



Leon County

Board of County Commissioners

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March 8, 2010

RE: Northeast Branch Library Addition, Bid No: BC-03-11-10-19
Opening Date: Thursday, March 11, 2010 at 2:00 PM

ADDENDUM #2

Dear Contractor:

This letter serves as Addendum #2 for the above referenced project.

1. Attached is Addendum #2 from the Architect providing answers to contractor questions and detailing the items included as part of the addendum.

Acknowledgment of this addendum is required as part of your bid submittal. Failure to acknowledge this addendum may result in rejection of your bid.

Should you have any questions, feel free to call me at (850) 606-1600.

Sincerely,

A handwritten signature in black ink, appearing to read "Keith M. Roberts".

Keith M. Roberts
Purchasing Director

KMR

ADDENDUM NUMBER 2 to THE CONTRACT DOCUMENTS

Leon County NE Branch Library Addition

Prepared by:
Barnett Fronczak Barlowe Architects
225 South Adams Street
Tallahassee, Florida 32301

The following items hereby become part of the Contract Documents, revised dated 8 January 2010, for the above referenced project.

DESCRIPTION:

The following RFI's were received on or before 2 March 2010:

- 1. Question:** Plan sheet C3.0 shows the shorter run of fire line as being an alternate. FS1.0 shows the shorter fire line as being base bid. Which is correct?

Response: Sheet C3.0 has been revised (Rev. dated: 2/23/2010) to show the shorter fire line as the base bid. Bidders should note that all disturbed paving, curbing, landscaping, etc. will have to be restored. Note also: relocated Sanitary Sewer line revision.

- 2. Question:** Plant schedule on C6.0 shows (8) 1 gallon Cornus Florida under shrub category. Is this correct?

Response: The size container is not as important as the meeting the requirement for the specified foliage spread.

- 3. Question:** Are smaller container sizes or B&B trees (Live Oak) acceptable as long as the minimum height, spread, and caliper are met?

Response: Yes.

- 4. Question:** Sheet C6.0 references an irrigation system extension for all newly landscaped areas. Is a drawing available depicting the existing system?

Response: Yes. For reference: an (Existing) Irrigation Plan (also sheet C-6) from Spectra Engineering dated revised 2004, has been attached for the purpose planning the proposed

extension of the existing irrigation system. Bidders are responsible for the verifying the as-built location of piping, heads, and other related assemblies.

5. **Question:** Can you please confirm the installation of any fire sprinklers going under the 2 side canopies of the library?

Response: No sprinklers will be required under the north and south exterior canopies.

6. **Question:** Can you please confirm the installation of any fire sprinklers going above the A/C and Heating units on the mezzanine?

Response: Yes, fire sprinklers are required for the access portion of the mezzanine.

7. **Question:** Can you please confirm who's responsibility the ceiling tile and grid will be, in order to be taken down and put back in after the fire sprinkler pipe is installed above it?

Response: To be determined by the bidding general contractor. Indicate this exclusion in your sub-contract bid if this is not within your proposed scope.

8. **Question:** Can you please confirm whether the underground (fire piping) coming into the building is going to be coming under the slab or through the wall?

Response: Under slab. See sheet S1.1. Bidders please note structural conditions for penetration of the perimeter footer at this location.

9. **Question:** Can you please confirm what size city tap is going to be made for the under- ground piping coming into the building?

Response: No tap is required. The fire line will be connected to the existing fire line that feeds the existing hydrant.

10. **Question:** Is there an approved alternate to the Lee's Carpet in the Specs?

Response: No. The Lees carpets specified match the existing products in place.

11. **Question:** After touring the site today it came to my attention the locks and latches and cylinders currently being used at the Library are Sargent Mortise locks with LNJ trim. Heavy duty cylindrical locks by Corbin/Ruswin, Sargent or Schlage are what is specified in the specifications. Please verify locks, latches and cylinders are to match existing.

Response: It is the intent of the design team and the county for the new addition to match the existing facility as much as practical. The products specified are from the County's Facility Design Guidelines of preferred products. Preference will be given to match existing doors and hardware as close as practical.

12. Question: Are there any requirements for the doors that are scheduled to be stained?

Response: OMIT specification Section 082110 – Flush Wood Doors. Substitute NEW specification Section 081416 – Flush Wood Doors (See attached).

13. Question: The AISC requirements were removed from the BL Perry Library Specification. Are they being removed from the NE Library Branch spec?

Response: Yes. See REVISED Specification Section 05120.

14. Question: Sections 15010 and 16101 both contain a Special Pre-qualification Requirement that the sub-contractors have 5 years experience on similar projects, a list of references that must be turned in at the pre-bid meeting and the statement that the owner will issue an addendum within five calendar days of the pre-bid with a list of all contractors who have met the required pre-qualification. Is this requirement supposed to be in the specifications and will you be issuing a list of approved subcontractors?

Response: The Special Pre-qualification Requirements have been revised. See attached REVISED Specification Sections 15010-Mechanical General Provisions & 16101-Electrical General Provisions.

15. Leon County Library staff have requested additional lighting for the Storyville Room #118 space. Bidders are required to indicate a \$2,000 allowance to accommodate this additional scope.

16. County Library staff have requested that all new faucets be “goose-neck”. On Sheet P0.1, revise fixture F-404 to read: TOTO TEL5GGC-60 or equal.

ATTACHMENTS SUMMARY: (PDF's)

Specifications

Section 05120 - Structural Steel

Section 081416 - Flush Wood Doors

Section 01500 – Temporary Facilities and Controls

Section 15010 - Mechanical General Provisions

Section 16101 - Electrical General Provisions

24 x 36 Drawings

Sheet C1.0 - Site Plan (revised 2/23/2010)

Sheet C3.0 - Master Utility Plan (revised 2/23/2010)

Sheet C5.0 - Erosion Control Plan (revised 2/23/2010)

Sheet C6.0 - Landscape Plan (revised 2/23/2010)

Sheet FS1.0 – Site Plan – Fire Protection (revised dated 2/23/2010)

Sheet Landscape/Irrigation (revised dated 2004)

END OF DOCUMENTS

SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The work specified in this section includes all labor, materials, equipment, permits, and services necessary for the fabrication and erection of structural steel and related work, complete, in accordance with the Drawings and as specified herein, including the detailing of all connections.
- B. Structural steel is that work defined in AISC "Code of Standard Practice" and as otherwise shown on Drawings.

1.3 RELATED SECTIONS SPECIFIED ELSEWHERE

- A. Division 3 Section "Cast-In-Place Concrete" for Grouting Base Plates.
- B. Division 3 Section "Concrete Formwork" for Placing Anchor Rods.
- C. Division 5 Section "Steel Joists."
- D. Division 5 Section "Steel Deck."
- E. Division 5 Section "Miscellaneous Metal Fabrication."
- F. Division 7 Section "Fireproofing."
- G. Division 9 Section "Special Coatings."

