site was desirable for development because of the high ridge of the Pleistocene Terrace, providing good drainage and a flood-free location, and because of the availability of land for future expansion. Some trees and natural features interrupted the flat landscape, and wetland areas existed on the

perimeter of the early campus, distinguished by wetland tree species such as bald cypress. Several live oaks, already quite mature, dotted the site, as well as stands of upland hardwoods, such as American elms and southern magnolias. The Indian Mounds were also prominent landmarks.

From the early development of the campus until the 1960s, the landscape was designed and maintained under the direction of Steele Burden. Hallmarks of Burden's plan were regular planting of live oaks along major campus roads and in major campus open spaces (Quadrangle); supplementary planting of major open spaces with large evergreen and deciduous trees (southern magnolias, American elms, other species of oaks); planting of medium-size flowering trees (crape myrtle, Japanese magnolia, redbud, dogwood) as landscape accents; and planting of small courtyards, pedestrian corridors and building entrances with shrubs, herbaceous perennials, and semi-tropicals providing detail interest and seasonal color.

The plant palette used by Burden included plants associated with the Lower Mississippi Valley cultural region and early south Louisiana plantation landscape gardens-live oaks, crape myrtles, camellias, azaleas, sweet olive, dogwood, pines, palms, tree ligustrum, nandina, pittosporum, and flowering quince. Most of these plants are still mainstays of residential landscapes in the area.

In order to provide a unified visual identity for the campus, each new construction or major renovation project must have a landscape development plan that reinforces the historical character and current campus landscape development plan. Those plans must be designed by a licensed landscape architect and must relate to the landscape context in terms of the scale, materials used, and historical character of the specific site.

## 2. Planting

The planting design criteria for site improvements on campus are intended to achieve, avoid monotony, and complement the spatial structure established by campus architecture and circulation patterns. Elements include major outdoor plantings, informal plantings that reflect LSU's character, formal allées, and the preservation of significant existing trees. The plant materials used must reflect the climatic conditions that prevail in the region, with emphasis on low-maintenance plants.

## 3. Existing Tree Preservation

Large and/or significant trees contribute to LSU's special character and add interest to the campus. Such trees take thirty years or more to develop and cannot be easily replaced. Therefore, all significant trees, such as live oaks and magnolias, should be preserved.

Maintenance and construction projects may cause damage or require the removal of existing vegetation. However, these instances should be thoroughly evaluated and only permitted when absolutely necessary. When trees must be removed under these conditions, three trees of the same species with a 4" minimum caliper shall be provided as replacement.

Live oaks that are in a severe state of decline should not have ground cover of any species planted within the drip line. A mix of hardwood chips and lime should be placed under these trees until a substantial level of recovery is established. Asian jasmine should not be used under live oaks. The aggressive root system of the jasmine retains moisture and eventually causes' rotting of the tree's exposed roots and trunk base.

a. Trees

A variety of trees is encouraged. However, because of growth habit and maintenance problems, the following species should be limited, and planting locations should be thoughtfully chosen: black willow, cottonwood, hackberry, sweet gum, and Chinese elm. Native trees and shrubs have proven to be more resistant to extremes of climate and disease and more maintenance-free than most introduced species although introduced plants, such as the crape myrtle, Japanese magnolia, and Taiwan cherry, have been relatively successful.

Deciduous or semi-deciduous trees of light density and texture must be used to allow the penetration of sunlight throughout the winter and to create filtered light in summer. Evergreens are to be used as a backdrop for such deciduous trees where protection is desired and where they can hide unsightly elements, such as service yards.

Large- to medium-sized trees that fulfill the function of scale transition from the building to the pedestrian are to be used in allées and plazas. Smaller, low-growing trees will fulfill such functions as screening, providing shelter for intimate seating areas, and adding texture and seasonal color.

b. Shrubs

Although a variety of shrubs is encouraged on campus, low maintenance is extremely important. When construction projects or maintenance require the removal or loss of shrubs, replacement should follow with similar species in as large a size as practical. In areas of high visibility, some perennial planting may be required. However, these areas should be kept to a minimum.

c. Courtyards



Courtyards and small gathering areas offer the opportunity for selecting attractive specimen plants and for a variety of planting character. The designer should respond to the sun/shade requirements of individual courtyards with emphasis on low plantings and deciduous trees in north-facing courtyards. Plant materials and planting patterns should complement the spatial character of the courtyard and not dominate the space or the architecture.

d. Planting for Shallow Soil Conditions

In plant selection, drainage design, walk/plaza layouts, the extension of basement space, utility tunnels, existing tree systems, and other conditions that make for shallow soil must be taken into account.

e. Slopes

Normally, grasses should be planted on a maximum slope of 4:1; however, 3:1 slopes may be grassed in special situations. Plants with horizontally branching roots must be used on 3:1 or steeper slopes. In situations where slopes are shaded, ground cover with a vigorous root system is often needed.

f. Parking Area Landscaping

Orchard-type tree planting must be used by arranging tree planting pockets at regular intervals to soften the appearance of parking areas. Trees of a clean habit should be planted within the lots to provide shade and visual relief. A single species of tree is to be used for each primary compound, but the tree species may be different in separated parking compounds. Tree plantings must offer forty percent coverage (mature canopy) of parking area. When possible, screening should be used to lessen the visual impact of parking lots. Low shrubs or mounding with trees are suggested screening techniques. Shrubs that do not grow high enough to create a safety or security hazard should be selected. Light stand locations should be coordinated with tree patterns in order to alleviate unsafe dark zones in parking lots.

g. Planting at Intersections

Trees and shrubs planted at intersections must allow adequate visibility for safety and security. At a four-way intersection, the sight distance for a turning vehicle must be at least seventy-five feet. Such clearance can be obtained by ensuring that tree planting begins fifteen feet from the edges of curbs and shrub hedges begin beyond that line. Sight clearance from service loops into a two-way street should be fifty feet, obtained by starting tree and hedge planting seven feet or more from the edges of the curbs.

h. Irrigation

In most cases, the malls, plazas, quadrangles, and landscaped areas should rely on minimal irrigation. Higher maintenance should occur only in the courtyards and small-scale spaces. An investigation of the cost effectiveness of using irrigation must be presented before irrigation plans will be approved.

4. Site Features

a. Furniture

Seating, signs, kiosks, trash containers, and bicycle racks are just a few of the outdoor elements necessary for furnishing the campus environment. If carefully placed, there is sufficient variety of space and locale to accommodate standards elements while avoiding monotony. The prevailing criteria is that the elements be built of durable and appropriate materials, and be consistent in scale and style.

Trash receptacles must meet operations and maintenance standards, but the most important design criteria are how and where these individual elements are placed. They must encourage use yet be unobtrusive. Whenever feasible, landscape furniture elements should be developed that coordinate several functions into a consolidated furniture system.

b. Signage

All exterior campus signage shall conform to the LSU A&M signage ordinance and policies.

c. Water

The campus is blessed with several lakes and a close proximity to the Mississippi River. Special attention should be given to the visual impact of water features, but extensive use of fountains and other small-scale water features is not encouraged because of high maintenance requirements. When such features are appropriate, they must be attractive both with water is and is not present.

5. Outdoor Art

LSU does not have a legacy of outstanding public sculpture, but advantage should be taken of opportunities that might allow the building of such a legacy for future generations. New building projects offer potential for a collaboration involving architects, artists, landscape architects, and University staff in determining both the character of the setting and the pieces that are to be sited. The ability of the public to view the art and experience the space is an important consideration in the selection of sites for works of art.

Major works should be accessible at all times. Issues such as the backdrop, the play of sun and shadow, circulation patterns, and related scale of adjacent

elements must be evaluated carefully when selecting locations for the display of art. The following goals are consistent with the desired relationship of art to the LSU campus:

- Build a distinguished collection of art that has national stature but also supports and features Louisiana artists;
- Accommodate permanent new works purchased and/or commissioned as well as loans of sculpture installed for specified periods of time; Use art as a catalyst for activating outdoor spaces.

## 6. Lighting

### a. Safety

Due to the high level of nighttime pedestrian, bicycle, and motor vehicle traffic, a clear separation between pedestrian and vehicular circulation is necessary. This can be accomplished by consistent differentiation in the scale, the pattern, the color and the intensity of lighting layouts. Consequently, pedestrian traffic can be channeled to safe paths, and drivers can be given optimum visual guidance at locations of potential conflict and danger.

### b. Security

Security along major routes is primarily a matter of concern for pedestrians and bicyclists because of their relative vulnerability. Lighting should reduce danger by removing shadows and providing good visibility. This will be achieved by close spacing of the light sources, mounting of light sources below shadow-casting tree branches, and coordinating the spacing of trees and lights.

### c. General Lighting

General lighting will provide an appropriate response to the illumination needs of multi-directional pedestrian and bicycle traffic and gathering places on the campus.

### d. Corridor Lighting

Corridor lighting along secondary routes will reinforce the landscape pattern and contrast in both color and intensity with the lighting along major arteries.

### e. Special Lighting

Exterior building lighting shall supplement the general lighting in areas where there are entries, and it shall serve as security lighting at loading areas and along service corridors. Special attention shall be given to properly illuminating building names for orientation. Arcade lighting shall add additional illumination where shadows are a problem. Focal point

lighting for outdoor sculpture, fountains, special signage, and significant landscape features shall be provided as required.

f. **Fixtures**

All luminaries and fixtures shall be as specified in the *Design Standards for Louisiana State University*.

7. **Paving**

Paving must be integrated into the design of all new construction. It must be durable and consistent in order to unify and enhance the overall character of the campus. Paving elements are the walking and driving surfaces that include walks, paths, drives, plazas, steps, and ramps.

The preferred paving material is concrete, and it is recommended as the material of choice for all steps, walkways, and ramps.

Special paving material may be used in order to differentiate pedestrian axes from drives and service walks, to identify major entrances and stopping points, and to designate pedestrian and bicycle routes. Exposed aggregate concrete, scored concrete, and unit pavers are commonly used as special paving materials.

*Landscape Specifications*

See *Design Standards for Louisiana State University*.

8. **LSU Design Review**

Any project affecting the exterior environment of the campus shall be presented to the Facility Development and Design Committee (FD& DC). All agenda items for this committee shall be submitted to Roger Husser, Planning, Design & Construction a minimum of 7 working days prior to the scheduled committee meeting.

## **DIVISION 1 – GENERAL**

### **A. BARRICADES**

1. The contractor shall install fences and/or barricades as necessary for the protection and safety of pedestrian and vehicular traffic and for protection of trees and shrubbery (see Division 2). Fences shall be detailed and shown on the contract documents. Unless otherwise stated on the construction drawings, construction fences shall be 6' chain link fencing with an access gate for Facility Services personnel (see Division 2).

If the construction period exceeds 90 days, then 4' chain link fencing shall be installed at the drip-line of each tree as an additional protective barrier. These barriers shall be maintained by the Contractor for the duration of the project.

### **B. ACCESS, DAMAGE TO EXISTING STRUCTURES AND TRAFFIC RESTRICTIONS**

1. 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, including utilities damaged by the Contractor's operations. The Contractor shall conduct a pre-construction site survey with a Facility Services 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 University and Facility Services. 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 damaged by the Contractor and shall be repaired and/or replaced by the Contractor at no cost to the University. The structure(s) must be returned to their original condition to the satisfaction of Facility Services.

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.

#### **2. Traffic Control Plan**

All construction activity impacting roadways (vehicular access) or sidewalks (pedestrian access) shall have a written Traffic Control Plan (TCP) and access plan submitted for review and comment by the Office of Parking and Transportation Services prior to the completion of the final construction and bid documents.

The responsibility and implementation costs for any TCP required before, during, or after the project construction activity, shall be the responsibility of the Contractor. These costs shall include all labor and equipment necessary to meet the requirements of the TCP, including all reimbursement costs to the Office of

Parking and Transportation Services for special traffic direction, construction parking enforcement, or other personnel utilized to provide and assure the safety of LSU during the construction.

The TCP shall follow the standards found in the Uniform Manual for Traffic Control Devices issued by the State Department of Transportation (DOTD), except as modified by the Office of Parking and Transportation Services.

Cost and convenience should always be subordinated to the safety of the students, faculty, employees, and visitors on the LSU campus.

**C. TOILETS**

1. 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.

**D. PROTECTION**

1. The Contractor shall at all times be responsible for ensuring the safety of all occupants and users of the building from injury or damage resulting from any contact with the work, workmen, or equipment. The Contractor shall at all times be responsible for protecting building, property and contents during construction.

**E. DEMOLITION**

1. The Contractor shall perform all demolition necessary or required to complete the work shown on the drawings or described in the specifications. Take special precautions to protect existing work which is to remain in place or to replace or repair any damage to such work.
2. The Contractor shall establish construction waste management plan to ensure 50% (by volume) is diverted from the waste stream (salvaged, recycled, or reused). Separate containers shall be provided onsite by the contractor for source separation by all job-site personnel.

Quantities shall be tracked and final documentation and verification of landfill diversion records should be provided to LSU with final application for payment. Final report of construction debris tonnage (and volume) shall be submitted to LSU Recycling. This department can also provide contacts for recycling materials. Designer shall add a spec outlining the expectation of the management plan.

**F. TRASH AND DEBRIS REMOVAL**

1. The Contractor shall not permit trash and debris to accumulate in the building or on the ground in the vicinity of the building. They 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. Any ornamental iron work, decorative light fixtures or hardware of historic nature shall be turned over to Facility Services

2. The Contractor shall be responsible for the removal and offsite disposal of all trash and debris from the campus originating from his project.

#### **G. CUTTING AND PATCHING**

1. Cutting and patching for all work in the project shall be the responsibility of the Contractor. They shall make neat and substantial joints between existing and new work, including patching, painting, finishing, etc. Patching shall be done to match existing construction as closely as possible. All work shall be left in a complete and finished condition, including existing surfaces affected by work in this contract.

#### **H. WARRANTY PERIOD**

1. All workmanship, materials, and equipment shall be guaranteed for a period of one year from the date of the official acceptance of the Contract, unless a longer period is stated in the specifications or in manufacturer's literature.
2. When items of equipment or material fail to perform or to give satisfactory service during this warranty period, the Owner may require that corrections be made even to the extent of installing new equipment or materials. When this becomes necessary, the warranty period shall extend for a period of one year from the date of acceptance of the new installation. The extended warranty period shall apply only to those items which have not performed satisfactorily.

#### **I. ELECTRONIC SUBMITTALS**

1. For purpose of clarity, Contract Documents include:
  - Paper and Digital Construction Drawings.
  - Paper and Digital Text Documents that include Construction Specifications (Specs), and Operation's Manual (O&M).
2. These guidelines are exclusively for electronic deliverables. Guidelines for submittals other than electronic media are specified elsewhere in the Contract Documents.
3. Unless specified otherwise in the Contract Documents, the Consultant shall submit electronic deliverables at the following stages of the project:
  - Programming
  - Schematic Design

- Design Development
  - Construction Documents
  - Project Closeout
4. Electronic deliverables for Programming, Schematic Design, Design Development, Construction Documents and Project Closeout must be in Adobe Acrobat (pdf) and/or dwf formats. "CAD files larger than 10 megabytes shall be in dwf format. **DWG files are required for Project Closeout.**
  5. Electronic submittal shall include pdf and/or dwf files of all CAD layouts. This assures that paper prints match digital files. Each respective CAD file will be named to relate to its sheet number within the plan set.

For example, the pdf file for the sheet numbered A1-1.dwg shall be named "A1-1.pdf and/or "A1-1.dwf.

6. All electronic deliverables shall be identical to the paper copies. That is, electronic deliverables are digital versions of paper documents and include:
  - Construction Drawings
  - Project Specifications
  - Operations Manuals

#### **J. MEDIA AND DATA TYPE**

1. All electronic deliverables must be submitted on Compact Disks (CDs) and/or DVDs formatted for the PC. Each media disk must be labeled with the project's name, project's number (State ID number), date, and consultant's name.
2. Compressed files are allowed only if accompanied by a non-proprietary, "self-extracting" file. **E-mail submittals are not allowed.**
3. Electronic Text and Graphic Documents shall be in Adobe Acrobat (pdf) and/or AutoCAD dwf formats. PDF files shall be in Version 6 or higher.
4. CAD drawings shall be in AutoCAD Release 2000 or greater. If a program other than AutoCAD is used to generate the project drawings, the Consultant shall be responsible for all conversion procedures necessary to generate the AutoCAD files. The Consultant shall also be responsible for maintaining the accuracy and inclusion of all items within the drawings during any translation process. **DXF format is not allowed.**
5. Data Structure:  
Store all files in a master folder. The master folder must be titled with the name of the project, date, and its corresponding project number.



The master folder shall contain the following subfolders: SPECIFICATIONS, OPERATIONS MANUAL, XREFs, RASTER, CAD. The RASTER folder shall contain images, logos, graphics, etc. The CAD folder shall contain subfolders for each discipline, including: CIVIL, LANDSCAPING, ARCHITECTURE, STRUCTURAL, MECHANICAL, ELECTRICAL.

6. CAD File Names:

Each file-name shall have the following format:

PROJECTNUMBER\_YEAR\_SHEETNUMBER

PROJECTCODE.EXTENSION

(e.g., Architectural Floor Plan Sheet 9 shall be named:

**1960191B6\_05\_A09FP.DWG**)

Individual files shall be placed in their corresponding subfolder (e.g., "A" sheets in the ARCHITECTURE subfolder).

**K. CAD Format**

1. CAD drawings shall be developed in conformance with the "**CAD Layering Guidelines**" (CLG) published by the American Institute of Architects (AIA), Second Edition. Each drawing file shall include only those layers that are used in the specific file. Unused or empty layers shall be "purged." Layers that are not listed in the CLG shall follow the same format as the CLG.
2. CAD drawings shall use standard AutoCAD menus, fonts, hatch patterns and line types. Copyrighted or non-Autodesk standard entities are not allowed.
3. CTB, PCP, PC3 or other files defining layouts, pen table, colors, widths and line styles shall be provided.
4. All unused entities such as layers, line-types, and blocks shall be "purged."
5. All drawings will be developed in full-scale format (e.g., one foot = one foot) in Model Space, and will be maintained as an integrated whole with individual drawings plotted using Layout/Paperspace.
6. Layouts:  
Sheet layouts will have borders developed as "layouts" in Paperspace. Layouts must include project name, project number, name of structure, structure's physical address, state site-code, and state ID number (The site code and state ID can be obtained from Louisiana's Department of Facility Planning and Control). Viewports in Layouts must be "locked" so that they retain their scale factors.
7. Nominal dimensions are not allowed in the generation of electronic drawings.

8. Title page shall contain a VICINITY MAP, a project summary that includes square footage and an outline of applicable codes.

<b>PROJECT NAME AND NUMBER HERE</b>		
<b>SHEET NO.</b>	<b>DRAWING DESCRIPTION</b>	<b>AUTOCAD® FILES</b>
TS1	Title Sheet, Notes, Abbreviations, Symbols	1960191B6_05_TS1.DWG
SP-2	Site Plan	1960191B6_05_SP02.DWG
A-3	Demolition of Second Floor Plan	1960191B6_05_A03DFP2.DWG
A-4	Admin Office Enlarged Floor Plan	1960191B6_05_A04EFP.DWG
A-5	Interior Elevation	1960191B6_05_A05IE.DWG
A-6	Building Section	1960191B6_05_A06BS.DWG

**L. PRE-CONSTRUCTION CONFERENCE**

1. After notification that the Contract has been executed, the Architect shall arrange and conduct with the Owner and Contractor a pre-construction conference to be held at the project site. The Contractor shall be responsible for ensuring that their subcontractors are in attendance and shall furnish to the Architect and Owner (1) the Schedule of Values, (2) list of subcontractors and material suppliers, and (3) the Construction Schedule.

**M. PUNCH LIST ITEMS**

1. At the time of the final inspection, a punch list with assigned monetary values will be compiled by the design professional in charge. If these items are not completed within the 45 day lien period, the monetary value of the item will be withheld and the item will be completed by the University.

**L. TEMPORARY UTILITIES**

1. Utilities during construction of new facilities or major modifications are the responsibility of the contractor. They may be purchased from the University, if available. Contractor is responsible for connection, metering and payment.

**M. ACCEPTANCE AND FINAL INSPECTION**

1. No project will be accepted for occupancy and no final inspection will be scheduled until the HVAC system is completely commissioned, including being fully integrated into the Campus Building Automation System, and balanced.

A Technical Air Balance report (TAB) must be prepared and delivered to the University. The TAB is to be reviewed and approved by the designer and their consultant prior to final inspection. The TAB will be utilized by Facility Services at

the time of final inspection to determine if the HVAC system is operating properly and the project can be accepted and occupied. A Registered Professional Engineer, employed by Facility Services, will be the determinant of the acceptability of the HVAC system.

**N. INTERIOR RENOVATIONS**

1. At job completion, strip tile floors to remove dirt, marks and previous finishes and apply three (3) coats of Johnson's Vectra Finish, or equal, as approved by the Office of Facility Services-Building Services Department. For masonry/stone floors, strip floors and apply three (3) coats of Johnson's Plaza Finish, or equal.

**O. NEW BUILDINGS NAMED AFTER AN INDIVIDUAL**

1. A bronze plaque with bibliographical information, including the Individual's relationship with LSU, may be displayed. The History Commission can be contacted for assistance on wording of the plaque and this requirement is in addition to any required by the State.

## **DIVISION 2 – SITEWORK**

### **A. CONCEPT**

- I. The term *Exterior Environment* is defined as all site improvements, plantings, lighting, irrigation systems, structures, amenities, land grading and drainage to be developed as a part of the building or site development on campus.
  
- II. The design of the Exterior Environment should reflect the Louisiana regional context, showing consideration and sensitivity to indigenous plant and hardscape materials. The design should integrate with the campus environment and reflect the historical nature of the campus. The selection of materials should consider reasonable maintenance burden and material availability for future repairs and replacement.

### **B. DESIGN TEAM**

- I. The Exterior Environment conceptual design is to be developed concurrent with the overall project plan, and the project team shall include a landscape architect and a civil engineer for all projects which affect the exterior environment. This process will allow site design considerations and cost estimate formulations to begin at the earliest stage of planning.

The landscape architect and civil engineer shall participate in the building siting and placement process and shall play a vital role in all exterior plazas and pedestrian corridors.

- II. Projected cost estimates submitted at each phase of the design process shall clearly identify and include all exterior site elements.
  
- III. A presentation package shall consist of an illustrative landscape/hardscape plan consistent with the project design theme and Owner's objectives for the project. The plan shall address and delineate a general concept for all site amenities and improvements.
  
- IV. Plans shall be of sufficient construction detail and labeling to clearly communicate landscape/hardscape intent and accuracy of scale in order to provide credible pricing for owner's approval prior to commencement of construction documents.
  
- V. Plans listed below shall be provided beginning at the design development phase for preliminary pricing:
  - a. Construction and Staking Plans
  - b. Grading Plans

- c. Lighting Plans
- d. Planting Plans
- e. General Landscape Plans
- f. Irrigation, Electrical and Sleeving Plans
- g. Drainage Plans (if applicable, Surface and Subsurface, tie into Civil)
- h. Erosion Control Plans (if applicable)
- i. Waterscape/Pottery/Exterior Furniture Plans
- j. Tree Protection Plan
- k. Details

VI. Submittals of samples, cut sheets or on-site product selection and approval at supplier warehouse or nursery shall be necessary to obtain designer's approval.

Approval of samples will be necessary for all materials, including concrete finishes, natural stone paving, finish surface for walls, caps, pilasters, fence (refer to campus fence, walls, and barriers guidelines), drainage materials and devices, light fixtures, turf, pottery and fixtures, etc.

### **C. GENERAL CONSTRUCTION REQUIREMENTS AND SCHEDULE**

- I. The General Contractor shall provide a detailed Landscape, Hardscape, Irrigation and Lighting Schedule for review and approval by the designer that will assure adequate coordination of the installation of all landscape and other construction tasks prior to the planting of turf grass.
- II. Turf grass establishment prior to building opening as outlined in Section E, Contractor Turnover; 4f, Lawn Installation, is a contract requisite. Therefore, all other construction tasks must be properly scheduled to accommodate the time required for turf grass establishment.

Solid sod turf planting requires a minimum time period of 30 days to establish. Sprig or seed planting requires a minimum of 84 days (12 weeks) in optimum climatic growing conditions to establish. Fine grading and debris removal for turf establishment are the contractor's responsibility.

- III. Construction staging should be planned in the Design Development phase of the project and included in the Design Development submittal. Construction staging plans should be developed in consultation with the Office of Parking and Transportation Services regarding traffic circulation, pedestrian walkways and construction parking.

Measures should be incorporated to ensure safe travel of pedestrians and vehicles during construction. These measures should be indicated on the Pedestrian Safety Plan that will become part of the final construction documents for the project. If construction staging is located on an existing parking lot, the

project shall pay for the temporary use of these spaces and restoration after construction. Staging areas will not be allowed so as to create potential conflicts with fire lanes. The Contractor shall coordinate with the Facility Services-Landscape Services department regarding maintaining trash/recycling services to ALL buildings in or around the construction area throughout the construction process and in conjunction with the University Landscape Architect regarding tree protection.

#### **D. EXTERIOR ENVIRONMENT**

##### **I. SITE SURVEY, CIVIL, GRADING AND DRAINAGE, GREEN INFRASTRUCTURE, SITE DISTURBANCE, HEAT ISLAND**

###### **a. Site Survey**

The design team shall define for the owner (if required) the specific requirements for a current certified land survey operator. This survey shall include: topographic contours, spot grades, lines of streets, alleys, pavements, and adjoining property; deed restrictions, boundaries, easements and contours of the Project site, locations, dimensions and complete data pertaining to existing buildings, other improvements and existing trees, and information concerning available services and utility lines both public and private, above and below grade, including inverts and depths.

###### **b. Civil**

The Landscape Architect and Civil Engineer shall produce final construction documents on the same base sheets to assure coordination of plans.

###### **c. Grading**

The grades for all exterior areas shall be set to adequately accommodate surface site drainage.

Earthwork shall be accomplished in accordance with the project's Soil Report (if required) that has been accepted by the Owner.

Earthwork shall be consistent with the design requirements of the Structural and Civil Engineer's design.

The final site grading plan shall assure there will be no standing water on any surface of the Exterior Environment, including but not limited to all landscape/softscape areas, hardscape surface areas, etc. The maximum approved slope grade shall not exceed 3:1 unless approved. Additionally, the Landscape Architect shall coordinate with the Architect to assure there are no areas of conflict concerning surface runoff water.

Finish grades and land contours shall be incorporated in to the Civil Engineering plans. The contractor shall be held responsible for providing earth surfaces finished to give positive gravity drainage away from the buildings and walks in areas of new construction.

Finished slopes shall be free from irregularities, hollows, or depressions. Soil shall be fine graded and free from construction debris. Provide sod or seed to all areas damaged by construction.

Fill and backfill material beneath building and paving limits shall be a clean, select material or silty clay with a plasticity index of 15 to 20. Use a maximum of 8" compacted thick lifts. Compaction shall be to a minimum dry density of 95% Standard Proctor or 92% Modified Proctor Test unless otherwise noted.

