DESIGN GUIDELINES AND STANDARDS
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21 West Church Street
Jacksonville, Florida 32202-3139

June 12, 2001

Mr. Dan Endicott
University of North Florida
Office of Environmental Health & Safety
Insurance & Risk Management
4667 St. John’s Bluff Road, South
Jacksonville, FL 32224-2848

Dear Mr. Endicott:

It was a pleasure speaking with you last week regarding construction of the new laboratory building on the UNF campus.

I received a fax letter from you on June 4, 2001 indicating the University’s preference to forego installation of an acid dilution tank at this building to neutralize corrosive liquids before they enter the sanitary sewer system. In your letter, you indicated that UNF has a number of control measures for the proper disposal of chemical wastes, including the following:

1. UNF prohibits the improper disposal of chemical waste via the sanitary sewer system;
2. UNF uses a centralized chemical acquisition system;
3. UNF conducts annual lab safety surveys to include chemical storage and disposal procedures;
4. UNF provides annual RCRA training for lab faculty and staff;
5. UNF has a centralized chemical waste accumulation and disposal program.

We understand your concern that acid dilution tanks may become subject to waste characterization and the tank could become a permit-required treatment facility. Based on the comprehensive institutional controls you have in place, the Industrial Pretreatment Department agrees that there is little need for the dilution tank, and we will not require you to have it in place.

We commend you on your thorough pollution prevention and appropriate waste handling activities, and thank you for bringing this to our attention. JEA offers our best wishes to UNF in your endeavor to provide high quality Science and Engineering facilities to your students.

Sincerely,

[Signature]

Paul Steinbrecher, PE
JEA Manager, Industrial Pretreatment
01 41 00 UNF Landscape MOU With County – EXHIBIT 2

UNIVERSITY OF NORTH FLORIDA

Adam W. Herbert
President

12 September 1991

Chancellor Charles B. Reed
State University System of Florida
1514 Florida Education Center
325 West Gaines Street
Tallahassee, Florida 32399-1950

Dear Charlie:

I am pleased to advise you that we have reached complete agreement with the City of Jacksonville relative to the tree ordinance. The City's Chief Administrator Officer has signed the attached Letter of Agreement. We also have received a signed memorandum from the Building & Zoning Inspection Division indicating our compliance with the spirit and intent of the Landscape and Tree Protection regulations.

I greatly appreciate your advice and Greg Gleason's intervention with the City Attorney.

Sincerely,

Adam

cc: Greg Gleason

4567 St. Johns Bluff Road, South, Jacksonville, Florida 32216-6699
An Equal Opportunity Institution
12 September 1991

Mr. Lex A. Hester
Chief Administrative Officer
Office of the Mayor
City of Jacksonville
1400 City Hall
Jacksonville, Florida 32202

RE: Resolution of Zoning Dispute

Dear Mr. Hester:

This letter will confirm our understanding of how the current difference of opinion between the University of North Florida ("UNF") and the City concerning the applicability of certain portions of the City’s Ordinance Code to UNF may be resolved to the mutual benefit of both parties. We understand the City’s policy of enforcing the Landscape and Tree Protection Regulations, which comprise a part of the City’s Zoning Code, against all governmental agencies, including state agencies, arises out of its desire to act in the best interest of all of the citizens of Jacksonville, and that it is to the benefit of the City as a whole to protect trees from destruction during development to the greatest possible extent and to establish minimum landscaping standards for all development.

Accordingly, UNF will agree to comply with the spirit and intent of the Landscape and Tree Protection Regulations and will provide its landscape and site plans for review by the City’s Building & Zoning Inspection Division to ensure that the requirements of the law are met. However, the City will continue to treat UNF as it has in the past, and as it continues to treat all other state agencies, and will not require UNF to obtain any permits which would otherwise be required under the zoning regulations.

AN AFFIRMATIVE ACTION = EQUAL OPPORTUNITY EMPLOYER
Mr. Lex A. Hester  
12 September 1991  
Page Two  

Your acknowledgement on behalf of the City, in the space provided below, will constitute an immediate resolution of all issues which are currently in dispute between UNF and the City and will authorize UNF to continue site clearing immediately at the gymnasium site, provided the above-specified gymnasium plans are furnished to the City within a reasonable period of time from the date hereof.

Sincerely,

[Signature]

Adam W. Herbert  
President  

ACCEPTED and AGREED TO  
BY THE CITY OF JACKSONVILLE  

By: [Signature]  
Lex A. Hester  
Chief Administrator Officer  

AWH/bgs
Honorable Robert B. Mautz
Chancellor
State University System of Florida
107 West Gaines Street
Tallahassee, Florida 32304

Re: STATE UNIVERSITIES—applicability of a county tree ordinance to university campus.

Dear Chancellor Mautz:

This is in response to your request for an opinion upon the following question:

ARS LANDS OWNED BY THE STATE OF FLORIDA IN ITS GOVERNMENTAL CAPACITY, SPECIFICALLY THE UNIVERSITY OF FLORIDA CAMPUS, SUBJECT TO THE ATTACHED TREE ORDINANCE OF ALACHUA COUNTY (A POLITICAL SUBDIVISION OF THE STATE), WITHIN WHOSE BOUNDARIES SAID LAND IS LOCATED?

Previous opinions of this office relating to the applicability of city and county regulatory ordinances to state-owned property indicate that your question should be answered, generally, in the negative.

In AGO 071-203A, in ruling on the question of whether the City of Gainesville or Alachua County could exercise its police power over the campus of the University of Florida, I said:

... the police power of a municipality or county respecting matters such as zoning,
building codes, the sale or use of alcoholic beverages, licensing or other regulatory ordinances, and the like, cannot be enforced against the state—its agencies and its property—in the absence of an act of the state legislature manifesting a legislative intent to waive the state’s immunity from such local regulation.

According to AGO 074-237, applying the same rule to the question of whether a municipality’s zoning regulations could validly be applied to regulate the Division of Youth Services, a state agency, in carrying out its official duties with respect to the placing of children in foster group homes.

I am not aware of any changes in the constitutional or statutory law of this state since the 1971 opinion was rendered—nor, certainly, since the 1974 opinion, dated August 8, 1974; was adopted—that would require a different ruling. It follows, therefore, that the University is not required to obtain a county permit before removing or destroying a tree on the campus in order to carry out a governmental function. The caveat of AGO 074-237 should not, however, be overlooked. It was there noted that state agencies must always seek to act reasonably in any situation; and attention was directed to the article Governmental Immunity From Local Zoning Ordinances, 84 Harv. L. Rev. 869 (1970-71), stating that the author

...proposes the application of a "balancing of interests" test when the accomplishment of one governmental entity’s statutorily-assigned duty conflicts with another governmental entity’s local regulations.

Your question is answered accordingly.

SUMMARY

Ordinarily, lands owned by the State of Florida are not subject to the regulatory ordinances of the county within whose boundaries such lands are located, and a
university is not required to obtain a county permit, as required by the county's tree ordinance, before removing or destroying a tree on the campus in order to carry out a governmental function.

Sincerely,

ROBERT E. SHEVIN
ATTORNEY GENERAL

Prepared By:

Rebecca Bowles Hawkins
Assistant Attorney General

RDS/RBH/dw
01 41 00 UNF Building Code Administration Program Design and Construction Checklist Guideline – EXHIBIT 3

1. General

   A. Related Documents: Use the following link to access the current Design and Construction Checklist Guideline.

   1. [http://www.unf.edu/ehs/Building_Code_Administration.aspx](http://www.unf.edu/ehs/Building_Code_Administration.aspx)
01 58 13 Project Identification – Temporary Project Signage – EXHIBIT 1
01 81 13 Sustainable Design Requirements

1. General

A. LEED: All new UNF facilities are to be LEED accredited.
01 83 00 Facility Shell Performance Requirements

1. General

A. Roofs:

I. Roof Access:

a. If permissible by project's budget, it is preferable to have elevator access to facility roof deck(s).

b. All buildings must have parapets at roof edges.

c. Gravel stops and flashing are not to be used.

d. Parapets that act as a railing for rooftop areas are to be 42 inches high minimum.

e. Other parapets are to be 24 inches minimum and shall be used to define roof edge.

II. All rooftop equipment shall be at least 6 feet from the roof’s edge. If this is unachievable and if adjacent parapets are less than 42 inches, rooftop anchorage points are to be installed/utilized.
01 84 00 Interiors Performance Requirements

1. General

A. **Exterior Stairways:** Exterior stairs shall be fully enclosed but need not be air conditioned.

B. **Gender Neutral Restrooms:** Provide gender neutral restrooms and outfit with baby diaper changing stations.

**Custodial Work Rooms Diagram – EXHIBIT 1**

Not to Scale

**Minimum Requirements for Janitor Work Closet Each Floor**
1. Room for one 2’ x 8’ Metal Shelf for Daily Supply Stock.
2. Room for one Floor Cart (2’ x 4’)
3. Floor Vacuum for Carpet.
4. Room for one round trash can (2’ Dia.)
5. Mop, Mop Bucket, Dust Mop, Broom, etc.
6. One Mop Sink.
7. At least one 120 v 20 a duplex outlet.
8. Lights switch
01 89 16 Site Improvements Performance Requirements

1. General

A. Site Access:
   I. New building designs should include site access for service vehicles, electric carts and bicycles.
   II. To the extent possible, adjacent sidewalks shall be ADA compliant.

B. Storage or service yard areas shall be enclosed with privacy fence.

2. Stormwater Management Program

A. Design Team Responsibilities:
   I. The design team will identify and design the requirements to control construction site stormwater runoff in the project Construction Documents.
   II. Design stormwater control and collection systems for the project
   III. Construction site stormwater runoff control – sediment fencing requirements
   IV. Post construction stormwater management – establishment of turf and duration of sediment fencing. Also confirmation of stormwater control devices are functioning.

B. Contractor Responsibilities:
   I. Coordination and installation of construction site stormwater runoff control measures will be the responsibility of the Contractor as identified in the Construction Documents.
   II. Post construction stormwater management
   III. Erosion Control
      • Minimize disturbed area
      • Phase construction activity
      • Control stormwater flowing onto and through the project
      • Stabilize soils promptly
      • Protect slopes
IV. Sediment Control

- Protect Storm drain inlets
- Establish perimeter controls
- Retain Sediment on-site and control dewatering practices
- Establish stabilized construction exits
- Inspect and maintain controls

V. Non-Compliance

- If any time the storm water control devices are not properly functioning, they must be corrected in a timely manner. Failure to do so will result in the withholding of payment until corrective measures have been satisfactorily taken.

C. Best Management Practices:

I. Provide for waste management with control and disposal of construction materials.

II. Establish proper building material staging areas

III. Designate paint and concrete washout areas

IV. Establish proper equipment/vehicle fueling and maintenance practices

V. Control equipment/vehicle washing and allowable non-stormwater discharges

VI. Develop a spill prevention and response plan

VII. Provide contact information including phone number on job site sign
05 00 00 Metals
05 73 00 Decorative Metal Railings – EXHIBIT 1

A. All handrails and railings shall be powder-coated aluminum to match Color XXXX.

3" Ø ALUMINUM PIPE TOP RAIL

1/2" X 1" ALUMINUM BORDER TRIM ALL AROUND INFILL PANEL

2" Ø ALUMINUM PIPE VERTICAL POST BEYOND

2" X 2" ALUMINUM GRID INFILL PANEL - GAUGE TO MATCH UNF STANDARDS AND EXISTING INSTALLATIONS ON CAMPUS.

2" Ø ALUMINUM PIPE BOTTOM RAIL

CONCRETE CURB

FINISHED FLOOR

NOTE:
POWDER COAT ALL ALUMINUM RAILING COMPONENTS SILVER

GUARDRAIL SECTION
GUARDRAIL SECTION

- 3" Ø ALUMINUM PIPE TOP RAIL
- 1/2" X 1" ALUMINUM BORDER TRIM ALL AROUND INFILL PANEL
- 2" Ø ALUMINUM PIPE VERTICAL POST
- 2" X 2" ALUMINUM GRID INFILL PANEL
- 2" Ø ALUMINUM PIPE BOTTOM RAIL
- CONCRETE CURB
- FINISHED FLOOR
07 00 00 Thermal & Moisture Protection
07 52 16 Styrene-Butadiene-Styrene Modified Bituminous Roofing

1. Products

A. Styrene-butadiene-styrene (SBS) modified bituminous membrane roof, directly applied to either lightweight insulating concrete roof substrates or to flat and tapered rigid insulation roof substrates.

B. Manufacturer - Basis-of-Design is Siplast, Inc.
08 00 00 Openings
08 00 00 General

1. Door, Frame and Hardware Design Information and General Application Requirements:

   Minimum Door Width: No doors (interior or exterior) to be less than 3 feet in width and 7 feet in height.

   Door Hinges: Hinges shall be provided per the following quantity requirements, unless specifically indicated otherwise in division 08 71 00 Project specific Construction Documents:

   i. For doors up to, but not exceeding 3 feet in width and / or 7 feet in height shall be provided with 3 each hinges.

   ii. Doors greater than 3 feet in width and / or greater than 7 feet in height shall receive at least 4 each hinges, unless continuous hinges are specified.

   Exterior Door Assemblies: All exterior door assemblies shall meet the requirements of the applicable version Florida Building Code in which the building has been permitted.

   Fiberglass Door Usage: Fiberglass doors (FRP) are to be considered for some exterior door entry applications (mechanical & electrical rooms, etc.). Confirm FRP door and frame locations with Owner and Project Design Team.

   Applicability: Proper application of these types of doors and associated mechanical and electromechanical door hardware shall be at the sole discretion of the Owner and Project Design Team. Information detailed herein shall be considered a guide only, and in no way are to be considered applicable to all facilities and openings.

   Key Issuance:

   • Students: Intellikey and Osprey Card only.
   • Adjuncts: Intellikey and Osprey Card only.
   • Full-time faculty & staff: Intellikey / Osprey Card / hard key.
### 2. Product Procurement and Installation Matrix – EXHIBIT 1:

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<tr>
<td>Div. 08</td>
<td>Hollow Metal Frames</td>
<td>D.H.C.</td>
<td>M/D</td>
<td>A/C / B.A.S. / E.C.</td>
<td></td>
</tr>
<tr>
<td>Div. 08</td>
<td>Hollow Metal / FRP / Wood Doors</td>
<td>D.H.C.</td>
<td>D.H.C.</td>
<td>A/C / B.A.S.</td>
<td></td>
</tr>
<tr>
<td>Div. 08</td>
<td>Aluminum Doors, Frames and Aluminum Door Hardware Only</td>
<td>A.D.S.</td>
<td>A.D.S.</td>
<td>A/C / B.A.S. / E.C.</td>
<td></td>
</tr>
<tr>
<td>Div. 08</td>
<td>D.H.</td>
<td>Mechanical Hardware</td>
<td>D.H.C.</td>
<td>D.H.C.</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electromechanical Hardware (including Wi-Fi locksets)</td>
<td>D.H.C.</td>
<td>D.H.C.</td>
<td>A/C / B.A.S.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Power Supplies (Door Hardware Only)</td>
<td>D.H.C.</td>
<td>D.H.C.</td>
<td>A/C / B.A.S.</td>
</tr>
<tr>
<td>Div. 26 / 27</td>
<td>Conduit Throughout Facility</td>
<td>E.C.</td>
<td>E.C.</td>
<td>A/C / B.A.S.</td>
<td></td>
</tr>
<tr>
<td>Div. 26 / 27</td>
<td>Cabling Throughout Facility</td>
<td>S.I.C. / C.C.</td>
<td>S.I.C. / C.C.</td>
<td>A/C / B.A.S.</td>
<td></td>
</tr>
<tr>
<td>O.F.</td>
<td>Surveillance Cameras / Head End Equipment</td>
<td>O.F.</td>
<td>S.I.C.</td>
<td>A/C</td>
<td></td>
</tr>
</tbody>
</table>

**LEGEND**

- **D.H.C.** Door Hardware Contractor
- **D.H.** Door Hardware
- **M/D** Masonry and / or Drywall Trades
- **A.D.S.** Aluminum Door Supplier
- **A.O.S.** Automatic Door Operator Supplier
- **A.D.O.** Automatic Door Operator (Swing and Sliding)
- **S.I.C.** Security Integrator Contractor
- **C.C.** Cabling Contractor (if separate from S.I.C.)
- **B.A.C.** Building Automation Contractor
- **E.C.** Electrical Contractor
- **O.F.** Owner Finished
- **B.A.S.** Building Automation System
- **A/C** Access Control System
- **DPS** Door Position Switch
3. Locking Device General Application Matrix – EXHIBIT 2:

<table>
<thead>
<tr>
<th>OPENING TYPE:</th>
<th>LOCKING DEVICE TYPE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Bldg. Entrance</td>
<td>Exit device – scheduled locking or unlocking, card reader access control when door electronically locked. Automatic operator may be required, application to be determined by Owner / design team.</td>
</tr>
<tr>
<td>Office Suite Entry</td>
<td>Wi-Fi mortise lock – (battery / hardwired power) or exit device with card reader if required by code. Scheduled locking or unlocking. Automatic operator may be required, application to be determined by Owner / design team.</td>
</tr>
<tr>
<td>Single Office within a Suite</td>
<td>Mechanical mortise lock, with thumb-turn deadbolt.</td>
</tr>
<tr>
<td>Single Office NOT within a Suite</td>
<td>Wi-Fi mortise lock, with thumb-turn deadbolt - (battery powered).</td>
</tr>
<tr>
<td>Mechanical / Electrical Room</td>
<td>Storeroom function – mechanical keyed.</td>
</tr>
<tr>
<td>Comm. / IDF / MDF Room</td>
<td>Wi-Fi mortise lock - (battery powered).</td>
</tr>
<tr>
<td>Classroom</td>
<td>Wi-Fi mortise lock – (battery / hardwired power) or exit device with card reader if required by code. Scheduled locking or unlocking. Automatic operator may be required, application to be determined by Owner / design team.</td>
</tr>
<tr>
<td>Janitor Closet</td>
<td>Storeroom function – mechanical keyed.</td>
</tr>
<tr>
<td>Gang Restroom</td>
<td>Automatic door operator generally required, typically push / pull with classroom deadlock.</td>
</tr>
</tbody>
</table>

NOTES: The above mentioned information is a general guide only, each facility, Project and opening may have specific requirements that do NOT follow the above mentioned guidelines. The Owner’s design team shall be involved in any and all design decisions, regardless of the circumstance.

Auxiliary DPS devices to be used at most exterior openings, monitored by access control system and building automation system.

Automatic door operators to be provided with hardwired actuators, NO wireless radio frequency (RF) actuators to be provided, unless Project Contract Documents specifically call for said wireless devices.

Typically, exterior doors with mechanical and / or electromechanical ingress capability are to be tied into the UNF Campus Wide Lockdown system via electromechanical locking.

In some specific cases, auxiliary local lockdown / local time of delay override functions may be required for specific large assembly areas and / or main entry openings for override of time of day locking. This situation is to be determined by the Owner / design team on a case by case situation, and is not applicable at all buildings.
08 11 13 Hollow Metal Doors and Frames

1. Quality Assurance

A. Pre-installation Conference: Contractor shall coordinate a pre-installation conference prior to installation of hollow metal doors and frames. Required attendees: UNF Project Manager, UNF Lock Department, Architect, Door Hardware / Security Consultant Project Manager, Door / Frame / Hardware Supplier and Installer, Security Integrator Contractor and Electrical Contractor. Review methods and procedures related to mechanical and electromechanical doors, frames and hardware including, but not limited to the following:

Review and finalize construction schedule and verify availability of materials, installer’s personnel, equipment and facilities needed to make progress an avoid delays. Present General Contractor with a written report indicating the conditions of floors, walls, or other building or environmental features that may adversely impact the installation or proper operation of doors, frames, and hardware. Review installer’s responsibilities for testing, inspecting and adjusting doors and frames.

B. Door / Frame Gap Tolerances: Contractor shall utilize frame tolerance check list report for each opening to verify proper installation. See 08 11 13 EXHIBIT 1 as well as Project.

2. Products

Interior Doors and Frames Basis of Design:

Door Design: Flush panel, polystyrene core.

Door Gauge: 16 gauge.

Door Steel: A60 galvanized steel sheet, cold-rolled steel sheet, continuously welded.

Door Edges: Seamless welded vertical edges, fill and grind smooth. Horizontal edges, tack weld, fill and grind smooth.

Doors and Frames: Factory baked primer ready for paint.

Frame Gauge: 16 gauge for 36” and under widths. 14 gauge for 36” and over widths. All frame materials shall be minimum A60 Galvanized Steel Sheet. Continuous welded.
Exterior Doors Basis of Design:

Door Design: Flush panel, polystyrene core.

Door Gauge: 16 gauge.

Door Steel: G90 galvanized steel sheet, cold-rolled steel sheet, continuously welded.

Door Edges: Seamlessly, continuous welded top and vertical edges, fill and grind smooth. Bottom edge, tack weld, fill and grind smooth.

Doors and Frames: Factory baked primer ready for paint.

Frame Gauge: 14 gauge, materials shall be minimum A60 Galvanized Steel Sheet. Continuous welded, seamless and ground smooth.

Hardware Reinforcement: Fabricate with internal reinforcing plates as follows: 7-gauge hinge reinforcements, 12-gauge continuous sleeve closer reinforcements suitable for face mount or soffit mount door closer arms.

Rated Door Label Requirement: Fire rated doors require metal applied label indicating rating designation.

Electrified Openings: Doors and frames shall be factory pre-wired with sufficient number of concealed wires to accommodate electric function of specified hardware. Provide Molex type standardized plug in connectors to accommodate up to twelve wires.
3. **08 1113 Hollow Metal Frame Tolerances – EXHIBIT 1:**

The following report must be completed for each door frame on the project, new or existing. Reports are to be initiated after installation of frame and prior to installation of adjacent walls or construction. Reports must be re-verified during and after completion of the adjacent construction. Tolerances must comply with the requirements of the Project specific tolerance specified in specification Section 08 11 13.

![Diagram of Hollow Metal Frame Tolerances]

<table>
<thead>
<tr>
<th>Date:</th>
<th>Project:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure / Area:</td>
<td>Door Number:</td>
</tr>
<tr>
<td>Frame Type:</td>
<td>Description:</td>
</tr>
<tr>
<td></td>
<td>Within Specified Tolerances:</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Hinge Jamb Plumb:</td>
<td></td>
</tr>
<tr>
<td>Strike Jamb Plumb:</td>
<td></td>
</tr>
<tr>
<td>Header Level:</td>
<td></td>
</tr>
<tr>
<td>Header Square:</td>
<td></td>
</tr>
<tr>
<td>Frame Alignment:</td>
<td></td>
</tr>
<tr>
<td>Hinge Jamb Twist:</td>
<td></td>
</tr>
<tr>
<td>Strike Jamb Twist:</td>
<td></td>
</tr>
<tr>
<td>Proper Frame Prep:</td>
<td></td>
</tr>
<tr>
<td>Inspection Date:</td>
<td></td>
</tr>
<tr>
<td>Inspected By:</td>
<td></td>
</tr>
</tbody>
</table>
08 14 16 Flush Wood Doors

1. General

Interior solid-core doors shall have wood-veneer faces compliant with Project specific wood door specification requirements.

Doors shall be factory finished flush wood doors.

Fit flush wood doors to frames and factory machine doors for hardware.

2. Products

WDMA I.S.1-A Performance Grade: Type I: Extra Heavy Duty.

Construction: Five plies minimum, hot pressed.

Cores: Structured Composite Lumber Core (SCLC) Doors to be used at non-rated and 20-minute rated openings.

Fire Rated Door Cores: Mineral-Core Doors to be used at 45, 60, and 90-minute rated openings. Mineral Core doors shall have sufficient blocking for all surface mounted hardware eliminating the need for through bolting.

Stiles: 1-3/8 inches prior to factory trimming, glued to core. Stiles shall be hardwoods of same species as face veneers.

Matching: Pairs within same opening.

Labeling: Fire rated doors require metal applied label indicating rating designation.

Electrified Openings: Doors shall be pre-wired with sufficient number of concealed wires to accommodate electric function of specified hardware. Provide Molex type standardized plug in connectors to accommodate up to twelve wires.

Warranty: Lifetime of installation.

Glass Lites: to be wired glass in areas where there are security concerns. For door and frame assemblies requiring a fire rating, wired glass or laminated glass can be utilized dependent on aesthetic concerns. Ceramic glazing is preferred, coordinate with UNF PM

Fabrication:
Factory machine doors for hardware that is not surface applied. Internally reinforce wood doors for attachment of hardware specified without requirement of the use of thru bolts.

Factory finish doors with manufacturer’s standard stain color and sheen as selected by the architect per Project specific specification requirements.

**Factory Finishing:**

Factory finish door faces and vertical edges to match the veneer, stain, cut, color and sheen selected by the architect.

Finish:

UV Cured system with performance properties equivalent to TR-6 or OP-6 catalyzed polyurethane.

Individually protect doors with factory poly-wrap.
08 41 33 Aluminum Entrances and Storefronts

1. General

A. **Summary:** Section includes:
   I. Exterior aluminum storefront swing doors and frames.

2. Products

B. **Manufacturers:**
   I. Manufacturers: Provide products by one of the following:
      a. Kawneer.
      b. YKK AP America Inc.
   II. Note: All exterior aluminum storefront swing door and frame assemblies must meet applicable version of Florida Building Code windstorm requirements as detailed on Project specific drawings and specifications.

C. **Framing Systems:**
   I. Framing Members: Extruded-aluminum meeting ASTM standard requirements as detailed in Project specifications and/or elevation drawings.
   II. Glazing: Double glazed. Design for replacement of glazing without disassembly of system. Thickness shall be reinforced as required to support imposed loads per structural engineering drawings.

D. **Entrance Door Systems:**
   I. 500 series (Basis of design: Kawneer).
   II. Construction 1-3/4 inches overall thickness extruded-aluminum.
   III. Design: Wide stile, 5 inches width, intermediate rails required unless specifically otherwise noted.
   IV. Top, bottom and intermediate rails to be 6 inches, unless specified otherwise in Project specific drawings and specifications.
   V. Door maximum 7 feet 0-inch height, unless specifically otherwise noted.

E. **Entrance Door Hardware:**
   I. **Cylinders:** Specified in Section 08 71 00 “Door Hardware.”
II. **Hinges**: Specified in Section 08 71 00 “Door Hardware.”

III. **Mortise Locks**: Specified in Section 08 71 00 “Door Hardware.”

IV. **Manual Flush Bolts**: Not to be used unless specifically specified in Project contract documents.

V. **Automatic and Self-Latching Flush Bolts**: Not to be used unless specifically specified in Project contract documents.

VI. **Exit Devices**: Specified in Section 08 71 00 “Door Hardware.”

VII. **Closers**: Specified in Section 08 71 00 “Door Hardware.”

VIII. **Concealed Overhead Holders**: Specified in Section 08 71 00 “Door Hardware.”

IX. **Door Stops**: Specified in Section 08 71 00 “Door Hardware.”

X. **Weather Stripping**: Provide manufacturer recommended kerf-in weather stripping at door perimeter and door meeting stiles, meeting all applicable building codes, tested and listed under applicable version of the Florida Building Code.

XI. **Thresholds**: Provide extruded aluminum raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch. Provide manufacturer recommended thresholds, meeting all applicable building codes, tested and listed under applicable version of the Florida Building Code.

F. **Fabrication**:

I. Form or extrude aluminum shapes before finishing.

II. **Welding**: Comply with AWS recommendations. Weld in concealed locations to greatest extent possible; grind exposed welds smooth and restore finish. Provide lifetime warranty.

III. **Reinforcing**: Install reinforcement as required for hardware and necessary for performance requirements, sag resistance and rigidity.

IV. **Dissimilar Metals**: Separate dissimilar metals with zinc chromate primer, bituminous paint, or other separator that will prevent corrosion.

G. **Aluminum Finishes**: Unless specified otherwise in Project specific specifications, provide the following at all aluminum doors and frames:

I. **Clear Anodic Finish**: AAMA 611, AA-M12C22A41, Class I, 0.018 mm.
08 71 00 Door Hardware

1. General:

   Summary: Section includes:

   Interior and Exterior Mechanical and Electromechanical Door Hardware Application.

2. References:

   A. Door Hardware Procurement and Installation Matrix:

       See “08 00 00 Product Procurement and Installation Matrix – EXHIBIT 1” for general
door hardware product procurement and installation responsibility matrix.

   B. Locking Device Application Matrix:

       See “08 00 00 Locking Device General Application Matrix – EXHIBIT 2” for general
application of locking device applications.

   Automatic Door Openers: For each project, the respective design team is to arrange for
a meeting with UNF’s ADA Compliance Director upon entering the project’s Design
Development phase to ascertain where UNF desires these devices to be located. Typically,
among automatic door openers are located on the following door types:

   - Public restroom facilities.
   - Main exterior facility entry doors.

   UNF Remote Lock Down System - Exterior Door Electro-Mechanical Hardware: UNF’s campus remote lock-down / time of day locking override system interfaces with a standalone push button and / or key switch operated locking / unlocking interface to openings that may need to be individually locked or unlocked outside of the pre-programmed time of day, pre-programmed facility opening and closing schedule. Specific design of said system shall be designed into each Project on a Project specific basis, taking into considerations facility’s function, campus wide lockdown functionality, student / faculty and staff personal safety, security and overall feasibility of said system into consideration.

   UNF Remote Lock Down System - Programming Options: UNF’s campus remote lock-down system’s electronic hardware is remotely controlled by UNF’s Access Control System software. This software is programmed by UNF’s Physical Facilities Department and is monitored by UNF’s Police Department. Time schedule information is
programmed into this system’s software by Physical Facility staff allowing a facility’s exterior door openings, equipped with this automatic hardware arrangement, to be remotely locked-down or opened-up at various desired times. Changes to a facility’s door security schedule can be made by submission of a Physical Facility work order request for such.

**OPTION 1A: “Permanent Unlocked” with Non-Classroom Function Hardware:**

This programming provides for free access into a space. When a door's electro-mechanical hardware is programmed to be in this mode, the following occurs:

- Door's hardware latch bolts and/or interior rods are electrically retracted.
- UNF Police Department does not get alarm notices when doors are opened.
- This “override” switch allows the building employees to manually control when the electro-mechanical hardware is energized.

In the Permanent Unlocked mode, at the end of the business day, the override switch may be manually thrown which energizes the electro-mechanical hardware and the door is secured in a locked position. When the employee arrives the next day to “open-up” these doors to the public, the employee then may active the door to a “permanently unlocked state” via presentation of valid card credential to a card reader or by simply depressing a wall or desk mounted push button, thus retracting the latch bolts on the entry door, unlocking the entry door for free public access.

Please note: UNF PD can override the “override switch” whenever necessary to lock down said openings during an emergency event. In the event of an emergency, if these doors are currently “dogged-down” by the override switch, UNF PD can remotely release the electro-mechanical hardware’s internal component devices to release the latch bolt(s) to lock down the opening(s).