1.4 RESPONSIBILITIES

- A. The Engineer of Record is responsible for the design of the steel framing and connections as presented in the Contract Documents. No changes to the requirements of the Contract Documents will be considered without complying with the applicable requirements for substitutions. This includes, but is not limited to, connection details, member sizes or steel grades.
- B. The fabricator is responsible for the preparation of Shop and Erection Drawings pursuant to the requirements of the Contract Documents. These drawings shall be prepared by or under the direct supervision and control of a Florida Licensed Engineer, who shall submit a letter to the

Architect stating such. The fabricator's Engineer shall, where necessary, complete the details presented on the Contract Documents and adapt those details to accommodate the atypical conditions. These drawings do not require his signature and seal. Acceptance of the Shop and Erection Drawings by the Architect/Engineer does not relieve the fabricator of the responsibility for accuracy of detail dimensions on the shop drawings and the general fit-up of parts to be assembled in the field.

- C. The fabricator is responsible for the design and detailing of all substitutions, which shall be prepared by or under the direct supervision and control of a Delegated Engineer as defined in the Contract Documents.
- D. The fabricator is responsible for the coordination of all surveyed field conditions and field measurements necessary for the detailing, fabrication and erection of their work. All field measurements shall be provided on the shop drawings prior to submittal.
- E. The Engineer of Record is responsible for the structural adequacy of the structure in the completed project. The erector is responsible for the means, methods and safety of the erection, including all temporary guys, beams, falsework, cribbing or other elements required for the erection operation. If the erector is unsure of these requirements, he shall retain a Florida Licensed Engineer to determine and design all temporary requirements.

1.5 SUBMITTALS

- A. Submit in accordance with conditions of Contract and Division 1 Specification Sections.
- B. Qualifications: Include lists of Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- C. Product Data for each type of product specified, including the following:
 - 1. Bolts, nuts, and washers, including mechanical properties.
 - 2. Direct-tension indicators.
 - 3. Shear stud connectors.
 - 4. Structural steel coatings.
- D. Fabricator's certification that the chemical and physical properties of the following materials comply with the Project requirements:
 - 1. Structural steel
 - 2. Bolts, nuts and washers.
 - 3. Direct-tension indicators.
 - 4. Shear studs.
 - 5. Welding electrodes.
- E. Welder's certification. Submit to Owner's inspection agency.
- F. Letter from Florida Licensed Engineer responsible for shop drawings.

- G. The fabricator shall submit details and complete calculations that clearly identify proposed substitutions for Engineer's review prior to preparation of detailed shop drawings. Proposed variations to details shown on the Contract Drawings will be considered and such variations must have preliminary acceptance prior to the preparation of detailed shop drawings. The details and calculations shall clearly show the capacity of the connections designed by the fabricator. The calculations shall show details of the assembled joint with all bolts and welds required. All design calculations, drawings and details shall be signed, sealed and dated by the Delegated Engineer.
- H. Submit to the Architect for acceptance shop and erection drawings prepared by or under the direct supervision and control of a Florida Licensed Engineer. See "Shop Drawings and Other Submittals" notes regarding the possible reproduction of Structural Drawings for use as shop or erection drawings. Drawings shall include complete details, dimensions, schedules and procedures for the fabrication, assembly, and sequence of erection.
 - 1. Include details of cuts, connections, camber, holes, threaded fasteners and other pertinent data. Indicate welds by standard AWS A2.4 symbols and show size, length, and type of each weld. Show shop welds on shop drawings and field welds on erection drawings.
 - 2. Provide setting drawings, templates, and directions for installation of anchor rods, embeds and other anchorages to be installed by others.
 - 3. Indicate surface preparation, such as primed, galvanized, etc., of each surface of each piece.
- I. Before welding is started, the steel fabricator and erector, as applicable, shall submit to the Architect a signed and sealed statement by a Florida Licensed Engineer, who specializes in the design of weldments, that he/she has provided written welding procedures for this Project, establishing the welding process, sequence of assembly, preheat, interpass and post heat requirements in general if high residual stresses are present, and in particular for all members requiring partial or complete penetration groove welding.
- J. Fabricator's Quality Control Program.
- K. Fabricator's shop inspection and test reports.
- L. Substantiating data for primer on Class A faying surface.

1.6 CODES AND STANDARDS

- A. Florida Building Code, 2007 Edition with 2009 Supplement.
- B. AISC "Code of Standard Practice for Steel Buildings and Bridges".
 - 1. Paragraph 4.4. "Approval" is modified such that the Structural Engineer will return submittals to the Architect within ten working days from time of receipt.
- C. AISC "Specifications for Structural Steel Buildings", including "Commentary" and Supplements thereto as issued.
- D. AISC "Specifications for Structural Joints using ASTM A 325 or A490 Bolts" approved by the Research Council on Structural Connections of the Engineering Foundation.

- E. AWS D1.1 "Structural Welding Code".
- F. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".
- G. S.S.P.C. Society for Protective Coatings.
- H. Occupational Safety and Health Act (OSHA), as amended to date.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Fabricator shall have an a minimum five years of documented successful experience on equivalent projects. **Submit copy of résumé demonstrating equivalent project experience. [REVISED 3-4-2010]**
- B. Erector Qualifications: Erector shall have a minimum five years of documented successful experience on equivalent projects. **Submit copy résumé demonstrating equivalent project experience. [REVISED 3-4-2010]**
- C. Qualifications for welding work: Qualify welding procedures and operators in accordance with AWS "Standard Qualification Procedure".
 1. The Fabricator for shop welds and the Erector for field welds shall retain a Florida Licensed Engineer, who specializes in the design of weldments to prepare a written welding program pursuant to the requirements of ANSI/AWS D1.1. The program shall include all necessary Welding Procedure Specifications (WPS), all necessary requirements for qualification testing of WPS and welding personnel. The WPS shall include the welding process, sequence of assembly, preheat, interpass and postheat requirements. Welded joints of heavy sections and plates 2 inch thick and greater shall be detailed to limit the amount of weld metal. Double bevels shall be used in lieu of single bevels. Welding shall start at the most restrained part of the weldment and proceed to the least restrained.
 2. The Fabricator and Erector, as applicable, shall conduct all necessary tests required by ANSI/AWS D1.1 to qualify the WPS.
 3. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests for the welding process and position used and have been continuously employed as a welder since certification. If recertification of welders is required, retesting will be Contractor's responsibility.
- D. The Fabricator shall ultrasonically inspect for laminations all joints where material is subjected to tension in the though thickness direction. Ultrasonic inspection shall extend for a distance of six times the material thickness subject to the through thickness tension, either side of the element delivering the tension.
- E. Stud Application Qualification Test:
 1. Prior to erection, conduct stud application qualification tests in accordance with AWS D1.1 Chapter 7.6 and Annex IX. The tests are the responsibility of the Contractor or stud applicator.