Topsoil and planting medium for turf, trees, shrubs, and groundcover will form the final finish grade for earthwork and shall be a minimum depth of 6"–12" for turf and shrub bed areas respectively. Pit planting shall be utilized under existing Live Oak trees.

d. Drainage

Ground floor slab elevations shall be above adjacent streets, parking lots and above the 100 year flood plain. Confirm final finish floor elevation with University personnel prior to completion of Construction Document phase.

Site drainage shall provide satisfactory runoff of storm water during normal rainfall conditions and prevent any pockets of standing casual water creating detriment of nuisance to horizontal paved surfaces and planted landscape and lawn areas. The inlet structures should be designed with consideration for seasonal heavy leaf accumulation and catch basins located for ease of regular maintenance.

Site drainage considerations shall include subsurface drainage in areas of poor internal soil moisture percolation which results in saturated soil conditions causing detriment to plant growth in landscape areas, nuisance seepage onto horizontal paved surfaces and continuous seepage through retaining walls leaving unacceptable stains.

Surface drainage infill structures shall be located and grades set to accommodate surface runoff. Size of drain lines, drainage inlets

and points of connection are to be established and connected to the main site storm drainage lines. Locate drainage apparatus away from entrances.

Subsurface drainage for over structure planters, planting beds, and tight soil areas where poor internal water percolation exists shall be designed and coordinated with Facility Services for points of connection into the site main drainage system and for inclusion of subsurface drainage lines with civil plans.

## II. GREEN INFRASTRUCTURE

### a. Low Impact Development

Designer shall identify green infrastructure/low impact development practices that could help avoid water quality degradation. See [www.epa.gov/npdes/greeninfrastructure](http://www.epa.gov/npdes/greeninfrastructure).

In accordance with Louisiana Department of Environmental Quality's Storm Water Management Program requirements for East Baton Rouge under rule LAS000101/AI 90427/PER 20090001, the plan must describe measures implemented to accomplish the following objectives:

- a) Keep rain out of the sewer system
- b) Allow storm water to be absorbed and cleansed by soil and vegetation and either re-used or allowed to flow back into groundwater or surface water resources.

Measures can include, but are not limited to, alternative surfaces (vegetated roofs, sediment filters, pervious pavement or grid pavers) and nonstructural techniques (rain gardens, trees and tree boxes, vegetated swales, disconnection of imperviousness, rainwater recycling and rainwater harvesting for non-potable uses such as toilet flushing and landscape irrigation) to reduce imperviousness and promote infiltration, thereby reducing pollutant loadings.

All measures and monitoring shall be documented in the project's Waste Water Management Plan and shall be capable of removing 80% of the average annual post development total suspended solids (TSS) load based on monitoring reports.

### b. Site Disturbance

For sites not previously developed ("greenfield sites"), consider providing vegetated open space equal to 20% of the total project



site area. Include pedestrian oriented hardscape in open space calculation and consider using pervious paving for these surfaces.

Vegetation shall be native/adaptive to the area (require minimal maintenance, no irrigation and no fertilizing). Limit site disturbance to the following parameters.

Note these site protection requirements in the construction documents and verify locations before construction begins.

- a) 40 feet maximum around building perimeter
- b) 25 feet maximum around permeable surfaces (including turf areas)
- c) 15 feet maximum around primary roadway curbs
- d) 10 feet maximum around sidewalks and surface parking

For previously developed sites, consider restoring or protecting a minimum of 75% of the project site area (excluding building footprint) with native or adaptive vegetation.

c. Heat Island (non-roof)

For 75% of the site hardscape, design project site to use any combination of the following strategies:

- a) Provide shade from a tree canopy within 5 years of project completion.
- b) Specify a hardscape material with a solar reflectance index of 29 or greater.

### 3. TERMITE TREATMENT

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

### 4. TREE PRESERVATION

A tree protection and pruning plan is required for all projects. The plan shall be developed in consultation with LSU's Landscape Architect (LA) and the University's Project Manager during the schematic or design development phase, and it becomes part of the design and construction documents.

Placement of tree and landscape protection measures, such as fences, protective mulch, protective fabric, and logging mats, should be indicated, as detailed below. The plan is a separate drawing, at an appropriate scale, labeled "Tree Protection Plan," and it should:

1. Identify size, species and location of all trees affected by the project.

2. Indicate which trees and shrubs are to be removed from the site.

Note: When trees and shrubs are removed, care must be taken to protect trees and other landscape elements that are to remain. (Indicate which trees and shrubs are to remain).

All trees determined to be preserved by the LSU Landscape Architect shall be fenced at the drip line of the branches. There shall be no break in the continuity of the fencing. If the lawn has to be maintained within this area, then an adequate lockable gate shall be provided.

The fencing shall be 4 foot tall vandal resistant, chain link. The area inside the fence shall not be used for any construction activity such as storage, lay down, etc. This includes protection from construction contamination from paint tool washing, diesel, and silt etc. The fenced area must be maintained in good physical and visual condition throughout the project.

- d. Soil mitigation work shall be completed in the root zones of all live oak trees affected by the construction project. This work shall consist of injecting, according to manufacturer's recommendations, Plant Health Care, Inc. MycorTree, Pt Injectable (Ectomycorrhizal Inoculants) and PHC BioPak, or approved equal, into the soil under the drip line of all affected live oak trees.
- e. Mulch shall be placed under the drip lines of the live oak trees affected by the project as determined by the LSU LA. Mulch shall be a minimum of 4 inches of fresh or aged hardwood chips or grindings. Mulch shall not be placed on the root flares of the trees.
- f. Any deadwood and/or limited crown reduction pruning of trees affected by the construction project shall be included as part of the project. The work shall conform to ANSI standards A300 and be performed by an arborist licensed by the ISA (International Society of Arboriculture) and/or LAA (Louisiana Arborist Association). All work shall proceed under the direction and observation of the LSU Arborist or the LSU LA.
- g. If the trees affected by the construction project are infected with Ball Moss, the Contractor shall treat with a solution of 5% sodium bicarbonate in water by spraying until drenching on all visible ball moss.
- h. Plans must indicate all trees to be pruned and treated prior to the start of the project.
- i. In some locations a visible barrier shall be attached to the chain link fencing located around affected trees, as required by the Owner. These locations

shall be identified on the tree protection plan and shall be maintained by the Contractor on a regular basis.

## **E. CONTRACTOR TURNOVER**

### **I. SEQUENCING**

- a. The Design Team is to develop a sequence of how the site is to be developed, nursery organized and secured, and final landscaping developed. The General Contractor is to incorporate this plan and sequence into his scheduling for turnover of the area of the site to be landscaped. The sequence of landscape installation and site inspection prior to commencement of landscaping shall be approved by the Owner.
- b. Accessibility to the main water supply for the building shall be made available to the Landscape Contractor for irrigation system main tie-in at the time of commencement of landscape activity in any given area. The Contractor is to make provisions for watering of trees that are installed early or existing landscaped areas that are to be maintained through construction.

### **II. UTILITIES**

- a. The Design Team shall exercise sensitivity to site aesthetics in selecting the location of all infrastructure surface devices such as drain inlets, electric load centers and transformers, backflow devices, utility vaults cleanouts, water meters, etc., with the approval of the Owner.
- b. The location of all utility valves and appurtenances shall receive the input of the Campus' Landscape Architect with the intent being to prevent obtrusion for the exterior aesthetics of the site with subsequent approval of the Owner. Finish surfaces of all utility appurtenances shall be equal to, and compatible with, surrounding hardscape finishes.
- c. Water meter and backflow prevention devices will be located in vaults concealed from public view with finish surfaces compatible with surrounding hardscape. Provide freeze protection as required.
- d. Sleeving:
  - (1) All horizontal paving shall be sleeved at designated locations per sleeving plans for site lighting, irrigation, and other utilities not installed prior to paving.
  - (2) Sleeves shall be buried below paving a minimum of 4" and a maximum of 15" and be Schedule 40 PVC, 100mm (4") diameter. Provide 3/8" X 3" brass stove bolt in paving at sleeve locations.

- (3) The General Contractor is responsible to provide an ongoing as-built sleeve plan designating accurate locations and depth.

### III. PAVING AND HARDSCAPE

- a. Locate drains to the edges or terraces; slop terraces so that furniture remains level.
- b. The Landscape Architect shall show on the landscape plans all above grade terraces exterior to the building along with details of paving material selection and paving pattern. The Landscape Architect is responsible for assuring full coordination of all project terraces with the Architect and Interior Designer.
- c. Exterior horizontal paved surfaces minimum standards are as stated below. Color and sample of each material and finished surface shall be approved by Owner. Minimum 6' X 6' field samples shall be provided by the General Contractor for site review and approval of the Owner, as deemed necessary.
- d. Entry Drives are to have a barrier curb along both outside edges. The finish of the curb shall match that of the Entry Drive.
- e. Porte-Cochere and associated circular driveway are to receive barrier curbs of the same finish as the adjacent drive. All adjacent walkways shall be distinguished from the drive in color and texture.
- f. An expansion joint shall be placed between the exterior entry and the Entry Drive and adjacent walkways. Expansion joints are to be kept away from the building entry. Any expansion joints are to be caulked with on approved material and color.
- g. Grout colors to be approved as part of standard sample mock-up review.
- h. Minimum acceptable standards for hardscape surfaces are as listed below:
  - (1) Concrete Walks
    - (a) Minimum width of concrete walks shall be 8' unless specifically approved by Planning, Design & Construction Site Review Team.
    - (b) All concrete walks shall have a minimum depth of 5" and have a non-slip surface finish.

- (c) Provide 3" PVC sleeves under all sidewalks at 100' maximum intervals.
- (d) Drill and pin, in both directions, 24" O.C. with #4 steel re-bar all existing concrete that abuts new concrete walks or drives. #4 steel re-bar shall be installed 24" O.C. at all construction joints for new concrete walks.
- (e) Provide truncated domes in sidewalk ramps which abut vehicular areas. The truncated domes shall be installed within the final 2' of paved surface prior to the vehicular use area, and shall be installed across the entire width of the walk. Individual truncated dome paver units shall be used and shall be terra cotta color.

#### Streets and Driveways

- a. All streets and driveways must meet highway standards for construction and maintain an optimum width of 24' for two-way traffic and 12' for one way traffic. If site conditions do not allow the optimum layout, an absolute minimum width of 22' for two-way traffic and 11' for one-way traffic may be allowed.
- b. Islands and any other physical barriers should not be employed to channel traffic. Signage and other traffic control devices should conform to the most current Manual on Uniform Traffic Control Devices.

#### Parking Lots

- a. The general design to maximize use of parking areas on the LSU campus is to employ a 90 degree parking space 8.5 feet wide and 18 feet long with an optimum bay width of 57 feet to a maximum of 60 feet for a double and 41 feet to a maximum of 43 feet respectively for a single bay.
- b. If the site conditions do not allow for the optimum layout, a minimum bay width of 55 feet for a double bay and 39 feet for single bay is acceptable. Parking quantities shall be designed at a rate of 1:1 for residential areas, .7:1 for commuter lots, and 1:200sf of office space and shall meet all federal requirements for the Americans with Disabilities Act.

- c. The second method to maximize parking is 70 degree parking. The space width is 9 feet by 16 feet. Double loaded bay widths are 49' minimum, 51' optimum, and 53' maximum. Single bays are 19' minimum, 21' optimum, 23' maximum.
- d. Parallel parking standards are 21' long by 8' wide.
- e. Handicapped spaces must comply with ADA standards.
- f. Layout of all parking areas must be approved by the Office of Parking & Transportation Services before implementation. Where existing parking capacity is displaced by the construction of a new facility, those displaced parking spaces must be mitigated on a one-for-one basis. Designers should submit for review a traffic study for vehicular circulation to and around the new facility, including service, delivery and public transportation vehicles.
- g. The University has numerous card access gated parking lots. Any additional card access controllers must be compatible with the existing system. Further information can be obtained from the Office of Parking & Transportation Services.
- h. Lighting is to be included as part of parking lot projects. Light standard locations should be considered relative to tree planting in order to avoid dark areas in parking lots and should be coordinated with the landscape consultant.
- i. Provide 3" (minimum) sleeves under new paving to all green areas. Identify sleeve locations on As-Built drawings and provide 3/8" X 3" brass stove bolt in pavement at the location of each sleeve.
- j. In addition to all other landscaping requirements, all new off-street parking lots with fifty (50) or more spaces shall provide and maintain landscaped planting areas within the interior of, and adjacent to, the parking lot.
- k. Perimeter landscaping shall be provided a rate of one (1) tree for every seventy-five (75) linear feet of paving frontage. Trees shall be spaced so that there is a minimum

of one (1) tree for every one hundred twenty-five (125) linear feet of paving frontage.

- I. Interior tree planting shall be provided at a rate of one (1) tree for every forty (40) parking spaces located in islands at the end of parking bays, island located between parallel rows of cars, driveway medians, intermediate islands or a combination of locations. In addition to the required trees, interior planting areas shall be grassed, landscaped or covered with mulch.

## **F. LANDSCAPING**

### **I. QUALITY CONTROL**

- a. Quality control is the essence for achievement of the finished product for the exterior environment. The Landscape Architect is to recommend standards for landscape material selection and installation to provide the Owner with a final product that is consistent with other LSU facilities. The Owner shall be involved in the decisions that impact the end-product, including but not limited to, a review and approval of:

- (1) All aspects of the technical landscape design and installation
- (2) Design/build shop drawings and mechanical function
- (3) Material selection including plants, stone, aggregate, concrete, furniture, fixtures, lighting, signage, railing, fences, etc...
- (4) Finish grading
- (5) Surface drainage and details and techniques of subsurface drainage
- (6) Irrigation design and equipment
- (7) Soils and plant bed preparation specifications including chemical and physical properties
- (8) Hardscape design pattern and installation details and materials selection
- (9) Water feature design and mechanical engineering
- (10) Interiorscape plans, specifications, and materials selections

- b. The Landscape Architect shall coordinate with the Interior Designer the located and placed on the landscape plan by the Landscape Architect, with submittal cut sheets and physical sample for approval.

### **II. SOILS AND PLANT BED PREPARATION**

- a. The Landscape Architect shall approve soils and plant bed soil preparation and installation for compliance with plans and specifications. Soils and associated amendments have a direct bearing on the performance and ultimate success of plant materials used in the landscape. Selection of soils, amendments and soil preparation mixing ratios shall follow the

recommendation of the Agronomic Soil Test and shall be clearly outlined in the construction documents by the Landscape Architect.

### III. PLANTING PLAN DETAILS

- a. Planting beds, pit excavation and backfill for trees, shrubs, groundcover and annuals: Planting plan details and specifications shall clearly address this issue with specific consideration for location conditions regarding diameter of planting pits, depths of planting beds, usability of natural site soil and recommended soil amendments.

### IV. SITE LANDSCAPE GRADING AND DRAINAGE

- a. Site Grading in preparation for landscape installation shall be in accordance with the site plans. All soils, subgrade or topsoil, native to the site or imported are to be guaranteed free of noxious weeds.

Additionally, all clods, rocks, roots, and other trash, foreign to good friable soil conditions, greater than 1" diameter size are to be raked and removed from the site.

- (1) The final finish grade for all landscaped areas shall include a 2" layer of topsoil for all turf areas unless otherwise specified.
- (2) The General Contractor shall assure that all areas or phases of the Project that are ready for landscape installation are graded to specifications, but also clear of all obstacles, equipment and material, etc. that will impair complete and open access to the designated area and ultimately risk quality control of the landscape end-product.
- (3) To protect the quality of the landscape, the General Contractor shall control ingress and egress of all subcontractors and trades not directly associated with the landscape installation into all areas designated ready for landscape.
- (4) Subsurface drainage using perforated pipe with filter fabric embedded in gravel aggregate shall be installed per plans and specifications in all areas of underground seepage, wet seepage conditions involving paved surfaces, areas slow to percolate due to impervious or tight soil conditions and other site conditions warranting subsurface drainage.
- (5) All over-structure planter beds and large stationary plant pots shall have subsurface drainage connected directly into the building or



site drainage system or a means of dewatering through siphon tubes (saucers with pots are not acceptable).

V. PLANT MATERIAL STANDARDS AND SPECIFICATIONS (ALL SIZES STATED ARE MINIMUM SIZES)

- (1) The Landscape Architect shall approve all plant material used on the Project, prior to shipment from the nursery. Plant materials that do not meet the standards of the specifications and landscape planting plans as described by the Landscape Architect shall be rejected.
- (2) The American Association of Nurserymen Standards shall serve as the standard of quality in developing guideline standards for specification of plant material regarding size for height, spread, caliper, rootball, etc., for container-grown and B&B trees, shrubs, groundcover and annual flowers.
- (3) Shrub plants shall be planted triangularly and spaced to achieve 100% coverage within a 3-year grow-in period, unless otherwise specifically approved by the Owner.
- (4) Groundcover: Plant material shall be triangularly-spaced to achieve 100% coverage within a 3-year grow-in period, unless otherwise approved by the Owner.
- (5) Annual flowers: Plants shall be 4" pots, bud and bloomed, spaced 6" o.c. at initial planting. Some species of annual color may be 6" pot size in which case the plant spacing will be adjusted accordingly as approved by the Owner.
- (6) Trees: Size and specification will vary based on species and plant availability. Selection shall necessitate a degree of flexibility and reasonableness based on availability and quality. (Trees must be individually hand-selected and approved by the Campus Landscape Architect.) Specifications shall be in accordance with the applicable selection standards and the Landscape Architect shall specify plants by height, spread, caliper size, rootball and box/container size.

All trees shall be tagged with pre-numbered, interlocking tags.

- (7) All plant material delivered to the site shall have tight, firm rootballs. The plant shall not be loose in the rootball at the root crown and the burlap shall be tightly affixed with wire on any rootball greater than 20" diameter. Plants grown in containers shall

be fully and deeply rooted and not recently transplanted in such a manner that the roots have not had sufficient time to develop.

- (8) Contract Growing, Special Procurement and On-Site Nursery: Due to plant availability shortages, contract growing of shrubs, groundcover and annual flowers, early procurement of tree plant materials and on-site nursery arrangements may be necessary to have plant materials available for the project of acceptable quality, size and species to comply with the schedule of installation.

In this case, the Landscape Architect shall approve procedures associated with such an arrangement and the schedule outlines to accomplish the task. Arrangements for this procedure must begin very early in the Project construction process to allow sufficient time for growing plants.

## VI. LAWN INSTALLATION

- (1) Grading of site prior to planting grass must alleviate all pockets of standing or puddling casual water.
- (2) Selection of Species: The turf grass species shall be conducive to the Louisiana region and pre-approved by Campus Landscape Architect, capable of vigorous growth and development of a thick turf cover.

The turf species shall be fine-textured, capable of being developed into manicured turf of refined finish.

- (3) The turf quality shall be free of noxious weeds and diseases, true to species as approved by the Owner.
- (4) Turf installation shall be by means of solid sod, laid on the finished graded surface, rolled for smoothness and compaction. Plans shall clearly indicate all areas to receive sod.
- (5) Turf planting methods other than sod, such as hydro-sprigging or hydro-seeding, shall only be considered on an individual project basis in large areas greater than 100' from outer face of the building as approved by the Owner.
- (6) The General Contractor shall be responsible for providing a 100% fully established turf a minimum of 30 days prior to the opening of the building. NOTE: Established turf is defined as 100% ground coverage, matted together sufficiently to support pedestrian foot traffic and growing in a vigorous manner. The turf must be free of

erosion, standing water, wet-slow to drain areas, noxious weeds and disease. Newly planted grass must have been mowed on a weekly basis with the proper type mower for at least 30 days prior to final acceptance to be considered established.

## **G. IRRIGATION**

- a. Landscape Irrigation shall be designed by a licensed landscape irrigator.
- b. The Irrigation System shall be fully automated and controlled by an electrical controller and shall provide 100% coverage of landscaped areas with heads triangularly-spaced with overlapping head-to-head trajectory.
- c. Remote control valves shall be electrically activated.
- d. Turf and planting beds are to be valved separately due to different water requirements.
- e. Turf heads shall be a minimum 4" pop-up spray heads in small cut-up areas of turf and rotary gear-driven heads in large expanse areas of turf.
- f. Shrub and groundcover areas are to receive 12" pop-up spray heads along turf borders, sidewalks and other areas along exterior perimeters where there is no interference from vegetative growth. All interior areas of the bed shall receive shrub sprays on stationary risers with a flex pipe connection to the lateral line. The nozzles on the risers shall be brass.
- g. The automatic controller is to be electromechanical repeat cycle with a master control valve to prevent errant operation. Place in a concealed location (approved by Owner) and all boxes are to be lockable, either by use of a padlock or with an integral lock. Battery operated controllers shall be acceptable on an individual case by case basis.
- h. Irrigation System design is to assure consideration is provided to accommodate prevailing winds and static pressure reading to keep spray off of walks, street and parking areas.
- i. The Irrigation System shall be designed with sufficient quick coupler valves in all areas of the site to be reached with 100' of water hose.
- j. The Irrigation system is to be separated from the domestic water system by a backflow presenter device.
- k. Design shall specify a rain sensor on all campus irrigation systems.

- I. Contractor shall submit a schematic diagram of the completed irrigation system to owner showing all operable zones and the corresponding descriptor on the control box. Review operating procedures with a representative of LSU Landscape Services.

1. WATER FEATURES/FOUNTAINS/SPECIAL SITE AMENITIES

- a. Special site amenities such as site fountains, gazebos, pavilions, etc...shall be considered in the design of the Exterior Environment as appropriate to create special spaces, function areas and features of interest. (Approval on a case-by-case basis)
- b. All fountains shall be designed by the Landscape Architect, in conjunction with a sculptor when necessary, with the intent of creating a special theme compatible with the building or function area.
- c. Water feature design is a "hands-on" subjective process with mechanical and hydraulic requirements for water movements and effect and water quality control. Rock boulders, stones and rock outcroppings are not indigenous to the geographic region and should not be used.

The aesthetic character should create a naturalistic environment with lake or pond edges blending naturally into the surrounding setting. Where a water feature edge abuts plazas, walkways or other spaces, the edge treatment shall conform to applicable accessibility codes.

- d. Bicycle Racks: Bicycle riding is encouraged on campus and bicycle racks should be included in the project when appropriate. Bicycle parking sites shall be considered at the schematic design phase and final site locations indicated in the final construction documents. Consider bicycle parking and parking surface as part of the construction costs.

The number and location of bicycle racks is determined in joint consultation with the LSU Office of Parking & Transportation Services and LSU Campus Planning. Follow the guidelines below when determining bicycle parking quantity and location:

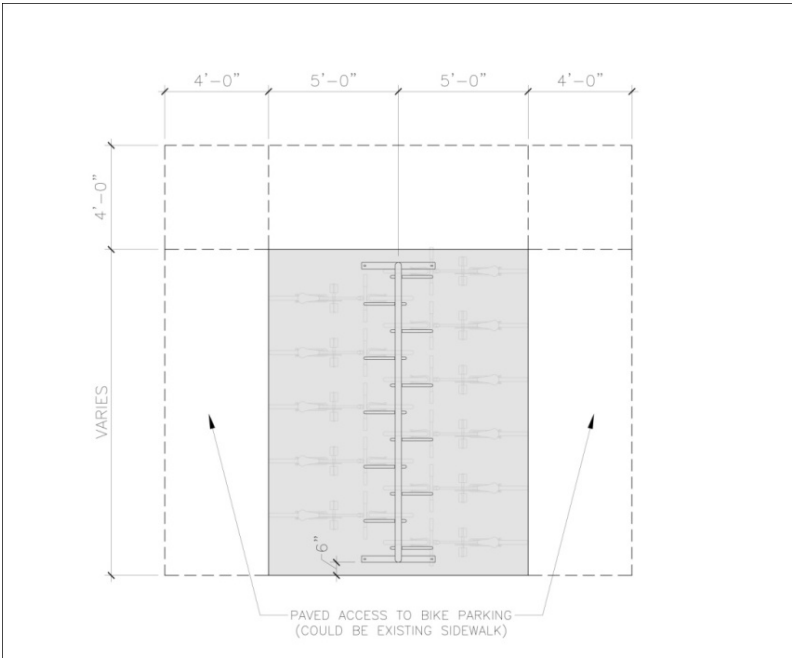
**For Residential Facilities:**

Provide bike parking spots within **300 feet** of a building entrance for at least **15%** of the building occupants.

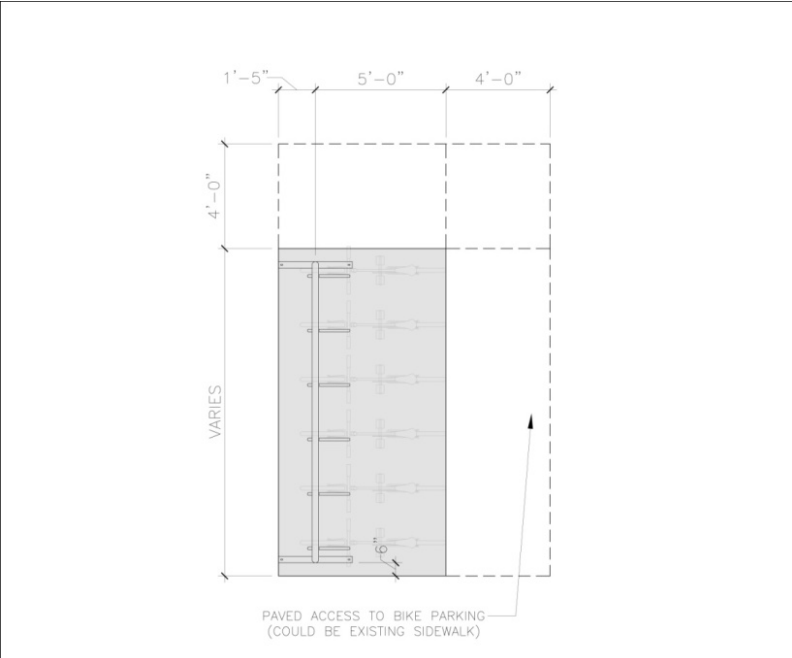
**For Non-Residential Facilities:**

Provide bike parking spots within **300 feet** of a building entrance for at least **5%** of the building's peak users. Estimate peak building users by applying an efficiency factor of 75% to the building's occupancy.

Bike racks shall be: **Dero-Campus Rack, galvanized finish, surface mounted;** or equal manufacturer.



**(Above) Double sided bicycle rack**



**(Above) Single sided bicycle rack**

- e. When locating bicycle racks, choose locations that are accessible by bicycle. Bicycle parking racks should be installed on a paved surface. The dimensional requirements of the paved surface are described in the sketches below. Designer should consider future expansion opportunities.
- f. Bus Stop/ Shelters: The Office of Parking & Transportation Services and the LSU Landscape Architect shall determine where to locate bus stops/shelters when ridership volumes justify use and adequate space is available. The unit used on campus is to be mounted on a brick paved area. It should be appropriately illuminated and adequately transparent to ensure user security and safety.

Provide a suitable clear space around the shelter to allow for visual accessibility and maintenance. Integrate related site furnishings such as waste receptacles, lighting, newspaper machines, public telephones and landscaping features into the space surrounding the shelter.