**OPTION 1B: “Permanent Unlocked” with Classroom Function Hardware (Hard Key Operation) – Door Open Programming:**

This programming provides for free access into a space, yet the hardware allows the user of the space to manually dog-down the exit device for free public access as desired without the use of an override switch system. When a door's electro-mechanical hardware is programmed to be in this
mode, the following occurs:

Door's hardware latch bolts and/or interior rods are manually retracted.

UNF Police Department does not get alarm notices when doors are opened.

In order for the UNF employee to have control over the opening of their exterior storefront door at the beginning of the business day and closing (securing) at the close of business hours, classroom type function hardware has been installed on their exterior storefront door. This hardware allows the user to manually control when the mechanical hardware is placed in either a locked or unlocked (dogged) position.

**OPTION 2: “Permanent Lock” – Door Locked Program:**

This programming provides for no access into an area unless an individual has been granted rights via his UNF issued Card Credential. When individuals access these doors with their Card Credential, they are able to disengage the electro-mechanical hardware by use of the hardware set's thumb turn. Upon entry into the space, the door(s) shut behind the individual in a locked down mode. These doors cannot be “dogged-down” with any device other than remote programming.

**OPTION 3: “Time Schedule Programming” – Automatic Door Opening and Closing Programming:**

Recommendations for establishing electro-mechanical trade responsibilities in regards to a general contractor's procurement and installation of UNF's remote lock down system, please refer to EXHIBIT 1 in Division 08 – Door Hardware Resource Matrix.

### 3. Quality Assurance

**Physical Security Consultant / Designer Requirement:** Project specific architect shall employ a non-manufacturer affiliated, independent Physical Security Consultant to specify doors, frames, mechanical and electromechanical hardware and provide security drawings to achieve the above mentioned locking arrangements. Consultant shall produce detailed security drawings indicating all electro-mechanical hardware, card readers, power transfer devices, door position switches, and door security riser diagrams. Diagrams shall include a complete operational narrative of each specific door opening, automatic door operators and low voltage power supplies.

**Supplier Qualifications:** Hardware supplier must be engaged regularly in
contracting work and be staffed to expedite work; the firm shall have been furnishing hardware on similar projects in the geographic area for not less than five years. The supplier must have in his employ a certified Architectural Hardware Consultant (AHC) to direct detailing, setting, and applying of all hardware items. The supplier shall be an authorized factory direct dealer of major hardware items listed in this specification.

**Installer Qualifications:** Hardware for the project shall be installed by factory authorized personnel who have successfully completed factory training courses and shall be certified for the installation of locksets, door closers and exit devices. Prior to installation the installer shall inspect all door frames for proper plumb and square condition. General contractor shall be notified of frames found out of square, plumb or unsuitable for door installation at the installation meeting.

**Electronic / Electromechanical Hardware:** It shall be the responsibility of supplier to coordinate with the approved manufacturer and the electrical / security / fire systems contractor all electronic / electrical finish hardware items covered within this section via factory wiring diagram showing point to point connections, riser diagram, operational narrative and system schematic. Wiring diagram shall be furnished with Door Hardware Submittals (See 1.06). Submittals without Factory Wiring Diagrams will be rejected without review.

**Pre-installation Conference for Mechanical Hardware:** Conduct conference at project site to comply with requirements in Division 01 Section “Project Meeting.” Review methods and procedures related to mechanical door hardware, including but not limited to the following:

- Review and finalize construction schedule and verify availability of materials, installer’s personnel, equipment and facilities needed to make progress and avoid delays.
- Present general contractor with a written report of the condition of door frames in terms of squareness and any other condition that may impede the installation and operation of the doors and hardware.
- Review installer’s responsibilities for testing, inspecting and adjusting doors and hardware in accordance with 087100 Part 3 EXECUTION.

**Pre-installation Conference for Electrified Hardware:** Conduct conference prior to electrical Rough-in for electro-mechanical hardware components. Required attendance: UNF Project Manager, UNF Lock Department, Architect, Door Hardware (AHC) / Security Consultant, BAS System Integrator, Electrical Contractor, Door Hardware Supplier, Security Integrator, Aluminum Door Supplier and Automatic Door Operator Supplier. Review methods and procedures related to electrified door hardware including, but not limited to the following:
Discuss electrical rough-in requirements and other preparatory work to be performed by other trades.

Review sequence of operation for each type of electrical door hardware.


Review and finalize construction schedule and verify availability of materials, installer’s personnel, equipment and facilities needed to make progress and avoid delays.

**Florida Wind and Impact Requirements:** All hardware shall meet or exceed requirements for Wind Pressure and Impact ratings. Furnish copies of Notice of Acceptance as required by the architect.

**Electrical Products:** To assure proper integration, all electrical products to be produced by the same manufacturer.

### 4. Products: NOTE: ALL DOOR HARDWARE LISTED BELOW SHALL BE REFERENCED AS A GENERAL GUIDE ONLY. PROJECT SPECIFIC DOOR HARDWARE SHALL BE PROVIDED PER PROJECT SPECIFIC SPECIFICATIONS AND DRAWINGS.

**Butt Hinges:**

Manufacturer: McKinney Products Company Series TA2314, and T4A3386. Alternates may be considered, but must be approved by Design team and Owner prior to submission of alternate consideration:

Stainless Steel Ball bearing heavy duty hinges to be used at all high traffic areas (classrooms, bathrooms, conference centers, stairwell doors, restrooms, etc.) or in all other locations noted in Project specific specifications.

Butts and Hinges: BHMA A156.1 for interior wood doors, interior hollow metal doors, and exterior hollow metal doors.

Out-swinging lockable, access controlled and exterior doors shall have NRP (non-removable pin) hinges.

Width of hinges shall be sufficient to clear trim and wall conditions shown on drawings.

3 each 4-1/2 inches by 4-1/2 inches for doors up to 3 feet 0-inch width and up to 7 feet 0 inch in height, and 4 each inches by 4-1/2 inches by 4-1/2 inches for doors over 3 feet 0 inches in width and / or 7 feet 0 inches in height or more. Provide heavy weight hinges (.180) at high traffic doors (i.e., corridors, exterior, classrooms, restroom, etc.) or where specified
in Project specific specifications.

Electric Hinges: Provide sufficient number of concealed wires to accommodate electric function of specified hardware. Locate electric hinge at center location. Provide McKinney MG-16 mortar guard for each electric hinge specified. Provide Molex type standardized plug in connectors to accommodate up to twelve wires.

All exterior doors, restroom doors and doors in wet areas shall be stainless steel (630) or where specified in Project specific specifications.

Continuous Hinges:

Manufacturer: McKinney Products Company Series MCK-12HD and MCK-25HD or the following acceptable alternates:

Pemko Manufacturing Co. Series CFMHD1.


Provide continuous hinges at exterior aluminum and FRP doors, or where specified in Project specific specifications.

Provide heavy weight continuous hinges when retrofitting new doors in existing frames where frame hinge preparations are compromised.

Power Transfers:

Manufacturer: Electrified hinges with quick connects, electrolynx connectors. See “Electric Hinges.” McKinney T4A3386 QC or MCK25HD QC as required.

Provide power transfers at heavy use electrical openings to transfer power from frame to door.

All power transfer devices, locks, latches, electric strikes and exit devices shall include factory installed Molex type connectors. Splicing of security hardware wiring shall not be permitted.

Flush Bolts:

Manufacturer: McKinney Products Company Series FB M and FB W with Dust Proof Strike or the following acceptable alternates:

Rockwood Series 555/557 and 1842/1942 with 570 Dust Proof Strike.

Trimco Series 3913/3917 and 3810/3815 with 3910 Dust Proof Strike.

Provide manual or automatic flush bolts as necessary for code compliance. Install with dust proof strike.
Provide extended top rod for oversized doors when using manual flush bolts.

Manual Flush Bolts: BHMA A156.16; designed for mortising into door edge.

**Lock Cylinders:**

Manufacturer: Provide Sargent Manufacturing Company cylinders, keyed at Physical Facilities direction on a per Project basis.

Standard Lock Cylinders: BHMA A156.5.

High-Security Lock Cylinders: BHMA A156.30.

Provide High Security cylinders with patented key control for all exterior doors as required by Physical Facilities.

Provide standard Sargent interchangeable core (I/C) cylinders for interior doors. Architect and Physical Facilities approval required.

Cylinders shall be an integral part of the locks as manufactured by specified lock supplier. Substitution of foreign made cylinders or components will not be allowed and also will be cause for rejection of supplier.

Furnish cylinders with construction master keying for use during the construction period. These temporary, construction cylinders are only to be removed and replaced with the facility's permanent cylinders after all Wi-Fi access control hardware programming has been completed and tested for correct operation.

Furnish all cylinders and keys as required by UNF’s Physical Facilities Department.

**Keying:**

Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Field keying will not be permitted and will be considered as just cause for rejection of supplier.

Patented high security keys shall be able to operate both the appropriate conventional and high security cylinders within the same master key system while the keys for the conventional cylinders will not open the high security cylinders.

Cylinders shall be keyed to an existing great grand master key system. All keying will be supplied directly to Physical Facilities.

Key bitting list to be supplied to Physical Facilities.

Keys: Nickel silver.
Quantity (Shall be confirmed with Physical Facilities on a per Project basis):

- Cylinder Change Keys: Four (4) each per cylinder.
- Master Keys: Ten (10) each section.
- Grand Master Keys: Twenty (20) each.
- Emergency Keys (hotel locks): Two (2) each.
- Permanent Control Keys: Two (2) each.
- Construction Master Keys: Ten (10) each.
- Construction Control Keys: Two (2) each.
- Key Blanks: Four (4) each, per set.

Provide blank keying schedule to be completed by Physical Facilities.

**Mechanical Locks and Latches:**

- Manufacturer: Sargent Series 8200 x LNJ trim design, no substitutions.
- Provide Mortise locks on all new construction.
- On all renovation projects, lock types to be verified by UNF.
- Install custom strikes to match existing frame preparations when new lock is scheduled to be installed in existing frame. Existing frames to be modified to accept new custom strikes as necessary.
- Provide lockset lever handles, and escutcheons with Standard 26D finish.

**Locking Function Descriptions:**

- Sargent Storeroom Function: 8204 x LNJ.
- Dormitory or Exit: 8225 x LNJ.
- Others to be determined by Physical Facilities.

**Wi-Fi Locksets:**

- Manufacturer: Sargent Series 8200 IN-120 x LNJ trim design, no substitutions.
- Mortise Locks: BHMA A156.13 Series 1000, Grade 1 standard and ANSI A117.1 accessibility guidelines.
Wireless Access Control Mortise Locks: BHMA certified extra heavy duty, lever type mortise lock conforming to ANSI 156.13 Series 1000, Grade 1 standard and ANSI A117.1 accessibility guidelines. Mortise lockset with integrated contactless card reader, request-to-exit, and external door position signaling in one complete unit. Electronic motorized locking control of lever handle trim with 3/4” anti-friction deadlocking latch.

Electronic motorized locking control of lever handle trim (solenoids not acceptable) with 3/4” anti-friction deadlocking latch and 1” case-hardened steel deadbolt. UL listed and labeled for up to 3-hour fire rated openings.

Provide Emergency override access capability by optional mechanical key cylinder retraction of lock latch bolt without electronic activation necessary.

Wi-Fi access control locking devices interface using field replaceable IEEE 802.11 b/g/n, 2.4 GHz wireless radio connection to an Ethernet Local Area Network (LAN) facilitating centralized control. Locks will continue to operate independent of Ethernet (LAN) wireless connection slowdown or failure.

Provide access control products with non-volatile memory.

Supports WEP, WPA, WPA2 and 802.1x wireless encryption (IEEE 802.11 b/g/n, 2.4 GHz). AES 128 encrypted communication between IP Enabled lock and electronic access control system platform.

Distributed intelligence allows stand-alone functional operation of lock in absence of network communication or slowdown allowing for system operational redundancy.

The supplier must be Factory trained and authorized Sargent IN120 supplier.

The installer must be Factory trained and authorized Sargent IN120 installer.

Basis of Design: SARGENT IN120, specific functions as specified within hardware specified on a per Project basis.

6 each additional AA Alkaline batteries per IN120 lockset (6 each AA Alkaline batteries to be installed during programming and construction, new set of 6 each batteries to be installed at completion of Project).

**Electric Strikes:**

Manufacturer:  HES, Inc. 9600 Series or Folger Adam 300 and 700 Series.

Standard:  BHMA A156.31.

General:  Use fail-secure electric strikes with fire-rated devices.

**Exit Devices:**
Manufacturer: Sargent 80 Series x ETJ Trim Design.
Exit Devices: BHMA A156.3.

Single doors: Use rim exit device.

Pairs of doors: Use rim devices with keyed removable mullion. Surface vertical rods only to be used if approved by Physical Facilities Lock Shop.

Cross corridor interior doors: Use vertical rod exit devices, less bottom rod as preferred securing device. Concealed rods on hollow metal doors, surface rods on wood doors.

Exit device dogging: Cylinder in rail shall hold latch retracted to allow door to function as push pull. Omit on fire rated doors and when width of door is too narrow.

Doors entering public occupied rooms off corridors - use double cylinder exit devices on mortise and rim types. Outside trim can be locked from inside room. Exit device on inside allows free egress, but outside trim remains locked.

Exterior Doors: Pull trims preferred, freewheeling lever trim when lever is used.

Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

Power Supplies:
Manufacturer: Securitron BPS-24-X Series.

24VDC, size power supply with a minimum of 50 percent more amperage than required by total load.

Removable Mullions and Exit Devices:
Manufacturer: Sargent HCL980 Series.
Removable Mullions: BHMA A156.3.
Types: Lockable, steel, key removable. Part of keying system. Key is not required to reinstall the mullion.

Provide multi-wire connectors when electric or monitor strikes are used. This allows mullion removal without damaging electrical connections.

Preferred method of securing exterior pairs of doors when using rim exit devices.
Concealed and Vertical Rod Exit devices may only be specified at the direction
and approval of Physical Facilities.

<table>
<thead>
<tr>
<th>MECHANICAL</th>
<th>Single Door</th>
<th>Pairs of Doors</th>
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<tbody>
<tr>
<td></td>
<td>Non Rated</td>
<td>Fire Rated</td>
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<tr>
<td>Interior</td>
<td></td>
<td></td>
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<td>Wood</td>
<td>Rim</td>
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<td>Rim</td>
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<tr>
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</tr>
<tr>
<td>Hollow Metal</td>
<td>Rim</td>
<td>Rim</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Rim</td>
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<th>Pair of Doors</th>
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</thead>
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<td>Fire Rated</td>
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<tr>
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</tr>
<tr>
<td>Aluminum</td>
<td>Rim</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Operating Trim:

Manufacturer: Rockwood BF158 Series Door Pulls with Type 12 HD mounting allowed.

Standard: BHMA A156.6.

Materials: Fabricate from stainless steel.

Mounting methods to be concealed type wherever possible.

Provide decorative thru bolts at free ends of push/pull bars and pulls when used with exit devices.
Push Plate Size: 8 inches by 16 inches minimum, except when limited by door stile.

**Closers:**

Manufacturer: Sargent 1341 Series. Provide Heavy Duty Arms for all door closers.

Closers: BHMA A156.4.

Closers shall have non-ferrous covers, heavy duty forged steel arms, and separate valves for adjusting back check, delayed action, closing and latching cycles and adjustable spring to provide sizes 1 through 6.

Provide non-sized closers, adjustable to meet maximum opening force requirements of ADA.

Provide drop plates, brackets, or adapters for arms as required to suit details.

Mount closers on room side of corridor doors and inside of exterior doors. Where possible, install closers on door for optimum aesthetics. Blocking reinforcements required at all frames and doors for door closers.

Provide closure stops where door stops are not feasible (high traffic areas).

Provide spacers as necessary / utilize all fasteners & hardware provided by manufacturer.

**Coordinators:**

Manufacturer: McKinney Products Company CSM Series Coordinator or the following acceptable alternates:

Rockwood 2600 Series Coordinators.

Coordinators: BHMA A156.3.

Provide filler bars for total opening width, closer mounting brackets, carry bars and special preparation for top latches where applicable.

**Low Energy Operators:**

Manufacturer: Besam SW200i.

Provide wall-mounted actuator switches by the same manufacturer as the operator. Provide weather-resistant types at exterior applications. Install per code. Hardwire all door activation devices.
Protective Trim Units:

Manufacturer: McKinney Products Company KP50 (B4E CSK) Series Protection Plates or the following acceptable alternates:
Rockwood K1050 (B4E CSK) Series Protection Plates.

Size: Kick plates 8 inches high, Mop plates 6 inches high, Armor plates 36 inches high.

Width: 2 inches less door width (LDW) at single doors when mounted on push side. 1 inch LDW at pairs and when mounted on pull side.

Material: Stainless steel 0.050 inch thick with countersunk holes, beveled four edges (B4E).

Overhead Stops and Holders:

Manufacturer: Sargent 590 Series, 690 Series, and 1540 Series or the following acceptable alternates:
Rixson 9 Series, 1 Series and 3 Series.
Glynn Johnson 900 Series, 100 Series and 450 Series.

Stops and Bumpers: BHMA A156.16.

Provide floor mounted dome stops for doors wall type stops. Used in brick or masonry only. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.

Use special template closers to allow offset arms for surface applied stops.

Wall and Floor Stops:

Manufacturer: McKinney Products Company WS03 Series Wall Stop and FS01 Series Floor Stop or the following acceptable alternates:
Rockwood 400 Series Wall Stop and 441 Series Floor Stop.
Trimco 1270 Series Wall Stop and 1200 Series Floor Stop.

All stops shall be cast. Wrought stops are not acceptable.

Use wall stops only on masonry walls.

Magnetic Holders:

Manufacturer: Sargent 1561 Series or the following acceptable alternates:
Rixson FM-990 Series.

LCN SEM7800 Series.

Wire to release upon activation of fire alarm. Verify required voltage.

**Door Gasketing:**

Standard: BHMA A156.22.

All gaskets screwed in place.

**Thresholds:**

Manufacturer: McKinney MCK2005 Series Stop Threshold or the following acceptable alternates:

- Pemko 2005 T Series Stop Threshold.
- Reese S482APR Series Stop Threshold.

Standard: BHMA A156.21.

Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with “Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG).”

Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.

**Key Cabinet:**

Key Control Cabinet: BHMA A156.5 metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.

Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.

Key Cabinet shall be set up and indexed ready for Owner use.

Provide key cabinet manufactured by Telkee or Lund Equipment Co. Inc.

**Fabrication:**

Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified
door hardware units and BHMA A156.18 for finishes.

**Finishes (Architect Shall Verify Requirements for Individual Projects):**

Standard: BHMA A156.18.

BHMA Designations: Comply with Project specific specifications.

**Execution**

**Inspection:** After installation has been completed, the hardware supplier shall have a qualified and Board Certified Architectural Hardware Consultant (AHC) check the job to determine the proper application of hardware according to the approved hardware schedule and keying schedule. The AHC shall submit a written report of compliance of the specifications, current AHC Certification and acceptance of the installation of products to Industry Standards to the general contractor for submission to the University of North Florida Project Manager.

**Installation:**

Refer to the DHI manual publication for Recommended Locations for Builders Hardware, and ADA REQUIREMENTS for instruction. Install all hardware in compliance with manufacturer's instruction and recommendations. Drill and countersink all items which are not factory prepared for fasteners. Cut and fit all thresholds and weather-stripping to profile of door frames. Set thresholds in accordance with the application condition.

Use only fasteners supplied with hardware and approved by the manufacturer. Drill and tap doors and frames as required prior to installation of hardware. Self-drilling screws are not acceptable.


Coordinate automatic door operator installation and functions with electro- mechanical door hardware as required.

**Adjusting & Cleaning:**

At final completion all hardware shall be left clean and free from disfigurement. The contractor shall make a final adjustment to all door closers and other hardware items. Where hardware is found defective, repair or replace or otherwise correct as directed.

At the completion of the project and/or during the closeout phase of the
project, the supplier will review with the designated Owner’s representative the proper service and adjustment of all hardware items.

At the completion of the project and/or during the closeout phase of the project, the supplier will perform a final adjustment to all door closers furnished in this section to ensure that all fire rated doors close and latch and that all door closer opening and closing pressures are in compliance with ADA.

Operations, Maintenance and Training:

At completion of the project, provide the Owner with a manual containing the following information:
- Final (as built) copy of hardware schedule.
- Final copy of keying schedule.
- Final copy of all system schematics and wiring diagrams.
- Copy of product data sheets as submitted including all Warranty data.
- Parts list for Locksets, Door Closers and Exit Devices.
- Copy of installation instructions for each type of hardware used.
- Name, address and phone number of each manufacturer and local representative.
- Complete set of any specialized tools.

At the completion of the project the supplier shall engage a factory authorized service representative to train the Owner's maintenance personnel to adjust, operate and maintain door hardware and Wi-Fi Locking Devices.

Protection:

The general contractor is responsible for the proper protection of all items of hardware until the Owner accepts the job as complete.
08 80 00 Glazing

1. General

   A. Applicability: The project designer is to consult with UNF on a project-by-project basis concerning modifying this guideline.

2. Products

   A. Manufacturer:

   I. AGC Flat Glass North America, Inc.; Kingsport, TN:

      a. Configuration:

         i. Exterior Lite 1/4 inch (6 mm) Clear Comfort Ti-AC40#2.

         ii. Airspace 1/2 inch (12.5 mm).

         iii. Interior Lite 1/4 inch (6 mm) Clear.

      b. Visible Light:

         iv. Transmittance (LT) 68 percent.

         v. Reflectance – Outdoors (LR) 9 percent.

         vi. Reflectance – Indoors 11 percent.

      c. Solar Energy:

         vii. Transmittance 34 percent.

         viii. Reflectance – Outdoors (ER) 30 percent.

      d. U.V. Light:

         ix. Transmittance 39 percent.

         x. Damage Weighted Index – ISO 59 percent.

      e. U-Values:

         xi. Winter – Air / Argon 0.29/0.24.

         xii. Summer – Air / Argon 0.28/0.22.

      f. Other Values:
xiii. Solar Heat Gain Coefficient (SHGC) 0.39.

xiv. Shading Coefficient 0.45.

xv. Relative Heat Gain – BTU/Hr/sq. ft. 94.

xvi. Light to Solar Heat Gain Ratio 1.74.
08 91 00 Louvers

1. General

   A. Summary: Section includes:
      I. Miami-Dade County, Florida approved extruded aluminum stationary louvers.

2. Products

   A. Materials:
      I. Aluminum Extrusions: ASTM B 221, alloy 6063-T5.

   B. Fixed, Extruded-Aluminum Louvers:
      I. Vertical Storm-Resistant Louver.
      II. Manufacturer: Ruskin, EME6625D.
      III. Louver Depth: 6 inches.
      IV. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.081 inch for blades and 0.125 inch for frames.
      V. Performance Requirements: 99.8 percent effective at preventing water penetration through louver when tested at 50 miles per hour wind with 8 inches per hour rainfall and 2,175 feet per minute airflow through the free area in the AMCA 500-L Wind Driven Rain Test.

   VI. Screens:
       a. Material: Aluminum, 1/2 inch mesh by 0.063 inch, intercrimp.
       b. Frame: Removable, re-wireable.

   VII. Finish: Kynar 500 Fluoropolymer Coating. Color to be approved by the University.

   VIII. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
09 00 00 Finishes
09 00 00 General Finish Information

1. General

   A. Carpet:
      I. UNF prefers carpet tiles.

   B. Vinyl Composition Tile:
      I. No Vinyl Composition Tile is to be utilized. Utilize Linoleum Tile instead – see Section 09 65 16 for more information.

   C. Wall Surfaces:
      I. Walls in restrooms shall be tile no less than 8’ in height from finish floor.

   D. Ceilings:
      I. UNF prefers 2x2 or 2x4 metal acoustical suspended ceiling assemblies and tiles. No specialty or architectural acoustical suspended ceiling assemblies and tiles shall be utilized.
      II. Ceilings in restrooms shall be Gypsum Wall Board.
      III. No insulation shall be laid on top of ceiling tiles in an effort to mitigate sound transmissions. Should sound transmission be of concern, utilize alternate methods as approved by UNF.

   E. Vinyl Wall Coverings:
      I. No Vinyl Wall Coverings are to be utilized.

   F. Tile:
      I. Ceramic / Porcelain Floor Tiles: Floor tiles are to be no less than 12 inches by 12 inches in size, except in showers and wet areas where the tiles shall be no less 2 inches by 2 inches.
      II. Floor tile grout to be dark in color.
      III. No epoxy grout is to be utilized.
09 65 16 Resilient Flooring and Accessories

1. General

   A. Summary: Section includes:
   
   I. Linoleum tile.
   II. Resilient wall base and accessories.

2. Products

   A. Linoleum Tile:
   
   I. Products: Basis-of-Design:
      
      a. Forbo Flooring, Inc.; Marmoleum Dual Marbleized Linoleum Tile Resilient Floor Covering.
   
   II. Linoleum Tile Physical Characteristics:
      
      b. Tile size: Approximately 13 inches by 13 inches.
      c. Gauge: 1/10 inch.
      d. Backing: Polyester.

   B. Resilient Wall Base:
   
   I. Wall Base: ASTM F 1861.
   II. Type (Material Requirement): Rubber.
   III. Style: Cove (with top-set toe).
   IV. Minimum Thickness: 0.125 inch (3.2 mm).
   V. Height: 4 inches (102 mm).
   VI. Lengths: Coils in manufacturer's standard length.
   VII. Outside Corners: Premolded or field formed.
   VIII. Inside Corners: Premolded or field formed.
      
      IX. Surface: Smooth.

   C. Resilient Molding Accessory:
I. Description: Carpet edge for glue-down applications, nosing for carpet, nosing for resilient floor covering, reducer strip for resilient floor covering, joiner for tile and carpet.

II. Material: Rubber.

III. Profile and Dimensions: As indicated.
09 68 13 Tile Carpeting

1. General

   A. Summary: This section includes modular, pattern loop, solution dyed carpet tile.

2. Products

   A. Carpet Tile:

      I. Basis-of-Design Products: Subject to compliance with requirements, provide one of the following:

         a. Shaw Contract Group; “Luminosity” style number 59362:

            i. Color: As selected by architect from manufacturer's full range.

            ii. Pattern: As directed by architect.
10 00 00 Specialties
10 00 00 General Specialties Information

1. General

A. Safety related:

I. Evacuation chairs – to be make/model: Stryker 6253. Project designer to work with UNF’s EH&S group for location determination at completion of design development phase.

B. Interior Panel Signage Protocol.

I. Classrooms – all instructional classrooms are to have a maximum occupant load sign installed.

II. UNF Room Numbering:

   a. In new buildings, all 10 space category rooms will be assigned a four (4) digit number. Generally, 1st floor will reflect 1000’s, 2nd floor 2000’s, etc. When numbering assignable space, a suite would be numbered 1000, rooms off of suite 1001, 1002, 1003, etc. When entering another suite, start with a different block of numbers – 1100, 1101, 1102, etc.

   b. In renovation projects it is important to coordinate numbering through the project manager as the numbers must not be duplicated; each space is individually entered in the space file and all rooms require a unique number.

   c. Mechanical, Custodial, Restrooms, Telephone Equipment, Recycling, etc. Unassignable space will have a dash 9 after the room number. Example: Custodial Room on the first floor 1000-9, Mechanical 1001-9 – number the rooms according to location – if in the 1000 area, 1000-9, etc. Stairwells will also require a dash 9 and reflect the floor accordingly. Since stairwells and restrooms are stacked, use same numbers except base on floor. Example: Stairwell on 1st floor 1000-9, 2nd floor 2000-9, 3rd floor 3000-9, etc. The same would hold true in the case of restrooms, mechanical rooms, etc.

   d. Circulation areas will also require the dash 9.

   e. In some instances, it may be necessary to assign an “A”; however, if possible, it is preferred to assign an individual room number.

   f. Any exterior “covered” areas will need to be identified as well as covered walkways with the dash 9.
C. Toilet Accessories:

I. UNF to supply the following products for contractor installation: Toilet paper roll dispensers, paper towel roll dispensers, liquid soap dispensers, toilet seat protective cover dispensers, feminine napkin disposal receptacles, and free-standing waste receptacles.

II. Toilet room cut-outs for the placement of a waste receptacle below the counter.

III. CFCl: Electric hand dryers where applicable. Consult with Physical Facilities for locations and make/model.

D. Visual Display Surfaces

I. Visual display surfaces are to be white boards with each unit no wider than 8’.

II. Chalk boards are not permitted.
10 14 00 Signage

10 14 00 Signage – EXHIBIT 1

1. General

   A. Related Documents: Use the following link to access the current UNF Campus Sign Standards Manual:
      1. Campus Sign Standards Manual
10 14 23 Panel Signage

10 14 23 Panel Signage – EXHIBIT A

Sign Type: A
Mechanical, Electrical, etc.