2. Prepare specimen plates of A992 steel, minimum 1/2 inch thick, with an SP-6 surface preparation.
 3. Weld a minimum of ten (10) studs through steel deck to the prepared plate(s). The studs and steel deck shall be of the same type as specified for use in the project. Test the studs by the bend test specified in AWS 7.6.6 or Annex IX.
 4. If the tests are conducted by other than the Owner's testing agency, that agency shall be properly notified so that they may be present to witness the entire test procedure.
- F. The Fabricator shall provide a system of quality control, including shop welding inspections and testing, to ensure that the minimum standards specified herein are attained. Submit to Owner, Architect, Engineer and Owner's Testing and Inspection Agency complete details of the quality control program to be used and all testing and inspection reports. Visually inspect 100% of shop welds. Also, as a minimum, perform non-destructive tests of welds in conformance with AWS D1.1 as follows:
1. Splices: 100%.
 2. Full penetration welds: 100% of cantilevered members, 50% for all others.
 3. Partial penetration welds: 25%.
 4. Fillet welds: 10%.
- G. The fabricator may use the following examination methods, in descending order of importance. When a particular examination method for a joint is unfeasible, the highest order method that is practicable shall be used. Standard of acceptance shall be in accordance with AWS D1.1.
1. Ultrasonic Method: In accordance with AWS D1.1.
 2. Radiographic Method: In accordance with ASTM E 94 and ASTM E 142, with a minimum quality level of "2-2T". This procedure is limited to the inspection of groove welds in butt joints only and is not to be used for fillet welds.
 3. Magnetic Particle Method: In accordance with ASTM E109. Use for examining partial penetration welds. Percentage of examinations is defined elsewhere in these specifications. The Yoke method may be used only for supplementary surface examination.
 4. Dye Penetrant Examination Method: In accordance with ASTM E165.
- H. Cleaning and lubrication of ASTM F1852 twist-off-type tension-control bolt assemblies is not permitted.
- I. Turn-of-nut method of bolt tightening is not acceptable.
- J. Preconstruction Meeting: There shall be a Preconstruction Meeting with the Owner, Architect, Structural Engineer, Contractor, Fabricator, Erector, Testing Laboratory and Special Inspector to clarify responsibilities and requirements as set forth in the Contract Documents.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site at such intervals to insure uninterrupted progress of work
- B. Deliver anchor rods and anchorage devices which are to be embedded in cast-in-place concrete or masonry in ample time to not delay work.

- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using plates, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
- D. Store fasteners components in sealed containers until ready to use. Reseal open containers to prevent contamination by moisture or other deleterious substances. Store closed containers in a protective shelter to protect fasteners from dirt and moisture. Only as many fastener components as are anticipated to be installed during the work shift shall be taken from protective storage. Fastener components that are not incorporated into the work shall be returned to protective storage at the end of the work shift. Fasteners from open containers and fasteners that accumulate rust or dirt shall not be used and shall be immediately and permanently removed from the project site.
- E. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural steel rolled W and WT shapes: ASTM A 992, $F_y=50$ ksi.
 - 1. Requirements for Group 4 and 5 Members.
 - a. Steel shall be fine, grained killed steel.
 - b. Charpy V-notch impact tests shall be performed according to ASTM A673, "Sampling Procedure for Impact Testing of Structural Steel": The frequency of testing shall be as prescribed in A673; the test temperature shall be 70 F; the absorbed energy shall be 20 ft.-lb.
 - c. The Fabricator shall submit evidence to the Architect that the mill has complied with the above requirements.
 - 2. Mill Inspection: All structural shapes in Group 4 and 5 shall conform to the requirements of ASTM 898, "Straight Beam Ultrasonic Examination of Rolled Steel Structural Shapes" to assure delivery of shapes free of gross internal discontinuities such as pipe, ruptures, or laminations. The Fabricator shall submit to the Architect evidence of compliance by the mill with this requirement.
- B. Structural steel rolled M, S, C and MC shapes and Angles: ASTM A 36, $F_y=36$ ksi.
- C. Structural steel plates and bars: ASTM A 36, $F_y=36$ ksi.
 - 1. All steel plates exceeding 2" in thickness shall conform to the requirements of ASTM A435, "Straight-Beam Ultrasonic Examination of Steel Plates", to assure delivery of steel plates free of gross internal discontinuities such as pipe, ruptures, or laminations. Plates shall be identified by stamping or stenciling "UT 435" adjacent to marking required by the material specification. The Fabricator shall submit to the Architect evidence of compliance by the mill with this requirement.

- D. Cold-formed hollow structural sections (HSS):
1. Round sections: ASTM A500, Grade C, Fy=46 ksi.
 2. Square and Rectangular sections: ASTM A500, Grade B, Fy=46 ksi.
- E. Steel pipe: ASTM A53, Type E or S, Grade B, Fy=35 ksi.
- F. Anchor Rods: ASTM F1554, Grade 55 with Supplementary Requirement S1.
- G. Anchor Rods: ASTM A449 Type 1 threaded, with nuts and washers each end.
- H. Unfinished threaded fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts.
1. Provide square head and nuts.
- I. High-strength threaded fasteners: Heavy-hex structural bolts, heavy-hex nuts, and hardened washers, as follows:
1. Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A325 or A490.
- J. Direct tension indicator washers: ASTM F959.
- K. Bolt Lubrication: All bolts shall be well lubricated at time of installation, dry, rusty bolts will not be allowed. Bolts or nuts shall be wax dipped by the bolt supplier or "Johnson's Stick Wax 140" shall be used with all bolts in the shop or field. Cleaning and lubrication of ASTM 1852 twist-off type tension-control bolts is not permitted.
- L. Electrodes for welding: Comply with AWS D1.1-98, Table 3.1.
1. For complete-joint penetration groove welds, weld metal shall have a charpy V-notch impact strength of 20 ft./lbs. -20°F.
- M. Headed Studs – Type Shear connectors: ASTM A108, Grade 1015 or 1020, cold finished carbon steel AWS D1.1, Type B with dimensions complying with AISC specifications.
- N. Structural steel primer paint: SSPC – Paint 11 lead and chromate free, V.O.C. compliant, minimum solids 55% by volume. Use for steel not receiving special coatings or fireproofing. Refer to Architectural Drawings and Division 9.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Steel spec Heavy Duty Primer; Sherwin Williams.
 - b. Tnemec – Series 10; Tnemec.
 - c. Primatite; Devoe.
 2. Provide shop primer and shop applied top coat paint in accordance with Division 9 Section "Special Coatings" where shown on the Architectural Drawings.
 3. Steel permanently exposed to the elements that does not receive a coating, such as cooling tower supports, shall be hot dip galvanized.
- O. Non-metallic shrinkage-resistant grout: Provide in accordance with Section 03300.