- g. The University's Facility Design and Development Committee has approved a family of site furniture to be incorporated into the external environment.
- h. Benches are to be Victor Stanley, Inc.: Steelsites RB Series; RB-28 or RB-12, 6-foot length; Black finish or equal manufacturer.
- i. Litter Receptacles are to be Victor Stanley, Inc.: T Series; Model 32 w/S-1 lid; Black finish or equal manufacturer.

## 2. LANDSCAPE LIGHTING

### GENERAL REQUIREMENTS

- a. Landscape lighting design shall be conceptually designed by the Landscape Architect, with particular attention paid to creating a soft, serene and safe nighttime atmosphere. The ambiance afforded by landscape lighting is especially important in transforming the landscaped areas into pleasant, special experience for the students. Walkway lighting shall be very subtle and discreet, utilizing surrounding landscape illumination to serve the purpose of walkway lighting to the extent possible
- b. Lighting of special feature items or special seasonal displays and points of interest will be accomplished through landscape lighting. Provide additional circuit capacity at the building entry Porte Cochere and plazas.
- c. Landscape lighting design will be governed by the light quality more satisfactory to create the desired atmosphere fixture style and equipment

durability and shall consider all governmental agency requirements and regulations affecting exterior lighting.

- d. The Landscape Architect shall employ a qualified Lighting Consultant to ensure the proper execution of the lighting concept. This design is to be carefully coordinated with the exterior building lighting.
- e. Landscape lighting shall be furnished and installed by the Contractor per the plans and specifications. Electrical service and circuiting shall be provided by the General Contractor as part of the Project's electrical contract. Information for electrical service requirements shall be obtained from the landscape lighting plans and specifications.
- f. All site lighting shall be controlled on separate circuits from Landscape Lighting through either time clocks and/or photocells.

#### INSTALLATION

Exact physical locations of all landscape lighting fixtures shall be determined in the field by lighting consultant in coordination with Landscape Architect after tree pits are dug.

All exterior transformers and junction boxes shall be located in areas concealed from the public, as identified by the Landscape Architect and Owner.

- a. All exterior weather proof J-boxes shall be rated for NEMA 4X. Any above grade boxes shall be painted to match adjacent surface as specified by the Landscape Architect.
- b. Each ballast and junction box shall be specifically located by the Landscape Architect.
- c. All exposed conduit shall be painted out to match the adjacent surface as specified by the Landscape Architect.
- d. Final adjustments of all landscape lighting fixtures shall be approved by the Owner. Adjustments or proper focus of lighting shall be conducted as part of the contract.

#### FIXTURE REQUIREMENTS

Fixture specifications and quantities shall be per the legend on the lighting plan inclusive of the issues and items stated above.

Durability and corrosion resistance of any substitute fixture shall meet or exceed the original specified fixture as approved by the Owner.

- a. All lamps shall be in 3000K<sup>9</sup> color temperature range. All light physical color shall be the same or compatible.
- b. Provide all ground mounted fixtures with no manufacturer's logo visible on fixture housings.
- c. All pathway lights shall have a protective lens to prevent intrusion of water that would damage the lamp. The pathway light junction box shall be accessible below finished grade. The junction box will be mounted in a concrete pad for stability.
- d. Underwater fixtures shall conform with the NEC Article #680.
- e. Fixture shielding shall maximize concealment of light source.
  - 1. Uplights shall have attached flat lens, internal louver (if available), and rock guard louver
  - 1. Bullet lights shall have hex louver and eyebrow shield.
  - 2. Niche lights i.e., step lights, garden walls, or bridge rails, shall have flush mount lens, flat bronze down louvered grilles.
  - 3. Path lights shall be architecturally compatible with the building entry and/or wall sconce fixtures, 100% down shielded below the horizontal plane, clean flat lens to protect the lamp from irrigation water spray.
  - 4. Quantum fixtures shall be shrouded to prevent control spillage of light source into areas not intended to be lit.
- f. Parking lot fixtures shall be 100% down shielded.
  - 1. Signage lighting shall be shrouded to prevent spillage of lighting into any area other than the sign.
  - 2. Underwater fountain fixtures shall be permanently affixed to the bottom of the fountain pool or recessed within the pool bottom. All electrical cords and wires shall be 100% concealed under the pool bottom and routed in conduits to the light location.

#### **H. FENCES, WALLS AND BARRIERS**

- a. The purpose of this section is to provide a design standard in regards to fences, walls, and barriers on campus that is consistent with the overall goals and intent of the 2003 Campus Master Plan which seeks to create a people-



friendly environment while at the same time promotes the public health, safety, and the general welfare of the user.

To further this goal, the use of fences, walls, and barriers is strongly discouraged and shall only be considered in the following circumstances:

- To contain livestock, maintain animal habitats, and/or to maintain other agricultural needs.
  - To provide a visual buffer of dumpsters, mechanical, and other unsightly structures or equipment.
  - To prevent unauthorized access to high voltage and/or other dangerous areas.
  - For security purposes as required by federal, state, or university safety officials.
  - To enhance the quality of a pedestrian oriented courtyard or space in public and residential areas.
  - To secure athletic and academic functions.
- b. Design of proposed fences, walls, and barriers is encouraged to reflect the existing heritage and gracious quality exemplified in the historical part of campus through the use of similar materials, color, proportion, and scale. If the use of arches and/or arcades is proposed, then consideration should be given to the character of the arcades surrounding the main quadrangle.

The color palette of materials to be used should be within the range of warm earth tones as seen in the historical part of campus which are generally light in color (i.e., colors found in the sandstone, buff, and terra-cotta families).

- c. Any fence, wall, or barrier shall be constructed in a durable fashion with a finished surface of brick, stone, decorative masonry material, cast stone, painted metal, approved synthetic material, landscape material, and/or a combination of said materials.

The use of wood and/or chain link fence shall not be acceptable except in extenuating circumstances which will be reviewed by the Campus Facility Development and Design Committee on a case by case basis. When the use of chain link fences is approved, they shall be 9 gauge vinyl coated heavy gauge material with schedule 40 galvanized steel pipe frame.

Fencing materials shall match surrounding architecture and site character as closely as possible to maintain visual harmony on campus. All designs shall be reviewed by the Planning, Design & Construction department for design integrity prior to presentation to the Facility Development and Design Committee.

- (1) The finished side of all walls or fences shall face the common property line boundary.
- (2) Fences, walls, and barriers shall be designed to be climb resistant, and shall be reviewed by campus security officials.
- (3) All fences, walls, and barriers shall allow access by university maintenance and security officials.
- (4) When gates are required, they shall be lockable only from the outside and shall conform to all fire and safety codes. Fences, walls, and barriers shall not restrict egress from a confined pedestrian area and Campus Police and Facility Services personnel shall be allowed access at all times.
- (5) When landscape material is used as a fence, wall, or barrier this material shall not exceed 5' in height and shall not be used on more than 2 contiguous sides. The use of climbing vines on fences, walls, and barriers is encouraged. All designs which utilize landscape materials shall be reviewed by the Campus Landscape Architect prior to presentation to the Facility Development and Design Committee.
- (6) When a fence is to be constructed directly adjacent to a pedestrian corridor, the fence height shall be proportionate to the width of the space directly adjacent in order to maintain a comfortable pedestrian atmosphere.

d. The following guidelines shall govern the design of fences, walls, and barriers when used in their respective campus zone:

Livestock and Agricultural

- (1) Fences shall be constructed with no more than 25% solid materials and should be mostly transparent in nature.
- (2) Decorative materials shall be utilized when these fences front a main pedestrian or vehicular corridor.

#### Dumpster and Mechanical Equipment Screening

- (1) The height of the fencing material used shall be relative to the equipment being screened; however, the height of this fence shall not exceed 8'.
- (2) These fences should not be transparent in nature.
- (3) This fence shall remain open on one (1) side, and this opening shall not be visible from a main pedestrian and/or vehicular corridor.

#### High Voltage and Other Dangerous Areas

- (1) The height of the fencing shall be 8'-12' in height.
- (2) These fences should not be transparent in nature.
- (3) These fences shall not be constructed of a material that is conductive in nature.

#### Public and/or Residential Courtyards

- (1) Fence shall not extend more than 5' in height and shall not extend beyond the building perimeter lines in any direction.
- (2) Fences shall be constructed with no more than 25% solid materials and should be mostly transparent in nature.

#### Athletic Functions

- (1) Fence shall extend no more than 8' in height.
- (2) Opacity of fence structure shall be relative to the function of the athletic area being confined.

### **I. BOLLARDS**

Steel pipe bollards a minimum 6" X 48" high are required adjacent to buildings where service vehicles back in to load/unload and in dumpster yards to prevent damage to fences and structures.

Must provide Schedule 40 pipe minimum *with black paint color being approved by the Office of Planning, Design & Construction*. Bollard locations for controlling pedestrian and vehicular movement shall require prior approval before installation.

### **J. UTILITIES**

- a. Street and Roadway Utility Repairs and Replacements: All utility repairs or replacements requiring cuts into roadways, driveways, or parking lots

shall be coordinated with the Office of Parking & Transportation Services in advance of the start of work.

In repairing required cuts to complete utility repairs, contractors shall provide a sub base compaction rate standard of 95%. Testing shall be conducted to ensure that the appropriate compaction rate is met.

## **DIVISION 3 – CONCRETE**

### **A. GENERAL**

1. All streets and driveways must meet state highway standards for design and construction, with a minimum width of 24 feet for two way traffic and 12 feet for one way traffic. Islands and any other physical barriers should not be employed to channelize traffic. Signage and other traffic control devices should conform to the most current Manual on Uniform Traffic Control Devices.
2. Plain and reinforced concrete work to comply with the current edition of the American Concrete Institute (ACI) publications, to the extent applicable in each reference.
3. Comply with current editions of the applicable American Society for Testing and Materials (ASTM) specifications, to the extent applicable in each reference.
4. Comply with current edition of the Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practices.

### **B. REINFORCING**

1. Reinforcing steel shall be ASTM-A615 deformed, billet-steel of grade 60 or better, and shall be installed in accordance with CRSI “Manual of Standard Practice for Reinforced Concrete Construction.”

### **C. CONCRETE**

1. All concrete shall be a minimum of 3,000 p.s.i. in 28 days. Higher strength concrete and possible admixtures should be considered in special situations.

### **D. AGGREGATES**

1. Aggregates shall conform to provisions of ASTM C33.
2. Use coarse aggregate from only one source and fine aggregate from only one source for exposed concrete in a single structure.
3. Select proportions of ingredients to produce a concrete having proper workability, durability, strength, and appearance. Proportion ingredients to produce a mixture that will work readily into corners and angles of forms and around reinforcement by methods of placing and consolidation employed on the project.

### **E. ENVIRONMENTAL CONTROLS**

1. Rinsing out of the transit mix trucks, washing or wetting of concrete, site cleanup, or other activity related to water at the site shall be in strict

conformance with all EPA requirements for the prevention of water runoff to storm water sewers or ditches.

#### **F. TESTING AND CONTROLS**

1. The Contractor shall be required to employ, at their expense, a commercial testing laboratory, acceptable to the Owner, to prepare and test the initial mix design for each class of concrete specified.
2. Field Test Cylinders During Construction:
  - a. Mold four cylinders for each set of tests specified.
  - b. Test one specimen at 7 days and two at 28 days according to ASTM C39. If one or both of the 28-day tests indicate a compressive strength below the strength required, the fourth specimen shall be tested at 56 days. If all tests indicate a compressive strength below the strength required, the Architect/Engineer may, at their discretion, direct the Contractor to perform testing of in-place concrete at no additional cost to the Owner, regardless of the outcome of the tests.
3. Testing of Deficient In-Place Concrete:
  - a. Concrete strength will be considered potentially deficient if the averages of two consecutive sets of strength test results fail to equal or exceed the specified strength or if any individual strength test result falls below the specified strength or if any individual strength test result falls below the specified strength. Testing may be required as directed by the Architect/Engineer.
  - b. Concrete work not having the required strength, as determined by the Architect/Engineer, shall be replaced at the Contractor's expense.
  - c. All costs incurred in providing the additional testing and/or analyses required as a result of deficient concrete shall be at the Contractor's expense. All costs as a result of delays due to additional testing and/or analyses will be at the Contractor's expense, with no extension of contract length, regardless of the outcome of the testing.

#### **G. ACCEPTANCE OF CONCRETE WORK**

1. Formed surfaces resulting in a configuration of members smaller than permitted under the tolerances specified shall be considered deficient and repaired or replaced as directed by the Architect/Engineer.
2. Concrete members cast in the wrong location shall be rejected if the strength, appearance, or function of the structure is, in the Architect/Engineer's opinion, adversely affected or if misplaced members interfere with other construction.

If rejected, remove members cast in the wrong location and repair or replace the Contractor's expense as directed by the Architect/Engineer.

3. All work required under this section shall be at the Contractor's expense, with no extension of contract time.

## **DIVISION 4 – MASONRY**

### **A. GENERAL**

1. Standards: All new brick work including, but not limited to, expansion joints, ties and fasteners and accessories shall conform to standards of the Brick Institute of America.
2. A sample brick panel of 100 face brick selected for the project shall be laid up with specified jointing for approval by the Designer and University prior to starting exterior face brick installation.
3. Should the initial sample panel be unsatisfactory, the Contractor will be required to erect additional samples until the brick work and jointing are approved by both the Designer and University.

### **B. CLAY UNIT MASONRY**

1. The predominant and preferred brick on campus is St. Joe Light Tan or Rose Blend. Any other brick selection must be approved by the Planning, Design & Construction department. Additions shall match existing brick in color and texture.

The University has approved an equal to St. Joe Brick. It is “Bengal Blend” tumbled face brick as manufactured by Cherokee Brick and Tile Company, Macon, Georgia

2. Coursing: New brickwork, which is adjacent to or an addition to existing brickwork, shall be coursed to match the existing brickwork.
3. Cavity Walls: Cavity walls shall be detailed and specified to keep cavities free of mortar and the Designer’s field representative shall enforce this requirement. There are several strategies available to keep mortar out of the cavity that does not require extraordinary masonry skills. Brick ties shall be specified with built-in drips to avoid water bridging the cavity.
4. Flashings: Flashings shall be carefully thought out and positioned. Extend beyond openings and specify dams. Coordinate and detail the interface between below grade waterproofing and through-wall flashing, as well as base flashing and weeps.
5. Weep holes: Weeps are preferred to be an open head joint rather than cords or tubes. Locate them far enough above adjacent roofs to allow reproofing without interfering with their operation. Weep holes on exterior walls shall extend the full height of the brick head joint and be a minimum of 24” on center.



6. Expansion and Control Joints: Expansion joints and expansion joint spacing shall strictly conform to the Brick Institute of America.
7. Mortar Joints: Mortar joints shall be tooled slightly concave. Struck or raked joints shall not be used in exterior walls. Exception: Joints in historic buildings shall match the existing ones.
8. Reinforcement, Ties and Anchors: Reinforcement, ties and anchors shall strictly conform to the American Concrete Institute, the American Society of Civil Engineers and the Masonry Society.
9. All new exterior brick or exposed aggregate finishes shall be sealed with a clear silane or silicone waterproofing solution. Windows, doors, and shrubbery shall be covered during the application. Provide a minimum 10 year manufacturer's warranty.
10. Due to potential rusting, brick veneer wall shall have CMU back up interior wall and not metal studs.
11. Air space between brick and wall shall be a minimum of 1 ½".
12. Glazed brick or ceramic tile on restroom walls: A minimum of five feet high is preferred.
13. Copper wall flashing: A minimum of 5 oz. shall extend below the entire width of the brick.
14. Bricks used for paving shall be of a grade designated as suitable for ground contact.
15. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting and ensure that they are securely tied. If units become wet, do not install until they are dry.

### **C. COPING STONES**

1. Thru-wall flashing shall be installed beneath all coping stone installations.

## **DIVISION 5 –METALS**

### **A. STRUCTURAL STEEL**

1. Structural steel work is defined in the American Institute of Steel Construction (AISC) “Code of Standard Practice.” Structural steel shall comply with the following:
  - a. AISC “Code of Standard Practice for Steel Buildings and Bridges”
  - b. AISC Specifications for Structural Steel Buildings,” including “Commentary”
  - c. “Specifications for Structural Joints Using ASTM A325 or A490 Bolts” approved by the Research Council on Structural Connections
  - d. American Welding Society (AWS) D1.1 “Structural Welding Code – Steel”
  - e. ASTM A6, “General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use”
  - f. ASTM A36, “Structural Steel Shapes, Plates, and Bars”
  - g. ASTM A500, “Grade B Cold-Formed Steel Tubing”
  - h. ASTM A501, “Hot-Formed Steel Tubing”
  - i. ASTM A307, “Anchor Bolts”
  - j. ASTM C150, “Type I or Type III, Cement Grout”

### **B. FIREPROOFING**

1. The Contractor shall coordinate the type of fireproofing to be used with structural steel primers. Some fireproofing materials cannot be easily or economically applied to painted surfaces and some Underwriter’s Laboratories, Inc. (UL) fireproofing designs do not permit primed steel.

### **C. STEEL JOIST AND GIRDERS**

1. Steel joist and joist girders shall comply with the following requirements:
  - a. Steel Joist Institute (SJI) for steel cord and web sections
  - b. ASTM A36, for steel bearing plates
  - c. ASTM A307, Grade A, for unfinished threaded fasteners, low carbon steel

- d. UL, for fire resistance rating.

#### **D. METAL DECKING**

1. Metal Decking shall comply with the following:
  - a. Steel Deck Institute (SDI) "Design Manual"
  - b. American Iron and Steel Institute (AISI) "Specification for Cold-Formed Steel Structural Members"
  - c. American Welding Society (AWS) D1.1, "Structural Welding Code – Steel" and AWS D1.3, "Structural Welding Code – Sheet Steel"
  - d. UL "Fire Resistance Directory"
2. All floor decking shall be galvanized in accordance with ASTM A 525 (ASTM A 525M). The Contractor shall provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.

#### **E. MISCELLANEOUS METALS**

1. Miscellaneous metals typically include items of steel, and sometimes aluminum that are not specified as part of the building structure or part of ornamental metal sections. To avoid change orders, the scope of miscellaneous metals shall be carefully reviewed and itemized prior to issuing the Contract Documents.
2. Miscellaneous metal work shall be carefully reviewed to identify all items that should be galvanized and all items that should be shop-primed and shop finished. In general, all exterior ferrous metal items should be galvanized.
3. 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. Ladders shall be lockable and meet all OSHA Standards.

## **DIVISION 6 -- WOOD & PLASTICS**

### **A. TREATED LUMBER**

1. Exterior wood shall be pressure treated where in contact with the ground and exposed to weathering. Lumber indicated to be preservative-treated shall comply with the applicable requirements of the American Wood Preservers Association, AWPAC2 (lumber) and AWPAC9 (plywood).
2. Preservatives for treated-wood blocking and nailers in contact with membrane roofing systems must be approved by the roof system manufacturer. Cresote, pentachlorophenol, copper naphthenate, and copper 8-quin-olinate are typically not approved by roofing system manufacturers.

### **B. WOOD BLOCKING**

1. Wood Blocking to support other work is a major portion of rough carpentry work for University projects. To avoid change orders, the scope of blocking required shall be clearly indicated. The following list includes some of the common items that may need concealed wood blocking:
  - a. Miscellaneous metals, such as handrails
  - b. Finish carpentry and millwork, including office shelves and casework
  - c. Roof and flashing
  - d. Roof accessories and skylights
  - e. Windows
  - f. Chalkboards and tack boards
  - g. Toilet partitions
  - h. Signage and graphics
  - i. Fire extinguishers and cabinets
  - j. Toilet accessories
  - k. Projection screens
  - l. Casework and attached furnishings, including laboratory bench casework
  - m. Window treatment such as blinds, shades, and drapes
  - n. Electrical framing such as mounting boards for telephone, fire alarm, and electrical panels

### **C. FINISHED CARPENTRY**

1. Finish carpentry refers to carpentry work that is exposed to view and is non-structural.
2. The Architectural Woodwork Institute (AWI) publication "Architectural Woodwork Quality Standards, Guide Specifications, and Quality Certification Program" shall be used when designing, detailing, and specifying finish carpentry and millwork.

## **DIVISION 7—THERMAL & MOISTURE PROTECTION**

### **A. ROOF DETAILS**

1. All roofing details shall conform to the NRCA (National Roofing Contractors Association) Roofing and Waterproofing Manual.

### **B. SHEET METAL DETAILS**

1. All sheet metal details shall conform to the SMACNA (Sheet Metal and Air Conditioning Contractors National Association) Architectural Sheet Metal Manual.

### **C. ROOF SCHEDULING**

1. Provide for all roofing to be installed such that any area started shall be completed through installation of aggregate the same day. Water-stops conforming to the NRCA Roofing Manual shall be installed at the end of each day's work to ensure maintenance of the waterproof integrity of the roof membrane.

### **D. ROOF SERVICE AGREEMENT**

1. Roof work shall be covered by the Membrane Roofing Service Guarantee described in these standards.

### **E. INSULATION**

1. Batt insulation is preferred to blown insulation. Where insulation is installed in roof areas, chicken wire will be used to support the batts within the roof rafters.
2. Exterior wall insulation shall be a minimum R-19 and ceiling/roof insulation R-30.

### **F. CLAY TILE ROOFS**

1. New roofs shall be sloped Ludowici-'S' Tile – 13 ¼" tile (9 ¾" x 13 ¼"). Larger size Ludowici 18 3/8" tile (9 ¾" x 18 3/8") may be substituted and approved upon review depending on the mass and scale of the structure.
2. Color pattern to match existing roofs (70% Clay Red, 20% Impressionist Fireflash, and 10% Desert Sand).
3. Hurricane clips, copper or stainless steel shall be used on all perimeter tiles. Fasten each tile with 2 or 3 nails. Fasten tiles overlapping sheet metal with copper wire and plastic cement.
4. Stainless steel hurricane clips shall be used on all tile within 36" of all perimeters. Cut valley tiles shall be notched and wired using 16 gauge solid copper wire without insulation and wired to a fastener driven into the deck beyond the

flashing and adhered to adjacent tiles using a polyurethane sealant that is suitable for bonding with clay tiles.

5. Nails for tile and cleats shall be copper, 11 gauge, ring shanked, 3/8" headed and proper length to allow minimum 3/4" penetration. No penetration is allowed on exposed eaves. Screws for tile shall be stainless steel or brass #8 or #9 and proper length to allow minimum 3/4" penetration. Fasten each tile with fastener in each provided hole.
6. Hip and ridge tile to have a clear silicone sealant (Dow 790) applied over the nail heads so that the adjacent tile is well adhered to minimize wind uplift. Accessory pieces to include end bands, beveled eaves, flat tops, detached gable rakes, rolled rakes, #102 hip rolls, #206 ridge, #152 LSU hip starter, #206 High Bump Closed Ridge End, #102/#206 High Bump Terminals.
7. Flat Interlocking LudoSlate -This tile may be used as an alternative to the Spanish tile above, upon written approval by the University, for reroofing projects and new sloped roof projects whereby design justifies its use. The size shall be 10 3/4" x 16" with the exception that the Desert Sand shall be 7" wide. Color pattern shall be same as per above requirements with noted exception for 7" wide tile. Fastening shall be per above requirements. Accessory hip and ridge pieces shall be same as per above requirements.
8. Both tile above shall be per ASTM 1167, have a durability of Grade 1, a warranty of 75 years, have a moisture absorption rate of less than 3%, and supplied by a factory that is ISO 9000 certified.
9. Equal products of other manufacturers submitted shall match Ludowici tile in colors, shapes, textures, sizes and include all accessory pieces as Ludowici products listed. Failure to meet these exact requirements shall be reason for rejection.

#### **G. ROOF SLOPE**

1. Minimum slope on flat roof re-roofing shall be 1/8" for coal tar pitch and 1/4" for asphalt pitch.
2. Underlayment for sloped roofs shall be a Modified Bituminous Self-Adhering Sheet not less than 60 mils thick equal to W.R. Grace and Co, Ice and Water Shield, W.R. Meadows SealTight Mel-Rol, or Pecora Duramem 700-SM.
3. Install a 30# asphalt saturated organic felt, un-perforated, over the self-adhering sheet. Underlayment for use under copper and other metals shall be Grace Ultra or equal which is used for high temperatures.

#### **H. METAL ROOFING**

1. All roof metal work shall be minimum 16 oz. copper, unless otherwise noted. Standing seam metal roofing and accessories shall be installed in accordance with the manufacturer's specifications and shall be 16" wide by 2" high, 24 gauge baked enamel galvalume steel with a double lock seam capable of withstanding 100 MPH sustained winds.

#### **I. LEAK REPAIRS**

1. Roofing contractor shall respond within 24 hours to leak repair requests by the University.

#### **J. UNDERGROUND EQUIPMENT PITS**

1. Underground equipment pits shall have bentonite waterproofing applied to the exterior of the walls.

#### **K. ROOF FEATURES**

1. The University discourages the use of skylights, sloped glazing and glass atriums.

#### **L. EXTERIOR MASONRY**

1. Exterior masonry (stucco) shall be finished to conform to STO 10610, Sea Shell, Fine Sand Finish and all caulking shall be a high performance gun-grade polyurethane sealant successfully tested for joint movement of  $\pm 50\%$ . It is to match existing color of masonry being caulked.

#### **M. ROOF HATCHES**

1. Roof hatches shall be a minimum 3' - 0" X 3' - 0", aluminum metal with 1" rigid insulation. Provide hold open arm and one point spring latch with pad locking provisions

#### **N. ASBESTOS**

1. All materials, including fireproofing, shall be asbestos-free

#### **O. ROOF ACCESS**

1. Buildings with multiple roof levels shall have roof access provided via 1) operable windows, 2) roof hatch, 3) door from attic or stair, or 4) wall mounted hot dipped galvanized steel ladder.