- Sign Specifications
- Letter Style: Futura Medium
- Graphic Colors: Labeled
- Background Color: MPS-41325P
  Brushed Aluminum
- Construction: 1/16” Non-glares face with braille
  and tactile room numbers,
  Back-painted face mounted
to 3/16” acrylic.
- Total sign thickness 1/4”
- Mounting: Installed with VHB Tape
10 14 23 Panel Signage – EXHIBIT B

**Sign Type:** B

**Department:** FT. Storage, Break Room, Classroom, Lab

**Sign Specifications**
- **Letter Style:** Futura Medium
- **Graphic Colors:** Black, Gray
- **Background Color:** MPS 4132SP
- **Material:** Brushed Aluminum
- **Construction:** 1/16" Non-glare face with braille and tactile room numbers.
- **Mounting:** 3/16" acrylic. Total sign thickness 1/4"
- **Wall Mounting:** Installed with VHB Tape

**Panel:**
- **Dimensions:** 6" x 6" x 1.375"
- **1st Surface Vinyl Logo:** Iron Grey
- **1st Surface Vinyl Black:** UNF
- **2nd Surface Vinyl Black:** FACULTY RESOURCES
10 14 23 Panel Signage – EXHIBIT C

Sign Type: C

Offices

Sign Specifications
Letter Style: Futura Medium
Graphic Colors: Labeled
Background Color: MPS-4132SP
Brushed Aluminum

Construction: 1/16" Non-glare face with braille and tactile room numbers. Back-painted face mounted to 3/16" acrylic.
Total sign thickness 1/4"

Mounting: Installed with VHB Tape

1030

UNF

First Surface Vinyl Logo
Iron Grey

King Blue

1/16" Non-glare back-painted color

1/16" Engraved cavity for insert

3/16" Clear Acrylic
10 14 23 Panel Signage – EXHIBIT E

Sign Type: E
Conference Rooms

Sign Specifications
Letter Style: Futura Medium
Graphic Colors: Labeled
Background Color: MPS-41325P
Brushed Aluminum
Mounting: Installed with VHB Tape

3100

CONFERENCE ROOM

IN USE

1st Surface Vinyl Logo: Non-Grey
King Blue

3/16" Non-glare back-painted silver

3/16" Clear Acrylic
10 14 23 Panel Signage – EXHIBIT F

- Practice Rooms 1300-1316
- Practice Rooms 1319-1716
- Classrooms 1420-1606
- Photo Labs 1002-1032
- Sculpture Labs 1500-1505
- Restrooms

Sign Type: F

Directions

Sign Specifications
- Letter Style: Futura Medium
- Graphic Colors: Labeled
- Background Color: M05 413235
  - Brushed Aluminum
- Construction: 1/16" Non-glare strips with second surface lettering
  - Back plate is 1/4" acrylic with magnetic sheeting
  - Strips adhere to back plate with metal tape
- Mounting: Installed with VHB Tape
10 14 23 Panel Signage – EXHIBIT G

Sign Type: G

Department

Sign Specifications
Letter Style: Futura Medium
Graphic Colors: Labeled
Background Color: MPS 41325P
Brushed Aluminum
Mounting: Installed with VHB Tape

CENTER FOR URBAN EDUCATION AND POLICY
Offices 3100-3111
### 10 14 23 Panel Signage – EXHIBIT H

#### Sign Type: H
- Pictogram

<table>
<thead>
<tr>
<th>Sign Specifications</th>
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<td>Graphic Colors: Labeled</td>
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<tr>
<td>Background Color: MPS 4132SP</td>
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<tr>
<td></td>
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<tr>
<td>Construction: 1/16&quot; Non-glares face with braille and tactile room numbers. Back-painted face mounted to 3/16&quot; acrylic. Total sign thickness 1/4&quot;</td>
</tr>
<tr>
<td>Mounting: Installed with UVB Tape</td>
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#### Signage Examples

- **EXIT**
- **STAIRS**
- **MEN**
- **WOMEN**
- **GENDER NEUTRAL**
- **ELEVATOR**
10 14 23 Panel Signage – EXHIBIT K

Sign Type: K
Evacuation

Sign Specifications
Letter Style: Futura Medium
Graphic Colors: Labeled
Background Color: MPS-4132SP
Brushed Aluminum
Mounting: Installed with VHB Tape

Legend
- You Are Here
- Fire Extinguisher
- Fire Alarm Pull

Fire Evacuation Map must be digital print on foam core

12" x 12"
MAXIMUM CAPACITY
100

NO SMOKING

Sign Type: L
Capacity

Sign Specifications
Letter Style: Futura Medium
Graphic Colors: Labeled
Background Color: MPS 4132SP
Brushed Aluminum
Construction: 1/16" Non-glare face with
    Second Surface Vinyl Lettering
    Back-painted face mounted
to 3/16" acrylic,
    Total sign thickness 1/4"
Mounting: Installed with VHB Tape
10 14 53 Traffic Signage

1. General

A. Road and Parking Signage Mounting: UNF requires a 4 inch diameter aluminum sign pole for the mounting of all road and parking area traffic signage.

10 14 53 Traffic Signage – EXHIBIT Gray Permit

Gray Lot Signs:

Top sign:
- Size: 24” X 24”
- .080 Aluminum material
- Verbiage on sign will be “GRAY LOT (Lot Number)” in 6” white letters at top, Osprey symbol centered, “GRAY PERMIT REQUIRED” in 4” white letters at bottom on gray background.

Bottom Sign:
- Size: 12” X 18”
- .080 Aluminum material
- Verbiage on sign will be “PARKING PERMIT/ENFORCEMENT/MON-THRS/7AM-8PM/FRIDAY/7AM-6PM” in 4” red letters white background with red ¼” red border.
10 14 53 Traffic Signage – EXHIBIT Green Permit

Green Permit Parking Only
10 14 53 Traffic Signage – EXHIBIT Housing A Permit

SIGN SPECIFICATIONS:

Top Sign:
• Size: 18” X 12”
• .080 Aluminum material
• Verbiage on sign will be “UNF PARKING LOT (NUMBER in 6” bold blue) all letters in 4” blue letters with white background.

Housing A Lot Signs:
• Size: 24” X 12”
• .080 Aluminum material
• Verbiage on sign will be “UNF PARKING PERMIT” in 4” black letters at top, “HOUSING A” in 4” black bold letters with yellow background centered. “REQUIRED FOR THIS LOT” in 4” black letters at bottom. Sign will have a white background.

Bottom Sign:
• Size: 18” X 12”
• .080 Aluminum material
**10 14 53 Traffic Signage – EXHIBIT Housing B Permit**

**SIGN SPECIFICATIONS:**

**Top Sign:**
- Size: 18” X 12”
- .080 Aluminum material
- Verbiage on sign will be “UNF PARKING LOT (NUMBER in 6” bold blue) all letters in 4” blue letters with white background.

**Housing B Lot Signs:**
- Size: 24” X 12”
- .080 Aluminum material
- Verbiage on sign will be “UNF PARKING PERMIT” in 4” black letters at top, “HOUSING B” in 4” black bold letters with red background centered, “REQUIRED FOR THIS LOT” in 4” black letters at bottom. Sign will have a white background.

**Bottom Sign:**
- Size: 18” X 12”
- .080 Aluminum material
10 14 53 Traffic Signage – EXHIBIT Housing F Permit

SIGN SPECIFICATIONS:

Top Sign:
- Size: 18” X 12”
- .080 Aluminum material
- Verbiage on sign will be “UNF PARKING LOT” in 6” bold blue) all letters in 4” blue letters with white background.

Housing F Lot Signs:
- Size: 24” X 12”
- .080 Aluminum material
- Verbiage on sign will be “UNF PARKING PERMIT” in 4” black letters at top, “HOUSING F” in 4” black bold letters with purple background centered, “REQUIRED FOR THIS LOT” in 4” black letters at bottom. Sign will have a white background.

Bottom Sign:
- Size: 18” X 12”
- .080 Aluminum material
10 14 53 Traffic Signage – EXHIBIT Motorcycle Permit

SIGN SPECIFICATIONS:

- Motorcycle Parking Only:
- Size: 12” X 18”
- .080 Aluminum material
- Verbiage on sign will be “MOTORCYCLE PARKING ONLY” in green 4” letters on white background with a ½” green border.
10 14 53 Traffic Signage – EXHIBIT Reserved Parking

Reserved parking for state tag:
- Top sign
- Size: 18" X 12"
- .080 Aluminum material
- Verbiage on sign will be “RESERVED FOR STATE TAG (TAG NUMBER)” in 4” blue letters on white background with a ¼” blue border.

Bottom sign
- Size: 18" X 12"
- .080 Aluminum material
- Verbiage on sign will be “ILLEGALLY PARKED VEHICLES” (in 4” red letters) and “WILL BE TOWED AT VEHICLE OWNER’S EXPENSE AND RISK” (in 2” red letters) on white background with a ¼” red border.
10 21 13 Toilet Compartments

1. General

   A. Toilet Compartments and Urinal Screen Materials: Toilet compartments and urinal screens shall be composed of solid-polymer panels.

   B. Toilet Compartment Mounting: Toilet compartments shall be floor mounted and braced overhead.

   C. Toilet Compartment Doors: Toilet compartment doors shall swing inward and shall be placed 36 inches from the leading edge of the water closet. Coat hook basis of design: Mockett CH13.
10 44 16 Fire Extinguishers

1. General

   A. Provide dry powder extinguishers.

   B. Provide CO₂ extinguishers in all computer rooms or other areas with electrical equipment.

   C. Approved Manufacturers:

      I. Amerex Corporation

      II. Badger Fire

      III. Ansul
10 73 43 Transportation Stop Shelters

1. General

A. **Wheelchair Clear Floor Space:** Provide a minimum 60 inch wide clear floor space for two wheelchairs adjacent to one side of bus shelter benches.

B. **Finish:** The finish of the bus shelters to match University standards for this structure.

C. **Materials:** Bench seating surface and backrest material to be recycled wood composite or plastic with faux wood texture.

D. **Reference Drawings:** See EXHIBIT 1 for Transportation Stop Shelters elevation drawings.
10 73 43 Transportation Stop Shelters – EXHIBIT 1

SIDE ELEVATION

FRONT ELEVATION

PLAN

- 83" CLEAR OPENING
- BENCH WITH BACKREST
- 60" X 60" CLEAR SPACE FOR TWC WHEELCHAIRS
11 00 00 Equipment
11 52 00 Audio-Visual Equipment

12 00 00 General Furnishings Information

1. General

A. Furniture:
   I. All academic facility lobby furnishings are to be secured to the floor.
   II. For large lecture classrooms, preference should be given for fixed tables.
   III. A/E to consult with UNF Procurement for products available in state contract. UNF Procurement shall compile bid packages for all selected products.

B. Waste Cans:
   I. Interior and exterior facility waste cans to be provided by UNF inclusive of recycling cans.
   II. No recessed toilet waste receptacles, all to be free standing beneath counters.

C. Clocks:
   I. Furnished by UNF.
   II. Battery operated, no electrical outlet required.

D. Walk Off Mats:
   I. UNF utilizes interior/exterior walk off mats.
   II. No Pedimat recessed floor mats shall be used.
12 36 61 Simulated Stone Countertops

1. Products

A. General Requirements: UNF’s preference is for solid surface toilet room countertops with Silestone as the performance standard.
12 50 00 Furniture

1. Laboratory Stools:
   A. Manufacturer: Cramer Rhino Plus stool

2. Classroom Tables:
   A. KI Synthesis 18x60, fixed cantilevered leg, no casters, no power, no modesty, 74P edge
   B. Color: neutral matching inventory

3. Classroom Chairs:
   A. KI Strive casters, 4-leg, upholstered seat, poly back, non-stacking, non-nesting
   B. Color: neutral matching inventory
12 51 00 Office Furniture – Typical Office Layout – EXHIBIT 1

PLAN VIEW
SCALE: 1/4"=1'-0"

STANDARD "A1" - PLASTIC LAMINATE RIGHT RETURN
STANDARD "A2" - PLASTIC LAMINATE LEFT RETURN

3D VIEW
SCALE: NONE

FRONT VIEW BOOKCASES
SCALE: NONE
12 51 00 Office Furniture – Typical Office Layout – EXHIBIT 2

Plan View
SCALE: 1/4"=1'-0"

3D View
SCALE: NONE

STANDARD "A3A" - WOOD RIGHT BRIDGE
STANDARD "A3" - PLASTIC LAMINATE RIGHT BRIDGE
STANDARD "A4" - PLASTIC LAMINATE LEFT BRIDGE
12 51 00 Office Furniture – Typical Office Layout – EXHIBIT 3

PLAN VIEW
SCALE: 1/4" = 1'-0"

3D VIEW
SCALE: NONE

STANDARD "A5A" - WOOD RIGHT BRIDGE
STANDARD "A5" - PLASTIC LAMINATE RIGHT BRIDGE
STANDARD "A6" - PLASTIC LAMINATE LEFT BRIDGE
12 93 00 Site Furnishings

1. General

   A. Items Furnished by UNF: Waste receptacles shall be provided by UNF.

2. Products

   A. Waste Receptacles:
      I. See Section 12 00 00 General Furnishings Information for exterior waste can types.

   B. Bicycle Racks:
      I. DuMor Site manufactured Model 125 – 40 type or similar.

   C. Site Seating:
      I. Victor Stanley, Inc. manufactured Model Steelsites RB-28 bench.
14 00 00 Conveying Equipment
14 00 00 General Elevator Requirements

1. General

   A. Provide hydraulic elevators whenever possible.

   B. UNF prefers ThyssenKrupp Elevators.

   C. Elevators shall have non-proprietary controls.

   D. Oil-minder pumps shall be used in lieu of oil-water separator tanks for elevator pits.

   E. Provide spare travelling cable.

   F. Utilize Modbus-compatible devices.

   G. Emergency power to elevators is not required.
21 00 00 Fire Suppression
21 13 13 Wet-Pipe Sprinkler Systems

1. General

   A. Summary: This section contains the requirements relating to fire protection systems.

   B. General Requirements:

      I. Fire-Hydrant Flow Test: Shall be performed prior to the start of any design work. Test shall be coordinated with Physical Facilities, performed by an independent contractor.

   C. System Performance Requirements:


      II. Fire-Suppression Standpipe System Design:

          a. Minimum Residual Pressure at Each Hose-Connection Outlet:

              i. NPS 1-1/2 Hose Connections: 65 psig.

          b. Maximum Residual Pressure at Required Flow at Each Hose-Connection Outlet:

              ii. NPS 1-1/2 Hose Connections: 100 psig.

   D. Components:

      I. Sprinkler Specialty Fittings: UL listed or FMG approved.

      II. Listed Fire-Protection Valves: UL listed or FMG approved.

      III. Sprinklers: UL listed or FMG approved.

      IV. Wall-Type Fire Hydrants:

          a. Type: Exposed, projecting.

          b. Finish: Polished chrome plated.

      V. Fire Department Connections:

          a. Exposed, Projecting Wall Type: Two inlets.

          b. Finish: Polished chrome plated.

          c. Sign: Provide red sign with white letters stating “Fire Department Connection.”
VI. Remote Fire Department Connections:
   a. Sign: Provide red sign with white letters strapped to riser indicating building served.

E. Installation:
   I. Piping between Fire Department Connections and Check Valves: Galvanized, schedule 40 steel pipe with grooved joints.
   II. Standard-Pressure, Wet or Dry Type Standpipe Application: Schedule 40 black or galvanized steel pipe with threaded or grooved joints.
   III. Standard-Pressure, Wet or Dry Pipe Sprinkler System Application: Schedule 40 black or galvanized steel pipe with threaded or grooved joints.
   IV. Sprinkler Applications:
      a. Rooms without Ceilings: Upright sprinklers. Provide safety cage around heads less than 9 feet above finished floor.
      b. Rooms with Suspended Ceilings: Recessed sprinklers.
      c. Wall Mounting: Sidewall sprinklers.
   V. Color: Paint all exposed sprinkler piping except galvanized, fire engine red.
22 00 00 Plumbing
22 00 00 Plumbing Project Requirements

1. Domestic Water Service:

   A. Domestic water for the University is provided by the local utility (JEA). Three services, master-metered, provide water to the University-maintained distribution system. Physical Facilities shall be consulted at the start of the project to determine the appropriate connection point and impact of the project on the existing distribution system. Any increases in the distribution system must be addressed as part of the project design.

   B. Water Pressure: Available pressure is normally sufficient to supply buildings up to two stories in height. Buildings three stories and higher shall be equipped with a domestic water booster pump. Flow tests shall be conducted at the start of the project to verify the available water supply and pressure at the proposed point of connection.

   C. Water piping shall not be located beneath the building slab. The main lines shall enter the building via a mechanical or valve room located adjacent to the building exterior.

   D. Water Meters: All new buildings and major renovations to existing buildings shall be furnished with water meters to measure domestic water consumption. A full line size bypass with appropriate isolation valves shall be provided to allow for servicing of the meter without disruption to the building water service. Consult with Physical Facilities during design to determine any sub-metering requirements.

   E. Isolation Valves:

      I. Provide sufficient flexibility to limit the area impacted by a water outage.

      II. Provide isolation valves for each riser. Location of riser isolation valves will be directly after the riser enters the building from the exterior and shall be readily accessible for operation.

      III. Provide isolation valves at the beginning of each branch piping takeoff from vertical risers and from horizontal mains.

      IV. Provide isolation valves for each bathroom group; preferred location is in the hallway outside the bathroom.

      V. Provide isolation valves to allow isolation of equipment.

   F. Hose Bibs:
I. Provide a hose bib in each mechanical room.

II. Provide key-operated hose bibs on each side of the building, and not more than 200 feet apart for maintenance use.

2. Sanitary Sewer:

A. Sanitary sewer service for the University is provided by the local utility (JEA). Buildings are tied into a central gravity system that feeds into a central lift station located west of the Child Development and Research Center. Physical Facilities shall be consulted at the start of the project to determine the appropriate connection point for the building.

B. Lift stations shall not be utilized unless a gravity connection to the existing sewer is unfeasible.

C. Building sanitary lines shall be connected to manholes. Provide new manholes as required to intercept existing sewer lines. Connection to existing sewer lines using a wye fitting is prohibited.

D. Cleanouts:

I. Provide cleanouts for each toilet group. Cleanout shall be located in an accessible location and above the bowl height of the adjacent water closet.

II. Provide cleanouts in the slab for each branch line and at 50 foot intervals on main lines.

III. Provide bi-directional cleanout at building exterior where main line enters the building.

E. Floor Drains: All floor drains shall be equipped with trap primers.

3. Storm System:

A. The roof drainage system shall be designed such that roof drains are located away from the roof edge.

B. A complete secondary roof drainage system shall be provided. Scuppers are not acceptable.

C. Roof drains shall be located a minimum of 10 feet from the roof edge.

4. Plumbing Fixtures and Equipment:
A. Trap primers shall be provided for each floor drain.

B. Domestic water pumps shall be connected to and monitored by the energy management system (EMS).

C. Each building shall have at least one domestic water cooler hydration station.

D. Urinal waste arms shall be PVC.
22 05 13 Common Motor Requirements for Plumbing Equipment

1. General

A. Summary: Section includes general requirements for single-phase and poly-phase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on AC power systems up to 600 volts and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

2. Products

A. General Motor Requirements:

I. Comply with requirements in this section except when stricter requirements are specified in plumbing equipment schedules or sections.

II. Comply with NEMA MG 1 unless otherwise indicated.


B. Motor Characteristics:

I. Duty: Continuous duty at ambient temperature of 40 Deg C and at altitude of 3300 feet above sea level.

II. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

III. All conduit boxes must face access side of motor.

IV. Poly-Phase Motors:

a. Motors shall be open drip-proof for indoor applications or totally enclosed fan cooled for outdoor applications.

b. Motors shall have cast iron frames with cast mounting feet.

c. Motors shall be three phase, 60 hertz, 1800 rpm, rated at 200 volts for 208-volt systems, 230 volts for 240-volt systems, and 460 volts for 480-volt systems. 230/208-volt motors shall not be permitted on 208-volt systems.

d. Motors shall be NEMA Design B and shall have 1.15 service factor at 60 hertz.

e. Insulation Systems:
22 05 13 Common Motor Requirements for Plumbing Equipment

i. In fixed speed applications, motors shall have Class B insulation with 80 Deg C rise over 40 Deg C ambient.

ii. For variable frequency drive (VFD) applications, motors shall have Class B insulation with 80 Deg C rise over 40 Deg C ambient. Motor manufacturer shall be notified if a motor is being purchased for VFD application and motor nameplate shall be marked “Suitable for Variable Frequency Drive.”

f. Motor Efficiencies:


g. Motors 25 hp and larger which are to be installed outdoors or in other high humidity areas shall be equipped with silicone rubber space heaters. Space heaters shall be energized when motor is de-energized.

V. Fractional Horsepower Motors One-Half HP and Above:

a. Motors shall be open drip-proof or totally enclosed fan cooled.

b. Motors shall be three phase, 60 hertz, 1800 rpm, rated at 200, 230 or 460 volts.

c. Motors shall be NEMA Design B with class B insulation.

VI. Fractional Horsepower Motors Less than One-Half HP:

a. Motors shall be single phase, 60 hertz, rated at 120 volts with integral thermal protection.

C. Overload Protection: Overload protection shall be provided for each motor. This protection may be an integral part of the motor or may be part of the motor controller and shall interrupt each ungrounded conductor. Three-phase motor protection shall insure that all three phases are interrupted with the loss of any one phase. Solid-state overloads shall be provided for poly-phase motors. Constructor to set overloads at start-up.
22 05 19 Meters and Gages for Plumbing Piping

1. General

   A. Summary: Section includes gages.

2. Products

   A. Pressure Gages:

      I. Direct-Mounting, Dial-Type Pressure Gages:

         a. Case: Liquid-filled type, metal, 4-1/2 inch diameter.

         b. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.

         c. Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.

         d. Movement: Mechanical, with link to pressure element and connection to pointer.

         e. Dial: Satin-faced, non-reflective aluminum with permanently etched scale markings.

         f. Pointer: Red or other dark-color metal.

         g. Window: Glass.

         h. Ring: Metal.

         i. Accuracy: Grade A, plus or minus 1 percent of middle half scale.

         j. Vacuum-Pressure Range: 30 inch Hg of vacuum to 15 psig of pressure.

         k. Range for Fluids under Pressure: Two times operating pressure.

   B. Pressure-Gage Fittings:

      I. Valves: NPS 1/4 brass or stainless-steel needle type.

      II. Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.
22 05 23 General-Duty Valves for Plumbing Equipment

1. General

   A. Summary: This section includes the following general-duty valves:
      
      I. Copper-alloy ball valves.
      
      II. Ferrous-alloy butterfly valves.

2. Products

   A. Valves, General:
      
      I. Bronze Valves: NPS 2-1/2 and smaller with threaded ends, unless otherwise indicated.
      
      II. Ferrous Valves: NPS 3 and larger with flanged ends, unless otherwise indicated.
      
      III. Valve Sizes: Same as upstream pipe.
      
      IV. Valve Actuators:
         
         a. Chainwheel: For all exposed valves located greater than 6 feet A.F.F.
         
         b. Gear Drive: For quarter-turn valves NPS 8 and larger.
         
         c. Handwheel: For valves other than quarter-turn types.
         
         d. Lever Handle: For quarter-turn valves NPS 6 and smaller.
      
      V. Extended Valve Stems: On insulated valves.

   B. Copper-Alloy Ball Valves:
      
      I. Two-Piece, Copper-Alloy Ball Valves: Brass or bronze body, full-port, stainless steel ball and stem, PTFE or TFE seats, and 600 psig minimum CWP rating.

   C. Ferrous-Alloy Butterfly Valves:
      
      I. 150 CWP, ductile iron, lug type, single-flange butterfly valves with EPDM seat, 316 stainless steel disc, 416 stainless steel stem.
22 05 53 Identification for Plumbing Piping and Equipment

1. General

A. Summary: Section includes:
   I. Equipment labels.
   II. Warning signs and labels.
   III. Pipe labels.
   IV. Valves tags.

2. Products

A. Equipment Labels:
   I. Plastic Labels for Equipment:
      a. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical 
         engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
      c. Background Color: Blue.
      d. Maximum Temperature: Able to withstand temperatures up to 160 Deg F.
      e. Minimum Label Size: Length and width vary for required label content, but not 
         less than 2-1/2 by 3/4 inch.
      f. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 
         inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger 
         lettering for greater viewing distances. Include secondary lettering two-thirds to 
         three-fourths the size of principal lettering.
      g. Fasteners: Stainless-steel rivets or self-tapping screws.
      h. Adhesive: Contact-type permanent adhesive, compatible with label and with 
         substrate.
   II. Label Content: Include equipment's drawing designation or unique equipment 
       number.
   III. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2 by 11 
       inch bond paper. Tabulate equipment identification number and identify drawing
numbers where equipment is indicated (plans, details, and schedules), plus the specification section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

B. Warning Signs and Labels:

I. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.


III. Background Color: Red.

IV. Maximum Temperature: Able to withstand temperatures up to 160 Deg F.

V. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

VI. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

VII. Fasteners: Stainless-steel rivets or self-tapping screws.

VIII. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

IX. Label Content: Include caution and warning information, plus emergency notification instructions.

C. Pipe Labels:

I. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

II. Pre-tensioned Pipe Labels: Pre-coiled, semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

III. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

IV. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on drawings, pipe size, and an arrow indicating flow direction.
a. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.

b. Lettering Size: At least 1-1/2 inches high.

D. Valve Tags:

I. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

   a. Tag Material: Stainless steel, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.

   b. Fasteners: Stainless steel beaded chain hook.

II. Valve Schedules: For each piping system, on 8-1/2 by 11 inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shut-off and similar special uses. Valve tag schedule shall be posted in each mechanical room. Valve tag schedule shall be included in operation and maintenance data.

3. Execution

A. Equipment Label Installation:

   I. Install or permanently fasten labels on each major item of mechanical equipment.

   II. Locate equipment labels where accessible and visible.

B. Pipe Label Installation:

   I. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

      a. Near each valve and control device.

      b. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.

      c. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.

      d. At access doors, manholes, and similar access points that permit view of concealed piping.
e. Near major equipment items and other points of origination and termination.

f. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.

g. On piping above removable acoustical ceilings.
22 11 16 Domestic Water Piping

1. General

   A. Summary: Section includes:

   I. Under-building slab and above-ground domestic water pipes, tubes, fittings, and specialties inside the building.

   B. Project Conditions:

   I. Interruption of Existing Water Service: Provide minimum 72 hours’ notification to Physical Facilities for any interruption to water service.

   II. All piping shall be cleaned and tested to comply with Health Department regulations. Water samples shall be tested. Test results shall be forwarded to the University before service is turned on.

2. Products

   A. Domestic Water Piping:

   I. Above Slab, Inside Building: Copper tube, type “K” soldered to wrought copper or cast bronze fittings. Lead free solder joints and non-toxic water-based solder paste suitable for domestic water systems. Acid flux is prohibited.

   II. Below Ground:

      a. Schedule 80 PVC pipe and fittings with solvent-welded joints.

      b. Ductile iron pipe.

      c. Copper piping is not acceptable for underground use.

   III. Reverse Osmosis / Deionized Water: Schedule 40 PVC with solvent-welded joints.
22 11 19 Domestic Water Piping Specialties

1. General

   **A. Summary:** This section includes the following domestic water piping specialties:

   I. Wall hydrants.

   **B. Performance Requirements:** Minimum working pressure for domestic water piping specialties: 125 psig, unless otherwise indicated.

2. Products

   **A. Wall Hydrants:** Vacuum Breaker Wall Hydrants:

   I. Standard: ASSE 1019, Type A or Type B.

   II. Type: Freeze resistant, automatic draining with integral air-inlet valve.

   III. Classification: Type A, for automatic draining with hose removed or Type B, for automatic draining with hose removed or with hose attached and nozzle closed.

   IV. Pressure Rating: 125 psig.

   V. Operation: Loose key.

   VI. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.

   VII. Inlet: NPS 1/2 or NPS 3/4.

   VIII. Outlet: Exposed with garden-hose thread complying with ASME B1.20.7.
22 11 23 Domestic Water Pumps

1. General

   A. Summary: This section includes the following all-bronze and bronze-fitted centrifugal pumps for domestic cold- and hot-water circulation:

      I. Close-coupled, in-line, seal-less centrifugal pumps.

2. Products

   A. Close Coupled, In-Line, Seal-Less Centrifugal Pumps:

      I. Manufacturers:

         a. Armstrong Pumps Inc.

         b. Bell & Gossett Domestic Pump; ITT Industries.

         c. Grundfos Pumps Corp.

         d. Taco, Inc.

      II. Description: Factory-assembled and -tested, single-stage, close-coupled, in-line, seal-less centrifugal pumps:

         a. Pump and Motor Assembly: Hermetically sealed, replaceable-cartridge-type unit with motor and impeller on common shaft and designed for installation with pump and motor shaft mounted horizontally.

         b. Casing: Bronze, with threaded companion-flange connections.

         c. Impeller: Corrosion-resistant material.

         d. Motor: Single speed, unless otherwise indicated. Comply with requirements in Division 22 Section “Common Motor Requirements for Plumbing Equipment.”
22 13 16 Sanitary Waste and Vent Piping

1. General

   A. Summary: Section includes:
      I. Under-building slab and above-ground sanitary waste and vent piping, fittings, and specialties inside the building.

   B. Project Conditions:
      I. Interruption of Existing Sewer Service: Provide minimum 72’ hour's notification to Physical Facilities for any interruption to sewer service.

2. Products

   A. Sanitary:
      I. Above Slab: Either of the following:
         a. Cast-iron with no hub couplings.
         b. Schedule 40 PVC with solvent-welded joints. PVC pipe located in return air plenums shall be wrapped.
         c. Waterless Urinals Special Condition:
            i. All waterless urinal lateral waste arms shall be entirely PVC to the vertical main and have a slope of ¼ inch per foot.
      II. Below Slab: Schedule 40 PVC with solvent-welded joints.
      III. Waste arms shall be schedule 40 PVC, minimum 1-1/2 inch in size.
22 14 13 Facility Storm Drainage Piping

1. General

   A. Summary: Section includes:

   I. Under-building slab and above-ground storm drainage piping, fittings, and specialties inside the building.

2. Products

   A. Storm Drainage Piping:

   I. Above Slab: Either of the following:

      a. Cast iron with no hub couplings.

      b. Schedule 40 PVC with solvent-welded joints. PVC pipe located in return air plenums shall be wrapped.

   II. Below Slab: Schedule 40 PVC with solvent-welded joints.

   B. Roof Drains:

   I. Metal Roof Drains:

      a. Standard: ASME A112.21.2M.

      b. Pattern: Roof drain.

      c. Body Material: Cast iron.

      d. Dimensions of Body: As noted.

      e. Combination Flashing Ring and Gravel Stop: Required.


      g. Outlet: Bottom.

      h. Dome Material: Cast iron.

      i. Extension Collars: Required.

      j. Under-deck Clamp: Required.

      k. Sump Receiver: Required.
22 30 00 Plumbing Equipment

1. Products

   A. Water Heaters:
      I. Where instantaneous electric water heaters are used, the manufacturer shall be Eemax.
      II. Special Warranty Requirement: 5 years from the date of Substantial Completion on tanks.

   B. Expansion Tanks:
      I. Special Warranty Requirement: 5 years from the date of Substantial Completion on tanks.
22 40 00 Plumbing Fixtures

1. General

   A. Summary: Section includes:
      I. Water closets, urinals, lavatories, faucets, domestic water coolers.

2. Products

   A. Water Closets:
      I. Wall mounted:
         a. White china.
         b. Basis of Design: Sloan.

   B. Flush Valve
      I. Basis of Design: Sloan
      II. “Sentry” feature shall be disabled.
      III. Battery operated.
      IV. Tested assembly rated at 1.28 gal per flush.

   C. Urinals:
      I. Waterless:
         a. Cartridge-less type. White china.
         b. Basis of Design: Kohler Model #4917.

   D. Lavatories:
      I. Construction: White vitreous china only.

   E. Sinks:
      I. Construction: 18 gauge stainless steel with sound dampening.

   F. Faucets:
I. Battery-Operated Sensor Type:
   a. Low-flow 0.5 gal per minute.
   b. Acceptable Manufacturers: Moen or Chicago.

G. Domestic Water Coolers:

I. Surface-Mount:
   b. For Water Coolers specified to be equipped with a hydration station (bottle filling), these are to have a filter system.
23 00 00 Heating, Ventilating, and Air-Conditioning (HVAC)
23 00 00 HVAC Project Requirements

1. General

   A. Codes and Standards: The latest ASHRAE Standards (55, 62.1, 90.1, etc.) shall be utilized in the design and construction of the HVAC systems.