2.2 FABRICATION

- A. Shop fabrication and assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.
- B. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
- C. Where finishing is required, complete the assembly, including welding before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.
- D. Camber: Camber of structural steel members is indicated on the drawings.
 - 1. Where possible, camber of beams shall be applied by a cold bend process. The local application of heat may be used to introduce or correct camber, curvature, or straightness, provided the temperature of the heated area, as measured by temperature crayons or other approved means, does not exceed 1200 F.
 - 2. Where indicated on the Drawings in a camber diagram, cantilever or double cantilever beams shall be cambered for the main span and cantilever end separately, either by a staged cold bending process or by the application of heat.
 - 3. Cambers indicated on the drawings are intended to be final cambers at time of erection. The fabricator shall account for camber loss in the initial camber operations and during transportation of material to the site.
 - 4. Beams and trusses detailed without specified camber shall be fabricated so that after erection any natural camber due to rolling or shop fabrication is upward.
 - 5. Specified camber for beams at time of erection shall be within a tolerance of minus zero to plus one-eighth inch for each ten feet of member length.
 - 6. Specified camber for trusses shall be built into the fabrication process with a tolerance of minus zero to plus 10% of the specified camber.
- E. Splices in Structural Steel: Splicing of structural steel members in the shop or the field is prohibited without prior approval of the Architect. Any member having a splice not shown and detailed on approved shop drawings will be rejected.
- F. Compression Joints: Compression joints which depend on contact bearing as part of the splice capacity shall have the bearing surfaces of individual fabricated pieces prepared to a common plane by milling, sawing, or other suitable means.
- G. Connections:
 - 1. Weld shop connections, as indicated.
 - 2. Bolt field connections, except where welded connections are indicated.
 - 3. Provide high-strength, threaded fasteners except for temporary bracing to facilitate erection or otherwise indicated.
 - 4. Faying surfaces, including coatings, for slip-critical connections shall have a minimum Class A slip coefficient.
 - 5. At welded beam-column flange joints, weld backing and run-off tabs shall be removed and repaired, including a 5/16" reinforcing fillet weld on the edge below the complete-joint-penetration groove weld. The exception that the top-flange backing is permitted to

remain if it is attached to the column flange with a continuous fillet weld on the edge below the complete-joint-penetration groove weld.

- H. Bearing and Fit-Up of Column Compression Joints: Compression joints of all columns shall have bearing surfaces finished to a common plane by milling, sawing, or other suitable means. Lack of contact bearing must not exceed 1/16", or corrective measures as defined by AISC Section M4.4 shall be required.
- I. Struts and Braces: Connect struts and braces to resist 50% of the allowable tensile strength of the members, unless otherwise specified.
- J. Compression members composed of two or more rolled shapes separated from one another by intermittent fillers shall be connected to one another at such fillers spaced at intervals so that the least slenderness ratio, l/r , of either shape, between the fasteners, does not exceed the governing slenderness ratio of the built-up member.
- K. High-strength bolted construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" (RCSC June 30, 2004).
- L. Welded construction: Comply with AWS D1.1 for procedures, appearance and quality of welds, and method used in correcting welding work.
- M. Holes for other work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.
- N. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.
- O. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes, or enlarge holes by burning. Drill holes in bearing plates.
- P. Provide weep hole in any confined steel surface capable of retaining water during erection or service. Seal weld as required to prevent migration of water into confined region.

2.3 SHOP PAINTING

- A. Surface preparation: After inspection and before shipping, clean steel work to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with SSPC: the Society for Protective Coatings. Use SSPC-SP 6, "Commercial Blast Cleaning" for steel to be painted or receive a coating and SSPC-SP 2, "Hand Tool Cleaning," or SSPC-SP 3, "Power Tool Cleaning" for all other conditions
- B. Priming: Unless specified otherwise in Division 9 "Special Coatings" comply with the following: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 2.5 mils. Use painting methods that result in full coverage of joints, corners, edges and exposed surfaces. Refer to Division 9 Section "Special Coatings" for priming and painting of members to receive coatings.

Shop prime structural steel, except do not prime:

1. Members or portions of members to be embedded in concrete or mortar. Prime embedded steel that is partially exposed on exposed portions and initial 2" of embedded areas only.
 2. Surfaces that are scheduled to receive sprayed-on fireproofing.
 3. Members that are to be hot dip galvanized.
 4. Surfaces within 2" of welds.
 5. The faying surfaces of slip-critical bolted connections. The exception is for members that receive a coating system. There the faying surfaces should receive a primer providing a Class A surface, with a slip coefficient of 0.33. Submit substantiating data in conformance with Appendix A of the AISC "Specification for Structural Joints".
 6. Mask off and do not prime a strip 2" wide on any surfaces to receive a row of headed studs or puddle welds.
- C. Steel members which cannot be readily painted after fabrication, such as back-to-back angles and tees, shall be primed and finish coated prior to fabrication.
- D. Hot dip galvanize members permanently exposed to the elements, such as cooling tower support steel.
- E. Do not print or emboss the name of the fabricator on exposed steel unless it is completely concealed by the finish painting.

PART 3 - EXECUTION

3.1 ERECTION

- A. Surveys: Employ a Florida Licensed Engineer or Land Surveyor for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Architect.
- B. Temporary shoring and bracing: Provide temporary shoring and bracing members and connections of sufficient strength to bear imposed loads from steel self weight and erection procedures or any other loads created by other contractors on a temporary basis. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guidelines to achieve proper alignment of structures as erection proceeds.
- C. Temporary planking: Provide temporary planking and working platforms as necessary to effectively complete work.
- D. Anchor rods and bolts: Furnish anchor rods, bolts and other connectors required for securing structural steel to foundations and other in-place work.
1. Furnish templates and other devices as necessary for pre-setting rods, bolts and other anchors to accurate locations.