**P. SERVICE AGREEMENT**

**TWO YEAR MEMBRANE ROOFING SERVICE GUARANTEE**

OWNER: State of Louisiana

ADDRESS: Office of Facility Services

Louisiana State University

Baton Rouge, LA 70803

NAME OF BUILDING PROJECT: \_\_\_\_\_

ADDRESS OR LOCATION OF BUILDING(S): \_\_\_\_\_

DESCRIPTION OF BUILDING(S): \_\_\_\_\_

TYPE OF ROOF DECK: \_\_\_\_\_

AREA OF ROOF: LINEAR FEET OF FLASHING: \_\_\_\_\_

DATE OF ACCEPTANCE OF PROJECT BY OWNER: \_\_\_\_\_

*This is to certify that the above described roofing system is guaranteed for a period of two (2) years from the above indicated date of project acceptance by the Owner not to leak as a result of the following causes:*

- 1. Deterioration of roofing membrane or base flashing resulting from usual and ordinary effects of wear and weather*
- 2. Errors or mistakes in workmanship of roofing contractor in supplying roofing and flashing materials*
- 3. Blisters, bare spots, buckles, wrinkles and ridges in the roofing membrane*
- 4. Splits in roofing or flashing membranes, except those caused by structural failure*
- 5. Damage to roofing or flashing membrane resulting from extreme fluctuations in temperature*
- 6. Breaks in flashing strips over gravel stops or other metal flanges*
- 7. Slippage of roofing membrane or base flashing*

*Excluded from the Roof Guarantee are leaks or other damage caused by:*

- 1. Natural disasters including, but not limited to, floods, lightning, hurricanes, hail, windstorms, earthquakes, tornadoes, etc.*
- 2. Structural failures such as cracks in decks, walls, partitions, foundations, etc.*
- 3. Traffic or storage of materials thereon*
- 4. Erection or construction of any additional installation on or through the roofing system after date of completion unless installed in a manner prescribed and accepted by the said roofing contractor*
- 5. Damage to interior, contents of building, roof insulation, roof deck or other base over which roofing system is applied*



*In the event any leak should occur within the guarantee period, Owner or their successor shall promptly notify said roofing contractor in writing. Representatives of the Owner and roofing contractor will inspect the roof and if leaks are within the coverage of this guarantee, said roofing contractor will, at its own expense, make all necessary repairs to put the roof in watertight condition. The expense of removing and replacing any traffic surfaces built over the roof shall be for the account of Owner or their successor.*

*This guarantee shall cease immediately and automatically if the roofing system or any part thereof is used in a manner or for a purpose for which it was not designed or if any additions, alterations or repairs (excepting only emergency, temporary repairs) are made by anyone except said roofing contractor.*

*This guarantee shall not become effective until all bills for installation, supplies and services in connection with the roofing system covered by this guarantee have been paid in full.*

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

ROOFING CONTRACTOR BY: \_\_\_\_\_

ADDRESS TITLE: \_\_\_\_\_

# DIVISION 8 -- DOORS AND WINDOWS

## A. FINISH HARDWARE AND SPECIALTIES

### 1. General

- a. It is the intent of this document to provide guidelines for the Architect's specifications section 08710, finish hardware.
- b. Products detailed herein are the standard of quality to be used on new projects and renovations or additions to existing buildings.
- c. Coordinate all products to meet the requirements of life safety codes, ADA requirements, and applicable building codes.
- d. All hardware for aluminum doors shall be specified and provided in this section.

### 2. Quality Assurance

#### a. Supplier:

(1) The supplier must be a factory authorized distributor of all materials to be furnished.

(2) The supplier must have an office and warehouse within a one hundred fifty mile radius of the project to properly service the projects.

#### b. Installer:

(1) Firm with three (3) years experience in the installation of commercial or institutional grade hardware

(2) Hardware must be installed accurately, applied securely, and adjusted properly.

(3) Install the hardware only with fasteners furnished by the manufacturer. Warranties and/or labels will be void on material installed with unauthorized fasteners.

(4) The installer will clean and make final adjustments of each item of hardware to insure proper operation and function. Adjust door control devices for final operation after air handling equipment is operational.

3. Field Quality Control
  - a. The finish hardware distributor shall provide the field quality control services as listed.
  - b. Furnish a complete report to the Architect and General Contractor after each field visit.
  - c. Prior to installation:
    - Visit the project site with the General Contractor and installer and check the hardware for any shortages or shipment damage.
    - Instruct the installer on any special conditions and the adjustments required for the proper installation of the finish hardware.
  - d. After Installation:
    - Check the project for the proper application of the finish hardware according to the approved hardware schedule.
    - Check that all items, including door control devices, have been properly adjusted and are operating properly.
    - Notify the Architect of any hardware not installed in accordance with the approved hardware schedule or properly adjusted.
    - If hardware is found that is not installed correctly or properly adjusted, the General Contractor must adjust, repair, or replace, as directed by the Architect.
    - Instruct the owner personnel in the proper operation, adjustments, and maintenance of the finish hardware.
  - e. One Year Review:
    - If requested by the Architect, the hardware distributor and hardware installer shall visit the project and make any final adjustments to the hardware as required.

## **B. WARRANTIES**

1. Manufacturers' standard warranties to cover defects in materials and workmanship
  - a. Warranty period to begin at date of substantial completion
  - b. Copies of all warranties shall be provided to the University at completion of the project

- c. Minimum ten years;
  - Heavy duty surface mounted door closers
- d. Minimum five years;
  - Heavy duty grade one mortise locks
  - Heavy duty grade one exit devices
- e. Minimum one year;
  - Electrical products
  - All other items not listed above.

**C. FINISH HARDWARE SCHEDULE**

1. Prior to approval of the finish hardware schedule, the Architect shall provide a copy to the University's Office of Facility Services for review.
  - Attention: Mr. Jerry Landry
2. Finish hardware schedule shall include the following:
  - a. A complete list of all manufacturers used
  - b. A complete list of all abbreviations used
  - c. A complete list and description of all finishes used, including base metals
  - d. A complete set of cut sheets illustrating all products proposed
  - e. Hardware heading are to be arranged to correspond with specification hardware sets.
  - f. Hardware heading shall include:
    - A complete description of the opening, including "LSU" room numbers, to be provided by Facility Services and Architect's room numbers
    - Key set numbers (See keying requirements )
    - A complete description of the products, including finishes

#### **D. KEY CYLINDERS AND KEYING REQUIREMENTS**

1. All key cylinders shall be provided from one of the following manufacturers who have established proprietary Great Grand Master Key Systems for the Baton Rouge campus.
  - a. All new buildings shall be keyed to a new Building Grand Master
  - b. All existing buildings shall be keyed to that building's existing Grand Master Key
  - c. Acceptable manufacturers for key cylinders. No exceptions will be considered.
    - Best Lock Co.
    - Corbin Russwin
    - Sargent
    - Yale Security
2. All key cylinders shall be provided with removable cores. Cores shall be removable by a control key without removing cylinder from locking device.
3. Construction cores shall be provided to the contractor by the supplier for use during construction.
4. At completion of the project, the General Contractor shall remove the construction cores and install the permanent cores.
5. All permanent keys shall be delivered to LSU Office of Facility Services at least thirty (30) days before final inspection.
  - a. Two copies of the manufacturer's bitting list shall be included.
  - b. The bitting list shall include the following:
    - (1) LSU room number (This information will be provided by LSU Facility Services)
    - (2) Key set number
6. All permanent keys shall be delivered in individual envelopes and tagged as follows:
  - a. Hardware heading number
  - b. LSU room number and location description
  - c. Architects room numbers
  - d. Key change number

- e. Number of keys enclosed
- 7. All keys and permanent cores shall be stamped as follows:
  - a. Key bows; manufacturers name and key set number only
  - b. Removable cores; stamp key set number on back of core.
- 8. Key Meeting
  - a. The finish hardware supplier will meet with the Architect, Contractor, representative from LSU Office of Facility Services and Department Client to establish the final keying requirements
  - b. This meeting shall be set up by the Architect and coordinated with LSU.
- 9. Key Quantities
  - a. Construction Masters (10)
  - b. Control Keys (3)
  - c. Change keys per cylinder (4 each)
  - d. Master and grand master keys (12 each)
  - e. Key blanks for each keyway used (200each)
- 10. Exception to the above keying requirements-
  - a. When 50 percent or more of a building's hardware is being replaced, provisions must be made to provide new key cylinders for the existing locking devices that are not being replaced.
- 11. All questions regarding keying shall be directed to:
  - Mr. Brian Broussard  
LSU Office of Facility Services  
225-578-5125
- 12. Provide five extra cylinders and cores of each key way used for LSU inventory

**E. ACCEPTABLE MANUFACTURERS AND PRODUCTS**

Specify materials only from the acceptable manufacturers listed.

**1. CONTINUOUS GEARED HINGES**

Acceptable manufacturers, products and applications:

- a. Types.
  - Bommer: FS--HD1.
  - Hager; 780-210HD1.

- McKinney; MCK22HD1.
  - Pemko; FS-HD1
  - Stanley; 655HD
- b. Provide for all exterior high frequency doors and all exterior doors equipped with exit devices
  - c. Provide for retrofit work where new doors are being installed into existing frames
  - d. Provide heavy duty full surface types.
  - e. Finish: Satin aluminum or Dark Bronze for all Storefront or Brown/Bronze Painted Doors

## 2. BUTT HINGES

Acceptable manufacturers, products and applications:

- a. Types.
  - Bommer; BB5005, BB5004, BB5001, & BB5000.
  - Hager; BB1199, BB1168, BB1191, & BB1279.
  - McKinney; T4A3386, T4A3786, TA2314, & TA2714.
  - Stanley; FBB199, FBB168, FBB191 & FBB179
- b. Provide anti-friction types for all butt hinges
- c. Provide non removable pins for all out swing exterior doors
- d. Provide stainless steel types for all restroom doors, toilet doors, and all other areas which may require non-ferrous material
- e. Provide heavy weight types for all interior doors equipped with exit devices and all other high frequency doors, such as entrance doors to classrooms, labs, libraries, cafeterias, auditoriums, restrooms, and all doors over 36" wide.
- f. Size; 4.5"x4.5" for doors up to 36" wide, 5.0"x4.5" for all doors over 36" wide
- g. Finish: (1) Satin stainless steel for non-ferrous types.  
(2). Satin chrome plated for steel base types.

## 3. EXTERIOR SECURITY EXIT DEVICES

Acceptable manufacturers, products and applications:

- a. Types.
  - Corbin Russwin; ED5200S x M52 series (SecureBolt)
  - Yale Security; 7155 series (SquareBolt)
  - Precision; Apex 2100
  - Von Duprin; CD-xp98 Series
- b. Provide heavy duty ANSI grade 1, type 28 types
- c. Provide for all exterior doors requiring exit devices
- d. Provide devices with direct throw latch bolts. Pullman latches are not acceptable.  
Concealed or surface vertical rod devices are not acceptable
- e. Provide cylinder dogging
- f. Provide offset pull exterior trim
- g. Finish: Satin stainless steel

#### 4. INTERIOR STANDARD AND FIRE EXIT DEVICES

Acceptable manufacturers, products and applications:

- a. Types.
  - Corbin Russwin; ED5200 series
  - Sargent; 8800 series
  - Von Duprin; 98 series
  - Yale Security; 7100 series
  - Precision; Apex 2100 series
- b. Provide heavy duty, ANSI grade 1 devices
- c. Provide all non-rated devices with inside cylinder dogging feature
- d. Provide offset pulls for all high frequency non-rated doors
- e. Provide lever trim for all fire rated doors
- f. Mount all devices with thru-bolts at all mounting points
- g. Concealed vertical rod types are not acceptable
- h. Surface applied vertical rod types less bottom rods are acceptable only for use on double egress doors, as required by codes
- i. Finish: Satin stainless steel



## 5. REMOVABLE MULLIONS

Acceptable manufacturers, products and applications:

- a. Types.
  - Precision KR822, KR822F
  - Corbin Russwin; 710KM, 707AKM, or 808
  - Sargent; L980, 12-L980, or 650A
  - Von Duprin; KR4954, KR9954, or 656
  - Yale Security; KRM100, KRM100F, or M300
- b. Provide key removable types
- c. Provide wall mounting brackets to store mullion when out of the opening
- d. Provide removable mullions with stabilizers
- e. Finish: (1) Primed for painting, steel mullions  
(2) Satin aluminum, for aluminum mullions

## 6. LOCK SETS

Acceptable manufacturers, products and applications:

- a. Types.
  - Best; 45H series x 3J lever trim
  - Corbin Russwin; ML2000 series x LSM lever trim
  - Sargent; 8200 series x LS1J lever trim
  - Yale Security; 8800FL series x CRE lever trim
  - Schlage; L9000 Series x 03N lever trim
- b. Provide heavy duty ANSI grade 1 mortise types
- c. Provide key cylinders, as required. See keying requirements.
- d. Provide lever trim that meets ADA requirement
- e. Provide cast levers x wrought escutcheon trim, thru-bolted to door
- f. Provide wrought box strikes for all locks
- g. All locks shall be free for egress from inside room at all times
- h. Finish: Satin chrome plated

## 7. DOOR CLOSERS

Acceptable manufacturers, products and applications:

- a. Types.
  - Corbin Russwin; DC6000 series
  - LCN; 4040 series
  - Sargent; 351 series
  - Yale Security; 4400 series
  - Stanley QDC111
- b. Provide top jamb mounted closers for exterior swing out doors
- c. Provide top jamb mounted closers for interior swing out corridor doors
- d. Provide regular arm mounted closers for all other doors
- e. Provide heavy duty barrier free & field adjustable types
- f. Provide closers UL listed for fire rated doors.
- g. Provide mounting brackets or plates, as required by opening and mounting conditions
- h. All closers shall be equipped with adjustable back check
- i. Hold open closers shall be held to a minimum
- j. Fusible link closers are not acceptable
- k. All closers shall comply with ADA requirements
- l. Provide sex nut & bolt mounting to doors
- m. Finish: Satin aluminum painted

## 8. OVERHEAD HOLDERS AND STOPS

Acceptable manufacturers, products and applications:

- a. Types.
  - ABH 9000 Series
  - Glynn Johnson; 900 series
  - Rixson; 9 series
  - Sargent; 590 series
- b. Provide heavy duty, surface applied types

- c. Provide thru bolted to doors
- d. Provide size as required by opening conditions
- e. Finish: (1) Satin stainless steel, for exterior doors  
(2) Satin chrome plated, for interior doors

#### 9. DOOR TRIM AND AUXILIARY ITEMS

Acceptable manufacturers, products and applications:

- a. Types.
  - Hager; 30S, 33G, 190S, 269F, 259F
  - Ives; 8200, 8302, 8500, FS18S
  - Rockwood; 70, 107x70, K1050, 466, 480
  - Trimco; 1001, 1017B, K0050, 1209, 1214
- b. All plates .050 thick
- c. Push plates; 6" x 16", door stile permitting
- d. Door pulls; 8" pull mounted on 4" x 16" plate
- e. Thru bolt mounting for all pulls
- f. Kick plates; 12" high
- g. Mop plates; 4" high
- h. Armor plates; 34"
- i. Provide heavy duty door stops
- j. Finishes: (1) Satin stainless steel / push, pulls, & protection plates  
(2) Black rubber / heavy duty floor stops  
(3) Grey rubber / door silencers  
(4) Primed for paint / coordinators  
(5) Satin chrome plated / all other items

#### 10. DOOR SEALS AND THRESHOLDS

Acceptable manufacturers, products and applications:

- a. Types.
  - Hager; 896SS, 891SV, 627S, 421S, 520SV
  - McKinney; MCK316AS, MCK303AV, MCK1715A, MCK171A, MCK2005AV

- National Guard; 137NA, 135NA, 425E, 896N
  - Pemko; 316AS, 303AV, 1715A, 171A, 2005AV
- b. Fire & smoke seals to meet positive pressure requirements
  - c. All seals to be screw in types.  
Adhesive mounted types are not acceptable.
  - d. Heavy duty thresholds for all corridor entrance doors and all other heavy traffic doors.
  - e. Thresholds must meet handicap requirements.
  - f. Finishes: (1) Slip resistant finish, similar to Pemko's "PemKote" or Hager's "Sure Step" for thresholds  
(2) Satin aluminum for all other items

#### 11. KEY CABINETS

Acceptable manufacturers, products and applications:

- a. Types.
  - Lund; 1200 series
  - TelKey; AWC series
- b. Provide only for new projects or complete building renovations
- c. Provide complete instruction book, two tag system, and index card
- d. Capacity to store all keys for this project, plus 50 percent expansion
- e. Finish: Manufacture's standard finish

#### 12. ELECTRIC HARDWARE

General requirements for electric hardware:

- a. All electric hardware shall be pre-wired at the factory with standardized connector
- b. Coordinate with door and frame manufacturers for wiring harness
- c. Wiring Elevations: Provide, as part of the hardware schedule, a door and frame elevation that shows location of each item of electric hardware, including a written description of operation
- d. Wiring Diagrams: Provide point-to-point wiring instructions with all electric hardware

- e. Coordinate all electrical hardware with access control supplier (Johnson Controls) specified in other section

**F. FACILITY MANAGEMENT SYSTEM (ACCESS CONTROL CONTROLLERS)**

1. The Access Control capabilities shall include, but are not be limited to, access controllers, terminal interfaces, card readers, conduit, wire and accessories required to provide a complete operational system.
2. The equipment and installation shall comply with the current applicable provisions of the following standards:
  - a. National Electric Code
  - b. Local and state building codes
  - c. All requirements of the local authority having jurisdiction
  - d. Underwriters Laboratories, Inc.
  - e. The system and all components shall be listed by Underwriters Laboratories, Inc, for use in Access Control Systems under the following standards as applicable. UL 294 Access Control System Unit.
3. All access controller panels shall be housed in a cabinet designed for mounting directly to a wall or vertical surface. Its doors shall contain a key lock. The integrated intelligent access controller shall provide or be capable of expansion to the following capacities:
  - Card Readers 16
  - Card Capacity 16,000
  - Alarm Points 128
  - Access Levels Unlimited
  - Time Zones 8
  - Password Levels 2
  - Card Issue Levels 8
  - Reports 5
4. The system shall be capable of storing 16,000 cards per intelligent access control panel.
5. The system shall be capable of storing a maximum of 640,000 card transactions on a single operator workstation file. A user definable limit shall cause the operator interface to warn the operator when the number of transactions in the file has exceeded that limit.

6. The intelligent central access controller shall be able to interface directly into the same Operator Workstation used for the HVAC and fire functions. Please refer to the Operator Interface section of this specification for more detail.
7. The entire database of the intelligent central access controller shall be definable at the Operator Workstation. The operator interface shall allow the operator to perform commands including, but not limited to, the following:
  - Override All Doors to the Access Mode of Operation
  - Release Overrides
  - Command Door to Access Mode
  - Command Door to Secure Mode
  - Command Door to Temporarily Open
  - Silence Local Alarms

System operators shall, from the operator interface, be able to manually unlock controlled doors for a variable time period, or program an event to automatically unlock and lock doors during a particular time period.

Reports shall be generated automatically or manually, and directed to either OWS displays, printers, or disk files. At minimum, the system shall allow the user to easily obtain the following:

- List of all cardholders
- List of all transactions currently available

The system shall provide on-line query generation which can be used to obtain specific information from the above logs based on user defined parameters. These queries, once defined, may be stored and used again when needed.

8. The system shall be provided complete with all equipment and documentation necessary to allow an operator to independently perform the following additional functions:
  - Add/Delete/Modify Access Control Panels
  - Add/Delete/Modify Smart Terminal Interfaces/Readers
  - Add/Delete/Modify Cardholder User Data
9. Graphical programming shall be used to define processes whereby other FMS functions may be controlled by a valid card transaction. Up to 64 cardholder groups shall be definable per intelligent access control panel connected.
10. The Access Controller shall communicate with the Smart Terminal Units of the system. Failure of a Smart Terminal Unit shall be detected and reported to the printer connected to the OWS.

11. When a card is read at a reader, the card number and issue level are sent to the controller. If the reader is equipped with a keypad, a 4 or 5 digit PIN number may be entered and verified at the reader. The controller, which shall be programmed to control access by both location and time periods, shall verify all information and immediately grant or deny access and record the transaction including date, time and location. The option of having the transactions printed as they occur shall also be provided. If access is granted, the controller shall send a signal to the appropriate reader to activate the door lock. If access is denied, the transaction will be recorded and/or printed identifying the reason.

The system shall be capable of supporting Magnetic Stripe card to be the existing LSU ID Card. The system shall be designed to maintain access control through two levels of degradation. The intelligent terminal controller shall continue to provide, using its local data base, a full level of access control upon loss of communications with the Facilities Management System. Upon loss of communications with the intelligent terminal controller, the readers shall continue to control access using verification of the facility code in the card and, if used, a PIN entry.

The system shall be able to designate certain readers to control only entry or exit, and shall require a cardholder using a card at an entry reader to subsequently use it at an exit reader before again entering the secured area. This shall prevent "passing back" a card to an unauthorized second user.

Individual cards may be programmed for special privileges to override access level and time zone parameters.

The controller shall provide an interface which permits data to be stored on a tape cartridge.

In the event of a power loss, a backup battery shall provide full controller operation for up to eight hours, and memory retention up to 24 hours.

Cards shall be programmed into the controller individually; additions, deletions, and changes shall be completed rapidly.

Alarms may be programmed by the user for suppression during specific time periods.

The intelligent terminal controller shall provide an output for annunciation of alarms.

The intelligent terminal controller shall provide a buffer to store 1000 historical transactions if communication is lost with the Facilities Management System.

12. The card readers shall consist of an intelligent terminal interface and magnetic stripe readers.

The intelligent terminal interface shall control the electric door lock, visual access indicators, access and shunt timers, and an auxiliary access input.

The intelligent terminal interface shall monitor door status via a door or lock contact. An alarm shall be reported when the door is not closed and locked, and when the door is forced open.

All readers (except proximity) shall provide a red and green visual indicator for granted and denied access, and tamper detection capability.

Readers shall be surface or flush mounted. Outdoor readers shall be supplied with special weather-resistant housings. Where required, readers shall be configured with integral 16-position keypads.

Readers with 16-position keypads shall be able to verify PIN codes even during loss of communications with the intelligent terminal controller. If the readers lose communications with intelligent terminal controller, they shall be able to determine authorized access based on the facility code and PIN, if used, which shall be verified at the reader.

Proximity readers that are capable of proper operation without the need of standoffs when mounted to walls containing substantial amounts of metal construction shall be available.

13. Magnetic Stripe Cards for this security system shall be constructed of top quality, durable, and resilient PVC laminated with a magnetic stripe of low coercivity material designed for use with magnetic stripe readers.

Each shall be encoded with a facility code unique to the security system, an individual card number, and one of eight issue level numbers. At the system owner's request, the manufacturer shall provide the equipment necessary for the system owner to encode magnetic stripe cards for use only in the owner's system.

Standard cards shall be available with minimal printing and permanently marked with respective card number and reference code. The standard LSU ID card is to be used.

The manufacturer shall provide custom print cards, in accordance to the manufacturer's guidelines, to meet the needs specified by the system owner.

14. The non-Johnson Control parts shall comply with the following:



- a. Door contacts: Provide door status contacts that mount to surface of door and frame.
- b. Magnetic Lock: Provide 1200lb magnetic lock with top holes for mounting below top door jamb, Conford or equal.
- c. Magnetic Lock: Provide 1200lb magnetic lock with face holes for mounting above door jamb, Conford or equal.
- d. Z-Bracket: Provide for in-swing doors used with magnetic lock above door.
- e. Crash Bar and Cable: Provide double pole, double throw with release button.
- f. Provide 2" by 2" button for egress where called for.
- g. Power Supply: Provide 12/24 volt power supplies with independent load switches and battery backup for maglocks.

## **DIVISION 9 – FINISHES**

### **A. CARPETING**

1. New finishes shall match existing as closely as possible where an addition or alteration is made to an existing building.
2. Carpeting should be free of visual blemishes, streaks or other physical or manufacturing defects.
3. Carpet materials and treatments shall be non-allergenic and free from other recognized health hazards.
4. All level loop type carpets shall be a minimum of 24 oz.
5. All cut pile carpeting shall be a minimum of 30 oz.
6. Only branded nylons shall be used.
7. Power stretchers must be used when installing carpeting over pad.
8. T-seaming as a method of installation requires prior approval and seaming diagram.
9. Vacuum carpet using commercial machine with face bearer element. Remove spots and replace carpet where spots cannot be removed. Remove any protruding face yarn using sharp scissors.

### **B. CARPET ADHESIVES**

1. Provide a premium adhesive recommended by the carpeting manufacturer which will allow removal of carpet at any time without damage to the carpeting.
2. Adhesives must comply with flame spread rating required for the carpet installation.
3. Adhesives must be asbestos free.

### **C. COVE BASE**

1. Rubber cove base recommended.
2. Restricted to standard sizes of 4" and 6".
3. Use continuous base scored at edges -no pre-molded edges.

4. Approved manufacturers are: Mercer, Flexco, Roppe or equal (prior approval by Planning, Design & Construction required for "equal").

#### **D. VINYL COMPOSITION TILE**

1. Use commercial rated tiles only. Tiles must be 1/8" thick and asbestos free.
2. Approved manufacturers are: Armstrong, Mannington, Tarkett or equal (prior approval by Planning, Design & Construction required for "equal").
3. Pattern and color must be through tile-no surface applied patterns accepted.

#### **E. TILE ADHESIVE**

1. Glue down with premium clear adhesive. Adhesive must be asbestos-free.
2. No "cut back" adhesive allowed.
3. New tile and terrazzo floors are to be stripped to remove dirt, marks and manufacturer's mill finish and contractor must apply seven (7) coats of Buckey's Citation Sealer/Finish or equal, as approved by Facility Services-Building Services Department. Burnish to a high gloss after the fifth (5<sup>th</sup>) coat and apply two (2) additional coats of wax.

#### **F. PAINT**

1. New finishes shall match existing as closely as possible where an addition or alteration is made to an existing building.
2. Coatings to be manufactured by Benjamin Moore, ICI Dulux, Sherwin Williams, Farrell Calhoun and Devoe. The Architect shall specify the top grade of each approved manufacturer.
3. Flat paint is not to be allowed, except on ceilings and on unusual areas as approved by the University. Interior wood doors shall receive a natural or stained finish. Variations will be permitted in most unusual cases.
4. All colors must be selected from the LSU Standard Paint Colors or approved by Planning, Design & Construction prior to submission to the Contractor.
5. When applicable, industrial coatings are to be used in corrosive environments.
6. Conventional spray painting is not allowed, although airless spray painting may be considered by special approval of Planning, Design & Construction.

7. Coatings for each project shall be of the same manufacturer for compatibility and warranty purposes.
8. Paints containing lead are not permitted.
9. Acrylic latex paint is acceptable on walls and ceilings; however, alkyd paint shall be used on doors and door frames where painting is an approved finish.

#### **G. PORTLAND CEMENT PLASTER (STUCCO)**

1. Stucco is a generic term used to describe Portland cement plaster applied to exterior surfaces. It is often used interchangeably with the term Portland cement plaster.
  - a. ACI 524R, "Guide to Portland Cement Plastering," contains useful guidelines to be used for preparing project specifications.
  - b. ASTM C926 and ASTM C1063, "Specification for Application of Portland Cement-Based Plaster and Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster, respectively, are standards that are to be used in preparing specifications.
2. Stucco exterior wall finishes are used on many existing buildings at LSU. New stucco finishes should match or be compatible with existing wall finishes. The most predominate stucco finish on campus is STO Sea Shell, #10610, fine sand finish. Any other finishes must be submitted to Planning, Design & Construction for prior approval. Mockup sample stucco finishes are to be submitted for approval prior to construction.

#### **H. CERAMIC TILE**

1. The slip resistance requirements for floor tile installation are those recommended by the Americans with Disabilities Act, "Accessibility Guidelines for Buildings" (ADAAG).

# DIVISION 10 – SPECIALTIES

## A. INTERIOR SIGNAGE

1. Each room number shall be displayed with a wall-mounted sign that is not less than 6" square placed 60" from its center to the finished floor and adjacent to the latch-side door jamb.
2. All room numbering signs shall be constructed of a clear photo-polymer lens inserted into a black acrylic frame. See Sign Type A.
3. The lens/plastic insert and holder shall have a non-glare matte finish.
4. **The room number shall be integral / embossed** into the ADA band that measures 2" high and 6" wide located at the top of the polymer lens.  
APPLIED LETTERING IS NOT ACCEPTABLE.

The color of the ADA band shall be putty (color to be approved by Planning, Design & Construction).