   B. Definitions:

   I. Provide/Install: The word “provide” shall mean furnish, install, connect, test, complete, and leave ready for operation. The word "install" where used in conjunction with equipment furnished by the University of North Florida or under another contract shall mean mount, connect, complete, and leave ready for operation.

   II. Concealed: The surface of insulated or non-insulated piping, ductwork or equipment is concealed from view when standing inside a finished room, such as inside a chase or above a ceiling.

   III. Exposed: The surface of insulated or non-insulated piping, ductwork or equipment is seen from inside a finished room, such as inside an equipment or Air Handling Unit room.

   IV. Protected: The surface of insulated or non-insulated piping, ductwork or equipment on the exterior of the building but protected from direct exposure to rain by an overhang, eave, in an unconditioned parking garage or building crawl space.

   V. Unprotected: The surface of insulated or non-insulated piping, ductwork or equipment on the exterior of the building and exposed to rain.

   VI. Abbreviations: Abbreviations, where not defined in the contract documents, shall be interpreted to mean the normal construction industry terminology, as determined by the architect. Plural words shall be interpreted as singular and singular words shall be interpreted as plural where applicable for context of the contract documents.

   C. Design Conditions:

   I. Outdoor: ASHRAE published design conditions for Jacksonville, FL (Craig Field).

   II. Summer Indoor: 75 Deg F, 50 percent RH.

   III. Winter Indoor: 70 Deg F.

   IV. Mechanical and Electrical Spaces: 85 Deg F, 50 percent RH Summer, 60 Deg F Winter.
D. Submittals: A copy of the HVAC submittals shall be provided to Physical Facilities concurrent with the engineer’s review, not for contract compliance-related approval, but to allow Physical Facilities to become familiar with the products to be maintained.

E. General Requirements:

I. Provide building humidity control and positive pressurization to prevent growth of mold and to maintain indoor air quality in compliance with ASHRAE Standard 62.1.

II. All systems shall be designed in a manner to facilitate ease of maintenance. Adequate access to accomplish all normally required maintenance without removal of other than access panels is mandatory.

III. Noise Criteria:

   c. Specialty Spaces: To be determined on project-by-project basis.

F. Ventilation Requirements:

I. Ventilation shall be in accordance with ASHRAE Standard 62.1. The outdoor air shall be well mixed with the return air.

II. Rooms or spaces utilized for lunch/break rooms, lounges, reprographics areas and kitchen areas shall be provided with exhaust air of adequate quantity as per the latest ASHRAE Standards.

III. All spaces which are provided with exhaust ventilation shall be maintained at a lower overall pressure than the surrounding areas (i.e., 0.01 inch w.g.).

IV. Any area that is designed to be exhausted shall be isolated from the return air system.

V. Local exhaust ventilation systems shall be designed utilizing the most recent version of the American Conference of Governmental Industrial Hygienists’ “Industrial Ventilation, a Manual of Recommended Practice.”

VI. Exhaust stack discharge height shall be in accordance with Chapter 5 of the American Conference of Governmental Industrial Hygienists’ “Industrial Ventilation, a Manual of Recommended Practice.”

VII. Consideration shall be given to the location of fresh air intakes to prevent introduction of pollutants to the building’s air supply. Intakes shall be located at
least 10 feet above the ground. Intakes shall be located at least 50 feet (vertically and horizontally) from loading docks, parking garages and garbage areas.

G. Chilled and Heating Hot Water Distribution:

I. The campus is served by a central cooling and heating plant. All facilities within the campus core shall be tied into the existing distribution system. Physical Facilities shall be consulted at the start of the project to determine the impact of the project on the existing plant. Any increases in plant capacity or delivery system must be addressed as part of the project design. When buildings are remote from the campus distribution system, the designer shall investigate options to provide a single plant to serve the facility. Direct expansion (DX) type systems should be avoided.

II. Design Temperatures:

   b. Heating Hot Water Supply Temperature: 120 Deg F. Design coils for a 20 Deg F drop.

III. Buildings served by the central plant should not have an expansion tank or an automatic water make-up system. Tertiary pumps shall not be utilized without prior approval by Physical Facilities. Make provisions for flushing and initial filling of the chilled water system using domestic water.

IV. Chilled and Heating Hot Water piping shall not be located beneath the building slab. The main lines shall enter the building via a mechanical or valve room located adjacent to the building exterior.

V. Isolation Valves:

   a. Provide isolation valves at the beginning of each branch piping takeoff in vertical risers.
   b. Provide isolation valves for each riser. Location of riser isolation valves will be directly after the riser enters the building from the exterior and shall be readily accessible for operation.
   c. Provide manual air vents on the plant side of the building isolation valves.
   d. Provide the means to drain and vent the building piping, as well as automatic air vents at the high points of supply and return risers.

VI. Metering:
a. All new buildings and major renovations to existing buildings shall be furnished with BTU meters to measure chilled and heating hot water consumption.

b. The BTU meters shall consist of flow stations with matched temperature sensors in the riser lines at the building service entry. Refer to Section 23 09 00 for additional information.

VII. HVAC Piping Components:

a. At a minimum, provide the following at each coil:
   i. Shut-off valves on supply and return.
   ii. Strainer with blow down valve and hose connection.
   iii. Two-way control valve (PICCV type if less than 2 inches or 100 GPM).
   iv. Auto flow balancing valve (not applicable if PICCV valve is used).
   v. Pete’s plug on both sides of control valve and strainer.
   vi. Pressure gage on supply and return (AHU only).
   vii. Thermometers on supply and return (AHU only).

H. Mechanical Rooms:

I. Standardization of Floor Plan: All mechanical rooms in new or renovated buildings shall have the same basic floor plan (equipment layout), as practical. Vertical alignment of mechanical rooms within new buildings is preferred, where practical.

II. Piping and Component Diagram: All mechanical rooms shall be designed to facilitate the installation of components in a serviceable manner. Complete piping and component diagrams, including sections/elevations of major equipment, shall be included in the construction documents to verify that the design intent is constructible and maintainable.

III. Coordination Drawings: The contractor shall submit coordination drawings assuring that the various components the contractor intends to install in mechanical rooms will result in a serviceable installation. These drawings shall be provided to Physical Facilities to review.

IV. Serviceability: Clearances suggested by manufacturers for equipment maintenance, removal, and replacement shall be indicated on the coordination drawings and accommodated by the layout. Larger and heavier components that may require future removal or replacement shall be identified on the coordination drawing and a clear path identified to the building exterior. Door sizes, lifting supports, and other
pertinent information shall be identified on coordination drawings. All components (cleanouts, shut-off valves, floor drains, pumps, etc.) shall have at least 24 inches to 36 inches of radial room around them to allow for maintenance access. All equipment access shall be provided within the equipment room.

V. Freight Elevator: Mechanical rooms above the first floor shall have access to a freight elevator. Penthouses shall have access to a freight elevator.

VI. Floor Drains: Provide drains and drain piping that is adequately sized to accommodate water volume when testing as well as normal service loads in all mechanical rooms.

VII. Hose Bib: Furnish at least one hose bib in each mechanical room.

VIII. Finishes:

   a. Floor: Two-part, high gloss, self-leveling epoxy floor coating.
      i. Color: Gray.
      ii. Thickness: 20 mils.

   b. Walls: Paint:

   c. Equipment Pads:
      iv. Color: Safety Yellow (edge only).

   d. Base: Vinyl.

I. Air Handling Systems:

   I. Roof-mounted equipment is not acceptable. The only exception to this is exhaust fans which are required to be roof mounted. Equipment shall be located a minimum of 10 feet from the roof edge.

   II. Air Handling Units shall be located in mechanical rooms within the building or located within a penthouse. The units shall be appropriately sized to allow for flexibility for future modifications.

   III. Service Clearance: Adequate clearance shall be provided for all service, repairs, and component replacement. For new buildings, the unit shall be placed such that the service personnel can freely walk to at least three sides of the unit. For renovations, the unit arrangement shall be reviewed with Physical Facilities.
IV. Equipment Pad: Mount AHU’s on concrete pads at least 6 inches above finished floor.

V. Fan coil units shall not be installed above ceilings.

J. Air Distribution:

I. No more than three offices shall be combined on a single thermostat (zone). Four offices may be permitted where not evenly divisible by three. Offices with different exposures or loads shall not be combined on the same thermostat.

II. Classrooms, conference rooms, laboratories, and places of assembly shall each have a dedicated thermostat.

III. Terminal Units:

   a. Terminal units shall be located outside of offices where feasible. In no case shall terminal units be located above furniture.

   b. Provide 120 volts / 1PH power to each terminal unit, unless fan-powered. Each terminal unit shall have a primary voltage to 24 volts secondary transformer in the control cabinet.

K. Energy Management System:

I. Provide new direct digital control system compliant with Section 23 09 00. The system shall be fully integrated with the existing campus EMS system. Existing graphics shall be updated to include the new building plans and control points.

II. The control system sequence of operations shall be tailored to capitalize on energy saving opportunities including:

   a. Variable Air Volume.

   b. Duct Static Pressure Reset.

   c. Demand Ventilation Control.

   d. Terminal Unit Minimum Reset.

III. Sensor Locations:

   a. Provide CO₂ sensors in all classrooms, conference rooms, and in the main return duct at the Air Handling Unit.

   b. Terminal Units:

      i. Discharge air temperature.
ii. Room temperature (sensor, not thermostat, located away from drafts or other sources which create false readings).

c. Air Handling Units:
   i. Outdoor air airflow.
   ii. Return air temperature.
   iii. Mixed air temperature.
   iv. Heating coil leaving temperature (averaging type).
   v. Freeze stat (upstream of cooling coil).
   vi. Cooling coil leaving temperature (averaging type).
   vii. Discharge air temperature.
   viii. Fan status (on/off, commanded speed, feedback speed).
   ix. Duct static pressure.
   x. Filter differential pressure switch (pre and final).

d. Outside air flow stations shall be installed in sufficient straight run of duct to provide accurate measurement.

L. Manufacturer’s Checkout:

I. Start-up and Checkout: At completion of installation and prior to performance verification, a factory-trained representative of the manufacturer shall provide start-up and checkout service. After the performance verification the manufacturer’s representative shall examine performance information and check the equipment in operation, and sign “Check-Out Memo” for the record. Submit a copy of Memo on each item of equipment where indicated in individual sections of these specifications for inclusion in each Technical Information Brochure. The "Check-Out Memo" shall be included with the performance verification data. Do not request “Instruction in Operation Conference” or request final inspection until Memos have been submitted and found acceptable.

M. Instructions to University of North Florida:

I. General: Instructions to the University of North Florida shall be by competent representatives of the manufacturers involved, with time allowed for complete coverage of all operating procedures. Provide classroom instruction and field training in the design, operation and maintenance of the equipment and
troubleshooting procedures. Explain the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar provisions of the systems. On the date of Substantial Completion, turn over the prime responsibility for operation of the mechanical equipment and systems to the University of North Florida’s operating personnel.

II. Training Period: Unless otherwise indicated, training periods shall encompass the following number of hours of classroom and hands-on instructions with a maximum period of 4 hours per day for either. Mixing classroom instructions and hands-on training in the same day is unacceptable.

   a. Training periods: As appropriate for the project.

III. Training shall be scheduled prior to Substantial Completion.
23 05 00 Common Work Results For HVAC

1. General

   A. Summary:
      
      I. General: All piping systems shall be cleaned, tested by the contractor and accepted
         by the University prior to being placed into service.
      
      II. Ferrous Pipe and Fittings: Iron pipe installed in a corrosive area shall be wrapped in a
         plastic approved for underground applications.
      
      III. Grooved Fittings, Valves, and Couplings: Grooved pipe and related devices shall be
         used at equipment connections only.
      
      IV. Acceptable manufacturers are Victaulic, Tyco/Grinnell.

   B. Piping Specialties: Dielectric nipples shall be used at all junctions of dissimilar metal
      piping, but as close as possible to the unit it serves. Provide isolation valves upstream,
      within 12 inches of dielectric nipples, and on all branch piping from mains.

   C. Definitions:
      
      I. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, 
         furred spaces, pipe and duct chases, unheated spaces immediately below roof, 
         spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
      
      II. Exposed, Interior Installations: Exposed to view indoors. Examples include finished 
         occupied spaces and mechanical equipment rooms.
      
      III. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor 
         ambient temperatures and weather conditions. Examples include rooftop locations.
      
      IV. Concealed, Interior Installations: Concealed from view and protected from physical 
         contact by building occupants. Examples include above ceilings and chases.
      
      V. Concealed, Exterior Installations: Concealed from view and protected from weather 
         conditions and physical contact by building occupants but subject to outdoor 
         ambient temperatures. Examples include installations within unheated shelters.

2. Quality Assurance

   A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, 
      “Structural Welding Code – Steel.”
B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, “Welding and Brazing Qualifications.”

I. Comply with provisions in ASME B31 Series, “Code for Pressure Piping.”

II. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
23 05 13 Common Motor Requirements for HVAC Equipment

1. General

   **A. Summary:** Section includes general requirements for single-phase and poly-phase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on AC power systems up to 600 volts and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

2. Products

   **A. General Motor Requirements:**

   I. Comply with requirements in this section except when stricter requirements are specified in HVAC equipment schedules or sections.

   II. Comply with NEMA MG 1 unless otherwise indicated.


   **B. Motor Characteristics:**

   I. Duty: Continuous duty at ambient temperature of 40 Deg C and at altitude of 3300 feet above sea level.

   II. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

   III. All conduit boxes must face access side of motor.

   IV. Poly-Phase Motors:

   a. Motors shall be open drip-proof for indoor applications or totally enclosed fan cooled for outdoor applications.

   b. Motors shall have cast iron frames with cast mounting feet.

   c. Motors shall be three phase, 60 hertz, 1800 rpm, rated at 200 volts for 208-volt systems, 230 volts for 240-volt systems, and 460 volts for 480-volt systems. 230/208-volt motors shall not be permitted on 208-volt systems.

   d. Motors shall be NEMA Design B and shall have 1.15 service factor at 60 hertz.

   e. Insulation Systems:
i. In fixed speed applications, motors shall have Class B insulation with 80 Deg C rise over 40 Deg C ambient.

ii. For variable frequency drive (VFD) applications, motors shall have Class B insulation with 80 Deg C rise over 40 Deg C ambient. Motor manufacturer shall be notified if a motor is being purchased for VFD application and motor nameplate shall be marked “Suitable for Variable Frequency Drive.”

f. Motor Efficiencies:


g. Motors 25 hp and larger which are to be installed outdoors or in other high humidity areas shall be equipped with silicone rubber space heaters. Space heaters shall be energized when motor is de-energized.

V. Fractional Horsepower Motors One-Half Hp and Above:

a. Motors shall be open drip-proof or totally enclosed fan cooled.

b. Motors shall be three phase, 60 hertz, 1800 rpm, rated at 200, 230 or 460 volts.

c. Motors shall be NEMA Design B with class B insulation.

VI. Fractional Horsepower Motors Less Than One-Half Hp: Motors shall be single phase, 60 hertz, rated at 120 volts with integral thermal protection.

C. Overload Protection: Overload protection shall be provided for each motor. This protection may be an integral part of the motor or may be part of the motor controller and shall interrupt each ungrounded conductor. Three-phase motor protection shall insure that all three phases are interrupted with the loss of any one phase. Solid-state overloads shall be provided for poly-phase motors. Constructor to set overloads at start-up.
23 05 19 Meters and Gages for HVAC Piping

1. General

   A. Summary: Section includes:

      I. Thermometers.
      II. Gages.

2. Products

   A. Metal-Case, Liquid-in-Glass Thermometers:

      I. Manufacturers:

         a. Trerice; H. O. Co.
         b. Weiss Instruments, Inc.
         c. Weksler Instruments Operating Unit; Dresser Industries, Instrument Div.

      II. Case: Die-cast aluminum, 9 inches long.
      III. Tube: Red or blue reading, organic-liquid filled, with magnifying lens.
      IV. Tube Background: Satin-faced, non-reflective aluminum with permanently etched scale markings.
      V. Window: Glass or plastic.
      VI. Connector: Adjustable type, 180 degrees in vertical plane, 360 degrees in horizontal plane, with locking device.
      VII. Stem: Copper-plated steel, aluminum, or brass for thermowell installation and of length to suit installation.
      VIII. Accuracy: Plus or minus 1 percent of range or plus or minus 1 scale division to maximum of 1.5 percent of range.

   B. Thermowells:

      I. Manufacturers: Same as manufacturer of thermometer being used.
      II. Description: Pressure-tight, socket-type metal fitting made for insertion into piping and of type, diameter, and length required to hold thermometer.

   C. Pressure Gages:
I. Manufacturers:
   a. Trerice; H. O. Co.
   b. Weiss Instruments, Inc.
   c. Weksler Instruments Operating Unit; Dresser Industries, Instrument Div.

II. Direct-Mounting, Dial-Type Pressure Gages: Indicating-dial type complying with ASME B40.100:
   a. Case: Liquid-filled type, cast aluminum, 4-1/2 inch diameter.
   b. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
   c. Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
   d. Movement: Mechanical, with link to pressure element and connection to pointer.
   e. Dial: Satin-faced, non-reflective aluminum with permanently etched scale markings.
   f. Pointer: Dark-color metal.
   g. Window: Glass or plastic.
   h. Ring: Brass.
   i. Accuracy: Grade A, plus or minus 1 percent of whole scale.
   j. Vacuum-Pressure Range: 30-in. Hg of vacuum to 15 psig of pressure.
   k. Range for Fluids under Pressure: Two times operating pressure.

III. Pressure-Gage Fittings:
   a. Valves: NPS 1/4 brass or stainless-steel needle type.
   b. Syphons: NPS 1/4 coil of brass tubing with threaded ends.
   c. Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.
23 05 23 General-Duty Valves for HVAC Piping

1. General

A. Summary: Section includes:
   I. Bronze ball valves.
   II. Iron, single-flange butterfly valves.
   III. Check valves.
   IV. Balancing valves.
   V. Chainwheels.

2. Products

A. General Requirements for Valves:
   I. Valve Sizes: Same as upstream piping unless otherwise indicated.
   II. Valve Actuator Types:
      a. Gear Actuator: For quarter-turn valves NPS 8 and larger.
      b. Handwheel: For valves other than quarter-turn types.
      c. Handlever: For quarter-turn valves NPS 6 and smaller.
      d. Chainwheel: In exposed locations where valve is installed greater than 8 feet above finished floor. Extend chains to 50 inches above finished floor.
   III. Valves in Insulated Piping: Provide stem extensions matching insulation thickness and the following features:
      a. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
   IV. Triple Duty Valves: Triple duty (check, balancing, shut-off) valves shall not be used.

B. Bronze Ball Valves: Two-piece, full-port, bronze ball valves with stainless-steel trim:
   I. Description:
a. SWP Rating: 150 psig minimum.
b. CWP Rating: 600 psig minimum.
c. Body Design: Two piece.
d. Body Material: Bronze.
e. Ends: Threaded.
f. Seats: PTFE or TFE.
g. Stem: Stainless steel.
h. Ball: Stainless steel, vented.
i. Port: Full.

C. Iron, Single-Flange Butterfly Valves: 150 CWP, iron, single-flange butterfly valves with EPDM seat and stainless-steel disc:

I. Description:
   a. CWP Rating: 150 psig minimum.
   b. Body Design: Lug type, suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
   c. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
   d. Seat: EPDM.
   e. Stem: One- or two-piece 416 stainless steel.
   f. Disc: 316 stainless steel.

D. Check Valves:
   I. Up to 2 inches: Bronze, swing type.
   II. 2-1/2 inches and above: Iron, spring-loaded (non-slam), swing type.

E. Balancing Valves:
   I. Up to 2 inches (100 GPM or less): A separate balancing valve is not required. Provide Pressure-Independent Characteristic Control Valve (PICCV) with integral balancing valve:
      a. Manufacturer: Belimo.
II. 2-1/2 inches and above: Auto-flow type for use in variable pressure/flow systems.

III. Circuit setters shall only be used on multiple header coils where needed to balance the flow between multiple coil sections. The appropriate PICCV or auto-flow control device shall be used to control the flow for the entire coil assembly.

F. Chainwheels:
   I. Description: Valve actuation assembly with sprocket rim, brackets, and chain.
      a. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
      b. Attachment: For connection to butterfly valve stems.
      c. Sprocket Rim with Chain Guides: Ductile iron, of type and size required for valve. Include zinc coating.
      d. Chain: Hot-dip, galvanized steel, of size required to fit sprocket rim.

3. Execution

A. Valve Installation:
   I. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
   II. Locate valves for easy access and provide separate support where necessary.
   III. Install valves in horizontal piping with stem at or above center of pipe.
   IV. Install valves in position to allow full stem movement.

B. General Requirements For Valve Applications: Select valves with the following end connections:
   I. For Copper Tubing, NPS 2-1/2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
   II. For Copper Tubing, NPS 3 and Larger: Flanged ends.
   III. For Steel Piping, NPS 2-1/2 and Smaller: Threaded ends.
   IV. For Steel Piping, NPS 3 and Larger: Flanged ends.

C. Valve Schedule:
   I. Pipe NPS 2-1/2 and Smaller: Ball valves.
   II. Pipe NPS 3 and Larger: Iron single-flange butterfly valves.
23 05 53 Identification for HVAC Piping and Equipment

1. General

   A. Summary: Section includes:

   I. Equipment labels.
   II. Warning signs and labels.
   III. Pipe labels.
   IV. Valve tags.

2. Products

   A. Equipment Labels:

   I. Plastic Labels for Equipment:

      a. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.


      c. Background Color: Blue.

      d. Maximum Temperature: Able to withstand temperatures up to 160 Deg F.

      e. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 inches by 3/4 inch.

      f. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

      g. Fasteners: Stainless-steel rivets or self-tapping screws.

      h. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

   II. Label Content: Include equipment's drawing designation or unique equipment number.

   III. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2 by 11 inch bond paper. Tabulate equipment identification number and identify drawing
Identification for HVAC Piping and Equipment

numbers where equipment is indicated (plans, details, and schedules), plus the specification section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

B. Warning Signs And Labels:

I. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.


III. Background Color: Red.

IV. Maximum Temperature: Able to withstand temperatures up to 160 Deg F.

V. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 inches by 3/4 inch.

VI. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

VII. Fasteners: Stainless-steel rivets or self-tapping screws.

VIII. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

IX. Label Content: Include caution and warning information, plus emergency notification instructions.

C. Pipe Labels:

I. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

II. Pretensioned Pipe Labels: Precoiled, semi rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

III. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

IV. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on drawings, pipe size, and an arrow indicating flow direction.
a. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.

b. Lettering Size: At least 1-1/2 inches high.

D. Valve Tags:

I. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

   a. Tag Material: Stainless steel, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.

   b. Fasteners: Stainless steel beaded chain hook.

II. Valve Schedules: For each piping system, on 8-1/2 by 11 inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shut-off and similar special uses. Valve-tag schedule shall be posted in each mechanical room. Valve-tag schedule shall be included in operation and maintenance data.

3. Execution:

A. Equipment Label Installation:

   I. Install or permanently fasten labels on each major item of mechanical equipment.

   II. Locate equipment labels where accessible and visible.

B. Pipe Label Installation:

   I. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

      a. Near each valve and control device.

      b. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.

      c. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.

      d. At access doors, manholes, and similar access points that permit view of concealed piping.
e. Near major equipment items and other points of origination and termination.

f. Spaced at maximum intervals of 500 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.

g. On piping above removable acoustical ceilings.

II. Pipe Label Color Schedule:

a. Chilled-Water Piping:
   i. Background Color: Blue.

b. Condenser-Water Piping:
   i. Background Color: Black.

c. Heating Water Piping:
   i. Background Color: Red.

d. Refrigerant Piping:
   i. Background Color: Yellow.
   ii. Letter Color: Blue.
23 05 93 Testing, Adjusting, and Balancing

1. General

   A. Summary: This section contains the technical procedures for testing, adjusting, and balancing of mechanical equipment and systems.

2. Quality Assurance

   A. TAB Firm Qualifications: Engage a TAB firm certified by AABC or NEBB:

   I. A firm certified by the National Environmental Balancing Bureau (NEBB) in the testing, adjusting and balancing disciplines required for the project, who is not the installer of the systems to be tested and is otherwise independent of the project. Complying with NEBB “Procedural Standards for Testing Adjusting and Balancing of Environmental Systems.”

   II. A firm certified by Associated Air Balance Council (AABC) in the testing, adjusting and balancing disciplines is required for the project. Complying with “AABC National Standards.”

   B. Equipment Calibration: Calibration of instruments shall be in accordance with the current NEBB or AABC requirements.

3. Execution

   A. Requirements:

   I. A complete Test, Adjust and Balance (TAB) report is required for the entire building and/or project. The TAB shall include, but is not limited to, air distribution systems, hydronic distribution systems, and all associated equipment and apparatus of mechanical work. Including, but not limited to, setting of speed and volume (flow), adjusting all apparatus provided for systems, recording data, conducting tests, preparing and submitting reports.

   II. A preliminary TAB report shall be submitted a minimum of 2 weeks prior to Substantial Completion for review by the University (FP&C, PF, EH&S and the Engineer or Record). All deficiencies noted by the TAB firm shall be listed in the preliminary report. The deficiencies deemed “minor” in nature by the University shall not prevent the project from being deemed “Substantially Complete.”

   III. A final, corrected, TAB report shall be submitted to the University prior to Final Completion.
23 07 00 HVAC Insulation

1. General

   A. Duct Insulation Schedule, General:

      I. Plenums and Ducts Requiring Insulation:

         a. Indoor, concealed supply and outdoor air.
         b. Indoor, exposed supply and outdoor air.
         c. Indoor, concealed return located in nonconditioned space.
         d. Indoor, exposed return located in nonconditioned space.
         e. Indoor, concealed, Type I, commercial, kitchen hood exhaust.
         f. Indoor, exposed, Type I, commercial, kitchen hood exhaust.
         g. Indoor, concealed oven and warewash exhaust.
         h. Indoor, exposed oven and warewash exhaust.
         i. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
         j. Indoor, exposed exhaust between isolation damper and penetration of building exterior.
         k. Outdoor, concealed supply and return.
         l. Outdoor, exposed supply and return.
         m. Backside of all supply diffusers and grilles.

      II. Items Not Insulated:

         a. Factory-insulated flexible ducts.
         b. Factory-insulated plenums and casings.
         c. Flexible connectors.
         d. Vibration-control devices.
         e. Factory-insulated access panels and doors.

   B. Insulation General Requirements:
I. Insulation joints shall be sealed with glass fabric and mastic. Duct tape is not acceptable.

II. If condensation occurs at any time during the warranty period, the contractor shall be required to re-work the insulation until satisfactory, at no additional cost to the University.

C. Indoor Duct And Plenum Insulation Schedule:
   I. Concealed Duct Insulation: Fiberglass blanket.
   II. Concealed, Type I, Commercial, Kitchen Hood Exhaust Duct and Plenum Insulation: Fire-rated blanket; thickness as required to achieve 2-hour fire rating.
   III. Exposed Duct Insulation: Fiberglass board.
   IV. Supply ductwork shall not be internally insulated. Return ductwork shall only be internally insulated where required for acoustical purposes.

D. Indoor Piping Insulation Schedule:
   I. Condensate and Equipment Drain Water: Flexible elastomeric.
   II. Chilled Water: Cellular glass.
   III. Condenser-Water Supply and Return: None.
   IV. Heating-Hot-Water Supply and Return: Cellular glass or fiberglass, pre-formed pipe, Type I.
   V. Refrigerant Suction and Hot-Gas Piping: Flexible elastomeric.

E. Outdoor, Above-Ground Piping Insulation Schedule:
   I. Condensate and Equipment Drain Water: None.
   II. Chilled Water: Cellular glass.
   III. Condenser-Water Supply and Return: None.
   V. Refrigerant Suction and Hot-Gas Piping: Flexible elastomeric.

F. Outdoor, Underground Piping Insulation Schedule:
   I. Underground piping shall be a pre-insulated system. Where loose fill insulation is required, provide the following.
II. Chilled Water: Cellular glass.


G. Indoor, Field-Applied Jacket Schedule:
   I. Piping, Exposed: PVC.

H. Outdoor, Field-Applied Jacket Schedule:
   I. Piping, Exposed: Aluminum.

I. Underground, Field-Installed Insulation Jacket:
   I. For underground direct-buried piping applications, install underground direct-buried jacket over insulation material.
23 21 13 Hydronic Piping

1. General

   A. Summary:
   
   I. This section includes pipe and fitting materials, joining methods, special-duty valves, and specialties for the following:
   
   a. Hot-water heating piping.
   
   b. Chilled-water piping.
   
   c. Condensate-drain piping.
   
   II. All piping systems shall be cleaned, tested, and accepted by Physical Facilities prior to being placed in service.

2. Products

   A. Copper Tube and Fittings:
   
   I. Annealed-Temper Copper Tubing: ASTM B 88, Type K.
   
   II. DWV tubing in first paragraph below is intended for non-pressure applications and is applicable for condensate drains.
   
   III. DWV Copper Tubing: ASTM B 306, Type DWV.

   B. Steel Pipe and Fittings:
   
   I. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; type, grade, and wall thickness as indicated in Part 3 “Piping Applications” article.

   C. Direct Bury Valve:
   
   I. Iron, Single-Flange Direct-Buried Butterfly Valves: 150 CWP, iron, single-flange butterfly valves with EPDM seat and stainless-steel disc
   
   II. CWP Rating: 150 psig minimum
   
   III. Body Design: Lug type, suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
   
   IV. Body Material: ASTM A 126, cast iron or ASTM A 536 ductile iron.
   
   V. Seat: EPDM
VI. Stem: One or two-piece 304/316/416 stainless steel. Shaft seals shall be standard self-adjusting split V packing. Shaft seals shall be of a design allowing replacement without removing the valve shaft. Valve Bearings shall be sleeve type that are corrosion resistant and self-lubricating.

VII. Disc: 304/316/416 stainless steel.

VIII. Actuator: Actuators shall be fully grease packed and have stops in the open/close position. The actuator shall have a mechanical stop which will withstand an input torque of 450 ft. lbs. against the stop (Actuators with worm Gears prohibited). The traveling nut shall engage alignment grooves in the housing. The actuators shall have a built in packing leak bypass to eliminate possible packing leakage into the actuator housing.

IX. Finish: All external surfaces shall be covered with a polyamide cured epoxy coating applied over a sand blasted “new white metal surface” per SSPC-SP10 to a minimum of 6 mils in compliance with AWWA C550.

X. All valves will be provided with a ground level position indicator and extension stem so that the manual actuation nut resides no lower than 3 ft. from finished surface.