2. Refer to Division 3 of these specifications for anchor rod installation requirements in concrete, and Division 4 for masonry installation.
- E. Setting bases and bearing plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and clean bottom of base and bearing plate.
1. Set base or bearing plate wedge or other adjusting devices.
 2. Tighten anchor rods after structural steel frame has been plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
 3. Pack or pour non-shrink grout solidly between bearing surface and base or plate. Ensure that no voids remain. Finish exposed surfaces, protect grout and allow to cure.
 4. For proprietary grout materials, comply with manufacturer's instructions.
 5. Base plates must be grouted a minimum of 72 hours prior to placing concrete slabs on supporting steel structure.
- F. Field assembly: Set structural members accurately to lines and elevations indicated. Align and adjust various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Comply with AISC Code of Standard Practice except where more stringent requirements are contained herein.
1. Level and plumb individual members of structure within specified AISC tolerances.
 2. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.
- G. Splice members only where indicated and accepted on shop drawings.
- H. Erection bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.
- I. Comply with AISC Specification for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
- J. Do not enlarge unfair holes in members by burning or by use of drift pins. Ream holes that must be enlarged to admit bolts as permitted by Architect.
- K. Tighten bearing-type bolts (A-325N, A-325X, A-490N, and A-490X) to the snug tight condition as follows:
1. Bolts shall be placed in all holes, with washers positioned as required and nuts threaded to complete the assembly.
 2. Compacting the joint to the snug-tight condition shall progress systematically from the most rigid part of the joint.
 3. The snug-tightened condition is the tightness that is attained with a few impacts of an impact wrench or the full effort of an ironworker using an ordinary spud wrench.
 4. More than one cycle through the bolt pattern may be required to achieve the snug-tightened joint.

L. Tighten slip-critical bolts (A-325SC and A-490SC) to the minimum fastener tension indicated in Table 8.1 of the "Specification for Structural Joints using ASTM A-325 or ASTM A-490 Bolts" as follows:

1. Begin final tightening of slip-critical bolts only after a snug-tight joint as described above is achieved. Progress systematically from the most rigid part of the joint.
2. If splined end of tension-control bolts is severed prior to achieving snug-tight joint, remove and replace the fastener assembly.
3. Progress systematically from the most rigid part of the joint.
4. Determine tension using either load indicator washers or tension-control bolts.

At the Contractor's option, slip-critical bolts may be installed in either standard, oversize, or short slotted holes. Design of connections using slip-critical bolts is based on a Class A faying surface and oversized holes.

- M. Provide hardened washers conforming to ASTM F436 and place under the part being turned.
- N. Do not reuse or retighten bolts which have been fully tightened. Use only non-galvanized nuts and bolts that are clean, rust-free, and well lubricated. Bolts and nuts shall be wax dipped by the bolt supplier or lubricated with Johnson's Stick Wax 140. Cleaning and lubrication of ASTM F1852 twist-off-type tension-control bolts is not permitted.
- O. Where slotted holes are used to accommodate thermal movement, notify the Architect if bolt is expected to hit the end of slot, based on temperature at time of installation.
- P. Store fastener components in sealed containers until ready for use. Reseal open containers to prevent contamination by moisture or other deleterious substances. Store closed containers from dirt and moisture in a protective shelter. Take from protective storage only as many fastener components as are anticipated to be installed during the work shift. Fastener components that are not incorporated into the work shall be returned to protective storage at the end of the work shift. Fasteners from open containers and fasteners that accumulate rust or dirt shall not be used and shall be immediately and permanently removed from the project site.
- Q. Headed shear studs: All welding ferrules for shear connectors shall be removed prior to placement of concrete.
- R. Gas cutting: Do not use gas-cutting torches in field for correcting fabrication errors in primary structural framing. When permitted, finish gas-cut sections equal to a sheared appearance by grinding or reaming. Do not use gas cutting to fabricate bolt holes.
- S. Touch-up painting: Immediately after erection, slag field welds and clean bolted connections and abraded areas of shop paint. Apply paint to exposed areas using original shop primer or cold galvanizing compound. For exposed steel having special coatings system, reapply both primer and top coat per Division 9 Section, "Special Coatings". For galvanized steel, apply Zinc Clad Cold Galvanizing by Sherwin-Williams or Cold Galvanizing by ZRC Chemical by brush or spray to provide a minimum dry film thickness of 3 mils.

3.2 QUALITY CONTROL

- A. Shop testing and inspection by the Owner is to evaluate the effectiveness of the Fabricator's required Quality Control and Assurance Program.
- B. Owner will engage a Structural Inspector to perform field inspections pursuant to the Structural Inspection Plan presented on the Drawings.
- C. Owner will engage a testing agency to perform shop inspections, shop testing, field-testing, and to prepare test and inspection reports.
- D. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.
- E. Provide access for testing agency to places where structural steel work is being fabricated or produced and unobstructed views to all members in nearby storage so that required inspection and testing can be accomplished.
- F. Testing agency may inspect structural steel at plant before shipment; however, Architect reserves the right, at any time before final acceptance, to reject material not complying with specified requirement.
- G. Correct deficiencies in structural steel work which inspections or laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any noncompliance of original work, and as may be necessary to show compliance of corrected work.
- H. Shop Inspection and Tests: Testing Agency is to inspect and test during fabrication of structural steel assemblies, as follows:
 - 1. Review shop drawings and shop procedures with Fabricator's supervisory personnel.
 - 2. Request and obtain necessary mill certifications of steel and verify proper material throughout the duration of the job.
 - 3. Verify welding procedure qualifications, either by prequalifications or by witnessing qualification tests.
 - 4. Verify welder qualifications, either by certification and/or by retesting. Obtain welder certificates.
 - 5. Spot check layout and dimensions of jigs and fixtures for joint preparation, and fit up of members.
 - 6. Verify welding electrodes to be used and other welding consumables as the job progresses.
 - 7. Check preheating procedures for conformance to AWS D1.1.
 - 8. Verify procedures for welding in accordance with applicable portions of section 4, "Technique", AWS D1.1.
 - 9. Verify that quality of welds meet the requirements of Paragraph B.15, "Quality of Welds", AWS D1.1.
 - 10. Provide inspection of surface preparation for coating and coating operations in accordance with SSPC VIS 1 and 2.
 - 11. Perform visual inspection of all welds for compliance with Contract Documents. Provide random non-destructive tests of welds in conformance with Section 6 of AWS D1.1, as may be required by Architect, but not less than:
 - a. Full penetration welds: 25%.
 - b. Partial penetration welds: 15%.