An actual sign sample must be submitted for approval to Planning, Design & Construction.

The integral / embossed room number shall be black and left justified with a minimum 5/8" text. The text style must be sans-serif Helvetica and the text color shall be black.

Braille shall be integral / embossed under the room number within the ADA band.

APPLIED BEADS ARE NOT ACCEPTABLE.

5. The frame/holder shall be black with a square corner and a square edge. A 1/8" high black rule line shall be incorporated into the polymer insert located on the lower portion of the ADA band to help define the ADA band and the lower portion of the plastic insert.

The frame/holder shall be prepared for screw mount, although the preferred mounting method is by vinyl tape (double sided silicone foam tape) that shall be provided by the Contractor.

6. All room number signs shall carry a one year adhesion warranty.

7. **Paper Inserts:** Paper inserts shall be provided and installed within individual signs prior to initial signage installation. Signage vendor is responsible to educate end user department on how to use signage software.

Additional manufacturers recommended card stock (MINIMUM 80 LB.) shall be provided by contractor.

Where identification of a department office or general function serving the public requires a larger text area, the sign shall be 8" square placed 60" from its center to the finished floor and adjacent to the latch-side door jamb.

When there is inefficient wall space available on latch side of door the sign shall be installed on the next adjacent wall.

8. Room numbers shall be coordinated with the standard LSU room numbering scheme, which shall be the only room numbering scheme used on floor plans.

**Architects and/or contractors must seek final approval for all room numbering schemes that are to be implemented on a project.**

All room numbers on the final plans must be the LSU room numbers. The Architect shall submit prints/copies (hard copy & AutoCAD) of floor plans to the University (Planning, Design & Construction) early in the working drawing phase to ensure that every space has been assigned a permanent LSU room number on all floor plans. The appropriate LSU room number will be incorporated into these prints and returned to the Architect for use on floor plans, schedules, and other documents.

All signs must comply with current ADA standards.

9. Signs identifying rest rooms and stairways shall be 8" square. See Sign Type B & C.

Room numbering signs for restrooms and stairs shall be constructed of an opaque putty colored polymer plastic insert (color to be approved by Planning, Design & Construction) that is inserted into a black acrylic frame.

The plastic insert shall have a non-glare matte finish.

The room number shall be integral / embossed into the ADA band that measures 2" high and 8" wide located at the top of the lens.

APPLIED LETTERING IS NOT ACCEPTABLE.

The embossed room number shall be black and left justified with a minimum of 5/8" text height. Braille shall be integral / embossed under the room number within the ADA band.

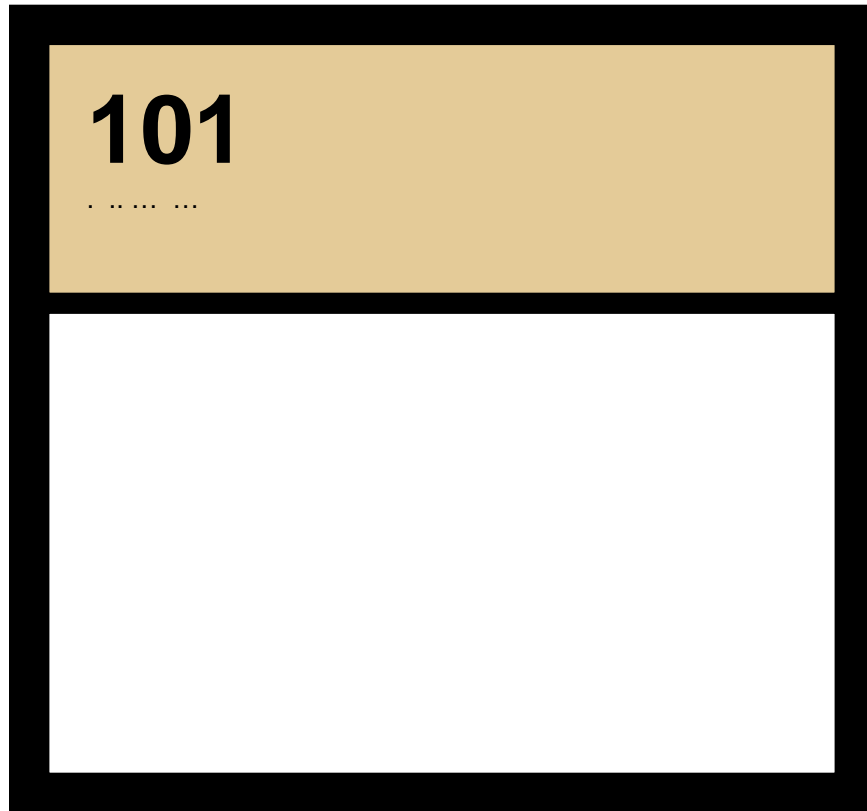
APPLIED BEADS ARE NOT ACCEPTABLE.

Text shall be right justified (all caps) within the ADA band and on the same line as the room number. The text style must be sans-serif Helvetica and the text color shall be black.

Braille shall be integral / embossed under the text within the ADA band. A 1/8" high black rule line should be incorporated into the polymer insert located on the lower portion of the ADA band to help define the ADA band and the lower portion of the plastic insert.

A standard (black) graphic symbol centered within a 6" field shall be incorporated to identify the space on the lower portion of sign insert. The sign shall be wall-mounted adjacent to the latch-side door jamb, or most conspicuous available location adjacent to the doorway, and located 60" from the center of the sign to the finished floor.

**EMBOSED BLACK ROOM NUMBER  
LEFT JUSTIFY**



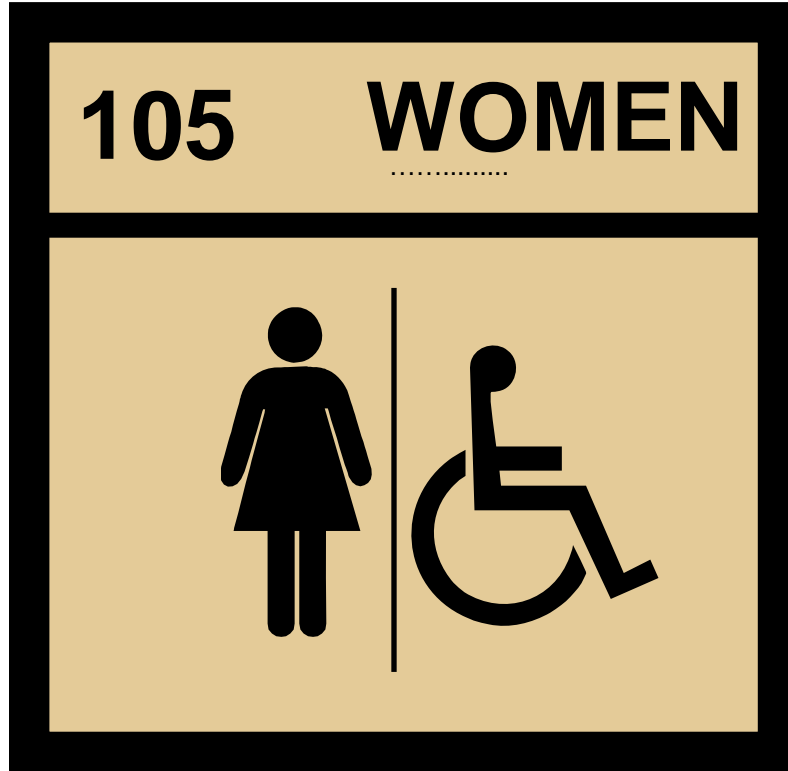
**TYPE A – ADA Compliant Room Identification (6”W x 6”H)**

- Holder Color: Black (square corner, square edge, matte finish)
- ADA Band Color: Putty (Color to be approved by Planning, Design & Construction)  
Vendor to submit actual sample for approval
- Imprint Color: Black (numbers and/or text must be integral / embossed with a matte finish. APPLIED LETTERING OR BEADS ARE NOT ACCEPTABLE.)
- Paper Insert Color: User defined (Contractor to bid project to include blank paper inserts installed within individual signs prior to initial signage installation. Signage vendor is responsible to educate end user department on how to use signage software. Additional manufacturers recommended card stock “MINIMUM 80 LB.” shall be provided by contractor.
- Holder Mounting: Vinyl Tape (Double-sided silicone foam tape); sign holder should be prepared for screw mounting. All room signs shall carry a one year adhesion warranty.
- Text Size: Minimum 5/8”
- Text Style: Sans-Serif text style, Helvetica
- Graphic Application: Screen-printed (NO LOGOS PERMITTED)
- Rule Line 1/8” : Black (matte finish)



**EMBOSSSED BLACK ROOM NUMBER  
LEFT JUSTIFY  
SAME LINE AS TEXT**

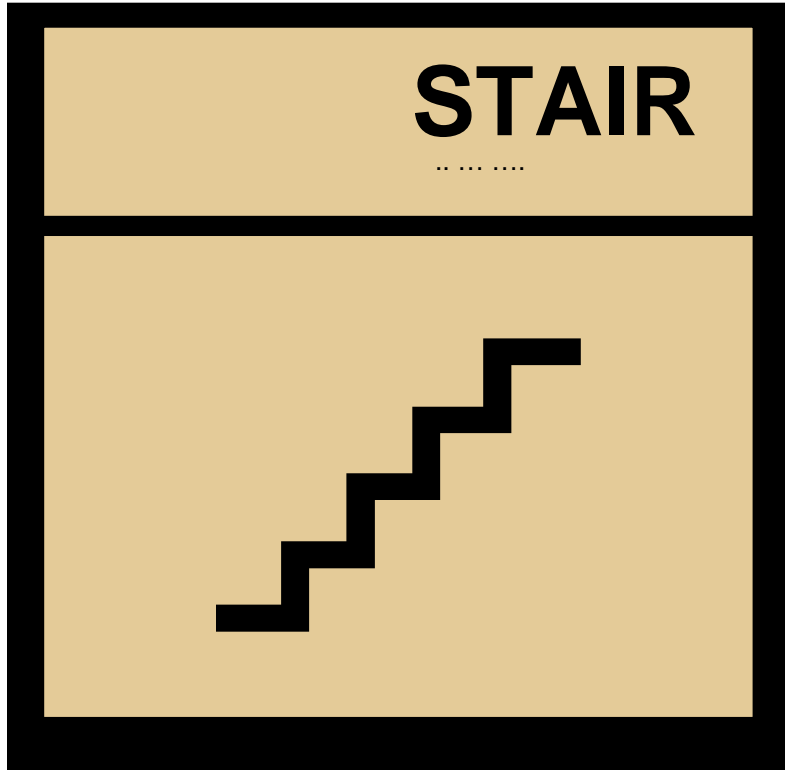
**EMBOSSSED BLACK ALL CAPS TEXT  
RIGHT JUSTIFY  
SAME LINE AS ROOM NUMBER**



**TYPE B – ADA Compliant Restroom Identification (8”W x 8”H)**

- Holder Color: Black (square corner, square edge, matte finish)  
Insert Color: Putty (Color must be approved by Planning, Design & Construction). Vendor to submit actual sample for approval.  
Imprint Color: Black (numbers and/or text must be integral / embossed with a matte finish. APPLIED LETTERING OR BEADS ARE NOT ACCEPTABLE.  
Holder Mounting: Vinyl Tape (Double-sided silicone foam tape mounting); sign holder should be prepared for screw mounting. All signs shall carry a one year adhesion warranty.  
Text Size: Minimum 5/8”  
Text Style: Sans-Serif text style, Helvetica (all capital letters)  
Graphic Application: Screen-printed (NO LOGOS PERMITTED)  
Rule Line 1/8” : Black (matte finish)

**EMBOSSSED BLACK ALL CAPS TEXT  
RIGHT JUSTIFY**



**TYPE C – ADA Compliant Stair Identification (8”W x 8”H)**

- Holder Color: Black (square corner, square edge, matte finish)
- Insert Color: Putty (Color must be approved by Planning, Design & Construction). Vendor to submit actual sample for approval.
- Imprint Color: Black (numbers and/or text must be integral / embossed with a matte finish. APPLIED LETTERING OR BEADS ARE NOT ACCEPTABLE.
- Holder Mounting: Vinyl Tape (Double sided silicone foam tape mounting); sign holder should be prepared for screw mounting. All signs shall carry a one year adhesion warranty.
- Text Size: Minimum 5/8”
- Text Style: Sans-Serif text style, Helvetica (all capital letters)
- Graphic Application: Screen-printed (NO LOGOS PERMITTED)
- Rule Line 1/8” : Black (matte finish)

**EMBOSSSED BLACK ROOM NUMBER  
LEFT JUSTIFY**

**EMBOSSSED BLACK ALL CAPS TEXT  
RIGHT JUSTIFY**



**TYPE D – ADA Compliant Danger Identification (8”W x 8”H)**

- Holder Color: Black (square corner, square edge, matte finish)  
Insert Color: White (Vendor must submit actual sample for approval)  
Insert Color: Red (Vendor must submit actual sample for approval)  
Imprint Color: Black (numbers and/or text must be integral / embossed with a matte finish. APPLIED LETTERING OR BEADS ARE NOT ACCEPTABLE.)  
Holder Mounting: Vinyl Tape (Double-sided silicone foam tape mounting); sign holder should be prepared for screw mounting. All signs shall carry a one year adhesion warranty.  
Text Size: Minimum 5/8”  
Text Style: Sans-Serif text style, Helvetica (all capital letters)  
Graphic Application: Screen-printed (NO LOGOS PERMITTED)  
Rule Line 1/8” : Black (matte finish)

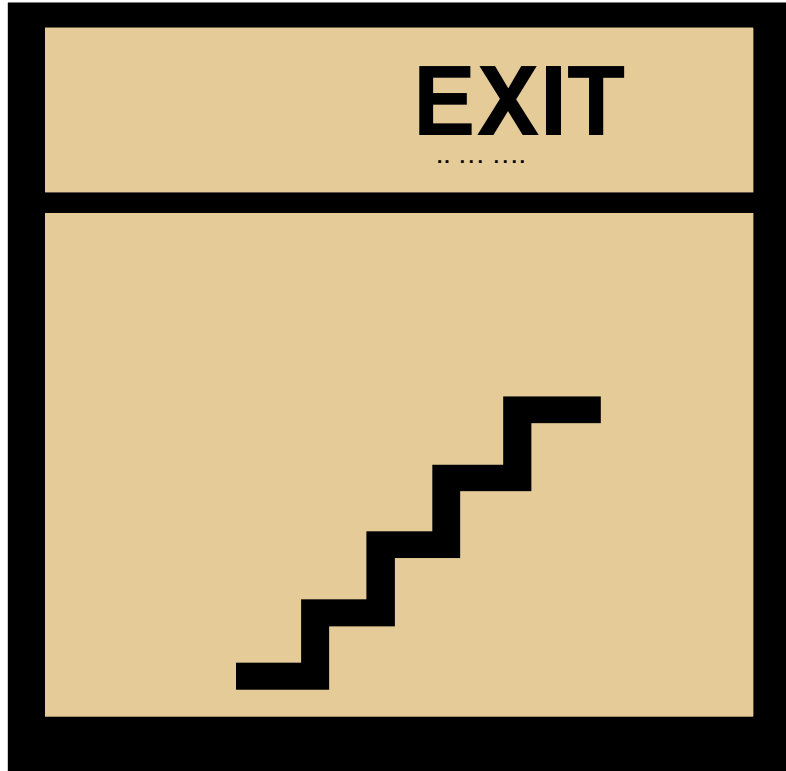
**EMBOSSSED BLACK ALL CAPS TEXT  
RIGHT JUSTIFY**



**TYPE E – ADA Compliant Room Identification (6”W x 4”H)**

- Holder Color: Black (square corner, square edge, matte finish)  
ADA Band Color: Putty (Color to be approved by Facility Development, vendor to submit actual sample for approval)  
Imprint Color: Black (numbers and/or text must be integral / embossed “APPLIED LETTERING OR BEADS NOT ACCEPTABLE” with a matte finish)  
Holder Mounting: Vinyl Tape (Double sided silicone foam tape, sign holder should be prepared for screw mounting. All room signs shall carry a one year adhesion warranty).  
Text Size: Minimum 5/8”  
Text Style: Sans-Serif text style, Helvetica  
Graphic Application: Screen-printed (NO LOGOS PERMITTED)  
Rule Line 1/8” : Black (matte finish)

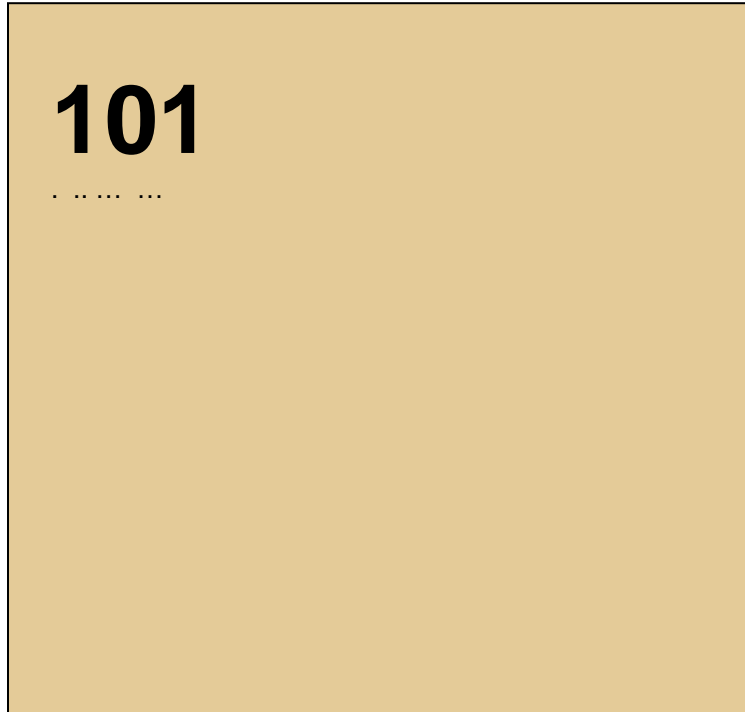
**EMBOSSSED BLACK ALL CAPS TEXT  
RIGHT JUSTIFY**



**TYPE ES – ADA Compliant Exit Identification for protected stairs (8”W x 8”H)**

Holder Color:	Black (square corner, square edge, matte finish)
Insert Color:	Putty (Color must be approved by Facility Development, vendor to submit actual sample for approval)
Imprint Color:	Black (numbers and/or text must be integral / embossed “APPLIED LETTERING OR BEADS NOT ACCEPTABLE” with a matte finish)
Holder Mounting:	Vinyl Tape (Double sided silicone foam tape mounting; sign holder should be prepared for screw mounting. All signs shall carry a one year adhesion warranty).
Text Size:	Minimum 5/8”
Text Style:	Sans-Serif text style, Helvetica (all capital letters)
Graphic Application:	Screen-printed (NO LOGOS PERMITTED)
Rule Line 1/8”:	Black (matte finish)

**EMBOSSSED BLACK ROOM NUMBER  
LEFT JUSTIFY**



**TYPE EXT. – ADA Compliant Room Identification (6”W x 6”H)**

**ADA Compliant Exterior Sign**

- |                      |  |
|----------------------|--|
| Holder Color:        | None   |
| Plaque:              | Exterior Grade Metal Etch, 1/16” thickness   |
| Plaque Color:        | Putty (Color to be approved by Facility Development, vendor to submit actual sample for approval)                      |
| Imprint Color:       | Black (numbers and / or text must be integral/ embossed “APPLIED LETTERING OR BEADS NOT ACCEPTABLE” with matte finish) |
| Mounting:            | Liquid Silicone or Liquid Nail. Do not drill into exterior wall of building.   |
| Text Size:           | Minimum 5/8”   |
| Text Style:          | Sans-Serif text style, Helvetia  |
| Graphic Application: | Screen-printed (NO LOGOS PERMITTED)  |

#### **A. NAMED BUILDING PLAQUES**

1. New or existing buildings that will be named after an individual (approved by the University Naming Committee and President/Chancellor) will display a bronze plaque with bibliographical information concerning the individual(s). Their relationship with LSU should be included, with dates for birth and death.

The suggested size for named building plaques is 24" x 18" in a horizontal format. A bas relief portrait of the honoree can be placed on the plaque. The plaque should be placed near the main building entrance.

The University History Commission shall be contacted for assistance with wording for the plaque. This requirement is in addition to any requirements by the State for plaques. Plaque examples shall be provided prior to fabrication.

#### **B. BOARDS**

1. The University prefers metal trim bulletin, chalk boards and erasable marker boards.
2. Standard heights for boards will be 37" above the floor to the tray.

#### **C. RESTROOMS**

1. The University prefers floor supported head rail braced toilet partitions.

Do not use a ceiling hung partition unless enclosed on each side with a wall. Partitions and doors shall be solid phenolic resin core, solid plastic or solid color reinforced composite. Partitions layout shall comply with ADA requirements. All hardware shall be type 304 stainless steel and door hinges shall be field adjustable to be self-closing or partially open when unoccupied.

2. The University uses roll, not flat, toilet paper having a core diameter of 3 ½ inches, a roll diameter of 12 ½ inches, a roll width of 3 ½ inches and a paper capacity of 1,000 linear feet.

The holder shall be Kimberly-Clark Model # 09551 or equal, mounted as per ADA guidelines.

3. The University uses roll hand towel dispensers having a core diameter of 1 ½ inches, a roll diameter of eight inches, a roll width of 8 inches and a paper capacity of 800 linear feet.

The cabinet style and model shall be Kimberly-Clark Model # 9755 or equal, mounted as per ADA guidelines.

4. Built in soap dispensers are not used in rest room areas, unless approved otherwise by the University.

The hand soap dispenser shall be GOJO Model # 052073, 2000ml liquid capacity or equal mounted as per ADA guidelines.

5. Mirrors shall be provided with a theft-proof locking device.

#### **D. FIRE EXTINGUISHERS**

1. Unless codes provide otherwise, the University prefers fire extinguishers rather than fire hoses. Fire extinguisher cabinets shall be provided in corridors only.
2. Fire extinguishers for general purpose shall be ABC multi-purpose, dry chemical.
3. Fire extinguishers for equipment rooms shall be CO2. Cabinets shall be semi-recessed, lockable with break-glass doors.

#### **E. FIXED SEATING FOR LECTURE WITH MULTIPLE SEATING**

1. The Director of LSU's Office of Procurement Services has determined that it is in the best interest of the State and University to approve a proprietary specification for the purchase and installation of fixed, lecture seating in academic buildings:

Acceptable Manufacturer: American Seating Company  
Product: Stellar - Model 3522 w/LSU custom tablet arm  
Color: To be approved by the University



## **DIVISION 11 – EQUIPMENT**

### **A. RADIOISOTOPE HOODS**

1. In order to avoid considerable difficulties incurred by the University, it is requested that the Architect submit shop drawings for radioisotope hoods to the University for approval prior to the beginning of fabrication of hoods.

Plans and specifications of Radiation Shielding for all X-Ray areas must be submitted to the University for approval.

### **B. LEFT-HAND SEATING**

1. 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**

1. All blinds shall have a lifetime warranty on working mechanisms.
2. Slat Requirements:
  - a. No smaller than .006 gauge will be accepted
  - b. Only 25 millimeter or larger slat width will be accepted. Aluminum slats only - no vinyl slats accepted.
  - c. Spacing between slats shall be no greater than 21.5 millimeters
  - d. Head rail metal thickness must be .025 gauge or greater
  - e. Approved manufacturers are: Hunter Douglas-Dacor, Levalor-Riviera or equal (Prior approval by Planning, Design & Construction required for "equal").

### **B. TABLET ARM CHAIRS**

1. Krueger Brand, Model 1060T-N has been approved by the Office of Procurement Services as a proprietary item and no other manufacturer's brand or model is acceptable to the University.

## **DIVISION 13 -- SPECIAL CONSTRUCTION**

### **A. PRE-ENGINEERED BUILDINGS**

1. 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. GENERAL TO ALL ELEVATORS AND EQUIPMENT

1. **ALL elevator equipment, without exception, installed on this campus shall be non-proprietary.**
  - a) Any elevator company shall be allowed to purchase, install and maintain this equipment.
  - b) Spare parts shall be available for sale for replacement stock to be maintained on site or anywhere the owner chooses in order to properly maintain the elevator equipment. A published readily available price list is required and the parts shall be sold free of additional requirements.
  - c) Should a diagnostic tool of any kind be needed to perform any kind of adjustment or troubleshooting, the tool shall be provided with the equipment or the tool may be placed on-board and shall operate all functions. This tool shall have unrestricted access to all parameters, adjustments, and flags or notifications for the full maintenance of the equipment. No expiring software, partial operation or keyed access is allowed. Price to replace any tool shall be supplied during bid phase, it shall remain the price for a period of 50 years with cost of living allowances calculated when requested.
  - d) Factory and or on-site training shall be available from the original manufacturer and shall be open for enrollment of anyone wishing to learn about the adjustment, maintenance and troubleshooting of the equipment. Training fees shall be reasonable, appropriate, and in line with other types of equipment maintenance training.
  - e) A technical support line shall be provided by the original manufacturers during normal working hours and shall be provided to anyone as designated by the owner. Technical support shall be free of charge for the life of the equipment.
  - f) Engineering support shall be provided by the original manufacturer to any contractor or mechanic as designated by the equipment owner.
  - g) Manuals, parts catalogs, technical guides, troubleshooting guides, engineering drawings, fault codes and parameters, circuit diagrams, wiring diagrams and prints, all in triplicate shall be provided for the equipment prior to initialization of work. In addition provide one a copy of elevator job specific controller software. All documents shall be the property of the owner and all documentation shall be available for replacement purchase at a reasonable cost to any contractor designated by the owner.

h) Full maintenance control plan specific to the elevator shall be included and is the property of the owner. At a minimum shall have full maintenance instructions, with detailed information and illustrations to prevent misinterpretations. Shall include enough detail to completely maintain, trouble shoot and test the equipment installed. Each manual shall include instructions and programs required to install, set-up, and adjust the elevator system or any part of the system including the passwords for all levels of interaction. This document shall be neatly bound and provided in triplicate.

**2. Approved elevator control manufacturers shall be**

- **Motion Control Engineering (Rancho Cordova, CA),**
- **Elevator Controls (Sacramento, CA),**
- **GALaxy (Bronx, NY),**
- **Smartrise (Sacramento, CA).**

3. Circulation patterns and anticipated usage of the building shall determine the appropriate types and number of elevators required to ensure a fully functional building. A traffic analysis of vertical transportation equipment will be compiled and presented for review.
4. At least one ADA 3500 lb. capacity elevator that will accommodate a full size stretcher in the flat position per the IBC building code is required to serve each floor of the building.
5. State of the art microprocessor based control systems shall include as a minimum remote monitoring, independent service, firefighter service, inspection, hoistway access, and two way leveling.
6. Control system shall have comprehensive means to access computer memory and shall have permanent indicators for important elevator statuses as an integral part of the system. Programming shall be stored in ROM or flash memory.
7. All elevator systems must have remote monitoring. Monitoring shall be through the existing campus wide monitoring system or a stand-alone compatible system completely provided and installed to location designated by the owner. The remote monitoring system shall be capable of monitoring multiple elevators and/or groups of elevators simultaneously, and each elevator or group of elevators shall be simultaneously monitored from at least two remote locations outside the building on campus. In addition, the remote monitoring shall include a dial in modem and software so that the system may be monitored from an off-campus site.