XI. Approved Manufactures:
   - a. Henry Pratt and Company, Groundhog Butterfly Valve, Model MDT
   - b. ValMatic; American –BFV Butterfly Valve
   - c. Mueller, Linseal Series Butterfly Valve

D. Hydronic Piping Specialties:

I. Y-Pattern Strainers:
   - a. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
   - b. End Connections: Threaded ends for NPS 2 and smaller, flanged ends for NPS 2-1/2 and larger.
   - c. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.

II. Stainless-Steel Bellow, Flexible Connectors:
b. End Connections: Threaded or flanged to match equipment connected.

3. Execution

A. Piping Applications:

I. Hot-water heating piping, above-ground, NPS 2-1/2 and smaller, shall be any of the following:
   a. Type K, annealed-temper copper tubing, wrought-copper fittings, and brazed joints.
   b. Schedule 40 steel pipe; Class 150, malleable-iron fittings; cast-iron flanges and flange fittings; and threaded joints.

II. Hot-water heating piping, above-ground, NPS 3 shall be the following:
   a. Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded and flanged joints. Grooved fittings may be used at equipment connections only.

III. Hot-Water Heating Piping Installed Belowground and within Slabs: Welded pre-insulated piping system. For underground connections to existing HW and CHW lines, standard weld fittings with insulation kits may be used in lieu of pre-insulated fittings.

IV. Chilled-water piping, above-ground, NPS 2-1/2 and smaller, shall be any of the following:
   a. Type K, annealed-temper copper tubing, wrought-copper fittings, and brazed joints.
   b. Schedule 40 steel pipe; Class 150, malleable-iron fittings; cast-iron flanges and flange fittings; and threaded joints.

V. Chilled-water piping, above-ground, NPS 3 and larger, shall be the following:
   a. Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded and flanged joints. Grooved fittings may be used at equipment connections only.

VI. Chilled-Water Piping Installed Belowground and Within Slabs: Welded pre-insulated piping system. For underground connections to existing HW and CW lines, standard weld fittings with insulation kits may be used in lieu of pre-insulated fittings.

VII. Condensate-Drain Piping: Type DWV, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
B. Piping Installations:

I. Contractor shall verify existing piping prior to making connections to existing systems. The contractor shall not assume that pipe labels correctly identify supply and return lines.

II. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

III. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

IV. Install piping to permit valve servicing.

C. Chemical Treatment:

I. Fill system with fresh water and add liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products from piping. Circulate solution for a minimum of 24 hours, drain, clean strainer screens, refill with fresh water and pre-treat. No equipment shall be put into service prior to initiation of water treatment.

II. Piping shall be initially treated by the contractor in accordance with the procedures of the University’s water treatment vendor at the time the system is put into service. Costs to replace chemicals due to system losses associated with construction shall be the responsibility of the contractor.
23 31 13 Metal Ducts

1. General

   A. **Summary:** Section includes:
      I. Ductwork.
      II. Ductwork accessories.

   B. **Performance Requirements:**
      I. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible" and performance requirements and design criteria indicated.
         a. Leakage Class: Leakage rate shall be less than 3 percent.

2. Products

   A. Ductwork:
      I. HVAC duct shall be fabricated from metal. Flexible duct may be used only for short runs of 6 feet or less to air outlets.
      II. Duct board is not an acceptable material for ductwork.

   B. Ductwork Accessories:
      I. Volume Dampers: Multi-blade dampers shall be aluminum construction, low-leakage, airfoil type, on galvanized steel shafts within synthetic or ball-type bearings.
      II. Fire Dampers: Fire dampers shall be dynamic rated for all applications.

3. Execution

   A. Seam And Joint Sealing:
      I. Seal Classes: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Table 1-2, “Standard Duct Sealing Requirements.”

   B. Duct Schedule:
      I. Fabricate ducts with galvanized sheet steel except as follows:
a. Commercial Kitchen Hood Exhaust Ducts: Comply with NFPA 96:
   i. Exposed to View: Type 304, stainless-steel sheet.
   iii. Welded seams and joints.
b. Dishwasher Hood Exhaust Ducts:
   i. Type 304, stainless-steel sheet.
   ii. Welded seams and flanged joints with watertight EPDM gaskets.
c. Fume Hood Exhaust Ducts:
   i. Shall be compatible with the chemicals being exhausted.
   ii. Welded seams and joints.
   iii. Ductwork shall be kept under negative pressure within the building envelope.

C. Field Quality Control:

   I. Perform tests and inspections.

   II. Leakage Tests:


   b. Test the following systems:

   i. All supply duct between the AHU's and within three feet of the terminal units.

   c. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.

   d. Test for leaks before insulation application.

   e. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.

   III. Duct System Cleanliness Tests:

   a. Visually inspect duct system to ensure that no visible contaminants are present.
23 34 16 Centrifugal HVAC Fans

1. General

   A. Summary: This section includes the following:

      I. Backward-inclined centrifugal fans.

   B. Extra Materials: Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents:

      I. Belts: One set(s) for each belt-driven unit.

2. Quality Assurance

   A. AMCA Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal.

   B. NEMA Compliance: Motors and electrical accessories shall comply with NEMA 1.

3. Products

   A. Backward-Inclined Centrifugal Fans:

      I. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:

         b. Loren Cook Company.
         c. Greenheck.

      II. Description: Factory-fabricated, -assembled, -tested, and -finished, belt-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, and support structure.

      III. Housings: Formed panels to make curved-scroll housings with shaped cutoff, with doors or panels to allow access to internal parts and components.

         a. Panel Bracing: Steel angle- or channel-iron member supports for mounting and supporting fan scroll, wheel, motor, and accessories.
         b. Spun inlet cone with flange.
c. Outlet flange.

IV. Backward-Inclined Wheels: Single-width-single-inlet and double-width-double-inlet construction with curved inlet flange, backplate, backward-inclined blades welded or riveted to flange and backplate, and fastened to shaft with set screws.

V. Shafts: Statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with final alignment and belt adjustment made after installation.

a. Turned, ground, and polished hot-rolled steel with keyway. Ship with a protective coating of lubricating oil.

b. Designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.

VI. Grease-Lubricated Shaft Bearings: Self-aligning, pillow-block-type, tapered roller bearings with double-locking collars and two-piece, cast-iron housing.

a. Ball-Bearing Rating Life: ABMA 9, Ll0 at 120,000 hours.

VII. Belt Drives: Factory mounted, with final alignment and belt adjustment made after installation.

a. Service Factor Based on Fan Motor Size: 1.15.

b. Fan Pulleys: Cast iron or cast steel with split, tapered bushing; dynamically balanced at factory.

c. Motor Pulleys: Adjustable pitch for use with motors through 5 hp, fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions. Use adjustable sheaves for test and balance work. After all systems are set and final test and balance is approved, install fixed sheaves on all fans.

d. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.

e. Belt Guards: Fabricate to comply with OSHA and SMACNA requirements of diamond-mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation. Include provisions for adjustment of belt tension, lubrication, and use of tachometer with guard in place.

VIII. Motors: Comply with requirements in Division 23 Section “Common Motor Requirements for HVAC Equipment.”

   a. Enclosure Type: Totally enclosed, fan cooled.
23 36 00 Air Terminal Units

1. General

   A. Summary: Section includes:

      I. Dual-duct air terminal units.

      II. Single-duct air terminal units.

2. Products

   A. Air Terminal Units:

      I. Acceptable Manufacturers:

         a. Trane.

         b. Enviro-tec/Johnson Control ETI.

         c. Titus.

      II. Configuration: Volume dampers inside unit casing with mixing attenuator section and control components located inside a protective metal shroud.

      III. Casing: 22 gauge.


         b. Access: Removable panels for access to dampers and other parts requiring service, adjustment, or maintenance; with airtight gasket.

      IV. Volume Damper: Galvanized steel with peripheral gasket and self-lubricating bearings. Nylon bearings are not acceptable.

         a. Maximum Damper Leakage: ARI 880 rated, 3 percent of nominal airflow at 3-inch wg inlet static pressure. Units must carry ARI seal.

      V. DDC Controls: Controls shall be factory-mounted. Provide transformer for control power.
23 37 13 Diffusers, Registers, and Grilles

1. General

   A. **Summary:** Section includes:

      I. Diffusers, registers, and grilles.

2. Products

   A. **Ceiling Diffusers:** Rectangular and Square Ceiling Diffusers:

      I. Material: Aluminum.

      II. Finish: Baked enamel, white.

      III. Face Size: 24 inches by 24 inches.

      IV. Face Style: Louvered, equal to Titus type TDC.

   B. **Registers and Grilles:** Fixed Face Return Air Grille:

      I. Material: Aluminum.

      II. Finish: Baked enamel, white.

      III. Face Arrangement: 1/2 inch by 1/2 inch by 1 inch grid core.

      IV. Core Construction: Integral.

      V. Mounting: Lay in.

   C. **Layout:**

      I. Diffusers, registers, and grilles shall be selected and located to ensure maximum throw and avoid short-circuiting, for maximum user comfort.

      II. Devices shall not have any user adjustment. Balancing dampers shall be located at branch take-offs and not at the device.

      III. Diffusers (supply or return) shall not be located on the end of a duct run. Branches are permitted near the end of a run.
23 73 13 Modular Indoor Central-Station Air Handling Units

1. General

   A. Summary: Section includes:
      I. Variable-air volume, single-zone Air Handling Units.

   B. Service Clearance: Adequate clearance shall be provided for all service, repairs and component replacement. For new buildings, the unit shall be placed such that the service personnel can freely walk to at least three sides of the unit. For renovations, the unit arrangement shall be reviewed with Physical Facilities.

2. Quality Assurance

   A. ARI Certification: Air Handling Units and their components shall be factory tested according to ARI 430 “Central-Station Air Handling Units” and shall be listed and labeled by ARI.

3. Products

   A. Manufacturers:
      I. Carrier.
      II. McQuay International.
      III. Temtrol.
      IV. Trane Custom.
      V. YORK International Corporation.

   B. Unit Casings:
      I. General Fabrication Requirements for Casings:
         a. Galvanized sheet metal.
         b. 2-inch double wall construction with an inner galvanized liner. Panel deflection shall not exceed L/240 at 125 percent of design pressure.
         c. Finish: Factory-primed and painted. Unit shall be shrink-wrapped for protection during shipping.
d. Base Frame: Formed structural channel supports, welded with integral lifting lugs. Frame shall be high enough to allow for proper condensate trap depth.

e. Floor: Accessible sections shall be furnished with a 0.125 inch thick aluminum tread plate.

II. Casing Insulation:

a. Injected foam insulation for an R-value of not less than R-13.

b. Fiberglass insulation may be used on large custom units with the approval of Physical Facilities.

III. Inspection and Access Panels and Access Doors:

a. All components (such as filters, motors, and belts) requiring regular service shall be accessible without disassembly of the unit. Provide hinged doors with windows for coils, fan and air plenums that are large enough for easy access.

b. Each section of an Air Handling Unit meant for access by service personnel, or equipped with a viewing window, shall be provided with a least one vapor-proof light fixture and switch. Circuiting shall be separate from other loads. Switches shall be external to the unit.

c. Panel and Door Fabrication: Formed and reinforced, double wall and insulated panels of same materials and thicknesses as casing.

   i. Hinges: A minimum of two 6-inch stainless steel piano hinges and two wedge-lever-type latches, operable from inside and outside. Arrange doors to be opened against air-pressure differential.

   ii. Gasket: Neoprene, applied around entire perimeters of panel frames.

   iii. Fabricate windows in doors of double-glazed, wire-reinforced safety glass with an air space between panes and sealed with interior and exterior rubber seals.

IV. Condensate Drain Pans:

a. Provide stainless steel, double wall, insulated drain pans that are sloped for positive drainage.

b. Provide intermediate pans and copper drop tubes for stacked coils.

c. Drain pan shall extend from upstream of the coil face continuously to 3 feet downstream of the coil.

d. Drain pans shall be drained by a trapped, insulated copper drainpipe that remains the full size (diameter) of the drain pan connection to the floor drain.
C. Fan, Drive, and Motor Section:

I. Provide airfoil fans, select for high efficiency.

II. Provide premium efficiency motors (refer to Section 23 05 13 for electric motor requirements).

III. Provide heavy-duty belts and sheaves selected for a 1.5 safety factor. Provide spare belt set.

IV. Provide externally accessible lubrication fittings.

V. Provide L-50 life at 400,000-hour heavy-duty pillow block, self-aligning bearings.

VI. Provide spring type vibration isolation.

VII. Provide variable frequency drive (refer to Division 26 for VFD requirements).

D. Coil Section:

I. Preheat Coils: Provide preheat coils on all units with more than 30 percent outdoor air or otherwise as required to protect the chilled water coil from freezing.

II. General Requirements for Coil Section:

   a. Comply with ARI 410.

   b. Clearance: Provide a minimum of two feet of clearance between coil faces on both heating and cooling coils for cleaning access.

   c. Air Velocity Across Coil: Coil face air velocities must be limited to 450 FPM; this shall allow an increase in airflow without replacing the coils.

   d. Coil headers shall be sealed to the casing with a rubber gasket.

III. Chilled Water Coils: Design chilled water coils for 16 Deg F temperature rise. Design chilled water temperature is 45 Deg F. Select coils such that flow does not become laminar at 50 percent turndown from design.

IV. Hot Water Coils: Design hot water coils for a 20 Deg F temperature drop. Design hot water temperature is 120 Deg F.

V. Construction: Seamless 0.035-inch wall thickness copper, expanded into 0.0095-inch thick aluminum fins. Coil frames shall be constructed of stainless steel.

VI. Coating: Coils exposed to unconditioned outside air shall be dipped and baked with Bronze Glow - Husky Coil Coat. Coils shall ship as an assembled section from the factory to be coated. Field application is not acceptable.
a. Special Warranty: 5 years from date of Substantial Completion on coating and coil.

E. Air Filtration Section:

I. General Requirements for Air Filtration Section:

a. Provide minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.

b. Provide filter holding frames arranged for flat or angular orientation, with access doors on both sides of unit. Filters shall be removable from one side or lifted out from access plenum.

c. Provide two sets of filters. One set shall ship installed in the Air Handling Unit.

II. Pre-Filters: 2 inch Cartridge MERV 8 (35 percent dust spot efficiency).

III. Final Filters: 12 inch Cartridge MERV 13 (80 percent dust spot efficiency).

IV. Filter Gage: 3-1/2 inch diameter, diaphragm-actuated dial in metal case for each filter bank.
23 82 19 Fan Coil Units

1. General

   A. Summary: This section includes fan coil units and accessories.

2. Products

   A. Fan Coil Units:

      I. Description: Factory-packaged and -tested units rated according to ARI 440.

      II. Insulation: 1-inch thick, foil-covered, closed-cell foam or neoprene coated glass fiber.

      III. Main and Auxiliary Drain Pans: Plastic or stainless steel formed to slope from all directions to the drain connection as required by ASHRAE 62.

      IV. Cabinet: Galvanized steel, with baked-enamel finish where exposed to view in manufacturer's standard paint color.

      V. Filters: Minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.


      VI. Hydronic Coils: 1/2-inch copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch, rated for a minimum working pressure of 25 psig and temperature of 300 Deg F. Include manual air vent and drain valve.

      VII. Fan and Motor Board: Removable.

         a. Fan: Forward curved, double width, centrifugal; directly connected to motor. Galvanized-steel fan scrolls.


   VIII. Electrical Connection: Factory wire motors and controls for a single electrical connection.
25 00 00 Integrated Automation
25 50 00 Integrated Automation Facility Controls

1. General

A. Summary: This section includes control equipment for HVAC systems and components.

B. General Requirements:

I. Test and Balance Support: Provide support to test and balance contractor to insure that their correction factors have been updated in the Andover Building Management System (BMS) and have been properly backed up.

II. Campus Door Management and Lockdown System: Exterior doors and other selected doors required by the University shall be connected to the Campus Door Management System. Doors shall be scheduled for occupancy in the BMS and shall be incorporated into the Campus Master Lockdown System. The controls contractor shall provide and install the Direct Digital Control (DDC) controllers, panels, low voltage wiring, programming, and graphics necessary to add controlled and monitored doors to the BMS.

III. Secondary Fire Alarm Device Reporting: Simplex Fire Alarm System devices shall be tied as “read only” inputs into the BMS through the existing Fire Alarm Interface Panel. The devices shall be reported and displayed graphically at the BMS workstation located in the University Police Department. The system shall be used for secondary monitoring only. All fire alarm life-safety and related functions such as fan shutdown, elevator recall, door release, resetting, etc. shall remain a function of the Fire Alarm System.

IV. Lighting Control Interface:

a. The BMS shall control all exterior lighting and interior lighting not controlled by sensor switch devices. Exterior lighting points shall be added to the Campus Sentry Logic System for testing and maintenance by Physical Facilities.

b. All lighting circuits shall have a method of bringing on the controlled circuit in the event of an emergency. This shall be accomplished with either a local override switch or a switch located within the associated DDC Controller. (This applies to exterior and interior lighting circuits that do not have a Hand/Off/Auto provided and installed by the electrical contractor.)

V. FAMIS System Interface: Provide programming to add meters and alarms to the Campus “FAMIS” work order system.
VI. Sentry Logic System: Provide programming to incorporate the Andover BMS information into the Sentry Logic system to add critical point alarming, trending, paging, and email notification to selected individuals as requested by Physical Facilities.

VII. Energy Reporting & Utility Information:

   a. Chilled Water Tonnage Calculations: Entering each building there shall be a chilled water flow meter and matched supply and return water temperature sensors. Energy calculations shall be performed to report the tonnage back to the BMS.

   b. Hot Water BTU Calculations: Entering each building there shall be a hot water flow meter and matched supply and return water temperature sensors. Energy calculations shall be performed to report the BTU consumption back to the BMS.

   c. Electrical Monitoring and Consumption: Provide interface hardware and MODBUS communications bus wiring necessary to interface the BMS system to the switchgear integral meters. Create and map electrical information to the BMS and perform electrical consumption calculations. Display the information graphically on the BMS. Add metered information to the Andover Campus "MeterView" program.

   d. Miscellaneous Metering and Monitoring: Provide meters / monitoring for the following systems:

      i. Irrigation Water Metering.
      ii. Potable Water Metering.
      iii. Gas Metering.
      iv. Miscellaneous Monitored Systems.
      v. Lift Station Monitoring.
      vi. Elevator Monitoring.
      vii. Emergency Generators.
      viii. Fuel Tank Monitoring.
      ix. Fountain Control.
      x. Variable Frequency Drive Monitoring.

VIII. All primary equipment (Chillers/Boilers) shall have a local override switch which will bring on the associated piece of equipment in the event of an emergency.
IX. The control contractor shall coordinate alarm notification options with Physical Facilities. This applies to the alarm selections, thresholds and the delivery locations.

2. Products

A. Control System:
   
   I. Acceptable Manufacturer:
      
      a. Andover Controls Corporation.

   II. The control contractor shall have an office within a 50-mile distance of the project site and offer complete maintenance and support services on a 24-hour, 365 day/year basis. This office shall have direct access to inventory of spare parts and all necessary test equipment required to install, commission, and service the BMS provided.

   III. The manufacturer products apply to operator workstation software, controller software, the custom application programming language, building controllers, custom application controllers, and application specific controllers. All other products specified herein, including sensors, valves, dampers, and actuators, do not need to be manufactured by Andover.

   IV. Control system shall consist of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, accessories, and software connected to distributed controllers operating in multi-user, multitasking environment on the campus network and programmed to control mechanical systems. Operator workstation permits interface with the network via dynamic color graphics with each mechanical system, building floor plan, and control device depicted by point-and-click graphics.

B. DDC Equipment:

   I. Operator Workstation: Consult with Physical Facilities at the start of the project to determine if additional operator workstations are required. Workstation shall comply with current Information Technology Systems (ITS) standards for the University.

   II. Control Units: Modular, comprising processor board with programmable, nonvolatile, random-access memory; local operator access; integral interface equipment; and backup power source.

   III. Power Supplies: Transformers with Class 2 current-limiting type or overcurrent protection; limit connected loads to 80 percent of rated capacity. DC power supply
shall match output current and voltage requirements of the connected equipment and be full-wave rectifier type.

IV. Surge Protection: Three-stage, in-line, power line protector with L to N, L to G, and N to G protection.

   a. Manufacturer \ Model: Kele \ HSP-121BT1RU.

V. Control Cabinet: NEMA 1 enclosure with internal perforated panel for equipment mounting sized to accommodate all control components and wiring in a clean and orderly fashion.

   b. Manufacturer \ Model: Kele \ RET Series.

C. Electronic Sensors:

   I. Description: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.

   II. Thermistor Temperature Sensors and Transmitters:

      a. Acceptable Manufacturers:

         i. Andover Controls.

         ii. Precon; Kele.

         iii. Greystone.

      b. Accuracy: Plus or Minus 0.5 Deg F at calibration point.

      c. Wire: Twisted-pair cable.

      d. Insertion Elements in Ducts: Length as appropriate for duct size; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft.

      e. Averaging Elements in Ducts: Length as appropriate for duct size. Use where prone to temperature stratification or where ducts are larger than 10 sq. ft.:

         i. Manufacturer \ Model: Precon \ ST-FZ Series or approved equal.

      f. VAV/FTU Temperature Sensors: Provide 4-inch temperature sensors on the discharge of all Variable Air Volume boxes and Fan Terminal units with reheat:

         i. Manufacturer \ Model: Greystone \ TE200 series or approved equal.

      g. Insertion Elements for Liquids: 304 stainless-steel probe and socket with minimum insertion length of 2-1/2 inches. Well mounted sensors shall include thermal conducting compound within the well to insure good heat transfer to the
sensor. All immersion sensors that are utilized in conjunction with flow meters in energy calculations shall be a matched pair.

i. Manufacturer \ Model: Precon \ ST/W Series or approved equal.

h. Room Sensor:
   i. Set-Point Adjustment: None.
   ii. Set-Point Indication: None.

III. Humidity Sensors: Bulk polymer sensor element:
   a. Manufacturer: Veris Industries.
   b. Accuracy: 5 percent full range with linear output.
   c. Sensor Range: 0 to 100 percent relative humidity.
   d. Room Sensor:
      i. Set-Point Adjustment: None.
      ii. Set-Point Indication: None.

IV. Carbon Dioxide Sensors: Non-dispersive infrared; 0-2000 ppm range, +/- 20 ppm accuracy, 4 to 20 milliamps output, 5-year calibration interval.
   a. Manufacturer \ Model: Veris Industries \ CDE/CWE Series.

V. Pressure Transducers:
   a. Air Pressure Transducers: High-impact ABS plastic panel with LCD display, 0-10” w.c. range, 1 percent of full scale accuracy, 4 to 20 milliamps output.
      i. Manufacturer \ Model: Veris Industries \ PX Series.
   b. Water Differential-Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig operating pressure and tested to 300-psig; linear output 4 to 20 mA.
      i. Manufacturer \ Model: Veris Industries \ PX Series.
c. Differential-Pressure Switch (Air or Water): Snap acting, with pilot-duty rating and with suitable scale range and differential.

i. AIR – Manufacturer \ Model: Kele \ Model P32 Series.

ii. Water – Manufacturer \ Model: Penn \ P74 Series or approved equal.

VI. Airflow Measuring Station: Station shall be sized to provide steady airflow measurement overall operating ranges.

a. Manufacturer \ Model: Ebtron \ Silver Series.

VII. Chilled Flow Sensor: Vortex, retractable insertion type suitable for fluid velocities between 0.5 and 15 ft/s. 316 Stainless steel construction with EPDM O-rings.

a. Manufacturer \ Model: Fluidyne \ Hydro-Flow 3100.

VIII. Hot Water Flow Sensor: Turbine, retractable insertion type suitable for fluid velocities between 0.4 and 20 ft/s.

a. Manufacturer \ Model: Onicon \ F-1110 Series.

IX. Safeties:


i. Manufacturer \ Model: Johnson Controls \ A11 Series.

b. Air Pressure Switch: Snap acting, diaphragm with calibration spring and manual reset button.

i. Manufacturer \ Model: Cleveland Controls \ AFS-460.

D. Status Sensors:

I. Current Switches: Split-core, self-powered, solid-state, selected to match current and system output requirements.

a. Manufacturer \ Model: Hawkeye \ 600.

E. Relays:

I. Pilot Duty Relays: Provide relay with the proper voltage and current ratings most suitable for the controlled application.

a. Manufacturer \ Model:
i. Functional Devices \ RIB Series.

ii. Air Products \ PAM Series.

iii. IDEC \ RH Series with SH Bases.

II. Power Duty Relays: Provide power rated relays in applications where there is no contactor or starter required in applications to control low horsepower motors and lighting circuits.

   a. Manufacturer \ Model: Functional Devices \ RIB Power Series.

F. Actuators:

   I. Manufacturer: Belimo.

   II. Electric Motors: Size to operate with sufficient reserve power to provide smooth modulating action or two-position action.

   III. Electronic Actuators: Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque. Actuators for terminal unit damper control shall be tristate; all others shall be analog with position feedback.

G. Control Valves:

   I. Manufacturer: Belimo.

   II. Control Valves: Factory fabricated, of type, body material, and pressure class based on maximum pressure and temperature rating of piping system, unless otherwise indicated.

   III. Valves 2 inches and smaller shall be PICCV type. Actuators for terminal unit heating coil control shall be tristate; all others shall be analog with position feedback.

H. Dampers:

   I. Acceptable Manufacturers:

      a. TAMCO (T.A. Morrison & Co. Inc.).

      b. Ruskin.

   II. Dampers: AMCA Class 1A listed, opposed-blade design; 0.125 inch minimum thick, extruded-aluminum frames with holes for duct mounting; airfoil damper blades with neoprene blade seals mounted on 1/2 inch diameter, zinc-plated axles, with nylon blade bearings and linkages concealed in the frame. Maximum leakage of 3 cfm/sq. ft. at 1 inch w.g. static pressure.
I. Exterior Lighting Wireless Control:

I. Enclosure: Fiberglass 16 inch by 14 inch by 8 inch enclosure with hinged cover and stainless snap latches with the ability to place a padlock.
   a. Manufacturer: Allied Molded Products, Inc.

II. Network Interface: Wireless 802.11b network interface to RS485 device which supports enterprise-class WPA2/802.11i security.
   a. Manufacturer / Model: Digi Connect / WI-SP.

III. Relay Module: SG2 Series programmable relay module sized to support the number of lighting circuits being controlled.
   a. Manufacturer: TECO.

IV. Power Supply: Din rail mounted DC power supply sized to support the voltage and current requirements of the equipment being powered.
   a. Manufacturer: IDEC.

V. Provide and install any pilot relays necessary to energize the lighting contactors.

VI. Provide a local override switch for each lighting circuit controlled for local testing and emergency operation of the lights.

VII. Provide and install a local photocell to be used as backup to the Andover BMS Schedule in the event of a communications failure.

VIII. All devices listed shall be mounted in their own enclosure separate from the high voltage lighting contactors.

IX. Update the Campus Andover Sentry Logic monitoring program to add new control points.

J. Wiring, Conduit, and Cable:

I. All wiring requirements shall conform to the standards outlined in the Electrical Specifications.

II. Conduit is required in all mechanical rooms, equipment rooms, and all concealed spaces.

III. Where the space above the ceiling is a supply or return air plenum, the wiring shall be plenum rated. Plenum rated wiring can be run without conduit above suspended ceilings.
IV. Control cable installed in walls shall be in conduit, terminated above ceiling with a bushing.

V. Network cabling shall be run as CAT5 plenum rated cable, pink color.

VI. All wire shall be copper and meet minimum wire size and insulation class as listed below:

<table>
<thead>
<tr>
<th>Wire Class</th>
<th>Wire Size</th>
<th>Insulation Class</th>
<th>Wire Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>12 Gauge</td>
<td>600 Volt</td>
<td>N/A</td>
</tr>
<tr>
<td>Class One</td>
<td>14 Gauge</td>
<td>600 Volt</td>
<td>N/A</td>
</tr>
<tr>
<td>Class Two &amp; Three</td>
<td>18 Gauge</td>
<td>300 Volt</td>
<td>N/A</td>
</tr>
<tr>
<td>Infinet Comm.</td>
<td>24 Gauge low cap</td>
<td>300 Volt</td>
<td>Orange</td>
</tr>
<tr>
<td>BACnet RTU Comm.</td>
<td>24 Gauge low cap</td>
<td>300 Volt</td>
<td>Org/Blu</td>
</tr>
<tr>
<td>MODbus Comm.</td>
<td>22 Gauge</td>
<td>300 Volt</td>
<td>Blue</td>
</tr>
<tr>
<td>LON Bus</td>
<td>24 Gauge low cap</td>
<td>300 Volt</td>
<td>Purple</td>
</tr>
</tbody>
</table>

K. Identification:

I. All control enclosures shall be identified with a phenolic nameplate. The lettering shall be white against a black background unless otherwise directed by the Owner.

II. Ceiling grids shall be tagged with a label tag identifying the terminal box number in coordination with the tag located on the associated temperature sensor.
26 00 00 Electrical
26 00 00 Electrical Project Requirements

1. General

   A. Summary: This section contains the Owner's project requirements for the design of electrical systems.

   B. Codes and Standards: The latest IEEE and ASHRAE Standards shall be utilized in the design and construction of the electrical systems.

   C. Submittals: A copy of the electrical submittals shall be provided to Physical Facilities concurrent with the engineer's review, not for contract compliance-related approval, but to allow Physical Facilities to become familiar with the products to be maintained.

   D. General Requirements:

      I. All systems shall be designed in a manner to facilitate ease of maintenance. Adequate access to accomplish all normally required maintenance without removal of other than access panels is mandatory.

      II. The electrical system shall be designed to facilitate the installation of components in a serviceable manner. Complete wiring and component diagrams shall be included in the construction documents to verify that the design intent is constructible and maintainable.

      III. Clearances suggested by manufacturers for equipment maintenance, removal, and replacement shall be indicated on 1/4 inch scale electrical room drawings and accommodated by the layout. Larger and heavier components that may require future removal or replacement shall be identified on the drawing and a clear path identified to the building exterior. Door sizes, lifting supports, and other pertinent information shall be identified on the drawings.

   E. Design Loads:

      I. General purpose receptacles shall not be on the same circuit with office receptacles.

   F. Power:

      I. Power to the University is provided by the local utility (JEA) via pad-mounted transformers. The University maintains the secondary distribution system. Physical Facilities in conjunction with JEA shall be consulted at the start of the project to determine the impact of the project on the existing primary / secondary distribution
system. Any increases in distribution capacity must be addressed as part of the project design.