- c. Fillet Welds: 10%.
 12. Testing laboratory may use the following examination methods, in descending order of importance. When a particular examination method for a joint is unfeasible, the highest order method that is practicable shall be used. Standard of acceptance shall be in accordance with AWS D1.1.
 - a. Ultrasonic Method: In accordance with AWS D1.1.
 - b. Radiographic Method: In accordance with ASTM E 94 and ASTM E 142, with a minimum quality level of "2-2T". This procedure is limited to the inspection of groove welds in butt joints only and is not to be used for fillet welds.
 - c. Magnetic Particle Method: In accordance with ASTM E109. Use for examining partial penetration welds. Percentage of examinations is defined elsewhere in these specifications. The Yoke method may be used only for supplementary surface examination.
 - d. Dye Penetrant Examination Method: In accordance with ASTM E165.
 13. Ultrasonically inspect for laminations after welding all joints with Group 4 and 5 rolled shapes and plates greater than 1 1/2" thick, where material is subjected to tension in the through thickness direction. The ultrasonic inspection shall extend for a distance of six times the thickness of the plate receiving the through thickness tension, either side of the plate delivering the tension.
 14. Interpret, record, and report all results of the non-destructive tests.
 15. Mark for repair, any area not meeting Specification requirements. Correction of rejected welds shall be made in accordance with Paragraph 3.7, "Corrections", AWS D1.1
 16. Re-examine all repair areas and interpret, record, and report the results of examinations of repair welds.
- I. Field Inspection and Tests: Inspect and Test during the erection of structural steel assemblies as directed by the Engineer of Record, but not less than the following
1. Verify field welding procedures and obtain welder certificates.
 2. Check joint preparation and fit up, backing strips, and runout plates.
 3. Check preheating to assure proper temperature, uniformity, and thoroughness through the full material thickness.
 4. Review welding sequence.
 5. Perform visual inspection of all welds for compliance with Contract Documents. Perform non-destructive tests of welds in conformance with Section 6 of AWS D1.1 as may be required by Architect, but not less than:
 - a. Splices: 100%.
 - b. Full Penetration Welds: 50% except 100% of cantilever members.
 - c. Partial Penetration Welds: 25%.
 - d. Fillet Welds: 10%.
 6. Check 100% of bolted connections according to inspection procedures outlined in the "Specification for Structural Joints using ASTM A325 or A490 Bolts" and as required elsewhere in these specifications.
 7. Production Stud Application Testing: Test the first two studs per welder per day for each set-up and size and type of stud. Test by bending studs 30 degrees using a 4 lb. hammer per AWS D1.1 Section 7.7. Use a 4 lb. hammer to sound 100% of studs. A pinging sound usually represents a sound weld. Studs that produce a "thud" should be bend tested. Passing studs may remain bent while failing studs must be replaced.
 8. Interpret, record, and report all results of the non-destructive tests.
 9. Mark for repair any area not meeting Specification requirements. Correction of rejected welds shall be made in accordance with Paragraph 3.7, "Corrections", AWS D1.1.

10. Re-examine all repair areas and interpret, record, and report the results of examinations of repair welds.
- J. Pre-installation testing of as-received fastener assemblies shall be performed according to the Specifications for Structural Joints using ASTM A325 or A490 Bolts, Section 7 and as follows:
1. Tension Calibrator (a hydraulic device that indicates the pretension that is developed in a bolt that is installed in it) shall be provided by the testing agency, at the Project Site, to confirm the tension force in the fastener assembly.
 2. A sample of not fewer than three complete fastener assemblies from each shipping container shall be checked at the site.
 3. Fastener assemblies tested shall develop a pretension force not less than 1.05 times that required by Table 8.1 in AISC. Minimum passing test force: A325: 3/4"=29.4 kips,

END OF SECTION 05120

SECTION
081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid-core doors and transom panels with wood-veneer faces.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Sections:

1. Division 06 Section "Interior Finish Carpentry" for wood door frames including fire-rated wood door frames.
2. Division 06 Section "Interior Architectural Woodwork" for requirements for veneers from the same flitches for both flush wood doors and wood paneling.
3. Division 08 Section "Glazing" for glass view panels in flush wood doors.

1.3 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.

- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire-protection ratings for fire-rated doors.

- C. Samples for Initial Selection: For factory-finished doors.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work. PROVIDE PRODUCT MATCHING EXISTING FACILITY.
2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
 - a. Provide samples for each species of veneer and solid lumber required.
 - b. Provide samples for each color, texture, and pattern of plastic laminate required.
 - c. Finish veneer-faced door samples with same materials proposed for factory-finished doors.
3. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

E. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Source Limitations: Obtain flush wood doors and wood paneling from single manufacturer.
- C. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
 1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
- D. Forest Certification: Provide doors made with cores and veneers not less than 70 percent of wood products obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- E. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.

- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Exterior Doors: Five years from date of Substantial Completion.
 - 4. Warranty Period for Solid-Core Interior Doors: Life of installation.
 - 5. Warranty Period for Hollow-Core Interior Doors: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Algoma Hardwoods, Inc.
 - 2. Ampco, Inc.

3. Buell Door Company Inc.
4. Chappell Door Co.
5. Eagle Plywood & Door Manufacturing, Inc.
6. Eggers Industries.
7. Graham; an Assa Abloy Group company.
8. Haley Brothers, Inc.
9. Ideal Architectural Doors & Plywood.
10. Ipik Door Company.
11. Lambton Doors.
12. Marlite.
13. Marshfield Door Systems, Inc.
14. Mohawk Flush Doors, Inc.; a Masonite company.
15. Oshkosh Architectural Door Company.
16. Poncraft Door Company.
17. Vancouver Door Company.
18. VT Industries Inc.

2.2 DOOR CONSTRUCTION, GENERAL

- A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
- B. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.
- C. Structural-Composite-Lumber-Core Doors:
 1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf (3100 N).
 - b. Screw Withdrawal, Edge: 400 lbf (1780 N).
- D. Mineral-Core Doors:
 1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
 2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
 - a. 5-inch (125-mm) top-rail blocking.
 - b. 5-inch (125-mm) bottom-rail blocking, in doors indicated to have protection plates.
 - c. 5-inch (125-mm) mid-rail blocking, in doors indicated to have armor plates.
 - d. 5-inch (125-mm) mid-rail blocking, in doors indicated to have exit devices.

3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade AA faces.
2. Species: MATCH EXISTING VENEER
3. Cut: Plain sliced (flat sliced).
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Center-balance match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
8. Transom Match: End match.
9. Blueprint Match: Where indicated, provide doors with faces produced from same flitches as adjacent wood paneling and arranged to provide blueprint match with wood paneling. Comply with requirements in Division 06 Section "Interior Architectural Woodwork."
10. Exposed Vertical and Top Edges: Same species as faces.
11. Core: Either glued wood stave or structural composite lumber.
12. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.
13. Construction: Seven plies, either bonded or nonbonded construction.
14. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.4 LOUVERS AND LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads as follows unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

- C. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- (1.2-mm-) thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated.