8. Provide state of the art microprocessor based AC drive control systems.
9. All motors used in the elevator system shall be guaranteed to be a minimum of 90% efficient at full load operation.
10. All equipment shall not be rated at more than 90% of the capacity of the product both electrically and mechanically. Electrically shall not exceed 90% of nameplate rating and mechanically sheave shaft loads, pumps and motors shall nor exceed 90% of their maximum ratings.
11. The Firefighter Service key-switch shall be operated by the EPCO MFD-1 key and all other key-switches and locks shall be Best 7-pin cylinder key-switches and locks per LSU's priority keying.
12. Insulation applied to walls or structural members in any elevator related space shall be encapsulated.
13. Elevator shall be powered through a shunt trip circuit breaker. Heat detector initiating devices to be located within 18 inch of any sprinkler head in elevator related spaces.
14. Sprinkler piping shall be installed per code requirements. A sprinkler shutoff valve shall be provided immediately outside the elevator related sprinkled space and its location shall be marked or a sign shall be provided at the sprinkler head denoting the valve's location.
15. Paint elevator machine rooms and elevator pit walls and floors to LSU's paint standards.
16. All elevator shafts and pits that are below grade shall be sealed and waterproofed with a barrier system on the exterior walls and below the pit floors.
17. Elevators shall have telephones with hands-free operation containing an integral automatic tone dialer, be field programmable without special tools or programmers and comply with ADA guidelines. These communication devices shall be made "Vandal-Proof" construction such as Janus' VPP Emergency Communication Devices. Owner will determine dial tone location.
18. The elevator car lighting disconnect shall be fed from the emergency lighting panel.
19. All elevators and counterweights to have standard T-rails.

20. All elevators shall have roller guides. Minimum three (3) rollers per shoe on cars 4000 lb. capacity or below and six (6) rollers per shoe on cars above 4000 lbs capacity.
21. All car and hoistway sills to be nickel silver.
22. Passenger cab lighting shall be GE Lumination ET LED Luminaires (Size: 2ft x 2ft), the spec sheet can be found at [http://www.gelighting.com/LightingWeb/na/images/ind021-ge-lumination-led-lighting-fixtures-et22-recessed-luminaire-spec-sheet\\_tcm201-53995.pdf](http://www.gelighting.com/LightingWeb/na/images/ind021-ge-lumination-led-lighting-fixtures-et22-recessed-luminaire-spec-sheet_tcm201-53995.pdf) . The lighting/ceiling system shall consist of 1-1/2" SS #4 tees and ells welded into a solid framework grid. Clear ceiling height shall be no less than 90 inches. Provide one light on smaller passenger cars and two lights on larger passenger cars and service/freight elevators.
23. Elevator door reopening devices shall be full length infrared curtain types with illuminated indicators such as Janus' Panachrome 3D Light Curtains.
24. Position indicators required on all elevators. Minimum 2" high red LED 16 segments on a black background with up and down arrows integral to unit. Located in car panel and on fire egress floor and alternate fire egress floor lobbies.
25. All elevator signal fixtures, hall and car, shall be vandal resistant, flush mounted and have engraved signage.
26. All governors to be located in the elevator machine room.
27. All elevator and counterweight safeties to be type B flexible clamp safeties.
28. Provide hoistway access escutcheons in all elevator hoistway doors.
29. All door operators shall be sized and rated for heavy duty operation.
30. All wiring installed from hatch to controller and from car to the controller shall have 10% spare wiring included.
31. Travel cable shall consist of minimum 10% spare conductors and an additional pair of shielded conductors and shall have an additional coax cable included in the cable for future needs.
32. Full size machine rooms required.

33. Perform maintenance, including emergency callback service 24 hours 7 days a week. Provide LSU with a monthly maintenance inspection report.
34. At a minimum ALL state local and federal codes for elevator installation, elevator product, elevator design, electrical requirements, fire and safety requirements, building code requirements and ADA requirements are to be followed.
35. Any proprietary equipment installed shall be replaced by the contractor at no extra cost to the State of Louisiana.
36. Testing and permits are the responsibility of the elevator contractor.
37. Submittals and shop drawings are required on all work. Generic elevator submittals will not be acceptable. Submit actual equipment being installed. Submittals shall be approved by architect and LSU.
38. All equipment and components of equipment shall be delivered in factory packaging for protection and shall be sheltered from the elements and protected from damage until installed.
39. All machine rooms are required to be conditioned to maintain the operating temperatures of the control equipment.
40. Elevator contractor is responsible for coordinating with all other trades and crafts to accomplish the acceptable finished product.
41. All equipment must be painted with rust blocking paint at the time of acceptance (either factory or field painted).
42. All elevator equipment shall be marked as required by elevator code and electrical code. Disconnects shall be marked with panel #, circuit # and room # or location of the circuit breaker from which it is fed.
43. ALL CONTRACTS shall hold a 10% retainage until all tools, codes, software and training have been received by LSU.

**B. SPECIFIC TO TRACTION ELEVATOR SYSTEMS**

1. ALL elevator machines shall be full size machines with a minimum 30 year useable lifespan and located in a full size machine room.
2. All suspension means shall be a minimum ½" steel elevator rope.
3. All machines shall be 1:1 roped.



4. NO MACHINEROOMLESS (MRL) equipment is allowed on campus.

### **C. SPECIFIC TO HYDRAULIC ELEVATOR SYSTEMS**

1. Pit sump pump required and shall be the oil separator type.
2. In ground jack installation is the standard.
3. No roped hydraulic installations allowed.
4. Twin post application allowed but telescopic twinpost application is not allowed.
5. Install back draft dampers in all elevator shaft vents with access to the dampers.
6. Hydraulic elevators may be provided for three (3) floors and less. All buildings above three floors shall require traction equipment.
7. All pump motors shall be rated 120 starts per hour or have a motor sized 20% greater in horsepower than capacity and speed require.
8. Provide sound isolation pads under pumping unit.
9. Hydraulic silencers with pulsation absorbing material in a blowout-proof housing required for each pump unit.
10. Oil coolers required on all campus elevator units.
11. Oil heaters required on all parking garage units.
12. Solid State starters required.
13. Shut-off valves required in machine room and pit.
14. Rupture valves required. Test and tag.
15. Elevator pumps, controllers and tanks shall be in an elevator machine room.
16. NO MACHINEROOMLES (MRL) equipment is allowed on campus.
17. Underground piping machine room to piston shall be avoided. If unavoidable the underground piping shall be coated, double wrapped with protective jack tape and installed in schedule watertight 40 PVC piping the full underground run.

18. In ground jack hole preparation:
  - a) Plumb oversized protective steel casing to accommodate the PVC casing required.
  - b) Plumb PVC oversized sealed/watertight casing with means of testing and removal of water or oil between casing and cylinder is required.
  - c) Jack to be installed plumb and centered on the car pick up point.

#### **D. SPECIFIC TO FREIGHT ELEVATORS**

1. Elevator cab interior lighting shall be a minimum of two LED lamps..... The fixture shall be guarded from contact with cover that will withstand the same force as required for the elevator car top.
2. Doors shall be power operated hatch and car with reopening protection.

#### **E. REFERENCE MATERIAL**

1. AISCS335 – Specification for structural steel buildings – Allowable stress design, plastic design, American Institute of Steel Corporation, Inc: 1989
2. AISC S350L – Load and resistance factor design specification for structural steel building: American Institute of Steel Construction, Inc: 1999, with supplement No. 1 in 2001.
3. ASME A17.1 – Safety Code for Elevators and Escalators: The American Society of Mechanical Engineers; Latest adopted code by the State of Alabama.
4. ASME A17.2 – Guide for Inspection of Elevators, Escalators, and Moving Walks: The American Society of Mechanical Engineers; Latest adopted code by the State of Alabama.
5. ASME A17.3 – Safety Code for Existing Elevators and Escalators: The American Society of Mechanical Engineers; Latest adopted code by the State of Alabama.
6. AWS D1.1 – Structural Welding Code – Steel; American Welding Society
7. ITS (DIR) – Directory of Listed Products: Intertek Testing Services NA, Inc; current edition.
8. NFPA 70 – National Electric Code; National Fire Protection Association; Most current adopted code.

9. NFPA 72 – National Fire Alarm Code; National Fire Protection Association; Most current adopted code.
10. NFPA 80 – Standard for Fire Doors and Fire Windows; National Fire Protection Association; Most current adopted code.
11. UL (BMD) – Building Materials Directory; Underwriters Laboratories Inc.; current edition.
12. U (ECMD) – Electrical Construction Materials Directory; Underwriters Laboratories Inc: current edition.
13. ADA – Building Transportation – latest adopted addition.
14. IBC - International Building Code; International Code Council; latest adopted addition.

# DIVISION 15 – MECHANICAL

## A. GENERAL DESIGN CONDITIONS

1. Design occupied spaces to maintain 72°F and a space dew point temperature not to exceed 55°F.
2. Design classroom and office space buildings with Variable Air Volume (VAV) air handlers.
3. Chilled water coils controlled by both space dry bulb and space dew point (or relative humidity) are preferred.
4. Coils for comfort heating in the re-heat position are preferred.
5. Where practical, provide return and outside air ducts and dampers capable of economizer operation.
6. VAV boxes shall be selected with hydronic re-heat coils.
7. Utilize campus steam (where available) to heat hydronic heating water.

## B. AIR HANDLING UNITS

1. All new air handling units shall be Variable Air Volume (VAV) with terminal re-heat utilizing hot water coils.
2. All new air handling unit cooling coils shall be chilled water cooling coils as follows:
  - a. Casing – minimum 16 gauge stainless steel
  - b. Tubing – minimum 0.020 inch thick wall thickness copper
  - c. Fins – minimum thickness 0/007 inches- continuous sheet, solid fin fabrication-copper or aluminum
  - d. Fin density – no more than 10 fins per inch
3. Coil selections shall utilize 48°F chilled water supply. Coils shall be of counter flow configuration. All new air handler unit casings shall be double wall construction. Wall panels shall have a minimum R-Value of 13.0 BTU/°F·ft<sup>2</sup> and shall be capable of withstanding 5 inches of water gauge of differential static pressure without permanent deflection.
4. Access panels shall be removable, bolt on hinge and with a gasket.

5. All new air handling units shall have pleated high efficiency media in angle filter racks or shall be bag type. Filter Face Velocity shall not exceed 300 feet per minute.
6. All new air handling units shall have stainless steel secondary safety pans. Pans shall allow 3" clearance on all sides of the unit footprint. Pans shall be a minimum of 3" deep all welded seam construction.
7. Pipe secondary drain pans to most convenient sanitary sewer storm drain. Allow a minimum ½" air gap to drain overflow rim.
8. Secondary drain pans shall lay flat on concrete house-keeping pads, minimum 3½" high. Pads shall have 1" chamfer on all sides and shall completely contact entire drain pan bottom. Provide block outs in pads and bottom drain connections on secondary drain pans. (Detail sketches of Unit/Pan/Pad configurations are available for review.)
9. AHU fans shall be selected to provide no greater than 2 inches water gauge external static pressure.
10. AHU fans shall be modulated using variable frequency drives (VFDs). Use of inlet valves or discharge dampers is unacceptable.
11. Balance contractor shall set up system to operate at minimum required external static pressure on prime moving fans.
12. Air handling equipment may not be placed on rooftops.

### **C. AIR HANDLING UNIT PIPING**

1. All coils 10 Total Tons and lower shall be piped with Type L hard drawn copper.
2. All cooling coils shall be trapped according to manufacturer's recommendation and piped to the most convenient sanitary waste or storm drain with adequate means.
3. All water coils shall have union or flanged connections to expedite future coil replacement.
4. All water coils shall have shut-off service valves in supply and return run outs. Service valves shall be for isolation purposes only.
5. All water coils shall have a strainer with a valve blow down piped to the most convenient sanitary sewer.

6. All water coils shall have thermometers in thermometer wells and pressure gauges with gauge cocks in both the supply and return run outs. Return run out pressure gauges shall be down stream of all control and balancing devices. An additional gauge cock and plug shall be installed between the discharge of the coil and any control or balancing device.
7. All air unit control valves shall be three way and shall be located in the return piping.

#### **D. TERMINAL HEATING PIPING**

1. All terminal reheat coils on both constant and variable air volume systems shall have isolation valves in the supply and return run outs.
2. Shut off valves shall be for isolation purposes only.
3. Pipe re-heat coils with union of flanged joints to expedite coil change out.
4. Provide an independent strainer for each coil run out. Strainer shall have a valve blow-down with a capped hose-bibb connection.
5. Provide capped and P&T plugs up stream and down stream of the strainer, the coil, the flow control valve, and the flow balancing valve.
6. In variable volume pumping systems provide two-way control valves at each coil and three way valves for the most remote locations suitable to handle 20% of the total re-heat system volumetric flow rate.
7. Re-heat systems should be designed for 180°F supply and 160°F return temperatures.

#### **E. DUCTWORK**

1. All ductwork shall be constructed to SMACNA and ASHRAE standards.
2. All ductwork shall be galvanized sheet steel construction, except for special ducts carrying corrosive or dangerous fumes.
  - a. Special duct systems shall be specifically called out in construction documents.
  - b. Designer shall consult with the Planning, Design & Construction department concerning all special duct systems.
3. All ductwork shall be flange connected or lock seam connected with mastic sealed joints.

4. All ductwork carrying air below ambient temperature shall be wrapped with 2" minimum thickness, 1½ pound density duct wrap with reinforced, foil vapor barrier.
  - a. Ductwork serving acoustically sensitive areas may be lined.
  - b. All lined duct shall be specifically called out in construction documents.
  - c. Designer shall consult with the Office of Facility Development concerning all acoustically lined ductwork.
5. Ductwork shall not be run over electrical panels, electrical switch boards or the working clearances of such items.
6. All rectangular duct take-offs shall be SMACNA standard angle take-offs.
7. Provide manual balancing dampers with locking quadrants at each duct take off. Splitter dampers are not acceptable.
8. All dampers shall be high efficiency, low leakage type.
9. All supply air diffusers shall be insulated with minimum 1" thick duct wrap.
  - a. Duct wrap on supply air diffusers shall have vapor barrier on ambient air side.
  - b. Seal duct wrap vapor barrier to supply air diffuser edge.

**F. COOLING TOWERS**

1. All Cooling Towers shall be induced flow design.
2. Distribution (hot) basins and collection (cold) basins shall be of stainless steel construction.
3. Sleeve bearings are unacceptable.
4. Drives shall be gear type only.

**G. PIPE IDENTIFICATION**

Piping shall be identified as follows:

Chilled Water Supply	Dark Blue
Chilled Water Return	Light Blue
Condenser Water Supply (From cooling tower collection basin to chiller condensing barrel)	Dark Green
Condenser Water Return (From chiller condensing barrel to cooling tower distribution basin)	Light Green

Steam	Dark Grey
Steam Condensate	Light Grey
Natural Gas	Yellow (ANSI Standard)
Chemical Feed	Purple
Heating Water Supply	Brown
Heating Water Return	Tan
Fire Suppression Systems	Red
Fire Suppression Systems Distribution	Red or to match architectural features

Provide ANSI standard labels at wall, floor and ceiling/roof penetrations and every 15 feet in machine rooms.

Provide direction arrows at all changes in direction and at labels.

## H. PUMPS

### 1. Hydronic Pumps

- a. Hydronic pumps shall be close coupled base mounted or horizontal split case type. Vertical split case pumps will be considered if foot print is limited in order to provide for sufficient access.
- b. All hydronic pumps of five (5) horsepower and above shall have adjustable frequency drives sufficiently sized to accommodate operation at 125% design flow and 156% of design head.
- c. All hydronic pumps of five (5) horsepower and above shall have impellers sized to accommodate operation at 125% design flow and 156% of design head.
- d. Select all pumps to operate within 10% to the right of maximum efficiency point (MEP) and 15% to the left of MEP.



## I. INSULATION

1. Above Grade Piping Insulation (all thicknesses and installation procedures as recommended by material manufacturer)
  - a. Chilled Water Piping
    - Steel piping shall be insulated with foam-glass insulation.
    - Copper piping shall be insulated with elastomeric foam insulation.
  - b. Heating Water Piping shall be insulated with preformed fiberglass pipe insulation.
  - c. Domestic Cold, Hot and Hot Return Water Piping shall be insulated with preformed fiberglass pipe insulation.
  - d. Steam and Steam Condensate Piping shall be insulated with preformed fiberglass pipe insulation.
  - e. Condensate lines from Air Handling Units and Ice Making Machinery shall be insulated with elastomeric foam insulation.
  - f. Direct Expansion Cooling Piping shall be insulated with elastomeric foam insulation.
2. Below Grade Piping Insulation (all thicknesses and installation procedures as recommended by material manufacturer).
  - a. Chilled Water Piping shall be pre-insulated piping with aluminum exterior PVC lagging.
  - b. Steam and Condensate Piping shall be pre-insulated piping with aluminum exterior PVC lagging.

# DIVISION 16 -- ELECTRICAL

## A. GENERAL:

1. Consultants shall explicitly follow all applicable criteria listed. Any variation from these criteria must be approved by the Office of Facility Services.
2. For each project, provide 3 bound sets of Operation and Maintenance manuals. Include submittal data on panel boards, switchboards, starters, transformers, meters, light fixtures, fire alarm system, sound systems, telecommunications equipment, etc.
3. All requests for power outages shall be coordinated with the Office of Facility Services, and shall be requested in writing at least two weeks prior to the outage. Contractor shall attend any pre-shutdown meetings required by the University to coordinate such outages. All work requiring a shutdown shall be scheduled after working hours or on weekends unless specifically allowed otherwise by LSU.
4. Verify with Mechanical that sufficient air conditioning is provided to all rooms with transformers, UPS's, Power Conditioners or other major heat generating electrical equipment.
5. All penetrations made in walls, floors or other building partitions for raceways, cables, equipment, etc. including penetrations in concealed areas (ceilings, chases, etc.) shall be either bore drilled or core drilled as required. Bust/poke-throughs with hand tools shall not be used to penetrate and will not be accepted. Any bust/poke through penetrations will be patched and redone with a drilled penetration by the contractor. All penetration work shall be neat and debris cleaned up after completion. Any walls or ceilings damaged due to penetration work shall be repaired. Any penetrations through walls or ceilings in visible finished areas shall be patched and painted, as required, to restore the finish around the penetration to its original condition. Where paint color/texture cannot be matched for an invisible transition from new to existing finish, the entire wall shall be repainted. The Contractor is to verify before starting any penetration work that the item to be penetrated has been checked by LSU and is free of asbestos.
6. All wiring shall be run in conduit or other type raceways unless specifically noted or allowed otherwise by LSU. Horizontal runs of low voltage fire alarm, telephone, data, and controls may be run without a raceway in equipment rooms and accessible ceiling spaces where allowed by code. Surveillance camera

wiring shall be considered data wiring. Where run without raceways, cables shall be routed and grouped together utilizing U.L approved J hooks by Caddy, Raco or approved equal attached to the building structure and spaced 4' - 0" maximum in a neat orderly arrangement. Ceilings considered accessible shall only be those with lay in panels on T bar grids. Other types of ceilings may be considered accessible if specifically approved as such by LSU. Hangers used to support wiring run without raceways shall be Caddy CAT series or B-Line BCH series J-hooks or other hangers approved by LSU with mounting as appropriate to the location. Hangers shall be submitted for approval. Do not use wire wraps or tie straps to support cable. Provide attachment accessory suitable for the substrate the hanger is being attached to. Wiring run without raceways shall be bundled together with reusable Velcro wraps (not nylon tie wraps) at least once between each 4'-0" support. Wiring must be routed on the supports as high as possible, free and clear of mechanical equipment, lighting fixtures, piping, conduits, ductwork, building structural members and any other building equipment or items. Cables shall not rest on the ceiling support grid system or other building items. Each wiring system (fire alarm, telecom, etc.) shall be run separate with separate hangers. Do not support from ceiling system supports, HVAC ductwork, conduit, piping, etc. Where wiring run without raceways penetrates walls or ceilings a metal conduit sleeve with bushings at each end shall be provided for the penetration. Cables shall not be run through holes in walls or ceilings. Each cable shall be continuous, without splices or connections from the source to the connected device. Routing shall be parallel or perpendicular to building lines. Support arrangement and tension on cables shall be minimized to prevent exceeding the maximum cable bending radius. Where cables transition from sections run without a raceway into sections run with a raceway, a bushing shall be installed on the entrance to the raceway (conduit, wiremold, etc.). All fire alarm wiring shall have a red colored jacket.

7. All penetrations through floors, ceilings or other partitions shall be sealed using the design and materials of an Underwriters Laboratory (UL) listed method to maintain the fire resistance rating of the system. The contractor shall submit manufacturer's cut sheets of the product(s) to be used and the UL assembly method it will be used in before making the penetrations. This information shall also be provided at the end of the project at the time of the Fire Marshal inspection. For renovation projects, all existing walls and ceilings shall be considered to have a minimum 2 hour assembly rating.
8. Wiring run without raceways through ceilings or other spaces used for environmental air handling (ceiling spaces used for return air, etc.) shall be listed for the use (plenum rated) and comply with NEC Section 300-22.
9. Provide an electrical load summary for each project, as part of the final review set.

10. The fault rating of all new electrical distribution equipment shall be sufficient for the maximum available fault current. The fault rating for all new equipment shall be listed in the specifications or on the drawings. New circuit breakers added to existing panels are to meet or exceed the fault rating of the existing breakers in the panel.
11. Provide concrete housekeeping slabs under all floor mounted electrical equipment.
12. The exact location of starters, disconnect switches, control panels and similar type items shall be coordinated in the field with all other items being installed in the project and with any existing items, and adjusted as required to maintain all code required clearances.
13. Permanently label all electrical distribution and control equipment (panels, safety switches, starters, transformers, etc.) with etched laminated plastic nameplates, black letters on white background, 1/4" minimum size lettering.
14. Meter all electrical services for both energy usage and power demand.
15. For any existing systems (fire alarm, emergency lighting, access control, etc.) for which work is performed in a project, before starting work, the contractor is to document in writing to LSU any existing problems with the system (control panels in alarm condition, lights not operating, etc.). Any non-documented problems in these systems noted after the contractor starts work will be the responsibility of the contractor to correct at no increase in cost to LSU.
16. The contractor is responsible for providing temporary construction power to all construction sites from a source to be determined by LSU. All temporary construction power is to be provided with metering and charges for the power are to be paid for by the contractor.
17. Electrical equipment shall be contained in a dedicated electrical room with a minimum of one room on each floor.
18. For elevators, verify telephone service is provided to the controller and provide generator emergency power circuit for elevator car lighting. The elevator traveling cable is to be provided by the elevator manufacturer with a cable for the car telephone and a coax cable, a fiber optic cable, and six total shielded, min 18 ga twisted pair cables for an owner supplied surveillance camera.

19. All mechanical piping and ductwork shall be routed such that they do not cross over electrical panels and switchboards or the working clearances of these items as per NEC.
20. Raceways shall be concealed in all finished areas unless required to be surface by existing conditions. Where raceways must be surface type in finished areas, they shall be decorative surface raceway, not exposed conduit. Surface raceways with only power conductors (not tel/data or combined power/tel/data raceways) shall be metal type, not non-metallic type. Surface raceways for telephone, data or combination tel/data/power shall be non-metallic type per LSU Information Technology Services standards. Surface power raceways shall consist of a system of U.L. approved, factory painted finish, surface metal raceway consisting of base and cover sections, wire retainers, corners, bends, junctions boxes and all accessories required for a neat and complete installation. Boxes shall be sized to accommodate the wiring devices to be installed. Size of raceway shall be approved for number of conductors to be installed. Surface metal raceway shall be by Wiremold or approved equal with manufacturer's standard accessories (couplers, corners, right angles, entrance end fittings, tees, end caps, etc. ) as required for a neat and complete installation. A factory supplied bushing shall be provided at the entrance to all surface metal raceways. Surface non-metallic raceway shall be surface mount constructed of high-impact, fire-resistant, UL Listed, PVC type compounds. All sizes and types of fittings including flat, inside and outside elbows shall be EIA/TIA compliant with respect to Cat-6 bend radius requirements. Non-metallic raceway shall be provided complete with manufacturer's standard accessories (couplers, corners, right angles, entrance end fittings, tees, end caps, etc. ) as required for a neat and complete installation. The color of all surface raceways and associated boxes, fittings, etc., shall be selected from the manufacturer's standard color selection to best match the finish color of the particular wall the box is to be installed on.
21. Wiring for transformers and bussing for panelboards, switchboards and bus ducts shall be copper.
22. Conduit connections to outdoor enclosures shall be watertight with listed weatherproof hubs, not with only locknuts and shall be made on the bottom or sides of the enclosure (no top penetrations).
23. Under demolition, add the requirement that the contractor re-feed any items to remain presently fed through items to be removed in this project. Remove all accessible unused and abandoned wiring and conduit back to the source. This includes the conduit and abandoned wiring in accessible ceiling spaces. Electrical demolition is to include removal of all unused electrical items (conduit, boxes, wire, light fixtures, cables, supports, etc.) in the area being renovated. This

includes any existing already un-energized abandoned electrical items as well items disconnected as part of this work.

24. The University has the right of salvage to any demolished equipment. For equipment to be removed, the Contractor is to confirm with the University whether or not the University desires to keep the respective piece of equipment. Equipment desired by the University shall be moved by the Contractor to a designated site on campus. Any equipment not desired by the University shall become the property of the Contractor and removed/disposed of by the Contractor.
25. For existing buildings being renovated, re-feed all exterior lighting circuits fed from the building which feed lights which are to remain (building mounted lights, street lights, etc.). Existing exterior lights shall be temporarily fed and controlled during construction to maintain security lighting around the building.
26. Unless specifically allowed otherwise by LSU, ceilings shall be accessible so that electrical equipment may be more easily maintained and circuits may be added in the future. In areas where LSU grants the designer permission to use non-accessible ceilings (plaster, gyp board, etc.) recessed light fixtures shall be capable of having the ballast replaced from below the ceiling through the fixture opening.
27. The electrical contractor is to obtain an excavation permit from Facility Services before performing any digging or driving any object below grade.
28. For excavating in areas congested with existing underground utilities, the contractor is to hand dig in the vicinity of existing lines. Exact routing of all new underground ductbanks is to be adjusted in the field to avoid existing obstructions.
29. For any work requiring building electrical outages, develop and list in the bid documents a recommended sequence of work to accomplish the electrical work and verify all necessary outages are addressed and any special work or materials required to maintain power to critical loads is provided for as part of the project. Coordinate with the building users and if they cannot accommodate an outage of sufficient length to accomplish the work, then include the cost in the project to provide and connect a temporary generator to power any necessary building loads. The sequence of work associated with the electrical outage utility work is to be outlined and the allowable duration of the associated outages is to be clearly stipulated in bid documents. The sequence developed is to be approved by LSU before the project bids.