II. Raceways:

a. Underground raceways shall have a minimum of 30 inches of cover.

b. Underground raceways shall be PVC. Secondary service conduits may be required to be concrete encased; consult with Physical Facilities at the start of the project.

c. All electrical duct banks shall contain reinforcing steel run parallel with the conduits. The number, size and locations of rebar incorporated into the duct bank shall be sufficient to allow a minimum ten foot span of undermined duct bank to be self-supporting. All underground duct banks shall be designed, configured and installed to eliminate standing water, directing drainage to manholes, pull boxes, switch vaults, etc. Provide a minimum of one spare 4 inch conduit in each duct bank. The use of Directional Drilling and Jack & Boring will be considered on a case-by-case basis in lieu of underground duct banks.

d. New building raceways and raceways added to existing buildings shall be concealed, except in Mechanical and Electrical Rooms.

e. Consult with Physical Facilities to determine need for spare conduits.

III. Electrical Distribution:

a. System shall be designed with 20 percent spare spaces available in switchboards, distribution panels, and panelboards.

b. Feeders to panels shall be sized for the full panel bus ampacity. Feeders shall not be downsized. For example, a 225A rated panel with 150A design load shall not be fed with a 150A breaker and feeder; upsize feeder and breaker to 225A.

IV. TVSS:

a. Provide Transient Voltage Surge Suppression (TVSS) on service entrances, and all panelboards serving plug loads.

G. Metering and Instrumentation:

I. University Policy: It is the policy of the University that all utilities be metered. All new buildings and renovations shall include installation of permanent metering of all utilities. This is in addition to the utility required metering.

II. Temporary Utilities: All utilities (including electricity) consumed during construction shall be metered and paid for with project funds. The contractor shall be billed for consumption, unless specifically stated otherwise in writing.
III. Absent or Improper Metering: Installations found either to be unmetered, or having incorrectly working meters, shall be disconnected from service immediately, and shall remain that way until properly working meters are installed. In the absence of metering, a flat rate based on the maximum connected load shall be charged. This calculation is solely at the discretion of Physical Facilities.

IV. The building main power shall be metered at the main service and connected to the Energy Management System (EMS). Consult with Physical Facilities during design to determine sub-metering requirements.

V. Vending machine circuits are to be dedicated and sub-metered.

H. Lighting:

I. The lighting system shall be designed in compliance with ASHRAE Standard 90.1.

II. Provide cut sheets of all proposed fixtures to Physical Facilities for review and approval.

III. Interior:

a. Interior fixtures shall utilize LED bulbs.

i. Consult with Physical Facilities for existing lamp inventory.

b. Emergency fixtures shall be powered from the emergency generator. Battery packs shall not be used without prior approval of Physical Facilities.

c. Switching:

i. Consideration shall be given to the full range of lighting control options including occupancy sensors, dual level control, and separate switching of daylight zones.

ii. Dual-technology (passive infrared and ultrasonic) wall-type sensor switches shall be used in all offices, conference rooms, and similar small spaces. Classrooms, computer labs, auditoriums, and other large spaces shall be ceiling-mount with wall-mount override control. Sensor location must be considered based upon the size of the room and the installation requirements.

d. Emergency fixture switching: Emergency fixtures shall not burn continuously in classrooms, computer labs, auditoriums, conference rooms, and other teaching or presentation spaces where the light may interfere with a projection presentation. Fixtures shall be configured to allow the occupant to turn off the fixture but will turn on automatically when there is a loss of power to the space.

e. Theater Step Lighting: Consult with Physical Facilities and EH&S.
IV. Site Lighting:
   a. It is the responsibility of each project to provide all security, walkway, plaza and parking lot lighting necessitated by that project.
   b. For energy conservation, extensive architectural lighting shall be avoided.
   c. Voltage: 480 volts / 1PH. Other voltages may be acceptable; consult with Physical Facilities.
   d. Light levels should be as recommended in the IES Lighting Handbook. A photometric plan shall be provided that clearly demonstrates conformance with these standards.
   e. Switching: Site lighting shall be controlled via contactors tied into the campus Energy Management System. Individual photocells or time clocks shall not be used.
   f. Metering: Consult with Physical Facilities for metering requirements.

I. Emergency Generator:
   I. Location: Generators shall be located such that exhaust from the engine does not become entrained in the building outside air intakes or otherwise be a nuisance.
   II. Screening: Generators shall be hidden from view by a fence, landscaping or other building element.
   III. All new facilities to be provided with an emergency generator. Fuel type to be determined on a project-by-project basis.

J. Lightning Protection: Provide UL Master Label or Lightning Protection Institute (LPI) certified lightning protection system for all new buildings.

K. Telecommunications:
   I. Electrical contractor to provide for data conduit, “back-boxes” and cable tray only.
   II. Cabling supply and installation by Owner.
26 05 00 Common Work Results For Electrical

1. General

A. **Summary:** Section includes:

   I. Electrical equipment coordination and installation.

   II. Common electrical installation requirements.

B. **Coordination:**

   I. Coordinate arrangement, mounting, and support of electrical equipment:

      a. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.

      b. To provide for ease of disconnecting the equipment with minimum interference to other installations.

      c. To allow right of way for piping and conduit installed at required slope.

      d. So connecting raceways, cables, wire ways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

   II. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

   III. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.

   IV. Coordinate sleeve selection and application with selection and application of fire stopping. **Note:** All visible piping and conduit penetrations must be sealed smoke tight or better.

C. **Trenching:**

   I. All trenching shall be done by hand unless other methods have been approved by Physical Facilities.
26 05 19 Low-Voltage Electrical Power Conductors and Cables

1. General

A. **Summary:** This section includes the following:
   I. Building wires and cables rated 600 volts and less.

B. **Wiring Methods:** Receptacles serving computers or any other location where the type and quantity of devices on a circuit are known to be a significant source of harmonics, neutrals for receptacles on circuits that feed offices shall not be shared by different circuits. Each circuit serving computer plug loads shall have its own dedicated neutral. Neutral shall be sized according to harmonic load.

2. Products

A. **Conductors and Cables:**
   I. All conductors shall be copper.
   II. Provide an insulated grounding conductor in all feeder and branch circuits.
   III. Crimp type connectors shall only be used on stranded wire.
   IV. Conductors for 120/208 volt shall be black/red/blue/white and green. Conductors for 277/480 volt shall be brown/orange/yellow/gray and green with yellow stripe.
   V. All neutral conductors shall be considered current carrying when considering pipe fill.
   VI. **Metalclad Cable:** Metalclad (MC) cable shall not be used without approval from Physical Facilities, and then it can only be used for branch circuit wiring within walls and up to junction boxes in the ceiling. Homeruns to an electrical panel shall be wire in rigid conduit.
26 05 33 Raceway and Boxes for Electrical Systems

1. General

A. **Summary:** This section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. **Wiring Methods:**
   
   I. **Boxes:**
      
      a. **Location:** Back-to-back and through-the-wall boxes are not acceptable. When boxes share the same partition they shall be offset a minimum of 12 inches for sound attenuation.
         
         i. **Boxes below suspended ceiling shall be “readily accessible” per NEC.** No removal of equipment or furnishings shall be necessary for access.
         
         ii. **Boxes above suspended ceilings shall be “accessible” per NEC.** They must be accessible from below or aside, and the access opening may not be less than 18 inches from a duct or structural component (excluding the ceiling grid). Junction boxes located above ceiling shall be installed facing down and shall be accessible after installation.
         
         iii. **Do not recess boxes deeper than 5 inches into a wall (finished/furred out or not).** Do not install multiple extension rings on one box. Do not install extension rings that will limit access to the back of the box, except for a trim ring. Boxes shall be sized so extension rings are not needed.

   b. **Cover Plates:** All cover plates shall be high abuse resistant nylon or stainless steel. All device cover plates that are served by the emergency generator shall be red in color.

   c. **Unless indicated otherwise, communication boxes shall be 4-11/16 inches by 4-11/16 inches by 2-1/8 inches deep with single device cover plates.**

   II. **Install warning tape 12 inches above all underground electrical raceways.**

2. **Products**

   A. **Rigid Conduit:**
      
      I. **Minimum Size:** 3/4 inch.

   B. **Flexible Conduit:**
I. Flexible conduit shall be steel or aluminum with a minimum diameter of 1/2 inch, except where supplied by a manufacturer with a lighting fixture or as part of a pre-manufactured wiring system.

II. Metalclad (MC) cable shall not be used without approval from Physical Facilities.

III. Separate green grounding conductors shall be installed in ANY length of flex.

IV. Flex shall not be used in lengths greater than 6 feet.

V. Flex shall not be used inside walls or as a replacement for EMT.

VI. Flex shall not be looped between light fixtures, except for wiring whips provided with light fixtures.

VII. Flex shall not pass through walls or ceilings. A junction box is required at the point of transition.

C. Handholes And Boxes For Exterior Underground Wiring:

I. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom. Frame and cover shall form top of enclosure and shall have load rating consistent with that of hand hole or box.

II. Frame and Cover: Weatherproof galvanized steel frame, with steel cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.

III. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.

IV. Cover Legend: Molded lettering – “ELECTRIC,” “TELEPHONE” – as indicated for each service.

V. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall. Conduit openings shall be sealed.

VI. Handholes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

VII. Depth: Boxes shall be less than 48 inches deep. Consult with EH&S if deeper boxes are required.
26 05 53 Identification for Electrical Systems

1. General

   A. Summary: Section includes:
      I. Identification for raceways.
      II. Identification of power and control cables.
      III. Identification for conductors.
      IV. Underground-line warning tape.
      V. Warning labels and signs.
      VI. Equipment identification labels.

   B. Labeling:
      I. Switches: Label panel and circuit number inside outlet box.
      II. Receptacles: Label panel and circuit number inside outlet box and on face of cover plate using preprinted alphanumeric adhesive markers, 1/4-inch minimum height.
      III. Boxes: Label panel and circuit number on face of the cover plate.
      IV. Control Wiring: Tagged at each enclosure.
      V. Emergency switches and outlets shall have red cover plates.

   C. Identification Of Underground Conduit:
      I. Warning Tape: All underground wiring and duct banks shall have metalized warning tape installed above a conduit, duct bank or electrical line that identifies the specific system buried below. Tape shall be installed 18 inches above the conduit, duct bank or electrical line and in no case less than 6 inches below grade.
      II. Tracer Wire: Tracer wire is not required for underground electrical lines.
      III. ID Tags: ID tags shall be installed on all splices and terminations in manholes with: Name of the Splicer, Name of the Electrical Contractor performing the work, and Date of Installation of the Splice.

2. Products
A. Power Raceway Identification Materials:

I. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

II. Colors for Raceways Carrying Circuits at 600 volts or less:

<table>
<thead>
<tr>
<th>System</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Safety</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>Normal Power</td>
<td>Royal Blue</td>
</tr>
<tr>
<td>Miscellaneous Communications</td>
<td>Brown</td>
</tr>
<tr>
<td>Fire Alarm</td>
<td>Red</td>
</tr>
<tr>
<td>Telephone/Computer</td>
<td>Black</td>
</tr>
<tr>
<td>TV</td>
<td>Light Pink</td>
</tr>
<tr>
<td>Paging</td>
<td>Grey</td>
</tr>
</tbody>
</table>

III. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 Volts or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

IV. Snap-Around Bands or Labels for Raceways Carrying Circuits at 600 Volts or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

B. Floor Marking Tape:

I. 2-inch wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

II. Marking tape shall be applied in front of and/or around all electrical equipment per NFPA requirements for arc flash protection.

C. Underground-Line Warning Tape: 6-inch wide, minimum 3.5-mil solid foil core encased in a protective plastic jacket (total thickness 5.5 mils) with black lettering imprinted on a color coded background that conforms to APWA color code specifications.

26 09 23 Lighting Control Devices

1. General

A. Summary: This section includes the following lighting control devices:

   I. Indoor occupancy sensors.

2. Products

A. Indoor Occupancy Sensors:

   I. General Description: Wall- or ceiling-mounting, solid-state units.

      a. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.

      b. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.

      c. Bypass Switch: Override the on function in case of sensor failure.

   II. Dual-Technology Type: Ceiling and wall mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit. Manufacturer: Wattstopper or equal.

          a. Sensitivity Adjustment: Separate for each sensing technology.
26 24 13 Switchboards

1. General

A. Summary: Section includes:
   I. Service and distribution switchboards rated 600 volts and less.
   II. Disconnecting and overcurrent protective devices.
   III. Instrumentation.

B. Warranty:
   I. Special Warranty: Five years from date of Substantial Completion.

2. Products

A. Switchboards:
   I. Acceptable vendors: General Electric, Square D, Siemens, Cutler Hammer.
   II. Busses shall be copper.
   III. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.

B. Disconnecting And Overcurrent Protective Devices:
   I. Main Overcurrent Protective Device: Switchboards shall be equipped with an automatic electrically-operated Molded-Case Circuit Breaker (MCCB). Each main breaker shall be equipped with devices to automatically open on phase imbalance, ground fault and overload. They shall return to normal operation five minutes after power has been restored. There shall be read-out devices to indicate the cause of an open breaker condition.

C. Instrumentation:
   I. Multifunction Digital-Metering Monitor: Microprocessor-based unit with the following features:
a. Phase currents, each phase.
b. Phase-to-phase voltages, three phase.
c. Phase-to-neutral voltages, three phase.
d. Megawatts.
e. Megavars.
f. Power factor.
g. Frequency.
h. Accumulated energy, megawatt hours.
i. Megawatt demand.
j. MODBUS communication interface to campus building automation system.
26 24 16 Panelboards

1. General

   A. **Summary:** Section includes:

      I. Distribution panelboards.

      II. Lighting and appliance branch-circuit panelboards.

   B. **Warranty:**

      I. Special Warranty: Five years from date of Substantial Completion.

2. Products

   A. **General Requirements For Panelboards:**

      I. Acceptable vendors: General Electric, Square D, Siemens, Cutler Hammer.

      II. Covers shall be “door in door” type.

      III. Busses shall be copper.

      IV. All panels shall be installed “readily accessible” without having to remove anything.

      V. Stub and cap three each 3/4-inch empty conduits to above ceiling from each recessed mounted panelboard. These conduits shall be accessible for future circuit installations.

      VI. Directory Card: Inside panelboard door, mounted in metal frame with transparent protective cover. All cards to be neatly typed with descriptive labels including what type of load they serve and the room number. Provide copy of each card in the operation and maintenance manual.

      VII. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices shall be included. “Spaces” in panels shall be prepared spaces.

      VIII. Metering: All sub-panels and circuits that require monitoring shall be sub-metered. Refer to Section 262713 for additional information.

      IX. All sub-panels shall be equipped with a main breaker unless protected by an upstream circuit breaker in the distribution panel located within line of sight in the same room.
B. Distribution Panelboards:

I. Panelboards: NEMA PB 1, power and feeder distribution type.


C. Lighting And Appliance Branch-Circuit Panelboards:

I. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

II. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

D. Disconnecting And Overcurrent Protective Devices:

I. All 480 volt and below circuit breakers shall be bolt on type. Plug in devices are not acceptable.

II. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.


   b. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

      i. Standard frame sizes, trip ratings, and number of poles.

      ii. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.

      iii. Application Listing: Appropriate for application – Type SWD for switching fluorescent lighting loads, Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.

      iv. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.
26 27 13 Electricity Metering

1. Products

   A. Equipment For Electricity Metering By Utility Company:
      
      I. Meters will be furnished by utility company.
      
      II. Current-Transformer Cabinets: Comply with requirements of JEA.
      
      III. Meter Sockets: Comply with requirements of JEA.
      
      IV. Meter Sockets: Steady-state and short-circuit current ratings shall meet indicated circuit ratings.
      
      V. JEA Contact: Gabor Acs at (904)665-7729, email: acsg@jea.com.

   B. Building Entrance (Main Service) Metering:
      
      I. Meter shall be integral to the switchboard with MODBUS output to the campus Energy Management System (EMS). Where a switchboard is not part of the job, see C. Submetering below; consult with Physical Facilities to determine application.

   C. Submetering:
      
      I. E-Mon / D-Mon Class 3000 Energy Meters with “P2 Pulser” option and connected to the campus EMS.
      
      II. Meter can with a GE model KV2C meter with MODBUS enabled output to the campus EMS.
26 27 26 Wiring Devices

1. General

   A. Summary: This section includes the following:
      I. Receptacles, receptacles with integral GFCI, and associated device plates.
      II. Snap switches and wall-box dimmers.
      III. Combination floor boxes.

2. Products

   A. Straight Blade Receptacles:
      I. Convenience Receptacles, 125 volts, 20 amps: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

   B. GFCI Receptacles:
      I. General Description: 125 volts, 20 amps. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

   C. Snap Switches:
      I. Comply with NEMA WD 1 and UL 20.
      II. Switches, 120/277 volts, 20 amps.

   D. Wall-Box Dimmers:
      I. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
      II. Control: Continuously adjustable slider, with single-pole or three-way switching. Comply with UL 1472.
      III. Incandescent Lamp Dimmers: 120 volts, control shall follow square-law dimming curve. On-off switch positions shall bypass dimmer module.
      IV. Fluorescent Lamp Dimmer Switches: Modular, compatible with dimmer ballasts, trim potentiometer to adjust low-end dimming, dimmer-ballast combination capable of consistent dimming with low end not greater than 20 percent of full brightness.
E. Combination Floor Boxes:

I. Manufacturer / Model: Wiremold / RFB Series.

II. Compartments: Barrier separates power from voice and data communication cabling.

III. Service Plate: Rectangular die-cast aluminum with satin finish.

IV. Power Receptacle: NEMA WD 6 configuration 5-20R.

V. Voice and Data Communication Outlet: Modular, keyed, color-coded, RJ-45 (Panduit) Category 5e jacks for structured cable.
26 29 23 Variable-Frequency Motor Controllers

1. Products

A. Manufacturers: Acceptable Manufacturers:

I. ABB Power Distribution, Inc.; ABB Control, Inc. subsidiary.

II. Toshiba International Corporation.

B. Variable Frequency Controllers:

I. Description: Provide unit suitable for operation of premium-efficiency motor as defined by NEMA MG 1.

II. Design and Rating: Match load type such as fans, blowers, and pumps -- and type of connection used between motor and load such as direct or through a power-transmission connection.

III. Output Rating: 3-phase; 6 to 60 hertz, with voltage proportional to frequency throughout voltage range.

IV. Isolated control interface to allow controller to follow control signal over an 11:1 speed range:
   a. Electrical Signal: 4 to 20 milliamps at 24 volts.

V. Communications: Provide an RS485 interface.

VI. Manual Bypass: Magnetic contactor arranged to safely transfer motor between controller output and bypass controller circuit when motor is at zero speed. Controller-off-bypass selector switch sets mode and indicator lights give indication of mode selected. Unit shall be capable of stable operation (starting, stopping, and running), with motor completely disconnected from controller (no load).

VII. Integral Disconnecting Means: NEMAKS 1, nonfusible switch with lockable handle.

VIII. Automatic [Reset].

C. Accessories:

I. Devices shall be factory installed in controller enclosure, unless otherwise indicated.

III. Current-Sensing, Phase-Failure Relays for Bypass Controller: Solid-state sensing circuit with isolated output contacts for hard-wired connection; arranged to operate on phase failure, phase reversal, current unbalance of from 30 to 40 percent, or loss of supply voltage; with adjustable response delay.
26 32 13 Engine Generators

1. General

   A. Summary: This section includes packaged engine-generator sets for emergency power supply with the following features:
      
      I. Diesel engine.
      II. Unit-mounted cooling system.
      III. Unit-mounted control and monitoring.
      IV. Outdoor enclosure.

   B. Warranty:
      
      I. Special Warranty: 2 years from date of Substantial Completion.

2. Products

   A. Manufacturers: Acceptable Manufacturers:
      
      I. Caterpillar; Engine Div.
      II. Generac Power Systems, Inc.


   C. Engine:
      
      I. Fuel: Fuel oil, Grade DF-2 or Natural Gas. Fuel selection to be reviewed with Physical Facilities.

      II. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements:

         a. Sound level measured at a distance of 10 feet from exhaust discharge after installation is complete shall be 85 dBA or less.

   D. Fuel Oil Storage:
I. Each facility’s generator is to be capable of providing for a continuous 24-hour run time.

II. Integral, double-wall base tank.

E. Control And Monitoring:

I. Provide MODBUS interface to campus Building Management System (BMS).

F. Outdoor Generator-Set Enclosure:

I. Description: Vandal-resistant, weatherproof aluminum housing. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Service panels shall open without tools. Instruments and controls shall be mounted within enclosure.

G. Finishes:

I. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.
26 36 00 Transfer Switches

1. General

   A. Summary: This section includes transfer switches rated 600 volts and less, including the following:
      I. Automatic transfer switches.

2. Products

   A. Manufacturers:
      I. Acceptable Manufacturers:
         a. Emerson; ASCO Power Technologies, LP.
         b. Generac Power Systems, Inc.
         d. Russelectric, Inc.

   B. Automatic Transfer Switches:
      I. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
      II. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.
      III. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

   C. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable:
      I. Switch Action: Double throw, mechanically held in both directions.
      II. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.
III. Switch shall be solid-state, programmable-time switch and push-button programming control with digital display of settings; sound attenuated.

IV. Neutral Switching: Where four-pole switches are indicated, provide neutral pole switched simultaneously with phase poles.

D. Remote Annunciator System:

I. Functional Description: Remote annunciator panel shall announce conditions for indicated transfer switches. Annunciation shall include the following:
   a. Sources available, as defined by actual pickup and dropout settings of transfer-switch controls.
   b. Switch position.
   c. Switch in test mode.
   d. Failure of communication link.

II. Annunciator Panel: LED-lamp type with audible signal and silencing switch:
   a. Indicating Lights: Grouped for each transfer switch monitored.
   b. Label each group, indicating transfer switch it monitors, location of switch, and identity of load it serves.
   c. Mounting: Flush, modular, steel cabinet, unless otherwise indicated.
   d. Lamp Test: Push-to-test or lamp-test switch on front panel.
26 41 13 Lightning Protection for Structures

1. General
   
   A. **Summary:** This section includes lightning protection for buildings and building elements.

   B. **Definitions:**
      
      I. LPI: Lightning Protection Institute.

   C. **Coordination:**
      
      I. Coordinate installation of lightning protection with installation of other building systems and components, including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to lightning protection components, and building finishes.

      II. Coordinate installation of air terminals attached to roof systems with roofing manufacturer and installer.

2. **Quality Assurance**

   A. **Installer Qualifications:** Engage an experienced installer who is certified by LPI as a Master Installer/Designer.

   B. **Listing and Labeling:** As defined in NFPA 780 “Definitions” Article.

3. **Products**

   A. **Manufacturers:**
      
      I. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
         
         a. Harger Lightning Protection, Inc.

         b. Independent Protection Co.

         c. Thompson Lightning Protection, Inc.

   B. **Lightning Protection System Components:**
      
      I. Comply with UL 96.
II. Roof-Mounting Air Terminals: NFPA Class I, aluminum, solid tubular, unless otherwise indicated.

III. Stack-Mounting Air Terminals: Stainless steel.

IV. Ground Rods, Ground Loop Conductors, and Concrete-Encased Electrodes: Comply with Division 26 Section “Grounding and Bonding for Electrical Systems” and with standards referenced in this section.
26 43 13 Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits

1. General

   A. Summary:

   I. This section includes Transient Voltage Surge Suppressor (TVSS) or Surge Protective Device (SPD) for low-voltage power, control, and communication equipment.

   II. TVSS or SPD is the equipment required for the protection, within specified and tested limits, of AC electrical circuits and electronic equipment from the effects of lightning induced voltages, external switching transients and internally generated switching transients.

   B. Definitions:

   I. SPD: Surge Protective Device.

   II. TVSS: Transient Voltage Surge Suppressor.

   C. Warranty:

   I. Surge suppression, grounding, and bonding shall effectively protect, within tested limits, against lightning transients, internal and external switching transients, and other surge transients throughout a ten year unconditional warranty period. Surge Protective devices (SPD) and related grounding and bonding systems shall be designed and installed in such a manner that normal operation, performance ratings, and listing of the system is not impaired by the installation of such devices, wiring or connections.

   II. Any SPD which shows evidence of failure or incorrect operation during the ten year warranty period shall be repaired or replaced at no expense to Owner including labor and materials. Since “Acts of Nature” or similar statements include the lightning threat to which these suppression devices shall be exposed, any such general clause limiting warranty responsibility in the general conditions of this specification shall not apply to this section. The warranty shall cover the entire device, not just the modules.

2. Products

   A. Manufacturers: Subject to compliance with requirements, provide AC power suppressors (SPD) products by one of the following:
I. Advanced Protection Technologies, Inc.

II. Atlantic Scientific.


IV. EFI Electronics Corp.

V. General Electric Company.

VI. Leviton Mfg. Company Inc.

VII. Square D Surgelogics.

B. Components:

I. Main Service and Distribution Equipment Suppressors (SPD): The AC Voltage Surge Protective Devices shall be a high speed, high current solid-state device designed to protect electronic equipment and electrical systems from transient overvoltages. It shall safely limit the magnitude of a transient overvoltage present on the AC service or distribution power lines. The suppressor shall provide continuous bi-polar, bi-directional, non-interrupting protection and be capable of instant automatic reset with a maximum of 0.5 percent degradation in protection capabilities. Gas tubes are not acceptable. The suppressor shall be solid state, utilizing silicon junction avalanche diodes or MOV's. At maximum surge current dissipation, the device shall not exceed the maximum voltage protection level (MXVPL). The suppressor assembly shall be installed on the load side and in parallel with the service main disconnect, distribution or branch panel main lugs or breaker as shown. Connect suppressor to overcurrent protection sized as shown with an AIC rating equal to panel or switch gear rating. The suppressor shall be contained in an enclosure appropriate for the environmental application. In addition, it shall have status indicator lights, dry contacts with remote alarm capabilities and an audible alarm. Suppressors shall be assembled as modular units to permit quick, easy replacement of failed components. Provide one spare “module” of each type suppressor for Owner’s use. If entire suppressor is one module, provide one complete spare.

II. Disconnect: Main service suppressors shall be provided with an integral fused disconnect switch or external branch circuit breaker as shown or required by UL. Breakers and suppressors shall have an AIC fault interrupting rating (AIC) equal or greater than the AIC rating of the equipment to which it is connected. The length of wiring from the tap at the service conductors to the suppressor being protected, however, shall not exceed the maximum length permitted by manufacturer, to maintain the maximum voltage protection level. Suppressors may be installed within switchgear or panelboards where permitted under UL label or listing,
providing that suppressors are completely and easily accessible for replacement of module(s), indicator lights are visible exterior to the enclosure, and audible alarm can be easily heard.

III. Enclosures: Enclosures for main service suppressors shall be minimum 14 gauge painted steel or suitable enclosure to meet the NEMA selected requirements as listed with fully hinged door and lockable latch.
26 51 00 Interior Lighting

1. General

   A. Summary: Section includes:

   I. Interior lighting fixtures, lamps, and ballasts.

   II. Exit signs.

2. Products

   A. Lighting Fixtures:

   I. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit re-lamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during re-lamping and when secured in operating position.

   II. LED Troffer 2x4; Curved Linear Prism.

   III. Traditional Acrylic Lens Troffer.

   IV. Linear, Indirect or Direct-Indirect pendant/cable hung fixtures.

   V. Round, recessed “can” fixtures.

   B. Lamps:

   I. Consult with Physical Facilities for existing lamp inventory. New lamp types shall not be introduced to the campus without prior approval of Physical Facilities.

   II. Utilize LED lamps.

   III. Any lamps in permanent fixtures used for construction lighting shall be replaced with new lamps at Substantial Completion. Lamps that burn out within 12 months of Substantial Completion shall be replaced at the contractor’s expense.

   IV. Lamps shall have a correlated color temperature of 4100 Kelvin and a minimum CRI of 75.

   C. Exit Signs:

   I. Internally Lighted Signs: Exit signs shall be completely solid state with Light Emitting Diodes (LED) as the light source, 70,000 hours minimum rated lamp life. Lexan covers with red letters, dual voltage.
II. Exit signs shall not have “stick on” chevrons for directional arrows.

III. Special Warranty: Five years on fixture, batteries and lights from date of Substantial Completion.
26 56 00 Exterior Lighting

1. General

   A. Summary: This section includes the following:
      
      I. Exterior lighting fixtures and lamps.

2. Products

   A. General Requirements:
      
      I. All fixtures shall be identified inside of pole handhole cover with name of fixture, manufacturer, and model number.
      
      II. Identification: All poles shall be numbered. Consult with Physical Facilities for numbering scheme.
      
      III. Mounting: Fixtures shall be fastened with galvanized hardware through cast holes. Field cut holes are forbidden. All hardware shall be made of non-rusting, non-corroding material.
      
      IV. Grounding: Poles shall have all conductive metal parts bonded together and connected to an equipment grounding conductor, and connected to the fixture at the top. Connect also to the branch circuit equipment grounding conductor, and to a ground rod at the bottom of each pole.
      
      V. All fixtures shall be full cut-off type and shall not allow any light to leave the fixture above horizontal.
      
      VI. Poles with fixture shall have a wind rating of 120 mph.

   B. Lighting Fixtures:
      
      I. Internal Campus Primary Walkways and Plazas:
         
         a. Manufacturer / Model:
            
            i. Gardco / Gullwing GL13 LED.
            
            ii. Pacific Lighting / KH Series LED.
            
         b. Lamp: LED 8,173LM 4000K.
            
         c. Pole:
            
            i. Height: 12 feet.
ii. **Style:** Square – 6 inches.

iii. **Material:** Aluminum.

iv. Mount fixture to face of pole / not tendon mount.

v. Base: Precast Concrete; 2’ diameter; 6” above finish grade

d. **Finish:** Bronze.

II. **Roadways and Parking Lots:**

a. **Manufacturer / Model:**
   
i. Gardco / Gullwing GL18.
   
ii. Pacific Lighting / KH Series LED.

b. **Lamp:** LED 4000K

c. **Pole:**
   
i. **Height:** 30 feet.
   
ii. **Style:** Round.
   
iii. **Material:** Aluminum.
   
iv. Base: Precast Concrete; 2’ diameter; 2’ above finish grade

d. **Finish:** Bronze.

III. **Bollards:**

a. **Manufacturer / Model:** Louis Poulson Lighting, Inc./Waterfront.

b. **Lamp:** Consult Project Manager.

c. **Height:** Consult Project Manager.

d. **Style:** Round with Dome Top.

e. **Material:** Aluminum.

f. **Finish:** Bronze.

**C. Lamps:** Lamps shall be pulse start Metal Halide, except where other provisions apply.
27 00 00 General Communication Requirements
27 00 00 Communications

1. General

A. Network cabling for all WAOs and other voice/data cabling shall be category 6.

B. Network cabling for all WAPs shall be category 6A. Cabling at each WAP location shall terminate with RJ45 male end connector. Contractor shall provide 15 feet of slack at each WAP location to allow for moving the WAP to provide maximum coverage.

C. Cabling pathways: 27-1500 Pathways 2.1B Cable Support B 3 special support requirements.

D. All cabling and associated connectivity devices shall be Panduit – Pan Net System or Comscope Uniprise System.

E. Pathway sleeves for 1-6 cables can be 1” for requirements greater than 6y cable consult with cable manufacturer for correct size / fill ratio. Use fire rated sleeves as required.