2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
 - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Openings: Cut and trim openings through doors in factory.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Finish doors at factory.
- C. Finish doors at factory that are indicated to receive transparent finish. Field finish doors indicated to receive opaque finish.
- D. Finish doors at factory where indicated in schedules or on Drawings as factory finished.
- E. Transparent Finish:
 - 1. Grade: Premium.

2. Finish: AWI conversion varnish or catalyzed polyurethane system.
3. Staining: As selected by Architect from manufacturer's full range.
4. Effect: Semifilled finish, produced by applying an additional finish coat to partially fill the wood pores.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
 2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste handling procedures.
 - 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service

during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts.
- B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide **galvanized-steel** bases for supporting posts.
- C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- D. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).
- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading, as needed.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations, if needed.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction. and clean HVAC system as required in mechanical specifications.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

- B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 - 1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 - 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- G. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

- H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

- 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
- 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

- 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Parking: Provide temporary parking areas for construction personnel.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

- 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
- 2. Remove snow and ice as required to minimize accumulations.

E. Project Signs: Provide Project signs as needed. Pre-approved signs are not permitted.

- 1. Identification Signs: Provide Project identification signs.
- 2. Provide temporary, directional signs for construction personnel and visitors.
- 3. Maintain and touchup signs so they are legible at all times.

- F. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."
- G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Division 01 Section "Execution."
- H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Division 01 Section "Summary."
- C. Temporary Erosion and Sedimentation Control: Comply with **requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and** requirements specified in Division 31 Section "Site Clearing."
- D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings or authorities having jurisdiction, whichever is more stringent.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

- E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- F. Tree and Plant Protection: Comply with requirements specified in Division 01 Section "Temporary Tree and Plant Protection."
- G. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- H. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- I. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- J. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- K. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- L. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- M. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

- N. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Insulate partitions to control noise transmission to occupied areas.
 - 3. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 4. Protect air-handling equipment.
 - 5. Provide walk-off mats at each entrance through temporary partition.

- O. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.

- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace, or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use permanent HVAC system to control humidity.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.

- D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

- E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

15010 MECHANICAL GENERAL PROVISIONS

1.0 GENERAL:

1.1 General Requirements:

- a. General Conditions, Supplementary Conditions, applicable provisions of Division 1, General Requirements, and other provisions and requirements of the contract documents apply to work of Division 15, Mechanical.
- b. Applicable provisions of this section apply to all sections of Division 15, Mechanical.
- c. All Division 15 sections shall be considered to be integrated with each other.
- d. Investigate all alternates, addenda and allowances as they relate to work of Division 15.
- e. Approval of the subcontractors will be based on experience, qualifications and financial responsibility.
- f. The Contractor shall provide all gas/water/power required for construction and operation up to acceptance of substantial completion.

1.2 Quality Assurance:

a. General:

1. It is the intent of the drawings and specifications to obtain a complete, operable and satisfactory installation.
2. All materials shall be new, be properly labeled and/or identified and be in full compliance with the contract documents.
3. All work shall comply with applicable Codes and Standards.
4. Manufacturer's model names and numbers used in this Division of the specifications are subject to change per manufacturer's action. Contractor shall therefore verify them with manufacturer's representative before ordering any product or equipment.

b. Manufacturers: Firms regularly engaged in manufacture of general use equipment with characteristics, pipe sizes and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

c. Installer: A firm with at least 3 years of successful installation experience on projects with installation work similar to that required for the project.

d. UL and NEMA Compliance: Provide electric motors and products which have been listed and labeled by Underwriters Laboratories and comply with NEMA standards.

e. Certification, Equipment Performance: Provide equipment whose performances, under specified operating conditions, are certified by manufacturer.

1.3 Code Requirements:

- a. Perform work in accordance with applicable statutes, ordinances, codes, and regulations of governmental authorities having jurisdiction. Applicable codes include the following:

1. ASHRAE

Standard 15 Safety Standard for Refrigeration Systems
Standard 55 Thermal Environmental Conditions for Human Occupancy
Standard 62 Ventilation Standard for Acceptable Indoor air Quality
Standard 90.1 Energy Standard for Buildings Except Low Rise Residential Buildings

2. ASME Boiler and Pressure Vessel Code
2004 Edition w/ 2005 & 2006 Addenda

Section I Rules for Construction of Power Boilers
Section IV Rules for Construction of Heating Boilers
Section VIII Rules for Construction of Pressure Vessels

3. Occupational Safety and Health Regulations (OSHA).

4. ASA Codes for Refrigeration Apparatus.

5. National Fire Codes:

NFPA 1 Uniform Fire Code
NFPA 70 National Electrical Code
NFPA 90A Standard for the Installation of Air Conditioning and Ventilation Systems
NFPA 90B Standard for the Installation of Warm Air Heating and Air Conditioning Systems
NFPA 101 Life Safety Code

The NFPA Standards in effect shall be as listed or adopted by the appropriate authority having jurisdiction.

6. Florida Building Codes 2007 Edition w/ 2008 & 2009 Supplements

Chapter 11 Florida Accessibility Code
Chapter 13 Energy Efficiency Code

Mechanical Code
Plumbing Code

7. Florida Administrative Code:

Chapter 6A-2 Electrical Facilities
Chapter 9B-7 Florida Building Commission – Handicapped Accessibility Standards
Chapter 61G15-33 Responsibility Rules of Professional Engineers Concerning the Design of Electrical Systems
Chapter 61G15-34 Responsibility Rules of Professional Engineers Concerning the Design of Mechanical Systems
Chapter 69A-3 Fire Prevention – General Provisions
Chapter 69A-60 The Florida Fire Prevention Code

8. ADA Accessibility Guidelines for Buildings (ADAAG)

- b. Resolve, in writing, any code violation discovered in contract documents with the Engineer prior to bidding. After award of the contract, make any correction or addition necessary for compliance with applicable codes at no additional cost to Owner.
- c. Conflicts: Where there is a conflict between the contract document and an applicable "CODE", the "CODE" shall govern except where the requirements of the contract documents are more stringent; where there is a conflict between the contract drawings and the contract specifications, the most stringent shall govern.
- d. The installer shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus and drawings required to comply with all applicable laws, ordinances, rules and regulations.

1.4 Permits, Fees and Inspections:

- a. Obtain and pay for all permits, fees, tap fees, connection charges, demand charges, systems charges, impact fees and inspections.
- b. Deliver all certificates of inspection issued by authorities having jurisdiction to the Engineer.