## **B. CONDUIT AND BOXES:**

1. Galvanized rigid steel conduit w/ threaded fittings shall be used for all exterior conduit, conduit in damp locations, and conduit embedded in or run through concrete slabs.
2. Underground conduit runs shall be schedule 40 PVC type. Conduits for all underground medium voltage feeders shall be encased in 3" minimum of red concrete unless directionally bored. Conduit for directional bores shall be continuous Schedule 80 HDPE coiled in reels for direct burial service. There shall be no splices in directionally bored conduit.
3. Interior conduit in dry locations shall be EMT type with compression type fittings. Set screw fittings shall not be used.
4. Provide an insulated bushing on the ends of all conduits 1" size and larger.
5. Outlet boxes in concealed conduit systems shall be flush mounted, galvanized steel of sufficient size to accommodate the number of conductors and devices contained and be securely fastened to wall or ceiling framing for a rigid installation.
6. Outlet boxes for lighting fixtures shall be 4" octagon, galvanized steel, not less than 1-1/2" deep, with fixture stud fastened through from the back of the box.
7. Where outlet boxes are installed in a concrete slab, units designed for this application shall be used.
8. Device boxes for receptacles, switches, data and communications outlets shall be deep type, not less than 4" square and 2-1/4" deep. Device boxes shall have box extension rings with the required number of gang openings and with a depth to match the wall finish material so that the face of the box extension is exactly flush with wall face.
9. Outlet boxes for switches and receptacles in exposed conduit systems shall be cast iron or aluminum, factory finished, Type FS or FD, with number of gangs as required.
10. Outlet boxes shall not be installed back to back in walls or floors.

**C. POWER WIRING (600 Volt and Below):**

1. All conductors shall be of soft drawn annealed copper having a conductivity of not less than 98% of that of pure copper. Conductors shall be standard code gauge in size, and shall have insulation rated for use at 600 volts.
2. All conductors shall be color-coded as follows:

<b>3Ph 480V System</b>	<b>3Ph 208 (or 240V) System</b>	<b>1Ph 240V System</b>
Phase 1-Brown	Phase 1-Black	Line 1-Black
Phase 2-Orange	Phase 2-Red*	Line 2-Red
Phase 3-Yellow	Phase 3-Blue	Neutral-White
Neutral-Gray	Neutral-White	Ground-Green
Ground-Green	Ground-Green	

\*orange for wild leg

3. Color coding shall be continuous the full length of wire No. 10 and smaller. On larger sizes, identification shall be by color-coded phasing tape at each box and connection. Surface printing at regular intervals on all conductors shall indicate manufacturer, size, voltage and insulation type. White or gray colored insulation shall only be used for grounded (neutral) conductors. For multiple neutrals run in the same conduit, provide separate neutral conductors with a continuous, factory applied tracer stripe matching the color of the respective phase conductor. Green colored insulation shall only be used for equipment grounding conductors. Insulation for isolated equipment grounding conductors shall be green with yellow tracers.
4. Except where specifically allowed, feeders shall be run their entire length without joints or splices. Splices in branch circuit wiring shall be made only at outlets or in accessible junction boxes. Splices in branch circuit wiring shall be listed for the quantity, types and sizes of the conductors connected. Splices shall be made with compression type solderless connectors or spring loaded, tapered, screw on type insulated units (wirenuts). Push-in, plastic body type connectors are not allowed. Do not use wirenuts on splices of solid wiring to stranded wiring. Terminations or splices for conductors No. 6 AWG and larger shall use compression type connecting lugs made with a hydraulic type compression tool approved by the manufacturer. All splices and terminations shall be insulated in an approved manner by an integral or separate cover or by taping to provide insulating value equal to that of the conductors being joined.
5. Branch circuit power conductors shall be a minimum No. 12 size except that conductors shall be minimum No. 10 size for 120V circuits with home runs over 75 feet long and for 277V circuits with home runs over 100 feet long.



6. Wire shall be copper, THHN/THWN insulation, #12 size minimum. Sizes 8 AWG and larger shall be stranded. Wires No. 12 and #10 AWG may be stranded if terminated in devices which do not use screw type terminal connections and are UL listed for termination with stranded conductors (lug, pressure plate connectors, etc.). Wires No. 12 and #10 AWG shall be solid if terminated in devices which use screw type terminal connections or which are not UL listed for termination with stranded conductors.
7. For all conduit runs and raceways, provide a separate, green colored, insulated equipment grounding conductor, sized per the NEC, in addition to the conduit or raceway ground
8. All emergency lighting shall be run in separate raceways from normal wiring, as per the NEC.
9. For receptacles and switches which are not the end of the line, the equipment grounding conductor shall not route through the device per NEC 250.148(B). For such instances, splice from the incoming conductor in the box with one conductor going to the device and one continuing to the next device on the run, such that the device can be removed without losing the ground connection to the downstream devices.
10. For receptacle multi-wire branch circuits (multiple phases sharing a common neutral) which are not the end of the line, the neutral conductor shall not route through the receptacle per NEC 300-13 (b). For such instances, splice from the incoming neutral conductor in the box with one conductor going to the device and one continuing to the next receptacle on the run, such that the device can be removed without losing the neutral connection to the downstream devices.
11. For branch circuit wiring, there shall not be more than 8 current carrying conductors per raceway. Neutral conductors shall be considered current carrying. Apply derating factors as per NEC B-310-11 and increase size of conductors if necessary.
12. Each feeder shall be run in its own dedicated raceway.
13. For multiwire branch circuits, there shall be a maximum of three phase conductors (of different phases) for each neutral conductor.

#### **D. WIRING DEVICES:**

1. Wiring devices (receptacles and switches) shall be specification grade, 20A minimum rating, with nylon housing and metal mounting strap (devices with plastic mounting straps are not acceptable). Switches shall be silent actuating with 120V or 277V rating, as required by the circuit controlled. Receptacles may be back or side wired, but back wired receptacles shall utilize a pressure connection requiring the side screw to be tightened (wires held in with clip type mechanisms are not acceptable). Contractor shall tighten the screws on any unused receptacle terminations, to reduce the possibility of protruding screws shorting to the box.
2. Provide receptacles with integral ground fault protection for outdoor receptacles, receptacles in wet locations and receptacles where required to be ground fault type by code.
3. For any existing receptacles to remain in areas being renovated, the contractor is to check out the existing wiring and correct any problems (no power, open grounds, reversed polarity, etc.) and to repair and/or replace any inoperative or damaged receptacles.
4. For all new receptacles and light switches and for existing receptacles and existing light switches in renovated areas, provide a permanent label on the coverplate with the panel designation and circuit number of the circuit serving the device. Labeling shall use laminated, scratch resistant, ½" wide polyester adhesive backed tape, Panduit LS4M or Brother P-Touch labeling system or equal system approved by LSU Facility Services. Labels shall be black letters on clear background for light colored plates (ivory, white, etc.) and white letters on clear background for dark colored plates (black, brown, etc.).
5. Wiring devices shall mount securely to the device backboxes with no play (no gaps between mounting ears of the device and the box or trim ring).
6. Cover plates for interior wiring devices (receptacles, light switches, etc.) shall be flexible nylon type (not hard thermoplastic). Covers for exterior wiring devices shall be gasketed, non-metallic type with upward operating self-closing spring door. Weatherproof receptacles shall be flush mounted in exterior walls, unless required otherwise.
7. Provide red colored devices and cover plates for all receptacles and switches on emergency generator power.
8. For all receptacles securely attach the devices yoke to the back box or back box to wall structure such that there is minimal movement of the device when a plug

is inserted or removed and the device is not dependent on the plate to keep it in position. For instances where the back box is loose, secure the back box to the wall structure. For instances where the mounting ears of the device do not touch the box ring due to improper extension ring depth and do not securely sit on the wall finish due incorrect wall opening size, where boxes are set back more than 1/4" from the face of the finished wall/ceiling provide an adjustable box extender ring (Bridgeport BXE series, RACO 976 series or approved equal). Where boxes are set back less than 1/4" from the face of the finished wall/ceiling provide a device leveler and retainer (Caddy RLC or approved equal). Provide any other work and accessories to provide a rigid, level installation of the device to the box.

#### **E. SAFETY SWITCHES:**

1. Safety switches (disconnect switches) shall be UL listed, heavy duty type with ratings and features as required by the load served. Switches shall have visible blades, be padlock-able in the off (down) position, use positive quick made, quick break operating mechanisms, be horsepower rated for the motor served, have a NEMA 1 enclosure for dry indoor location and a NEMA 3R enclosure for outdoor or wet locations. Safety switches shall have an isolated neutral bus for circuits with a neutral. All safety switches shall have ground lugs attached to the enclosure as required for terminating all equipment grounding conductors.
2. Safety switches shall be fused when required by code to provide overcurrent/short circuit protection or to comply with the nameplate data of the equipment served. Safety switches shall be non-fused when the branch circuit protection device ahead of the switch provides the code required overcurrent/short circuit protection and the specific protection required by the equipment served as listed on the equipment nameplate.
3. For maintenance considerations, wherever possible, use enclosed circuit breakers instead of fused type safety switches to provide overcurrent/short circuit protection to equipment.
4. Galvanized angle, channel or other suitable supports shall be provided for switches that cannot be mounted on walls or other rigid surfaces. Switches shall not be supported by conduit alone. Where switches must be mounted on equipment, the location shall be coordinated with the equipment manufacturer, such that the switch does not damage any working components or block any unit access.

## **F. FUSES:**

1. Fuses protecting panelboards, switchboards and other distribution equipment shall be current limiting type RK1. All other fuses shall be current limiting type RK5. Provide one spare set of fuses (3 minimum) for each type and size fuse used on a project.

## **G. PANELBOARDS:**

1. Panel boards shall be circuit breaker type using quick-made, quick-break, trip free, bolt-on, molded case circuit breakers. Provide 20 % spare/spaces in each panel section (minimum of 4). Provide an additional section, if necessary, to meet this requirement. Panel board shall be dead front safety type with main breaker or main lugs, as required by code. Panel boards shall have single, feed through, or double lugs to accommodate feeder conductors. Panel boards with neutrals shall have a neutral buss and a neutral bar insulated from the enclosure for terminating feeder and branch circuit neutral conductors. Each panel board shall have an equipment grounding bar connected to the cabinet for terminating feeder and branch circuit ground conductors. All panel board bussing shall be copper. Load centers are not acceptable.
2. Doors shall be fitted with flush cylinder locks, keys to which shall all be alike: two keys shall be furnished for each lock. Provide a directory for each panel with typewritten identification of all circuits listing final approved room names, room numbers and item served.
3. Panel boards shall have door-in-door trim to allow hinged access to the interior panel wiring without removal of the panel door assembly (one lockable door over the interior and one which exposes the gutter).
4. For recessed panel boards, provide a minimum of three 3/4" spare empty conduits from each panel section to the nearest accessible ceiling space.

## **H. SWITCHBOARDS:**

1. Switchboards shall be dead front with molded or insulated case circuit breaker mains and branches. Main circuit breaker shall have ground fault protection when required by code. Switchboards shall have an incoming solid state power meter recessed in the front of the enclosure to measure phase voltages (L-L and L-N), phase amps, KW, KVA, peak KW, peak KVA. Cts and Pts used in the metering shall provide minimum 2% accuracy.

2. Switchboard bussing shall be plated copper and be of sufficient cross sectional area to meet UL Standard #891 on temperature rise. The entire switchboard assembly (bussing, circuit breakers, etc.) shall have a fault rating as required to exceed the available fault current. All incomplete vertical sections shall have full length "space only" bussing such that it may accept future branch devices. This is to be in addition to the scheduled space or spare branches specified or scheduled. The continuous current rating of the vertical bussing shall be equal to or greater than the capacity of the available branches whether scheduled, supplied or not. Feeders shall enter and terminate in the same vertical section as per NEC 384-3 or interior wireways specifically for horizontal cable routing shall be provided. No cable is to route between or in physical contact with switchboard bussing. Horizontal bussing shall be full size, non-tapered with ampacities as required by the loads served plus minimum 25% extra for future and tapered for full size future extension.
3. The switchboard shall have a ground bus extending through all sections. All equipment grounding conductor cables shall terminate at this ground bus with suitable lugs and not the metal switchboard frame. The ground bus shall be factory bonded to the switchboard frame.
4. Switchboards in non-secure areas shall have full length and width lockable, handle operated, hinged doors.

#### **I. DRY TYPE TRANSFORMERS:**

1. Dry Type Transformers shall have two 2 ½ % primary taps above and below normal. Units are to have minimum 220 C insulation system with maximum 150 C temperature rise at 40 C ambient. Floor mounted units shall be provided with rubber vibration isolating pads (minimum ½" thick).
2. Sound levels shall not exceed 45 db for units 75 KVA and below, or 50 db for units above 75 KVA in an ambient of 24 db.
3. Transformers shall be K rated as required when serving loads with significant levels of non-linear harmonic load currents.

#### **J. LIGHTING:**

1. Design to Illuminating Engineering Society (IES) recommended levels for the use of the space. Lighting shall be energy efficient, preferably utilizing LED light sources where possible.

2. Fluorescent lamps shall be energy efficient type w/ 4100 deg k correlated color temperature. 48" lamps are to be T-8 using manufacturer's premium energy efficient electronic type ballast. 96" lamps are not to be used.
3. Ballasts for operations of F32T8 rapid start fluorescent lamps shall be as follows:
  - a. Operate lamps in programmed start mode.
  - b. Operate multiple lamps as parallel circuit, operating remaining lamp(s) at full light output upon failure of other lamp(s) on the same ballast.
  - c. Individual ballasts specifically designed and UL Listed to operate one, two, three or four lamps of a single fixture as scheduled on the drawings.
  - d. Operate lamps at rated lumen output and life specified by the lamp manuf.
  - e. Operate lamps at a frequency higher than 20 kHz.
  - f. Operate at a rated circuit voltage (120 or 277 V) and at an input frequency of 60 Hz, and tolerate +/- 10% sustained voltage variation without damage to the ballast and maintain light output at +/- 10% variation.
  - g. Comply with EMI and RFI limits set by FCC (CRF 47 Part 18) for non-consumer applications and not interfere with normal electrical equipment.
  - h. Power Factor shall be not less than 0.95.
  - i. Total Harmonic Distortion shall be less than 20%.
  - j. Lamp Crest Factor shall be 1.7 or less.
  - k. Ballast Factor shall be greater than 0.85.
  - l. Sound rating shall be "A".
  - m. Withstand transients as per ANSI C.62.41 for location category A.
  - n. Shall comply with ANSI standards.
  - o. Shall be CBM certified.
  - p. Ballast shall have internal thermal protection.
  - q. Shall be provided with a minimum two (2) year parts and labor warranty.
  - r. Ballasts shall be by Advance, Universal or approved equal.
4. All existing ballasts in ECM and renovation projects that do not carry the words "Non-PCB" shall be removed from existing fixtures, stored in the approved DOT/EPA specification drums (Provided by the contractor). These drums shall have a log of exact contents and date each article was in each drum. The drums shall be stored on pallets in a location suitable to the Owner. Disposal shall be the responsibility of the Contractor and shall be in accordance with all state and federal requirements. All PCB tracking documents from jobsite to destruction shall be delivered to the Owner via the Architect/Engineer prior to project close-out.
5. Incandescent and mercury lamps are not to be used. Justification and approval from LSU for specialty use is required.

6. Each fixture shall be supported independently from the building structure.
7. Where HID lighting is to be the predominate source of light, a minimum of 25% of the fixtures shall have quartz restrike capability.
8. Lenses for interior fixtures shall be injection molded UV stabilized acrylic or glass. Lens for fluorescent troffers shall be minimum 0.125" thick. Polycarbonate lens shall not be used unless specifically permitted by LSU.
9. The University prefers flexibility in switching of lighting on new installation for energy conservation. Provide multiple lighting levels (with switching) in labs and classrooms.
10. Use occupancy sensors to control lighting in classrooms, conference rooms, restrooms, offices, storage rooms and similar spaces. Occupancy sensors shall have adjustable time delay 30 sec to 30 minutes and adjustable sensitivity. Rooms shall generally have a switch at the door to override the occupancy sensor to off if a wall type occupancy sensor with this capability is not used.
11. Lighting in areas where computer terminals are used shall be designed to minimize direct and indirect glare when viewing the terminal displays.
12. Do not use HID lighting in classrooms.
13. Exit lights are to use LED lamps.
14. A lighting fixture schedule shall be provided in the design development phase providing at a minimum a description of each type fixture to be used and the type and quantity of lamps in each fixture.
15. Where existing fixtures are replaced with new fixtures, the connection shall include a #12 green equipment ground wire from the circuit equipment ground wire, if one is present, or from the metal box if a ground wire is not present.
16. Provide an HOA switch on all lighting contactors.
17. For recessed light fixtures, provide a maximum of 4 feet of steel constructed flexible metal conduit or MC cable between the last branch circuit wiring junction box and the fixture. Wiring in flexible conduit or MC cable shall be #12 size minimum with a green equipment ground wire. Flexible conduit to each fixture shall be from a hard conduit connected junction box to the fixture. Looping from fixture to fixture with flexible conduit or MC cable is not allowed.

18. Main corridor lighting shall be controlled by relays controlled through occupancy sensors. Selected minimal corridor lights shall be unswitched, connected to generator backed emergency lighting circuits with sufficient quantity and location to provide only the necessary code required emergency lighting and to allow the main corridor lights to be switched off during times of inactivity.
19. For emergency lighting, in all areas except for corridors and stairs, where lights are on an emergency lighting circuit, connect these fixtures to an emergency lighting circuit through an emergency lighting control unit (ECU) which normally controls the emergency fixture with the other normal fixtures in the room and automatically turns on the emergency fixture upon an outage of the normal lighting branch circuit. The ECU shall be Wattstopper ELCU-200 Emergency Lighting Control Unit or approved equal. Provide a nameplate in the fixture stating "EM FIXT W/ EM LTG CONT UNIT". Emergency lights in corridors and stairs are to be circuited as unswitched night lights and will not require an emergency control unit. Stairwell lights are to be provided with integral sensors to switch the fixture to reduced light output after no motion is detected after an adjustable time delay.

#### **K. OUTDOOR LIGHTING:**

1. Outdoor site lighting shall provide adequate security lighting around buildings and on the sidewalks and drives. Lighting levels shall be in accordance with the latest IES recommendations. The light source should be energy efficient for low operating cost with a long lifetime for low maintenance. Fixtures shall utilize LED light sources wherever possible. Glare shall be minimized as much as possible with fixtures using cutoff type reflectors wherever possible. Open face "wall pack" type fixtures generally shall not be used except for equipment type areas not generally visible from public view.
2. Exterior light fixtures shall have a glass or acrylic lens to prevent lens yellowing. Polycarbonate lens are not allowed. Exterior fixtures not exposed to the weather shall be UL damp location listed and those exposed to the weather shall be UL wet location listed
3. Bollards are not generally desired and should only be used where specifically approved for use by LSU and where there is little chance of being struck by lawnmowers or vehicles. Ground mounted fixtures (ground mounted floodlights, etc.) shall only be used where specifically allowed by LSU and provided with a secure, strong mounting arrangement. Exterior fixtures supported only by the conduit connection are not allowed. In-grade mounted fixtures are not allowed



4. Outdoor site lighting pole mounted fixtures shall utilize the LSU campus standard "Core/Historical" pole/fixture which shall consist of a traditional lantern type fixture on a decorative pole. Fixture and pole shall have a black finish. Fixture/pole shall consist of a cast aluminum fixture with a tapered six sided cage and top finial, minimum 126W LED light source, cutoff optics generally with a symmetrical reflector concealed in roof (with other type distribution where required), frosted chimney giving the appearance of the light source, clear seeded acrylic or clear seeded glass lenses, internal fusing in fixture or in-line fusing in pole base, 12 foot tall decorative cast alum pole. Fixture shall be Sternberg 6130C series with 4200 series pole, Hadco V2701 series with P-2063 pole or equal fixture/pole with similar appearance and construction.
5. All pole/fixture assemblies shall have a minimum 100 mph wind load rating with a 1.3 gust factor.
6. Exterior lighting is to be controlled by lighting contactors controlled by photocells.
7. Pole foundations shall utilize double nutting as the means of mounting and leveling. Grout shall be installed between the pole base plate and the top of the foundation around the bottom leveling nuts. All poles shall have metal base covers. All metal poles shall have a ground rod with a connection to the pole ground lug located inside the pole and accessible through the base handhole.

#### **L. EMERGENCY POWER:**

1. The preferred method for emergency power for "Exit" signs and egress illumination shall be by a building emergency power generator. The code specified transfer and duration will be met. For small buildings and for renovations where emergency lighting systems do not exist in a building, individual battery powered units may be considered on a case by case basis, but must be approved by LSU.
2. Generators shall be natural gas fueled. For each project, the Designer shall obtain permission from the State Fire Marshall to allow natural gas as the fuel in lieu of an on-premises fuel supply as allowed by the exception listed in NEC 701.11,(B),(3). The wording of the request to the Fire Marshal shall be coordinated with LSU utilizing the same as used in past successful requests.
3. Generators shall be have electronic isochronous governor, critical exhaust silencer, alternator and control panel space heaters, water jacket heater, output circuit breaker, max 130 deg C temp rise, automatic exerciser clock with selector

for load or no load exercising, starting batteries and charger, lockable outdoor weatherproof enclosure.

4. The ATS for the generator shall be 3P, SN unless required otherwise and have time delay neutral position or in phase monitor.
5. Generator and ATS shall have a 5 year/1500 hour comprehensive warranty.
6. All aspects of the natural gas supply shall be in accordance with NFPA, 37, 54 and 110. Where the gas supply is connected to the building gas supply system, it shall be connected on the supply side of the building main gas shutoff valve and marked as supplying an emergency generator. The building's main gas shutoff valve shall be marked to indicate the existence of the separate generator shutoff valve. Gas piping shall be Schedule 80, black steel, painted ANSI "Natural Gas" Yellow and installed by a licensed plumbing contractor. The connection at the generator is to be made with a flexible piping connection provided by the generator manufacturer. Gas trains shall include an equipment isolation valve at the generator, a manual shutoff valve in a remote location, a regulator and two automatic safety shutoff valves at the generator each with manual leak test valves. The automatic safety shutoff valves shall stop the flow of fuel in the event the engine stops for any cause. All gas piping shall be tested and purged in accordance with NFPA 54:8.
7. Provide a generator remote annunciator panel with emergency stop pushbutton in the building.
8. Provide a connection from the generator common alarm contact to the campus EMS system to monitor any generator alarm.
9. Generators shall be located a minimum of 5'-0" from buildings.

#### **M. FIRE ALARM SYSTEMS:**

1. The fire alarm shall be in accordance with NFPA 72, NFPA 101, ADA, and all other requirements of the Louisiana State Fire Marshall. All fire alarm system work shall be performed by a licensed fire alarm subcontractor in accordance with all requirements of the State Fire Marshall. The contractor shall be responsible for all Fire Marshall submittals and shall be responsible for any fees charged by the Fire Marshall for the reviews. For additions to existing systems, new fire alarm equipment shall be listed for use with the existing equipment.
2. The fire alarm system shall be non-coded, addressable, automatic and supervised. The fire alarm system shall be a Johnson Controls Metasys IFC 3030

system or Notifier NFS 3030 system. The fire alarm system shall be connected to and communicate on a point by point basis with the campus EMS system (Johnson Controls Metasys System) without using third party translators. The translation device shall be part of the control panel and UL listed for use with the fire alarm system control panel (the model number included on the UL listing sheet of compatible devices for the fire alarm control panel). Software programming of the Campus EMS system for this communication shall be done by the University. All other work and materials to accomplish this communication will be the responsibility of the fire alarm contractor. In addition to the point by point connection to Metasys, provide addressable relays on the data loop to tie into Metasys contacts for panel general trouble and alarm. In addition to this communication, the fire alarm system is to transmit status (normal, alarm, or trouble) to the LSU Campus police through a Keltron Model RF750L subscriber unit transceiver. It shall convert control panel data to point-specific life safety event information (not just indicate trouble and alarm). Where existing systems are being replaced with new systems, the existing radio transmitter may be reused if one is present.

3. Provide a fire alarm remote annunciator at the location the fire department/police would use to enter the building when an alarm occurs.
4. The fire alarm control panel and any power extenders shall be powered from the existing generator backed up emergency system when one is present.
5. Pull stations shall be key resettable by a key provided by the system manufacturer (not an allen head or other type screw arrangement). Over each pull station provide a clear, alarm deterrent cover with integral battery powered local alarm. Alarm deterrent covers shall be Americorp STI Stopper 2, STI-1100 series or Signal Communications Corp ST series.
6. Smoke detectors shall be photoelectric type, not ionization type.
7. Generally, all corridors and electrical and telecom equipment rooms shall be provided with smoke detection coverage per NFPA 72 whether required by code or not.
8. Shutdown of any air units shall be accomplished through a fire alarm addressable relay at the starter/drive for the air unit (not through the auxiliary contacts of the duct detector).
9. Provide isolation modules in the initiating wiring with no more than 25 addressable devices for each module.

10. The passwords for access to modifying the fire alarm system programming are to be left on the factory default settings and this password given to LSU at completion of the project.
11. A reduced copy of the as built fire alarm system shop drawings shall be included in the fire alarm system operations and maintenance manuals.
12. Fire alarm system control panel power supply and battery backup shall have 25% extra capacity to allow for additions to the system. Enclosures shall have 25% unoccupied extra physical space for future expansion capability.
13. Where existing fire alarm systems are replaced, remove all existing fire alarm items not reused including all wiring and exposed raceways after the new system is installed, operating and approved by the Fire Marshal.
14. Fire alarm system wiring shall be copper, 16 gauge minimum size. Fire alarm wiring shall be run in raceways except for sections in accessible ceilings for horizontal runs in equipment rooms which can be run without raceways supported and routed in accordance with LSU design standards. All fire alarm wiring shall have a red colored jacket and shall be installed separate from other building wiring systems. Fire alarm wiring between buildings shall be fiber optic cable where possible. Provide lightning/surge protectors at each end of fire alarm wiring serving items remote from the building. Wiring run underground shall be wet location listed.
15. For fire alarm control panels which are recessed in walls, provide three minimum 3/4" spare empty conduits from the panel to the nearest accessible ceiling space.
16. For all addressable fire alarm devices (smoke detectors, heat detectors, duct detectors, pull stations, etc.), provide a permanent label on the device base listing the device's complete address. Labeling shall use laminated, scratch resistant, 1/2" wide polyester adhesive backed tape, black letters on clear background, Panduit LS4M or Brother P-Touch labeling system or equal system approved by LSU Facility Services.
17. As part of the programming of the system, the contractor shall program Zone #50 to deactivate all outputs when this zone is disabled to allow the system initiating devices to be tested.
18. Where the building must remain in operation during construction, all outages of the existing system must be in accordance with the Fire Marshal requirements. The existing system shall be operational at the end of each work day unless specifically allowed otherwise by LSU. All work to disable/reconnect the existing

fire alarm system items is to be done by the fire alarm system sub-contractor (not by LSU).

19. The contractor shall provide LSU a minimum of 2 days advance notice of the scheduling the Fire Marshall checkout of the system.
20. A copy of the final software programming shall be provided to LSU on a DVD or flash drive at completion of the project as part of the operations and maintenance items.