F. Color for the cables shall be:
   I. Voice and data shall be blue.
   II. WAPs shall be yellow.
   III. Security and cameras shall be green.

G. Related Documents: Use the following link to access the current UNF IT Communication Standards:
   I. [http://www.unf.edu/its/](http://www.unf.edu/its/)
27 32 26 Ring-Down Emergency Telephones

1. Emergency Phone Types:

   A. Bollard Type: Talk A Phone ETP-MT/P Radius Tower Mount e/w Blue Light Strobe, Color – Safety Blue, Signage – White lettering “EMERGENCY.”

   B. Wall Type: Talk A Phone ETP-WM/E Economy Wall Mount unit, with Blue Light, Color – Safety Blue, Signage – White lettering “EMERGENCY.”

   C. Phone Units: Talk A Phone ETP 400 type units used for bollard and wall units.
27 40 00 Audio-Video Systems

1. General

   A. Related Documents: Use the following link to access the current UNF IT Audio-Video Standards:
      1. http://www.unf.edu/its/
28 00 00 Electronic Safety and Security
28 00 00 General Safety and Security Requirements

1. General

A. Summary: This section contains the Owner’s project requirements for the design of fire alarm systems, as well as equipment and installation.

B. Submittals: A copy of the electrical submittals shall be provided to Physical Facilities concurrent with the engineer’s review, not for contract compliance-related approval, but to allow Physical Facilities to become familiar with the products to be maintained.

C. General Requirements:

I. All systems shall be designed in a manner to facilitate ease of maintenance. Adequate access to accomplish all normally required maintenance without removal of other than access panels is mandatory.

II. The electrical system shall be designed to facilitate the installation of components in a serviceable manner. Complete wiring and component diagrams shall be included in the construction documents to verify that the design intent is constructible and maintainable.

III. Clearances suggested by manufacturers for equipment maintenance, removal, and replacement shall be indicated on 1/4 inch scale electrical room drawings and accommodated by the layout. Larger and heavier components that may require future removal or replacement shall be identified on the drawing and a clear path identified to the building exterior. Door sizes, lifting supports, and other pertinent information shall be identified on the drawings.

IV. UNF does not allow standalone security systems. All independent facility security systems are to be remotely monitored by UNF’s Police Department. This monitoring is achieved via each security system’s connection to the facility’s fire alarm panel.

V. For individual areas occupant protection, UNF utilizes panic buttons which are connected to the facility’s fire alarm panel. See EXHIBIT 1 for standard hold-up (panic alarm) device.

VI. During building design, the design team will engage the services of a consultant to evaluate, recommend and design an appropriate distributed antenna, bidirectional amplifier or similar radio enhancement solution to ensure that the facility, once constructed, will allow for normal and emergency first responder radio communications within the facility per current NFPA requirements.
ADEMCO’s series of hold-up devices have been designed for silent operation. Available in a stainless steel cover or hardwired. V-Plex and wireless versions, they mount quickly and easily in discreet locations. They are ideally suited for use in locations such as banks, jewelry stores, retail establishments or any situation that requires hold-up notification.

**FEATURES:**
- Silent operation
- Double-pole double-throw contacts for multi-notifications
- Twin 45° screw terminals with EOL resistor splicing terminal
- Adhesive pads for temporary positioning while installing
- Stainless steel cover 269R and 269SN
- Fully supervised
- Convenient reset key for testing and/or reset of alarm

**SPECIFICATIONS:**
- Switch type: Plunger type DPDT
- Switch action: Selectable latching or momentary
- Switch rating: 0.2A @ 30V/DC max.
- Connections: four position 45° screw terminal block for each output side with EOL resistor splicing terminals
- Operating temp: 14°F to 140°F
- Dimensions: 3.5” x 2.0” x 1.25”
- Listed for UL630 Hold-Up alarm units and systems

**ORDERING:**

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<tr>
<th>Part No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>269R</td>
<td>Hardwired Hold-Up switch with stainless steel cover</td>
</tr>
<tr>
<td>270R</td>
<td>Hardwired Hold-Up switch in plastic case</td>
</tr>
<tr>
<td>269SN</td>
<td>V-Plex Hold-Up switch with stainless steel cover</td>
</tr>
<tr>
<td>5860</td>
<td>(polling loop only)</td>
</tr>
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<td></td>
<td>5860 Series Wireless Hold-Up Switch</td>
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28 10 00 Electronic Access Control System

General

Summary: This section contains the Owner’s project requirements for the design of electronic access control systems and components.

Scope of Work: The Contractor shall be responsible for providing complete turnkey systems including all software, hardware, programming, interface with other systems and equipment (e.g. fire, overhead doors, automatic doors, etc.), wire and cable, unless otherwise noted as “Owner Provided”.

Products

A. Wireless and / or Hardwired IP Enabled Mortise Locks and / or Wall Mounted Card Reader Openings: IP enabled card access control devices will control access to the individual door based on authorized credential.

B. Wireless and / or Hardwired IP Enabled Mortise Locks and / or Wall Mounted Card Reader Openings: IP enabled card access control devices shall have the ability of being either set to lock and / or unlock via a pre-programmed scheduled for time of day / day of week based on Owner programmed schedule.

C. Wireless and / or Hardwired IP Enabled Mortise Locks and / or Wall Mounted Card Reader Openings: IP enabled card access control devices shall have the ability of being locked based on double swipe of authorized credential card holder, left in unlocked position from ingress side of opening, until authorized credential card holder double swipes card again to re-lock said card reader or IP enabled lockset.

Campus wide Lockdown of exterior doors equipped / specified with remote lockdown feature shall be programmed to lockdown individual buildings as well as all Owner buildings’ doors simultaneously as well as independently, per building and / or per opening. Lockdown system shall be provided with full integration to the existing UNF campus lockdown system (Andover). Contractor is responsible for providing a connectivity between the Owner’s existing Andover BAS to Owner’s RS2 SMS. Connectivity of Andover BAS to RS2 SMS to be used primarily for engaging or disengaging UNF Campus Wide Lockdown system and for monitoring door status, open (unsecured), closed (secured). The Contractor shall be responsible for providing the wiring / connectivity of Andover BAS and RS2 systems.

Manufacturers:

Access Control System head end equipment, I/O boards and door control panels: RS2
Technologies.

Wall / Mullion Mounted Card Readers: HID RPI0 (Mullion Mount), HID RP40 (Wall Mount). See SC Series Project Specific security drawings for required form factor.

Door Position Switches (DPS's): Non integral to Wi-Fi (IN120) lockset, auxiliary DPS’s to be GE / Interlogix / Aritech 1076D-G, Double Pole, Single Throw (DPDT).

All other hardware, mounting plates, back boxes, conduit, cabling, wiring terminations, SMS power supplies, 120vAC connections, junction boxes and conduit shall be provided for a fully operational, turn-key SMS as described herein, on Project Specific SC series drawings and associated specification sections.

All supporting equipment required to provide a fully operational, turn-key SMS shall be provided by Contractor, regardless of whether or not assumed as existing or new, shall be provided, installed and licensed for a fully operational SMS.

SMS and BAS integration, including labor and materials, shall be the responsibility of the Contractor, and by no means shall be deemed additional services and / or cause for additional fees above and beyond that which was originally awarded via successful bid to successful Contractor.

Description of System to be Provided:

A. Provide a complete turnkey system for the project and connect to the Owner's existing RS2 Access Control Campus Head End. Connection to the Head End services based software shall be provided via the data communication TCP/IP Network. Contractor shall be responsible to connect system level Network controllers and coordinate with Owner's IT staff to configure IP based access control equipment to conform with Owner's standards.

B. Prior to successful award of bid to Contractor, any and all labor and materials required to provide a fully operational, turn-key system as described herein, related specification sections and associated drawings must be included in official bid in order for Contractor to be successfully awarded contract to perform work.

Operation of System:

A. Field equipment shall include controllers, sensors, and controls.

Controllers shall serve as an interface between the central station and sensors and controls.
Data exchange between the central station and the controllers shall include down-line transmission of commands, software, and databases to controllers.

The up-line data exchange from the controller to the central station shall include status data such as intrusion alarms, status reports, and entry-control records.

Controllers are classified as alarm-annunciation or entry-control type.

Communication between controllers and the central station shall be TCP/IP via the UNF LAN network.

B. Door Hardware Interface:

General: Provide all necessary access control field hardware devices required to receive alarms and administer all access granted/denied decisions. Field hardware devices must be designed and installed in accordance with applicable electrical codes. Mortise locks shall be wireless, unless shown otherwise on the drawings. Encryption standards include Enterprise WPA2/AES as the preferred mechanism, and WPA2/PSK (pre-shared key) as the lesser mechanism for solutions which cannot participate in the use of digital certificates.

Mortise Lock: BHMA certified extra heavy duty, lever type mortise lock conforming to ANSI 156.13 Series 1000, Grade 1 standard and ANSI A117.1 accessibility guidelines. Mortise lockset with integrated contactless card reader, integrated request-to-exit, and integrated door position switch in one complete unit. Electronic motorized locking control of lever handle trim with 3/4” anti-friction deadlocking latch. Provide as specified in specification section 08 71 00.

Comply with Project specific Division 08 specifications and associated SC Series drawings.

Electrical characteristics of controllers shall match the signal and power requirements of door hardware.

All wireless locks must connect to the UNF network in the building that they serve.

Provide access control products with non-volatile memory.

Automatic unlock with or without first entry.

Minimum of 800 user codes and audit the last 10,000 event transaction history (event type, date, time, user ID and name).

Distributed intelligence allows stand-alone functional operation of lock in absence of network communication or slowdown allowing for system operational redundancy.

Contactless Card Reader: Integrated reader must support the following: 125 kHz proximity credentials; ISO 14443 A/B and ISO 15693 13.56 MHz contactless credentials; HID iCLASS SE (full authentication, all formats).
Provide network and lock configuration kit for initial lock set-up and programming to the Owner future additions.

Monitoring: Software accessible monitoring of external door position switch (door open/closed status), forced door, unknown card, door held open, battery status and tamper.

Power Source: Powered by alkaline batteries with LED indication of locked, programming mode and low capacity warning status conditions.

- Optional hard power by means of 12-24vDC power supply.
- Provide a minimum of 12 months of continuous operation defined as 100 card swipes and 12 communication sessions per day. The lock will be capable of providing a low voltage alarm and real time voltage reading when communicating.
- It is understood that the battery life of different systems is impacted by the communication interval and technology. Provide a description of the options for battery life management.

Keying: See division 087100 for keying information.

C. System Controllers and Programming:

- Supply, configuration and programming of the access control controllers and shall be the responsibility of the Security Integrator Contractor. Door Hardware Interface:

  Comply with Project specific Division 28 10 00 specifications and associated SC Series drawings for specific configuration and overall programming requirements of the access control system and door control modules as detailed in said Project specific drawings and specifications.

D. System Access Levels for Credentialed Card Holders:

  System shall be programmed by Security Integrated Contractor in conjunction with the Owner to provide access level assignment on a per door bases per Owner’s existing levels and assign each door accordingly. Coordinate with Owner prior to implementation.

  One level shall be predefined as the Master Access Level. The Master Access Level shall work at all doors at all times and override any anti-pass back.

  Program system based on Owner and user requirements for time of day controls for door indicated with multiple modes of operation in security design drawings.

E. Door Hardware Interface:
● Exit Alarm: Operation of a monitored door without a valid request to exit shall generate an alarm. Exit devices and alarm contacts are specified in UNF Standard Door Hardware Specifications.
● Where delayed egress exit devices are specified, fire alarm interface required to provide uninhibited free egress under fire alarm conditions.
● Interface to UNF Andover BAS system required at exterior door locations as well as any other opening detailed on SC Series Drawings where interface to UNF Campus Wide Lockdown system is required.

F. Video and CCTV Surveillance System Interface:

● Control station or designated workstation shall have the future capability to display live video from an IP CCTV source.

G. Cabling:

● General Cable Requirements: Comply with requirements in this specification section, specification section 26 and 27, and as recommended by system manufacturer for integration requirement.

H. Wireless Access Points (WAPs):

● Wireless access points and cabling shall be provided under division 27, access control system understood by all parties to only be functional based on adequate Wi-Fi coverage per locking device manufacturer's requirements.
● Division 27 technology designer must conduct a wireless survey of building to determine if the signal strength of the wireless network is sufficient.

J. Transformers:

● NFPA 70, Class II control transformers, NRTL listed. Transformers for security access control system shall not be shared with any other system.

6. Execution

A. Proof of Concept:

● Coordinate with UNF project manager and UNF IT department for equipment and systems to be provided by UNF.

B. Examination:

● Examine pathway elements intended for cables. Check raceways, cable trays,
and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.

- Examine roughing-in for LAN and control cable conduit systems to PCs, controllers, card readers, and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.
- Proceed with installation only after unsatisfactory conditions have been corrected.

C. Identification:

In addition to requirements in this article, comply with TIA/EIA 608-A. Label each terminal strip and screw terminal in each cabinet, rack, or panel.

All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with the name and number of the particular device as shown. Each wire connected to building-mounted devices is not required to be numbered at the device if the color of the wire is consistent with the associated wire connected and numbered within the panel or cabinet.

D. System Software and Hardware:

Develop, install, and test software and hardware, and perform database tests for the complete and proper operation of systems involved. Assign software license to Owner.

E. Field Quality Control:

Perform tests and inspections.

Manufacturer’s Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

F. Tests and Inspections:

- LAN Cable Procedures: Inspect for physical damage and test each conductor signal path for continuity and shorts. Use Class 2, bidirectional, Category 5 tester. Test for faulty connectors, splices, and terminations. Test according to TIA/EIA 568-C.1, ‘Commercial Building Telecommunications Cabling Standards - Part 1: General Requirements.’ Link performance for UTP cables must comply with minimum criteria in TIA/EIA 568-C.1.

- Test each circuit and component of each system. Tests shall include, but are not
limited to, measurements of power-supply output under maximum load, signal loop resistance, and leakage to ground where applicable. System components with battery backup shall be operated on battery power for a period of not less than 10 percent of the calculated battery operating time. Provide special equipment and software if testing requires special or dedicated equipment.

- Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed.
- Devices and circuits will be considered defective if they do not pass tests and inspections.
- Prepare test and inspection reports.

G. Startup Service:

Engage a factory-authorized service representative to supervise and assist with startup service.

Complete installation and startup checks according to approved procedures that were developed in ‘Preparation’ Article and with manufacturer’s written instructions.

Enroll and prepare badges and access cards for Owner’s operators, management, and security personnel.

H. Maintenance and Support:

- Describe in detail the support and maintenance that must be provided by your company as proposed by your solution, including:
  
  - Software and hardware support access and hours.
  - Service response times.
  - Help contact protocol to include all aspects of the solution and escalation procedures.

- UNF requires a four (4) hour response time for all mission critical (single point of failure that will disable the operation), components.
- UNF requires a twenty-four (24) hour response time for on-site repairs of any non-mission critical component.
- UNF requires a two week turn-around on all components that will be repaired off-site. All return repairs will be FOB Jacksonville, Florida, and the vendor shall provide shipping containers.
- UNF requires technical support via an on-call technician 24-hours/7 days per week to include holidays.
28 31 00 Fire Detection and Alarm

1. General

A. The campus fire alarm system is tied into a central head computer located in the University Police Department dispatch office. New fire alarm systems shall be integrated into the existing campus Simplex fire alarm fiber token ring. Update the head end points list and graphics as required.

B. Exterior Devices:
   I. Provide horns and strobes on exterior wall at building entry locations.

C. Voice Annunciation:
   I. The campus fire alarm system also serves as an emergency notification system via the fire alarm speakers. All building fire alarm systems shall have voice evacuation capability. Prior to Substantial Completion, a voice test of the emergency notification system shall be conducted by the State Fire Marshal.

D. Basic Requirements for Installation: All new buildings, and buildings undergoing major renovations, shall be equipped with a complete fire alarm system compliant with current code requirements. Provide all hardware necessary to tie in with the existing campus monitoring and emergency notification system located in University Police Department.

E. Coordination: Coordinate all installations with Physical Facilities and University Police Department.

F. Licensing: All work on fire alarm systems shall be performed by an individual or firm licensed as an “Alarm System Contractor I” as required by Florida Statute 489.505(a), other parts of said statute, and complies with all other licensing requirements of relevant codes and laws. Further, this individual or firm shall be either the prime constructor on such work or a subcontractor to the prime constructor.

2. Products

A. Equipment:
   I. Manufacturer: Simplex.
   II. Panels:

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a. Fire Alarm Control Panel (FACP): Provide programmable FACP with programmable field devices. Fire control panel shall meet NFPA 72 detector sensitivity readout/printout requirements. A history of a minimum of 200 events shall be readable on the fire alarm control panel display (200 events for alarm and 200 events for trouble).

b. Annunciator Panel: Annunciator panel shall be located where the Fire Department will enter the building. Annunciation panel shall duplicate all functions of the FACP.

III. Pull Stations: Pull stations shall be single action type. Glass rods for pull stations are prohibited. Pull stations shall be mounted 42 inches above finished floor to center of the device.

IV. Alarm Units: Alarm units shall be combination speaker and strobe. Alarm units shall be mounted 80 inches above finished floor to center of the device.

V. Air Handling Unit Shutdown Relay: The Air Handling Unit shutdown relay shall be supervised.

VI. Junction Boxes And Conduit: All junction boxes on the fire alarm system shall be painted fire-truck red and all conduit shall be spot painted red or pre-painted.

VII. Duct-Mounted Smoke Detectors: Non-radioactive smoke detectors and duct detectors are preferred (i.e., photoelectric). The operation shall be to shut down the unit, and provide notification.

B. Systems Operational Description:

I. Signal initiation from:
   b. Heat detectors.
   c. Flame detectors.
   d. Smoke detectors.
   e. Duct smoke detectors.
   f. Verified automatic alarm operation of smoke detectors.
   g. Automatic sprinkler system water flow.
   h. Heat detectors in elevator shaft and pit.
   i. Fire-extinguishing system operation.
j. Fire standpipe system water flow.

II. Signal initiates the following actions:

a. With the exception of the 5th and 6th items above; display banner message on graphics stating “Call JFRD.”

b. Continuously operate alarm notification appliances.

c. Identify alarm at the FACP.

d. Transmit an alarm signal to University Police Department.

e. Unlock electric door locks in designated egress paths.

f. Release fire and smoke doors held open by magnetic door holders.

g. Activate voice/alarm communication system.

h. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.

i. Activate smoke-control system (smoke management) at firefighter smoke-control system panel (where applicable).

j. Close smoke dampers in air ducts of designated air conditioning duct systems.

k. Recall elevators to recall floors.

l. Activate emergency lighting control.

m. Activate emergency shut-offs for gas and fuel supplies.

n. Record events in the system memory.

III. Supervisory signal initiation by:

a. Valve supervisory switch.

b. Low-air-pressure switch of a dry-pipe sprinkler system.

c. Elevator shunt-trip supervision.

IV. Trouble signal initiation by:

a. Open circuits, shorts, and grounds, in designated circuits.

b. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.

c. Loss of primary power at FACP.
d. Ground or a single break in FACP internal circuits.
e. Abnormal AC voltage at the FACP.
f. Break in standby battery circuitry.
g. Failure of battery charging.
h. Abnormal position of any switch at the fire-alarm control unit or annunciator.
i. Fire-pump power failure, including a dead-phase or phase-reversal condition.
j. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.

V. System Trouble and Supervisory Signal Actions: Initiate notification appliance and
annunciate at FACP and remote annunciators.

3. Execution

A. Field Quality Control:

I. Simplex shall be the installer for all fire alarm system components and wire with the
exception of raceway.

II. Nomenclature: Final University room numbers and names shall be used when
programming the system. Coordinate with Facilities Planning prior to programming.

Testing: Prior to Substantial Completion, the fire alarm and emergency notification
systems shall be completely tested and certified by the installing contractor prior to
the contractor's request for a final inspection by the State Fire Marshal and Building
Official.
32 00 00 Exterior Improvements
32 00 00 General Landscape and Irrigation Information

1. General

A. General Landscape Design:

I. Landscape architects are encouraged to be innovative as they blend new landscapes into the UNF campus. New plant species contribute to the educational opportunities on campus. A list of existing campus plant species is available on request. UNF horticulturists welcome conversations with landscape architects and other planners.

II. The primary role of the campus landscape is to provide a welcoming and safe environment for the UNF community. UNF expects the landscape architect to blend new landscape projects into the overall campus landscape, follow campus hardscape and furnishing standards, and address the following:

   a. Add color while minimizing use of annuals.

   b. Minimize future trimming demands by using plants of appropriate maximum size.

   c. Reduce future irrigation, fertilization, and pesticide demands by selecting plants appropriate to campus soil and climate conditions.

   d. Restrict plantings to Duval County native plants in spaces adjacent to natural areas (especially the Sawmill Slough Preserve).

   e. Support education by introducing new plant species to the campus landscape.

III. Security concerns require the maintenance of sight lines through campus. In general, shrubs and herbaceous perennials will be no more than three feet high and tree canopies will have at least seven feet of clearance.

IV. Exceptions to this general rule are:

   a. Young trees that can be trimmed to a seven foot clearance as they grow.

   b. Open, airy plants that do not create a visual barrier.

   c. Specimen shrubs in open areas that do not provide hiding places.

V. Every effort should be made to conserve existing trees every day and, especially, during construction activities. Before vehicles and equipment enter a landscape area, all trees that are not scheduled for removal will be protected with fencing. Protection for existing trees will encompass 1.5 times the radius of the drip line of the tree for the duration of the project. Depending upon circumstances and the
sensitivity of the tree species, UNF horticulturists may approve a minimum protected area equal to the drip line of the tree. Tree roots within this area are not be disturbed. The grade will not be changed in this area. Nothing will be parked or stored within this area. If the tree cannot be properly protected, it should be removed as part of the project.

VI. Landscape plans should incorporate new trees into landscape beds to protect their trunks from future injury by vehicles and lawn maintenance equipment. Maintain the natural campus edges wherever possible.

VII. City of Jacksonville code will guide the planting of trees in parking lots. Parking lot islands tend to be small, hot and dry. Smaller, heat and drought tolerant trees, such as crape myrtle, *Acacia stenophylla* and *Parkinsonia aculeata*, are well suited to these situations. Trees for narrow spaces must be of an appropriate mature size to avoid future problems with raised curbs and sidewalks, asphalt damage and blocked security lights. Palms and large, drought tolerant shrubs limbed up into arborescent form, such as *Acca*, *Loropetalum*, *Pittosporum* and *Ternstroemia*, are appropriate for small spaces. Larger shade trees like live oaks should be planted where sufficient space exists for them to develop to full size.

VIII. As a general rule, bahai sod can be utilized in parking area islands where no irrigation is provided.

IX. Bollards shall be 6 inches in diameter.

B. Miscellaneous Items Related to Landscape:

I. Each outdoor trash receptacle will be accompanied by a beverage container recycle receptacle.

II. Installing landscapes, including sod, below building overhangs is not sustainable. Where overhangs are necessary, provide appropriate hardscape features below.

III. Provide hose bibs on each building exterior.

IV. Provide adequate sidewalk width for carts and pedestrians (where carts are permitted).

V. Flair sidewalk ends and intersections to help reduce worn areas at these points. Avoid ‘T’ intersections in sidewalks where no barrier exists to stop pedestrian traffic. Provide for adequate cart and maintenance access around buildings. Space bollards for cart access.
VI. Mulch (recycled wood or cypress - dyed red) all landscape beds after planting for control of weeds and minor erosion. Apply an appropriate pre-emergent before application of mulch.
32 16 00 Curbs, Gutters, Sidewalks & Driveways

1. General

   A. Sidewalks:

      I. Separate sidewalks shall be provided with all new construction, or major re-
         construction in accordance with FDOT standards.

      II. Construction Requirements:

         a. Concrete sidewalks shall be a minimum of 6 inches thick, 4000 psi, with welded
            wire or fiber mesh reinforcement. Welded wire shall be supported on “chairs” for
            proper placement in the concrete.

         b. Sidewalk width shall be a minimum of 6 feet, or should match surrounding
            sidewalk patterns and widths.

         c. Expansion joints shall be a maximum of 10 feet apart, with saw cuts midway
            between each expansion joint.

         d. Provide light broom finish.

         e. Sidewalks shall be placed on undisturbed soil wherever possible, otherwise a sub-
            base compacted to 90 percent and a limerock base compacted to 95 percent of
            maximum density.

         f. For UNF main campus pedestrian sidewalks, a brick banding pattern is to be
            utilized to provide a visual indicator that the sidewalk is a “connecting” campus
            sidewalk.
32 17 00 Paving Specialties

1. General

    A. Raised crosswalk warning lights
        I. Traffic Safety Corp. #TS500, Yellow, bi-directional.
        II. Verify and match existing LED lighting layouts currently on UNF campus crosswalks for spacing and locations.
32 17 00 Paving Specialties – EXHIBIT Raised Crosswalk

NOTE: FOR SPECIAL EMPHASIS CROSSWALK REFER TO F.D.O.T. STANDARD INDEX 17346 (SHEET 8 OF 14)

RAISED CROSSWALK DETAIL

SECTION "A-A"
32 17 00 Paving Specialties – EXHIBIT 20 Minute

1. **20 Minute Parking Space**
   a. Spaces will be no less than 9'6" wide and 18' but can be adjusted to a maximum of 20'. Lengths and/or widths will vary depending on location. Lengths will not exceed 20'.
   b. Lines will be painted 18" X 6" white line using White-Code 15195-W paint. Exceptions are if a change in the length of the space(s) have been approved.
   c. If needed, space will have a 6" double faced car stop centered on space using two (2) 12" steel rebar. Rebar will be installed flush with top of car stop.
   d. The car stop will be painted white using White-Code 15195-W paint and stenciled in six (6) inch black letters "20 MINUTE" centered on car stop facing parking space.
   e. A 10' X 2-3/8" galvanized round post will be installed using one (1) bag of contact cement, 24" deep, and hole will be filled flushed with the surrounding landscape/surface. Four (4) 2-3/8" round sign post clamps and sign post rain cap will be affixed to each sign post. Sign will be affixed to sign post six (6) feet from the bottom of the sign to the surface where sign post is installed.

*All painted lines/symbols will include glass beads. E-10 Type 4, approximately one 50lb bag per 1000 LF*.
1. Blue Spaces
   a. Spaces will be no less than 9’0” wide and 18’ but can be
      adjusted to a maximum of 20’. Lengths and/or widths will
      vary depending on location. Lengths will not exceed 20’.
   b. Lines will be painted 18’ X 6” white line using White-Code
      15195-W paint with beads to enhance reflection. Exceptions
      are if a change in the length of the space(s) have been
      approved.
   c. If needed, space will have a 6’ double face car stop center
      on space using two (2) 12” steel rebar installed flush to top
      of car stop. Car stop will be painted white, using White-
      Code 15195-W and stencilled in 6” blue letters using OSHA
      Blue, Code 80.137, centered on car stop “BLUE PERMIT”.
   d. A 10’ X 2-3/8” galvanized round post will be installed
      (where instructed) using one (1) bag of contact cement, 24”
      deep, and hole will be filled flushed with the surrounding
      landscape/surface. Four (4) 2-3/8” round sign post clamps
      and sign post raln cap will be affixed to each sign post. Sign
      will be affixed to sign post six (6) feet from the bottom of
      the sign to the surface where sign post is installed.

   All painted lines/symbols will include glass beads/E-16 type 4. Approximately one 50lb bag per 1000 lf.
32 17 00 Paving Specialties – EXHIBIT Faculty/Staff

Faculty/Staff Parking Space

- Spaces will be no less than 9’6” wide and 18’ but can be adjusted to a maximum of 20’. Lengths and/or widths will vary depending on location. Lengths will not exceed 20’.
- Standard orange lines using UNF Orange Match/2011 HEX-FF660 will be painted 18’ X 6”. 9M manufactured, two way yellow pavement markers, Model: TCRPM2912Y will be affixed at the end of each space line.
- If needed, space will have a 6’ double face car stop center on space using two (2) 12” steel rebar. Rebar will be installed flush with top of car stop.
- The car stop will be painted orange using UNF Orange Match/2011 HEX-FF660 and stenciled in six (6) inch black letters “Faculty/Staff Only” centered on car stop facing parking space.
- A 10’ X 2- 3/8” galvanized round post will be installed (where instructed) using one (1) bag of contact cement, 24” deep, and hole will be filled flushed with the surrounding landscape/surface. Four (4) 2-3/8” round sign post clamps and sign post rain cap will be affixed to each sign post. Sign will affixed to sign post six (6) feet from the bottom of the sign to the surface where sign post is installed.

All painted lines/symbols will include glass beads/E-16 TYPE 4. Approximately one 50lb bag per 1000 LF.
32 17 00 Paving Specialties – EXHIBIT Gray

1. Gray Parking Space
   a. Spaces will be no less than 9’6” wide and 18’ but can be adjusted to a maximum of 20’. Lengths and/or widths will vary depending on location. Lengths will not exceed 20’.
   b. Lines will be painted 18’ X 6” white line using White-Code 15195-W paint. Exceptions are if a change in the length of the space(s) have been approved.
   c. If needed, space will have a 6” double faced car stop center on space using two (2) 12” steel rebar. Rebar will be installed flush with top of car stop.
   d. A 10’ X 2-3/8” galvanized round post will be installed using one (1) bag of contact cement, 24” deep, and hole will be filled flushed with the surrounding landscape/surface. Four (4) 2-3/8” round sign post clamps and sign post rain cap will be affixed to each sign post. Sign will affixed to sign post six (6) feet from the bottom of the sign to the surface where sign post is installed.

ALL PAINTED LINES/SYMBOLS WILL INCLUDE GLASS BEADS/E-16 TYPE 4. APPROXIMATELY ONE 50LB BAG PER 1000 LF.
32 17 00 Paving Specialties – EXHIBIT Green

1. Green Space
   a. Spaces will be no less than 9’6” wide and 18’ but can be adjusted to a maximum of 20’. Lengths and/or widths will vary depending on location. Lengths will not exceed 20’.
   b. 18’ X 6” lines will be painted green using Mack Green, Code: 80.138. Exceptions are if a change in the length of the space(s) have been approved.
   c. Space will have a 6” double faced car stop center on space using two (2) 12” steel rebar. Rebar will be installed flush with top of car stop. Car stop will be painted green using Mack Green, Code: 80.138 with white 6” lettering “GREEN PERMIT ONLY”.
   d. A 10’ X 2-3/8” galvanized round post will be installed using one (1) bag of contact cement, 24” deep, and hole will be filled flushed with the surrounding landscape/surface. Four (4) 2-3/8” round sign post clamps and sign post rain cap will be affixed to each sign post. Sign will affixed to sign post six (6) feet from the bottom of the sign to the surface where sign post is installed.