**N. MOTORS AND MOTOR CONTROLLERS:**

1. See Division 15 for motor and motor controller requirements.

**O. SOUND SYSTEMS, SPEAKERS, 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.

**P. CLOCK SYSTEMS:**

1. Specifications for clock systems shall be developed as the specific need is determined and the scope as defined by the user. In general, clocks are not to be provided in new buildings and existing clocks in renovated sections of existing buildings are to be removed as part of the renovation.

**Q. MEDIUM VOLTAGE WIRING (High Voltage System):**

1. For each project, provide a fault study and an overcurrent protective device coordination study. The coordination study shall cover from the utility system upstream substation main breaker down to the 480V branch circuit breakers in the building. The computer software program used to perform the studies shall be the ETAP program (latest version) and LSU shall be provided with all the data files for the fault study and coordination study at the completion of the project. Permanent electrical service to the building will not be provided until the coordination study curves and recommend protective device settings are

submitted to and approved by LSU. All equipment shall be rated for the available fault current as determined in the study.

2. Verify all outages to accomplish the electrical utility work are addressed and any special work or materials required to maintain power to critical loads is provided for. Address the phasing and outages associated with the replacement of the high voltage feeders and equipment. In general, LSU cannot accommodate prolonged outages to accomplish high voltage utility work. The sequence of work associated with the electrical utility work is to be outlined and the allowable duration of the associated outages is to be clearly stipulated in bid documents. As much as possible, high voltage utility work is to be scheduled during the periods of low activity at the university such as between semesters and during the week between Christmas and New Years when the University is closed. Portable backup generators shall be provided as part of the project (provided, installed, connected and fueled by the contractor) to power for any loads deemed critical by LSU and not capable of withstanding the outages necessary for the electrical utility work.
3. Medium voltage cable shall be UL listed, single conductor, 15kV rated, for use in solidly grounded wye circuits not exceeding 15kV phase to phase at conductor temperatures of 105 degrees C for continuous normal operation, 130 degrees C for emergency overload conditions, and 250 degrees C for short circuit conditions. Cable shall have stranded, concentric, round, compressed or compact, annealed copper conductor; extruded semi-conductor shield over the conductor; 220 mil Ethylene Propylene Rubber (EPR) insulation (133% insulation level); extruded semi-conductor shield over the insulation; minimum 3 mil thick helically applied 12% overlapping solid copper tape shield; and black 80 mil PVC jacket imprinted with manufacturer, size, type insulation, insulation thickness, voltage rating, and UL designation. Cable shall be for use in general purpose applications in wet or dry locations including conduit, cable tray, direct burial and aerial installations. Cable shall be constructed in accordance with all applicable IPCEA standards. Cables shall be manufactured by General Cable, Okonite, Pirelli, Southwire, or approved equal.
4. The new medium voltage wiring and equipment shall connect to the existing solidly grounded 13.8KV or 4.16KV grounding system. Provide a green insulated equipment ground conductor run in each conduit containing a medium voltage feeder, minimum #3/0 size for the 13.8KV system and minimum #2 size for the 4.16KV system. Ground busses or conductors in existing manholes shall be extended full size to the new equipment and wiring. Cable shields shall be grounded at each termination and splice with an individual, (one per cable) minimum #6 size conductor to the ground system. Provide a minimum #12 size green ground from the tab on the elbow to the ground system. Provide a ground rod in each new manhole with a connection to the ground system. Cable shields

for straight splices in manholes (except those made with elbow connectors) are not to be brought out and grounded.

5. Duct banks for medium voltage feeders shall have 25% spare conduits (minimum of one (1) each size).
6. The contractor shall be responsible for proper phasing of the system and shall demonstrate proper phasing for items fed by feeders affected by the work in this project. Coordinate phasing with Facility Services. The contractor shall be responsible for matching the phasing between the multiple feeders at HV switches and transformers and shall demonstrate proper phasing to LSU.
7. Provide new cable racks in existing manholes when required for proper support of cables.
8. New cables shall make one complete loop in each manhole. Where multiple feeders are present in a manhole the conductors of the different feeders are to be kept apart from each other as much as possible to minimize the possibility of a fault on one feeder affecting the other feeder.
9. For splicing to existing medium voltage cables in manholes, verify that sufficient slack in cable lengths exist in the manhole to allow existing splices to be cut out and new splices to be made. If sufficient length does not exist, pull slack from adjacent manholes when possible or replace cables from adjacent manholes if it is not possible.
10. Where multiple medium voltage feeders are present in manholes, the contractor may be required to splice one feeder while other feeders in the manhole are energized. Contractor shall provide insulating blankets for added safety from energized cables and other safety items, necessary by manhole conditions.
11. New manholes for the medium voltage distribution systems shall be minimum 8' square, 6' tall, have traffic rated covers, cable racks on all four sides, sump for draining, 10' long ground rod and be adjusted so top is flush with finished grade or paving. All conduits to manholes are to terminate with end bells. Provide pulling eyes on all four sides and on the bottom of the manhole directly under the opening
12. Note that in areas congested with existing underground utilities, the contractor may be required to hand dig in the vicinity of existing lines. Exact routing of all new ductbanks is to be adjusted in the field to avoid existing obstructions.
13. Verify all outages to accomplish the work are addressed and any special work or materials required to maintain power to a particular load is provided for.

14. The contractor is to submit to the Architect/Engineer for review, the name and list of experience of the cable splicer to be used (actual person who will perform the work). Should the University deem that the cable splicer is not acceptable; the Contractor must submit information for a different cable splicer and repeat this process, until one is found with acceptable experience.
15. In each manhole, transformer and high voltage switch, etc. where work is to be performed in this project, the Contractor shall install on each medium voltage cable an etched laminated plastic nameplate (tag) identifying the feeder number/designation. On loop feeders, the tag wording shall also include the destination of the cable after it leaves the manhole or equipment. Note that for loop feeders in manholes, there will be a set of tags on both locations that the cable enters/exits the manhole designating at both ends where the cable goes to. Exact wording on cable tags shall be submitted by the contractor and approved by LSU. Tags shall be etched laminated plastic, white plate with black letters, with minimum 1/2" size lettering, attached with two nylon tie wraps, one at each end of the tag. The tags are to be positioned so that they can be viewed from the manhole or equipment opening. At each tag, and on both sides of every splice, the medium voltage cable shall also be color coded with electrical tape as to the phase connection (colors shall be same as presently in use on the system).
16. Underground splices in the 13.8KV or 4.16KV distribution systems are to be avoided as much as possible. Where splices must be made they are to be located above grade in sectionalizing cabinets with 600A deadbreak separable connector (elbow) type junctions inside. Sectionalizing cabinets shall be tamperproof, constructed of minimum twelve gauge steel, Munsell green corrosion resistant finish, hinged padlockable cover with "Warning High Voltage" label and reflective sectionalizer designation label on outside, minimum 22" depth to allow back-to-back elbow connections, contain universal mounting plates with 600A junctions and parking stands. Sectionalizer cabinets shall be mounted on a minimum 6" thick, steel reinforced concrete pad with the top of the pad, 2" above grade. Provide an 18" deep, min 12" wide, below grade conduit window with concrete sides and open bottom to allow room for HV cables to turn before connecting to the unit. Conduits are to terminate 3" above the bottom of the window with bushings. Sectionalizing cabinets shall be manufactured by Cooper Power Systems, Malton, CMC/BMC, Maysteel or approved equal. Protect with concrete filled, 6" round, yellow painted pipe bollards extending min 3 feet below grade with underground section surrounded by 12 inches of concrete.
17. Where underground splices in manholes cannot be avoided and above grade sectionalizers cannot be installed, splices shall be made using 600A deadbreak, separable connector (elbow) type junctions in the manhole unless the manhole



containing the splice does not have sufficient space. If there is insufficient space in the manhole for elbow type junctions, splice kits shall be used.

18. Medium voltage cable in-line straight splice kits where cable does not change size significantly at the splice shall be made utilizing pre-packaged, cold shrink or heat shrink type kits for shielded cable. Kits shall include compression connector, semi-conducting and insulating tapes, cold shrink or heat shrink insulation body and shield continuity assembly. Splice kits shall be rated for 15kV, 150kV BIL. Splice kits shall be 3M QS-III 5513A thru 5516A series, or Raychem CAS-15M or HVS-1520 series or approved equal.
19. Medium voltage cable tee splice kits shall be made with pre-packaged cold shrink or heat shrink type kits for shielded cable. Kits shall include connector, semi-conducting and insulating tapes, cold shrink or heat shrink insulation body and shield continuity assembly. Tee splice kits shall be 3M QS2001B or Raychem HVSY with appropriate cable reducing accessories as required.
20. For medium voltage cable X splices and for tee or straight in-line splices with a cable size change that cannot be accommodated by the kits specified above, and for instances where there is insufficient space to use the kits specified above, the splice shall be made with hand wrapped tape type splice kits containing the necessary compression connectors, semi-conducting and insulating tapes, and shield continuity assembly. Tape splice kits shall be rated for 15kV, 150kV BIL. Tape splice kits shall be 3M 5700 series or approved equal.
21. Medium Voltage cable terminations on equipment shall be dead front type wherever possible (SF6 switches, sectionalizing cabinets, pad mount transformers, etc.) made with separable (elbow) type connectors. Separable elbow connectors shall be minimum 15kV class suitable for 4-wire multi-grounded or 3-wire ungrounded systems. Connectors shall be 600A, deadbreak type. Connectors not located in manholes shall have a test point for the mounting of a fault indicator or for aid in testing of power available and phase sequencing. Connectors in manholes shall not have a test point. Each connector shall come with an insulated plug, cap, stud, lug, cable adapter and metallic tape shield adapter. Connectors shall be sized for the conductor installed on the project. Connectors shall be by Elastimold or Cooper Power Systems.
22. Where medium voltage cables must terminate in a live front connection (Metal Clad switchgear, live front equipment, etc.) the connection shall be made utilizing termination kits rated for IEEE Standard 48-1990 Class 1 termination. Terminations shall consist of high dielectric constant stress relief tube inside a molded silicon insulator mounted on a supported core. Terminations shall be rated 15 KV minimum and have a continuous operating temperature rating of 105 deg. C with an emergency overload rating of 130 deg. C. Terminators shall be

constructed with insulators constructed of tracking resistant silicon rubber. Terminations for outdoor or inside outdoor pad-mounted gear shall be outdoor rated and shall be skirted. Terminations may be of a prestretched cold shrink design or heat shrink design. Termination kits shall include one piece silicone rubber termination with solderless mechanical ground assembly to accommodate tape shielded cables. The termination kits shall be utilized with listed copper compression lugs rated for 105 deg C continuous operation. Termination kits shall be properly selected for the conductor type and size involved. Field verify existing cable sizes. Termination kits shall be 3M QT-III series, Raychem TFT or HVT series or approved equal.

23. Each elbow connector at equipment connections (not in manholes) shall be provided with a single phase, test point mounted, fault indicator for mounting on the test point of the connector. Fault indicators shall have integral visual display, automatic reset upon restoration of system voltage (3 to 10 minutes), junction shield feature, and shall operate on a system voltage of 2.4 kV phase-to-ground. Nominal trip rating shall match the maximum ampacity of the cable served and shall be approved by the Engineer. Fault indicators shall be E. O. Schweitzer 1TPRI-J6 series or Hubbell Chance TJS series with junction shield feature or approved equal.
24. Each elbow connector at equipment connections (not in manholes) shall be provided with a single phase hot line indicator for mounting in place of the rubber cap on the connector. Hot line indicators shall be line powered, have flashing neon lamp, be hotstick installable and operate from 2 - 35 kV phase-to-ground. Hot line indicators shall be E. O. Schweitzer VIN600 series, Hubbell/Chance VI600F or approved equal.
25. Splicing and termination kits and elbow connectors shall be properly selected for the conductor type and size involved. The contractor is to field verify the existing cable size and insulation type/thickness before starting work.
26. For all HV terminations (switches, sectionalizers, transformers, etc.) provide an 18" deep, min 12" wide, below grade conduit window with concrete sides and open bottom to allow room for HV cables to turn before connecting to the unit. Conduits are to terminate 3" above the bottom of the window with bushings.
27. Seal all underground conduits at manholes and HV equipment to prevent water from draining from the equipment to manholes or buildings.
28. At the completion of work in power manholes and transformer vaults, the Contractor shall remove all debris, dirt and any other trash already present or created by the construction.

29. All medium voltage cables must be tested. The cable is to be tested on the reel by the manufacturer at time of construction, as per all applicable IPCEA standards. Each reel is to be tested individually. Copies of these tests shall be provided to LSU. The installing contractor shall also hire a testing contractor to test the cable after it is installed in conduits, but before connection to existing cables, equipment or transformers. Cables shall again be tested after all terminations, stress cones and splices have been completed, but prior to connections to any equipment and energization. When new cables are spliced on to existing cables, the cables shall be tested prior to making the splice. On completion of the splice, the entire run of new and existing cable, shall be tested as a unit. The maximum voltage on DC high potential tests is to be per the cable manufacturer's recommendation for new cable and not over the rating of the cable for existing cable. Each time the cable is tested, the following tests shall be made:

- a. Shield Continuity Test
- b. Insulation and Dielectrics Absorption Test
- c. Direct Current (DC) High Potential Test

30. For each existing medium voltage oil switch removed in this project, the contractor shall take an oil sample from the switch and have the sample tested for PCB content. For switches with a separate oil reservoir for each phase, the oil from only one reservoir will need to be tested. For any switches which test above 50 PPM PCB content, the university will drain the oil from the switch, after which the switch would be classified as non-hazardous. After the testing and, if necessary, the draining of the switches, all switches will become the property of the contractor and are to be removed from the campus by him. All testing procedures shall be coordinated with and performed in accordance with the LSU Occupational and Environmental Safety Department requirements. A copy of the test report for each switch shall be provided to the university. The lab performing the testing of samples shall be EPA certified and accredited by the AIHA. (ENTEK and Gulf Coast Analytical are two of several local labs that can perform this work.) Samples shall be tested as required by EPA per TSCA Part 761 (PCBs) using one of the following testing methods:

- a. ASTM D 923-86 (PCB specific)
- b. ASTM D 923-89 (PCB specific)
- c. EPA Method 8270 (PCB must be specified)

**R. MEDIUM VOLTAGE SWITCHGEAR:**

1. Medium Voltage switchgear shall be SF6 type pad mounted switchgear. The switchgear shall be dead front, load break, three phase, 15KV, minimum 600A

continuous current. The switchgear assembly (all switches and interrupters) shall have a minimum fault rating of 25KA symmetrical, 40kA asymmetrical. The switchgear shall generally consist of two non-interlocked, incoming feeder switches without overcurrent protection to select between two medium voltage feeders powering the switchgear. It shall also contain outgoing switches each with automatic load interrupters for each load fed by the switchgear. The quantity of outgoing switch/load interrupters shall be as required by the project. Each load interrupter shall have adjustable, electronic overcurrent trip control to automatically protect for overcurrent and fault conditions. Incoming switches and outgoing load interrupter switches shall be 3 position type (open, closed, ground). The switches and load interrupters shall operate in an insulating medium of SF6 gas contained in a type 304 stainless steel tank. Switches and load interrupters shall operate all three phases together. Each switch and interrupter way shall be provided with a large viewing window at least 6 inches by 8 inches to allow positive verification of the switch operating condition.

2. The switchgear shall be housed in a minimum 14 ga, tamper resistant, steel enclosure with Munsell green finish, access covers and hinged doors with recessed handles containing a pentahead bolt and provisions for pad locking. Provide a matching steel penta head wrench, Nordic Fiberglass Part #PH-1 or approved equal. The enclosure shall be independent of the switchgear, bolt to the concrete pad and be easily removable for replacement. Both the switchgear and the enclosure shall have lifting provisions.
3. Feeder connections shall be made with 600A, dead-break separable elbow connectors with test points. Elbow mounted fault indicators and hot line indicators shall be provided on each elbow connector. The switch enclosure shall be extended to allow for back-to-back elbow connections taking into consideration hot line indicators installed on the back of the outer elbows. Cable connections shall be on the opposite side of the unit from the switch and interrupter operating handles. Provide a minimum 18" deep concrete lined window for the conduit entries to allow space for the cables to be routed to the termination points without exceeding the cable bending radius and putting excessive stress on the elbow connectors.
4. Each switch/interrupter shall be provided with a factory supplied Voltage indicator to indicate the energization status of each phase of the switch respective switch. The indicator shall be visible from the operating side of the switchgear.
5. Each switch/interrupter shall be provided with factory supplied low voltage phase verification pins (one pin per phase) to allow verification of phasing between switches using a low voltage multimeter between the corresponding phase pins of each switch.

6. Medium Voltage switchgear shall be S&C Vista series or G&W Padmount series.
7. Medium Voltage switchgear are to be submitted to LSU for approval before ordering.

#### **S. LIQUID FILLED PAD MOUNT DISTRIBUTION TRANSFORMERS:**

1. Transformer shall be liquid filled pad mounted transformer with the following ratings: 3 phase, 60 HZ, 13.8KV or 4.16KV Delta connected primary, 95KV BIL, 480 WYE/277 volts or 208 WYE/120 volts secondary, 30 KV BIL. Transformers which will initially be connected at 4160V shall have field changeable dual voltage primaries at 4.16KV and 13.8KV with taps operational at both settings to allow the transformer to be reconnected in the future on the 13.8KV system. Transformers which will initially be connected at 13.8KV do not need to have a dual voltage primary. The transformer temperature rise shall not exceed 65 degree C above a 40 degree C ambient. Transformers shall be liquid filled with a 10 C insulating liquid. The transformer shall comply with the latest applicable standards of the American National Standards Institute (ANSI) and be provided with a test report as per ANSI Standards.
2. Transformers shall be compartment type, self-cooled, tamper proof and weatherproof for mounting on a pad. There shall be a transformer tank, high voltage compartment and low voltage compartment assembled as an integral unit. There shall be no exposed screws, bolts or other fastening devices which are externally removable.
3. Transformers shall be of the sealed tank construction of sufficient strength to withstand normal internal working pressures without permanent distortion. The cover shall be welded with a tamper proof bolted and gasketed handhole. Cooling panels will be provided on the back and sides of the tank. Lifting eyes and jacking pads will be provided.
4. The core and coil assembly shall be wound core type with copper windings. A tap changing mechanism shall be provided for accurate voltage adjustment without opening the transformer tank and shall have two 2½% voltage taps above and below the primary voltage. The tap changing mechanism shall be externally operated and shall be for de-energized operation only. Cores shall be high quality silicon steel.
5. The high and low voltage compartments shall be located side-by-side separated by a steel barrier. Terminal compartments shall be full height, air filled with individual doors. The high voltage door fastenings shall not be accessible until

the low voltage door has been opened. The low voltage door shall have a 3-point latching mechanism with vault type handle having provisions for a single padlock. The doors shall be equipped with lift-off type stainless steel hinges and door stops to hold the doors open when working in the compartments. ANSI tank grounding provisions shall be furnished in each compartment.

6. The high voltage terminations and equipment shall be dead front and conform to ANSI C57.12.26 requirements with the number of terminators required for the connection configuration (single radial, dual radial, loop, etc.). Each bushing well shall be suitable for accepting 15KV 600A separable (elbow) connectors. Provide accessory mounting brackets for use with test/grounding bushings or parking bushings adjacent to each bushing well.
7. The primary shall have an oil immersed switch to match the connection configuration and shall contain drywell cartridge current limiting fuses (McGraw Edison Type NX) or oil immersed Bay-O-Net type current limiting fuses. Fuses shall be externally replaceable with distribution hot stick without opening the transformer tank and shall be sized in accordance with the transformer rating to protect against transformer overloads. Fuses shall contain current limiting elements to provide the transformer with a 50,000 AIC symmetrical fault rating.
8. Padmount transformers shall have a recessed, stainless steel, captive, penta head security bolt with 0.560" sides. Provide a matching steel penta head wrench, Nordic Fiberglass Part #PH-1 or approved equal.
9. Furnish the following accessories:
  - a. Nameplate in low voltage compartment.
  - b. One-inch drain plug.
  - c. One-inch upper filter press and filling plug.
  - d. Liquid level gauge.
  - e. Pressure relief device (self resealing with indicator).
  - f. Pressure vacuum gauge
  - g. Temperature gauge
10. Transformers shall be by General Electric, Van Tran, Cooper, ABB, or equal.
11. Provide a permanent sign on the outside of each transformer door stating "Warning High Voltage".
12. Each transformer is to be provided with meter consisting of current and potential transformers as required mounted in the secondary compartment with a watt hour meter and meter pan mounted on the outside transformer housing. The Contractor is to provide all necessary wiring and connections to connect the meter. The meter is to be dial reading with demand indicator. CT's and PT's for

metering shall have 1% accuracy or better. Meter shall have 3 wire pulse initiator designed to communicate with the Campus Building Automation System (Johnson Controls Metasys System) with KWH per pulse as required by that system.

13. Before shipment the actual transformer shall be factory tested in accordance with the provisions of ANSI C57.12.90 and shall include as a minimum the following tests:

- a. RatioPolarity
- b. Phase Rotation
- c. No-Load Loss
- d. Excitation Current
- e. Impedance Voltage

14. A copy of the completed test report indicating passing for each test shall be provided.

15. Transformers are to be submitted to LSU for approval before ordering.

#### **T. TELECOMMUNICATIONS:**

1. Telecommunications shall be in accordance with the LSU Information Technology Services (ITS) requirements available from the LSU ITS (UNI) web site, which can be found by going to [www.lsu.edu](http://www.lsu.edu), and selecting LSU A-Z, Information Technology Services, ITS Units, UNI, Network Construction Requirements. You may also access the UNI requirements directly by going to:

[http://lsu.edu/it\\_services/uni/construction-requirements.php](http://lsu.edu/it_services/uni/construction-requirements.php)

# DIVISION 17 - SUSTAINABILITY

## A. RECYCLING CONSTRUCTION & DEMOLITION WASTE

1. Recycle at least 50% or more of all construction and demolition waste (e.g. concrete, wood, asphalt, scrap metal). **Records must be kept of total weights** (in tons) recycled, and reported to LSU staff periodically/as available.

## B. PLUMBING - Install the most efficient appliances/fixtures possible. Consider the following:

1. Install WaterSense-labeled appliances and equipment.
2. If not Water-Sense-labeled, appliances and equipment must meet these requirements:
  - a. Low-flow faucets (1.5 gallons per minute, or lower)
  - b. Sensor-operated faucets (recommended: 0.5 gpm faucets and 15-second shut-off time).
  - c. Low-flow toilets (1.28 gallons per flush, or lower)
  - d. Low-flow urinals (0.5 gallons per flush, or lower)
  - e. Low-flow showerheads (2.0 gallons per minute, or less)

## C. LIGHTING

1. Install the most energy-efficient lighting available for the lighting task. Consider the following:
  - a. LED lighting wherever possible.
  - b. Install occupancy sensors, timer controls, manual dimming, bi-level switching or automatic daylight dimming for more efficient indoor lighting controls.
  - c. Outdoor lighting: consider motion / photo sensor lighting, dimming controls, or timed lighting that turns off for places like electrical yards.

## D. APPLIANCES AND EQUIPMENT

1. Use the following types of appliances:
  - a. Residential clothes washers – ENERGY STAR labeled
  - b. Residential dish washers – ENERGY STAR labeled
  - c. Pre-rinse spray valves - < 1.3gpm
  - d. Ice machines – ENERGY STAR labeled

## E. REFRIGERANT MANAGEMENT

1. Meet the following (small units of 0.5 pounds or less refrigerant are exempt):
  - a. No CFC-based refrigerants used in new HVAC&R systems.
  - b. If reusing equipment, complete a CFC phase-out plan.



#### **F. HVAC / AIR FILTRATION**

1. For new construction, consider conducting a comprehensive commissioning process for mechanical, electrical, plumbing and renewable energy systems in accordance with ASHRAE 0-2005 and 1.1-2007.
2. Consider demand-response program (system for capability with real-time, fully-automated DR).
3. Consider installation of renewable energy systems (solar PV, solar thermal).
4. Consider green power, carbon offsets, or renewable energy certificates (RECs) for project.
5. Systems for filtering outdoor air to occupied spaces must have particle filters or air-cleaning devices that meet one of the following:
  - a. Minimum Efficiency Reporting Value (MERV) of 13 or higher
  - b. Class F7 or higher (CEN standard EN 779-2002)

#### **G. PAINTS, SEALERS, ADHESIVES – Consider using the following for all projects:**

1. Interior paints & coatings – Meet Green Seal Standard GS-11 (for 90% by volume for VOC emissions, and 100% for VOC content)
2. Adhesives, sealants and sealant primers - comply with SCAQMD Rule 1168.
3. Aerosol adhesives – comply with Green Seal Standard GS-36
4. Anti-corrosive and anti-rust paints – comply with Green Seal Standard C-03
5. Clear wood finishes, floor coatings, stains, primers, sealers applied to interior elements – SCAQMD Rule 1113.

#### **H. FURNITURE / MATERIALS - Generally furniture comes from state-contracted materials. In the event that we are procuring furniture outside of the state contract, consider the following specifications:**

1. Composite Wood - Must be documented to have low formaldehyde emissions that meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEE) resins or no added formaldehyde resins.
2. Furniture - Must comply with ANSI/BIFMA e3-2011 Furniture Sustainability Standard, Sections 7.6.1 and 7.6.2, using either the concentration modeling approach or the emissions factor approach
3. Carpet Systems - Must meet testing and requirements of Green Label Plus program (VOC limit of 50 g/L)

#### **I. ROOFING MATERIALS**

1. For roofs that will not use the standard terracotta tiles, use materials having a Solar Reflectance Index (SRI) equal to or greater than 78 for low-sloped roofs or 29 for steep sloped roofs for a minimum of 75% of the roof surface.
2. Consider green or vegetated roofing.

**J. PARKING LOTS / PAVING MATERIALS**

1. Consider using porous or semi-pervious pavement (e.g. porous asphalt, pervious concrete, interlocking concrete blocks, and gravel/grass pavers, brick pavers) to help manage stormwater. Consider pervious pavement for either entire parking surface, or parking stalls, crosswalks and overflow lots.
2. Consider using paving materials with Solar Reflectance Index of at least 29
3. Consider installation of swales, retention basins, vegetated buffer strips, infiltration systems, constructed wetlands and/or rain gardens (bioretention areas) to help manage stormwater.
4. Materials - Consider use of recycled asphalt, recycled rubberized asphalt

**K. SITE SELECTION / LANDSCAPE**

1. Minimize runoff and erosion on steep slopes (maximum slope of 3:1 for grassy slopes, or 2:1 slopes without turf or ground cover).
2. As much as possible, avoid removing any mature live oaks or other trees.
3. Reuse trees and shrubs where possible.
4. Recycle/compost all cleared vegetation.
5. Retain as much of the existing native landscaping as possible.
6. Use native plant species
3. Use irrigation techniques that are water-efficient: consider low-flow sprinkler systems, soaker hose, drip or subsurface irrigation.
4. Incorporate large trees into the landscape plan.
5. Incorporate clusters of trees into the landscape plan.
6. Incorporate undergrowth into the landscape plan.
7. Install root protection to protect tree roots from compaction during construction.
8. Provide sediment control barriers where fill or excavate will be temporarily located