ALL PAINTED LINES/SYMBOLS WILL INCLUDE GLASS BEADS/T-10 TYPE 4. APPROXIMATELY ONE 50LB BAG PER 1000 LF.
32 17 00 Paving Specialties – EXHIBIT Housing

1. Housing Parking Space
   a. Spaces will be no less than 9’6” wide and 18’ but can be adjusted to a maximum of 20’. Lengths and/or widths will vary depending on location. Lengths will not exceed 20’.
   b. Standard white lines using White-Code 15195-W paint will be painted 18’ X 6”. Exceptions are if a change in the length of the space(s) have been approved.
   c. If needed, space will have a 6” double face car stop center on space using two (2) 12” steel rebar. Rebar will be installed flush with top of car stop.
   d. A 12” X 2-3/8” galvanized round post will be installed using one (1) bag of contact cement, 24” deep, and hole will be filled flush with the surrounding landscape/surface. Four (4) 2-3/8” round sign post clamps and sign post rain cap will be affixed to each sign post. Sign will affixed to sign post six (6) feet from the bottom of the sign to the surface where sign post is installed.

ALL PAINTED LINES/SYMBOLS WILL INCLUDE GLASS BEADS/E-16 TYPE 4. APPROXIMATELY ONE 50LB BAG PER 1000 LF.
Motorcycle Spaces:

a. Motorcycle spaces will be constructed with a concrete surface.

b. Single motorcycle spaces will measure no less than 55” wide and 18’0” in length but can be adjusted to 20’. Lengths and/or widths will not vary without prior notification.

c. Multiple motorcycle spaces will measure 55” wide, 18’0” in length. The side borders will be painted with a 6” white lines using White-Code 15195-W paint and a 4” wide and line. A center line will be painted 4” wide the full length of the space. If wheel stop is installed, the wheel stop will be double sided; painted white, with the verbiage “MOTORCYCLES ONLY” stencilled centered on the wheel stop facing the parking space. Two (2) 12” rebar will be used to anchor the wheel stop and will be installed flush with the top of the wheel stop. Each space will be centered “Motorcycle” in black 4” letters centered on space. Lengths and/or widths will vary depending on location.

d. A 10” X 2”- 3/8” galvanized round post will be installed using one (1) bag of contact cement, 24” deep, and hole will be filled flushed with the surrounding landscape/surface. Four (4) 2-3/8” round sign post clamps and sign post rain cap will be affixed to each sign post. Sign will be affixed to sign post six (6) feet from the bottom of the sign to the surface where sign post is installed.

ALL PAINTED LINES/SYMBOLS WILL INCLUDE GLASS BEADS/E-16 TYPE 4. APPROXIMATELY ONE 50LB BAG PER 1000 LF.
### 32 17 00 Paving Specialties – EXHIBIT Disabled

**ALL PAINTED LINES/SYMBOLS WILL INCLUDE GLASS BEADS/E-16 TYPE 4. APPROXIMATELY ONE 50LB BAG PER 1000 LF**

1. **Multiple Disability Space**
   a. Spaces will be no less than 9 feet wide and 18 feet in length. Lengths and/or widths will not vary without prior notification.
   b. The parking access aisle will be at least 60" and located between the two disability spaces. The parking access aisle will be painted using White-Code 15196-W with white slanted 6" lines 24" apart denoting no parking area.
   c. Lines will be painted with an 18" X 6" ADA blue color using OSHA Blue Code: 80:137.
   d. Center and flushed with the rear entrance to the parking space will be the ADA blue disability symbol with white background when installed on asphalt. The symbol will be white with blue background when installed on white surfaces, i.e. concrete. The standard stencil for disability symbol will be 3 feet.
   e. Space will have a 6' double face car stop center on space using two (2) 12" steel rebar installed flush to top of car stop. Car stop will be painted ADA blue using OSHA Blue Code: 80:137.
   f. A 12' X 2-3/8" galvanized round post will be installed centered on each Disability space using one (1) bag of contact cement, 24" deep, and hole will be filled flushed with the surrounding landscape/surface. Four (4) 2-3/8" round sign post clamps and sign post rain cap will be affixed to each sign post. Disability sign will affixed to sign post 84" from the bottom of the sign to the surface where sign post is installed.
1. Single Disability Space
   a. Spaces will be no less than 9'6" wide and 18' long but can be adjusted to a maximum of 20', lengths and/or widths will vary depending on location. Lengths will not exceed 20'.
   b. There will be an adjacent parking access aisle at least 60", center line to center line. The parking access aisle will be painted using White Code 15195-W with white slanted 6" lines 24" apart denoting no parking area.
   c. Lines will be painted 18"x 6" blue lines using OSHA Blue Code: 80.137. The parking access aisle will include white slanted 6" lines 24" apart using White Code 15195-W denoting no parking area.
   d. Center and flushed with the rear entrance to the parking space will be the "3' X 3'" ADA blue disability symbol with white background when installed on asphalt. The symbol will be white with blue background when installed on white surfaces, i.e. concrete.
   e. Space will have a 6" double face car stop centered on space using two (2) 12" steel rebar installed flush to top of car stop. Car stop will be painted ADA blue using OSHA Blue Code: 80.137.
   f. A 12" x 2-3/8" galvanized round post will be installed centered on each Disability space using one (1) bag of contact cement, 24" deep, and hole will be filled flushed with the surrounding landscape/surface. Four (4) 2-3/8" round sign post clamps and sign post rain cap will be affixed to each sign post. Sign will affixed to sign post 84" from the bottom of the sign to the parking surface.

All painted lines/symbols will include glass beads/E-16 Type 4. Approximately one 50 lb bag per 1000 LF.
32 17 00 Paving Specialties – EXHIBIT Reserved

1. Reserved Parking Space
   a. Spaces will be no less than 9’6” wide and 18’ but can be adjusted to a maximum of 20’.
      Lengths and/or widths will vary depending on location. Lengths will not exceed 20’.
   b. Lines will be painted 18’ X 6” white line using White-Code 15195-W paint. Exceptions are if a change in the length of the space(s) have been approved.
   c. Space will have a 6’ double faced car stop center on space using two (2) 12” steel rebar. Rebar will be installed flush with top of car stop.
   d. The car stop will be painted white using White-Code 35195-W paint and stenciled in six (6) inch black letters “RESERVED” centered on car stop facing parking space.
   e. A 10’ X 2- 3/8” galvanized round post will be installed using one (1) bag of contact cement, 24” deep, and hole will be filled flushed with the surrounding landscape/surface. Four (4) 2-3/8” round sign post clamps and sign post rain cap will be affixed to each sign post. Sign will be affixed to sign post six (6) feet from the bottom of the sign to the surface where sign post is installed.

ALL PAINTED LINES/SYMBOLS WILL INCLUDE GLASS BEADS/E-16 TYPE 4. APPROXIMATELY ONE 50LB BAG PER 1000 LF.
1. State Vehicle Only
   
   a. Spaces will be no less than 9'6" wide and 18' long but can be adjusted to a maximum of 20'. Lengths and/or widths will vary depending on location. Lengths will not exceed 20'.
   
   b. If needed, space will have a neutral colored 6' double face car stop centered on space using two (2) 6" steel rebar. Rebar will be installed flush with top of car stop. Stenciled in 4" black letters centered on car stop facing parked vehicle car: “State Vehicle Only”.
   
   c. A 12" X 2-3/8" galvanized round post will be installed centered on each space using one (1) bag of contact cement, 24" deep, and hole will be filled flushed with the surrounding landscape/surface. Four (4) 2-3/8" round sign post clamps and sign post rain cap will be affixed to each sign post. Sign will affixed to sign post six (6) feet from the bottom of the sign to the surface where sign post is installed.
32 17 00 Paving Specialties – EXHIBIT Stop Bars

1. Stop Bars

a. Painted or thermoplastic white, 24” wide and no less than 12’6” long. There will be a 20’ perpendicular double yellow line as a lane divider with a yellow reflector at each end of the lines. (See drawing). If stop bar is located leading into a main traffic flow it will be accompanied with a 24” stop sign. A 12’ X 2-3/8” galvanized round post will be installed on the right side of the roadway, clearly visible to traffic, using one (1) bag of contact cement, 24” deep, and hole will be filled flushed with the surrounding landscape/surface. Four (4) 2-3/8” round sign post clamps and sign post rain cap will be affixed to each sign post. Sign will affixed to sign post six (6) feet from the bottom of the sign to the surface where sign post is installed.

b. If a stop bar is constructed inside a lot that does not feed into a main traffic flow, the stop bar will be constructed by painting a white 24” wide and no less than 12’6” line following the elongation of the curb line. Stenciled in 18” black letters centered on the stop bar “STOP”. All stop bars lines will include reflective beads in paint mixtures.

ALL PAINTED LINES/SYMBOLS WILL INCLUDE GLASS BEADS/E-18 TYPE 4. APPROXIMATELY ONE 50LB BAG PER 1000 LF.
32 17 26 Tactile Warning Surfacing

1. General

   A. UNF utilizes clay fired bricks with truncated domes. Style / type is Whitacre-Greer ADA Paver #30 (available at Cash Building Supply) as basis of design. These units are to be utilized at all sidewalk intersections with paved vehicular drive areas.

   I. 4” concrete sub-base shall be provided. Crush-crete is not acceptable. Refer to 32 14 00 Unit Paving – EXHIBIT 1.
32 80 00 Irrigation

1. General

   A. All irrigation installations and repairs must meet all local, state and regional regulations and guidelines.

   B. New landscapes must be irrigated unless specified otherwise by the Physical Facilities Assistant Director of Landscape and Grounds or a higher level supervisor.

   C. All irrigation installations and repairs must be performed by qualified irrigation technicians.

   D. Contractors are responsible for repairing irrigation due to their damages and/or rerouting irrigation that is interrupted or displaced by their work. Repairs must be made with like parts and materials. Repairs to lines larger than 2 ½” requires the use of ring tight pipe and/or mechanical fittings. Use thrust blocks where appropriate. Cut or damaged wires must be replaced and run back to the nearest junction boxes.

   E. Below grade work must be visually inspected by Physical Facilities Irrigation staff before it is covered.

   F. Contractors must supply As-Built drawings for all new irrigation installations and/or changes to existing systems.

G. Reclaimed Water

   I. Reclaimed water shall be utilized for all irrigation unless potable water is required in specific areas to meet Health Department requirements.

   II. All components are for reclaimed water.

   III. Minimize aerosol from reclaimed water irrigation around designated eating areas.

   IV. A minimum separation of three feet (outside to outside) shall be maintained between reclaimed water lines and either potable water mains or sewage collection lines.

   V. Contractor is required to post advisory signs to be approved by JEA prior to installation.

   VI. All piping, valves and valve boxes, sprinkler heads and other outlets shall be color coded using pantone purple 522c.
B. All pipe and wire under paving shall be placed in schedule 40 PVC sleeves for the full pavement coverage length and shall be at least 24” below grade.

C. Mainlines shall be buried to provide a minimum cover of 18”, while lateral lines shall have a minimum of 12”.

D. All piping downstream of solenoid valves to be purple PR-200 PVC.

E. All control wiring (controller to zone valve) to be 14/1 UF direct burial. All wiring from master valve to controller shall be 14/1 UF direct burial. Two different color from control wiring. All wiring from flow sensor to controller to be IP-19-6P.

F. Shrub body sprinklers may be substituted for hi-pops against buildings at owner’s discretion.

G. Install concrete thrust blocks at all dead end 90s and Tees, 2-1/2” and larger.

H. **Available Pressure and Flow:** The designer shall consult with the University to determine the available flow and pressure from the existing distribution system.

I. Contractor shall consult with the University before programming the irrigation system clocks.

J. Every new landscape installation will be irrigated. In most cases, new trees should have bubblers.

K. All applicable St. John’s Water Management District irrigation rules apply at UNF.

L. Use Rain Bird Maxicom controllers (ESP – SAT-40).

M. Work through UNF’s IT Department to provide communication from the Maxicom CCU to the controller (data line if possible, or wireless).

N. Install master valves on both potable and reclaimed on down side of main lines at least ten inches away from any Tees or elbows.

O. Install flow sensors at least ten inches per 1 inch of pipe diameter away from master valves.

P. Run IP-19-6P wire from flow sensors to controller.

Q. Run 2 single direct burial wires (different colors) from master valves to controller.
R. **Install grounding wires, plates, and rods:** Grounding rod needs to be ten feet from the controller (6 solid copper wire). Grounding plate to be installed twenty-five feet from the grounding rod.

S. **Tracer wire to be placed on top of all irrigation main lines.**

T. **Glued fittings are only acceptable with 2-1/2 inch irrigation pipe and below.** Any larger pipe diameter to be connected with mechanical lug type fittings with gaskets.

U. **Valve boxes to be chosen by number of valves located in box.** Boxes to be supported by bricks with gravel placed in bottom.

V. **Wire to be 14 gauge direct burial wire with proper wire nut and grease filled cap (DBY):** All zone wire to be run back to closest junction box; avoid splices.

W. **All wire repairs are to be made by a Maxicom certified contractor and all work is to be tested by UNF’s Physical Facilities irrigation group before final acceptance.**

2. **Design**

A. Irrigation Designers shall confirm available water source, flow and pressure rates before providing plans for new installations or changes. Systems need to be designed for head to head coverage and follow current best practices.

B. Use the lowest available quality water source available. Consult with Physical Facilities with any questions.

C. All components used must be approved for use with reclaimed water and compatible with Rainbird Maxicom systems.

D. Separate zones should be run for each landscape material type (i.e.: turf, beds, trees). Spray head types should not be mixed with in the same zone.

E. Install bubblers at each newly planted tree.

F. Install isolation vales in main lines to isolate large areas to help with servicing, maintenance and repairs.

G. **Dispersion devices:**

I. Turf: rotors or sprays

II. Beds: sprays
III. Trees: bubblers

IV. Containers and Planters: manifolds with micro spray spikes

H. UNF does not permit the use of Netafim pipe, barbed fittings or micro emitters other than the spray spikes used in containers.

3. Distribution and Supply:

A. PSR 200 purple PVC pipe must be used for all irrigation, above and below grade.

B. Lines larger than 2 ¼” must use ring tight pipe and/or mechanical fittings. Use thrust blocks where appropriate.

C. Tracer wires are to be installed on top of all main lines.

D. Lines that run under concrete or other hard surfaces must be run through sleeves. When new hard scape is installed existing lines should be run through sleeves or sleeves placed next to the existing lines to accommodate future repairs. Additional sleeves should be installed at regular intervals to allow for future expansion or changes.

E. Spray heads, rotors, bubblers and manifolds must be connected with a 12” length of rubber flex hose.

4. Controls:

A. All irrigation and communications components must be compatible with Rainbird Maxicom systems.

B. Controllers and other electrical components need to be mounted on the exterior of buildings so that they are easily accessible.

C. All components should be mounted in weatherproof locking cabinets.

D. Use 14 gauge direct burial wire for all control wiring.

E. All splices and connections must be located in junction boxes with a 10” coil of wire at each end to allow for servicing. Use proper wire nuts with grease filled caps (DBY).

F. Coordinate with UNF’s IT department to provide communication between the CCU and Controllers. Hard-wired data line is preferred.
G. Provide grounding for all irrigation controllers, electrical components and communication devices according to manufactures recommendations. Typically grounding rods need to be installed 10 feet from the controller using # 6 solid copper wire and grounding plates should be installed 25 feet from the grounding rods.

5. Materials

A. Valves

I. Remote Control valves shall be Rain Bird PSE-B series and sized as specified on the drawings and shall be installed in the location shown on the drawings. All remote control valves shall be set upright in valve boxes as illustrated in the details.

II. The valves shall be actuated by a low power, 2.0 watt 24 volt AC solenoid. The solenoid plunger shall have a “grit filter” to insure positive valve operation.

III. The valve shall have a flow control stem with wheel handle for regulating or shutting off the flow of water and a bleed screw for manual operation without electrically energizing the solenoid coil.

IV. The valve shall be rated at 200 PSI and construction shall be as such to provide for all internal parts to be removable from the top of the valve without disturbing the valve operation.

V. Isolation valves 3” or larger shall be mechanical type with mechanical fittings.

VI. All valves must be designed for use with reclaimed water.

VII. Valve boxes need to be sized to accommodate for their operation and service.

VIII. The valve box tops should be purple and level with the surrounding grade.

IX. A 4” layer of gravel needs to be placed under all valves and bricks should be used to support the valve boxes if they do not rest on the gravel beds.

X. Install isolation ball valves in front of all zone valves that are 2 ½” or less.

XI. Mechanic valve must be used on all pipe larger then 2 ¼”.

B. Pipe

I. Polyvinyl chloride (PVC) pipe shall be rigid unplasticized PVC extruded from virgin parent material of the type specified on the drawings. The pipe shall be homogenous throughout and free from visible cracks, holes, foreign materials, blisters, deleterious, wrinkles and dents. All pipe shall be Pantone purple 522c, continuously marked and permanently marked with the manufacturer’s name or trademark, size, schedule and type of pipe, working pressure at 73 degrees
Fahrenheit and National Sanitation Foundation (NSF) approval. Mainlines shall be installed with a 10/1 UF tracer wire. All piping 3” or larger shall be ring-tite PVC.

C. Fittings

I. All PVC fittings shall be molded fittings of schedule 40 pipe and shall be suitable for solvent weld, slip joint ring-tite seal or screwed connections. No fittings made of other materials shall be used except where noted on drawings or hereinafter specified.

D. Sprinkler Equipment

I. Spray type pop-up sprinkler: The sprinkler patterns shall be designated on the drawings. All part circle models shall be marked with a letter, or symbol designating the coverage pattern. All nozzles shall have an adjusting screw for adjustment of gallonage, pressure and coverage over the full operating range of the nozzle.

E. Valve Boxes

I. All remote control valves, manual valves, zone shut-off valves, gate valves or globe valves, unless otherwise indicated, shall be installed in a suitable thermos-plastic valve access box, of proper size as required for easy access to the valve.

II. Access boxes shall be complete with approved thermos-plastic cover. Locking and/or hinged covers for access boxes will not be required unless specifically designated on the drawings or hereinafter specified.

III. Identification: Identify zone valves with an aluminum or brass tag embossed with the zone number shown on the record drawings.

F. Controller

I. The irrigation system controller shall be located as noted on the drawings. Rain Bird Maxicom only.

II. The controller shall be wired to the remote control valves according to the manufacturer’s instructions and in accordance with the watering schedule provided on the drawings.

III. Controller station numbers shall match the zone number on the submittal drawings.

IV. All field wiring shall be tested and approved prior to backfilling.

G. Wire

I. All electrical control and ground wire shall be irrigation control cable. All wiring to be used for connecting the automatic remote control valve to the automatic controllers
shall be type “UF”, 600 volt, solid copper, single conductor wire with PVC insulation for direct underground burial feed cable (UF 14/1 minimum).

II. Provide PVC pipe sleeves for all pavement crossings of control wiring.

6. Products

A. Valve Boxes: PVB Professional Series with purple cover; generally VP 10 inch, 12 inch, or 24 inch

B. Junction Boxes: PVB Professional Series with purple cover

C. Spray Heads: 1800 series Rain Bird Pop ups (6 inch or 12 inch only)

D. Rotors (Athletic Field): 6500 Falcon Series Rain Bird

E. Rotors: 5000 Series Rain Bird

F. Nozzles: Rain Bird Only

G. Sprays (Pots): Rain Bird spray spikes (XS-360TS-SPYK)

H. Manifolds (Pots): Rain Bird 6 port Manifold (EMT-6XERI)

I. Bubblers: Rain Bird 1.0 gal (PCT10)

J. Flex Hose: IPS Flexible PVC pipe (Only) (KF050100)

K. Pipe: 200 PSR Purple PVC (Only) (PEB-NP-HAN2)

L. Valves: PSEB Rain Bird Scrubber Valves

M. Controller: Maxicom (ESP – SAT- 40)

N. Grounding Rods: 10 ft Length ¾ Diameter Copper

O. Grounding Wire: #6 Copper wire

P. Grounding Plates: 234MX grounding plate; minimum dimensions 4” x 96” x .0625” copper

Q. Grounding Connections: Blackburn copper ground clamp (G5-B1-30)

R. Grounding Compound: GEM (25A)
S. **Control Wire**: 14 Gauge direct burial (Red 14 AWG)

T. **Common Wire**: 14 Gauge direct burial (White 14 AWG)

U. **Grease Filled Caps**: Direct burial splices (DBR/Y-8)

V. **Mechanical Shut Off Valve**: American Flow Control (AFC2603DLA)

W. **Mechanical Fittings**: Compact MJ type with gaskets and Star grips (ANSI/AWWA/C153)
32 80 00 Irrigation – EXHIBIT Wall Mount Controller

COMMERCIAL CONTROLLER - SEE MANUAL FOR WALL MOUNTING INSTRUCTIONS, ALL WIRING TO BE INSTALLED AS PER LOCAL CODES.

JUNCTION BOX

CONDUIT FOR CONTROL AND COMMON U.F. DIRECT BURIAL WIRES TO REMOTE CONTROL VALVES. EXTEND CONDUIT 6" OUT FROM BASE OF WALL.

CONDUIT FOR 120 VOLT WIRE FROM POWER SOURCE.

TYPICAL WALL MOUNT CONTROLLER

NOT TO SCALE
32 80 00 Irrigation – EXHIBIT Pedestal Mount Controller

**Typical Pedestal Mount Controller**

- Metal Cabinet Controller
- Pedestal
- Concrete Slab
- Finish Grade
- 3/4" Conduit for 110 vac
- 2" Conduit for Valve Wires

*Not to Scale*
32 80 00 Irrigation – EXHIBIT Rain Sensor

NOTE:
INSTALL SENSOR WHERE IT IS EXPOSED TO RAINFALL BUT NOT IN PATH OF SPRINKLER.

LEAD WIRES TO CONTROLLER

TYPICAL RAIN SENSOR
NOT TO SCALE
32 80 00 Irrigation – EXHIBIT Solenoid Valve

DURABLE LEATHER RESISTANT PLASTIC VALVE BOX WITH EXTENSIONS IF NECESSARY.
FINISH GRADE
INSTALL VALVE BOX 1/2" ABOVE FINISH GRADE IN TURF AND 2" IN SHRUB AREAS.
3M-DBY WIRE CONNECTORS AND EXPANSION COILS, 10 WRAPS AROUND 1/2" PIPE.
ELECTRIC SOLENOID CONTROL VALVE.
LATERAL PIPING TO SPRINKLERS.
4" PEA GRAVEL BASE W/ FILTER LINING.
ISOLATION VALVE.
MAINLINE

TYPICAL SOLENOID VALVE
NOT TO SCALE
32 80 00 Irrigation – EXHIBIT Grounding Plate Grid

MAXICOM FIELD SATELLITE

SOLID BARE COPPER WIRE (16 GA)
FROM GROUNDING ROD TO SATELLITE
MAKE WIRE AS SHORT (APPROX. 10 FEET)
AND STRAIGHT AS POSSIBLE

FINISH GRADE

GROUND ROD CLAMP OR WELDS

5/8-INCH X 8 FT COPPER CLAD GROUNDING
ROD OR GROUNDING PLATE. INSTALL RODS IN
SOIL IN A TRIANGULAR PATTERN SPACED A
MINIMUM OF 18 FT APART FROM EACH
OTHER GROUNDING GRID TO HAVE A
RESISTANCE OF TEN (10) OHMS OR LESS

COPPER GROUNDING PLATE (INSTALL 20' FROM ROD)
GRID ENHANCEMENT MATERIAL (2 BAGS)

BARE COPPER WIRE (16 GA MIN.) BETWEEN
GROUNDING RODS AND GROUNDING PLATE
COVER GROUNDING ROD WITH VP-10
ROUND VALVE BOX AS SHOWN
32 80 00 Irrigation – EXHIBIT Grounding Rod Grid

MAXICOM FIELD SATELLITE

SOLID BARE COPPER WIRE (1/8 AWG) FROM GROUNDING ROD TO SATELLITE. MAKE WIRE AS SHORT AND STRAIGHT AS POSSIBLE

BARE COPPER WIRE (1/8 AWG MIN.) BETWEEN GROUNDING RODS

5/8- INCH X 8 FT COPPER CLAD GROUNDING ROD OR GROUNDING PLATE. INSTALL RODS IN SOIL IN A TRIANGULAR PATTERN SPACED A MINIMUM OF 16 FT APART FROM EACH OTHER. GROUNDING GRID TO HAVE A RESISTANCE OF TEN (10) OHMS OR LESS

COVER GROUNDING ROD WITH VP-10 ROUND VALVE BOX AS SHOWN

GROUNDING ROD GRID
NOT TO SCALE
32 80 00 Irrigation – EXHIBIT Ground Rod Assembly

4" MN

FINISH GRADE

BARE COPPER WIRE (16 AWG MN) BETWEEN GROUNDING RODS

GROUND ROOD CLAMP OR WELDS

COVER GROUNDING ROD WITH 1/2 ROUND VALVE BOX AS SHOWN

5/8-INCH X 8 FT COPPER CLAD GROUNDING ROD OR GROUNDING PLATE. INSTALL RODS IN SOIL IN A TRIANGULAR PATTERN SPACED A MINIMUM OF 16 FT APART FROM EACH OTHER. GROUNDING GRID TO HAVE A RESISTANCE OF TEN (10) OHMS OR LESS.
32 80 00 Irrigation – EXHIBIT Pop-Up Rotary Sprinkler

32 80 00 Irrigation – EXHIBIT Pop-Up Rotary Sprinkler

NOTE: NO BARBED FITTINGS ALLOWED.

NOTE: INSTALL SPRINKLER AT FINISHED GRADE

APPROVED BACKFILL

ROTARY SPRINKLER

3/4" PVC STREET ELL

3/4" FLEX PIPE

LATERAL PIPE

LATERAL TEE

TYPICAL POP UP ROTARY SPRINKLER

NOT TO SCALE
32 80 00 Irrigation – EXHIBIT Sports Field Rotor

**Typical Sports Field Rotor**

_NOT TO SCALE_

- **Note:** Install sprinkler at finished grade
- Rubber cover
- Approved backfill
- Rotary sprinkler
- 1" PVC street ell
- 1" x 12" SCH.80 nipple
- Lateral pipe
- 1" PVC street ell
- Lateral tee
32 80 00 Irrigation – EXHIBIT Hi-Pop Spray Sprinkler

TYPICAL HI-POP SPRAY SPRINKLER

NOTE: NO BARBED FITTINGS ALLOWED.

NOTE: INSTALL SPRINKLER AT FINISHED GRADE

APPROVED BACKFILL

HI-POP SPRAY SPRINKLER

1/2" PVC STREET ELL

NOTE: CONTRACTOR MAY INSTALL PIPE TO SIDE OR BOTTOM INLET

1/2" FLEX PIPE

LATERAL TEE

LATERAL PIPE

8" MIN

NOT TO SCALE
32 80 00 Irrigation – EXHIBIT Bubbler

Typical Bubbler

NOTE: Install bubbler 2" above finished grade
Approved backfill

BASE OF TREE
Bubbler
1/2" Flex Pipe
Lateral Tee
Lateral Pipe

TYPICAL BUBBLER
Not to scale
32 90 00 Planting

1. General

A. Planting Preparation:

I. Remove “black” burlap, plastic, or any inorganic covering from root balls prior to planting.

II. Remove rope or strapping from top of root ball after placing in ground.

III. Slit burlap root ball cover after placing in ground.

IV. Remove top of wire basket.

V. Handling the root ball or container instead of strapping the trunk when unloading will avoid most of the commonly observed trunk injuries and scarring. While burlap may be left on a plant’s root ball, all non-biogradable and slowly biodegradable materials will be removed (containers, plastic wraps, ropes, flagging tape on the branches, plant labels, etc.). Wire baskets may be left in the ground but above-ground portions must be cut away. Care must be taken also to avoid damaging or weakening the root balls. Containerized plants that are overgrown and root bound must be avoided. The installer should backfill the planting hole with native soil without amendments. Plants will be planted so the base of the plant is planted at surrounding grade, not higher or lower. The root balls of all plants should be free of weeds. A water well should then be constructed around trees at planting to contain water. Mulch depth should be no more than three inches deep around large trees (less with smaller plants). Mulch will be spread to, but not against, the bases of woody trees, shrubs and vines. Stake all trees that have a caliper of three inches or more. Stake otherwise as needed without nailing into the trunk. In particular, newly planted cabbage palm, *Sabal palmetto*, at the proper depth require staking.

VI. Provide minimum 4 inches of topsoil. Perform pH test, adjust pH level of soil to 6.5.

VII. Before sodding, the soil surface should be raked and leveled. Sod squares will be placed edge to edge. Sod installations will be rolled and top dressed as needed and will include low-nitrogen fertilization after installation. Mowing shall be the responsibility of the contractor for the first 30 days after installation.

VIII. Slopes for mowed turf will be 15 degree slopes or lower. Steeper slopes must be landscaped.

B. Turf and Grasses:
I. In general, Flora tam St. Augustine grass is the standard turf in the irrigated campus core. “High activity” lawns are Certified Tifway 419 Bermuda grass. Unirrigated perimeter and roadside turf is Bahia grass. UNF horticulturists will consider new, low maintenance turf grasses as new selections and species come available. Consult with the University on grass selections during design.

C. Plants:

I. Plans for new building landscapes will be reviewed and adjusted by horticulturists in Landscape and Grounds. UNF horticulturists will approve substitutions and help contractors locate sources.

D. Shrubs & Trees:

I. Shrubs and trees will be Florida #1 quality or higher (Florida Division of Plant Industry Grades and Standards). Herbaceous perennials should be healthy, full, and established in the container. The installer will make every effort to avoid injury to tree trunks.

II. Several plants are undesirable on campus. As of 2009, they are:

   a. All plants listed as exotic pest plants by the Florida Exotic Pest Plant Council (FLEPPC, http://www.fleppc.org).

   b. Golden rain tree, Koelreuteria bipinnata (weedy).

   c. Chinese elm, Ulmus parviflora (weedy).

   d. Paspalum quadrifolium (syn. Paspalum quadrifarium, possibly not a problem but a USDA scientist is concerned about the potential for weediness).

   e. King sago, Cycas revoluta, and other Cycas species (due to aulacaspis scale).

   f. Callery pear, Pyrus calleryana “Bradford” and other cultivars (poor branching, poor color in our area and susceptibility to fire blight disease).

III. Ground covers will be planted close enough that they will grow in to compete with weeds within one year.

IV. Tree grates will be not be used.

V. Trees 2-inch caliper and larger shall be staked.
32 90 00 Planting

33 00 00 Utilities
33 00 00 Utilities

1. General

   A. Copper clad steel (CCS) tracer wire shall be provided in open trenches to conductively locate underground utility lines.
33 19 00 Water Utility Metering Equipment

1. Manufacturer: Kamstrup Siemens MAG 8000 with READY Gateway