1.5 Reference Specifications and Standards:

- a. Materials which are specified by reference to Federal Specifications; ASTM, ASME, ANSI, or AWWA Specifications; Federal Standards; or other standard specifications must comply with latest editions, revisions, amendments or supplements in effect on date bids are received. Requirements in reference specifications and standards are minimum for all equipment, material and work. In instances where capacities, size or other feature of equipment, devices or materials exceed these minimums, meet listed or shown capacities.
- b. Whenever a reference is made to a standard, installation and materials shall comply with the latest published edition of the standard at the time project is bid unless otherwise specified herein.

1.6 Contract Documents:

- a. Examine all drawings and specifications carefully before submitting a bid. Existing conditions take precedence over mechanical or electrical drawings with reference to building construction. If discrepancies or conflicts occur between drawings, or between drawings and specifications, notify the Engineer in writing prior to bid date; however, the most stringent requirement shall govern.
- b. For purposes of clearness and legibility, drawings are essentially diagrammatic and, although size and location of equipment are drawn to scale wherever possible, Contractor shall make use of all data in all of the contract documents and shall verify this information at the building site.
- c. The drawings indicate required size and points of termination of pipes, conduits and ducts and suggest proper routes to conform to structure, avoid obstructions and preserve clearances. However, it is not intended that drawings indicate all necessary offsets, and it shall be the responsibility of the Contractor to make the installation in such a manner as to conform to structure, avoid obstructions, preserve headroom and keep openings and

passageways clear, without further instructions or cost to the Owner.

- d. Furnish, install and/or connect with appropriate services all items shown on any drawing without additional compensation.
- e. Consider the terms "provide" and "install" as synonymous with "furnish and install".
- f. Concealed Work: Where the word "concealed" is used in connection with insulating, painting, piping, ducts and the like, the word is understood to mean hidden from sight as in chases, furred spaces or above suspended ceilings. The word "concealed" shall also apply to items located on mezzanines. "Exposed" is understood to mean open to view and includes mechanical and equipment rooms.
- g. Any and all questions about a subcontractor's scope of work responsibility shall be addressed to and answered by the General Contractor.
- h. Questions About Construction Documents: Any and all questions shall be submitted through the proper channels IN WRITING and, in turn, shall be answered by the Engineer in writing. All telephone conversations shall be considered unofficial and, as such, shall not be considered official or binding responses to Contractor's questions.

1.7 Materials and Equipment:

- a. Furnish new and unused materials and equipment manufactured in the U.S.A. Where two or more units of the same type or class of equipment are required provide units of a single manufacturer.
- b. Only manufacturer's products specified hereinafter or listed in an addendum, prior to the acceptance of bids, shall be furnished and installed under this contract.
- c. All products used in this project installation shall be new and currently under manufacture and shall have been applied in similar installations for a minimum of two years. This installation shall not be used as a test site for any new products unless explicitly approved by the Owner in writing. Spare parts shall be available for at least five years after completion of this contract.

1.8 Substitutions and Prior Approval:

- a. Requests for substitutions shall be submitted to the Engineer's office at least ten (10) days prior to the date for receipt of bids. These requests will be reviewed by the Engineer and an addendum, listing acceptable manufacturers, shall be issued prior to receipt of bids. The listing of acceptable manufacturers only allows a manufacturer to bid the project with a product that meets the Engineer's specifications as interpreted by the Engineer. Said product shall be called an "approved equal" product. All information submitted shall contain information identical to shop drawing submittals and shall list any and all differences from the specified item. Failure to make this listing shall automatically disqualify the product submitted. Note: Should the Engineer not have an up-to-date copy of the manufacturer's general engineering catalog, an adequate evaluation of the requested substitution cannot be made in the allotted time and the product will not be considered.
- b. Substitutions submitted after the prescribed time for prior approval will not be considered.
- c. All substitutes or alternate manufacturers' products must meet detailed specifications, size and arrangement of equipment specified. Equipment must fit allocated space.

Only products equal to that specified will be considered.

- d. If the approved equal substitution contains differences or omissions not specifically called to the attention of the Engineer, those features shall be added to the substituted product at the Contractor's expense.

1.9 Additional Work:

Design is based on equipment as described in the drawings and specifications. Any required changes in foundation bases, electrical requirements, wiring, conduit, connections, piping, controls, openings, etc., shall be paid for by this Contractor.

1.10 Guarantee:

- a. Guarantee work and equipment for one year from the date of final acceptance of the project, and during that period make good any faults or imperfections that may arise due to defects or omissions in materials or workmanship.
- b. Furnish a copy of the manufacturer's guarantee and/or warranty for each piece of equipment.
- c. Furnish a letter from the control manufacturer stating that all controls have been checked for operation and calibration, and the system is operating as designed.
- d. Furnish a letter from an authorized factory representative of the air conditioning unit manufacturer stating that the complete refrigeration installation including pipe sizing and routing and operating and safety controls has been checked and is operating properly.

2.0 PRODUCTS:

Not used.

3.0 EXECUTION:

3.1 Workmanship:

Install materials and equipment in a professional manner. The Engineer may direct replacement of items which, in his opinion, do not present a professional appearance. Replace or reinstall items at the expense of the Contractor.

3.2 Supervision of Work:

Perform all work under the direct supervision of an experienced, qualified superintendent. The Engineer has the right to remove a superintendent who, in his opinion, is not satisfactory.

3.3 Connecting to Work of Others:

Examine all work installed by others where it applies to work of Division 15. Notify the Engineer if conditions exist which prevent satisfactory results. Start of work by the Contractor shall be construed as acceptance by him of all claims or questions as to suitability of the work of others to receive his work.

3.4 Damage to Other Work and Personnel:

- a. Adequately protect work, equipment, fixtures, and materials. At work completion, all work must be clean and in good condition.
- b. Carry insurance as prescribed by law and as required in this specification for protection of employees, other persons, materials and equipment on the building site.
- c. Contractor shall pay for all damages caused by his personnel, including his subcontractors.

3.5 Obstructions:

- a. The drawings indicate certain information pertaining to surface and subsurface obstructions which has been taken from available drawings. Such information is not guaranteed, however, as to accuracy of location or complete information.
- b. Before any cutting or trenching operations are begun, verify with Owner's representative, utility companies, municipalities, and other interested parties that all available information has been provided. Verify locations given.
- c. Should obstruction be encountered, whether shown or not, alter routing of new work, reroute existing lines, remove obstruction where permitted, or otherwise perform whatever work is necessary to satisfy the purpose of the new work and leave existing services and structures in a satisfactory and serviceable condition.
- d. Assume total responsibility for and repair any damage to existing utilities or construction, whether or not such existing facilities are shown.

3.6 Space Requirements:

Consider space limitations imposed by contiguous work in selection and location of equipment and material. Do not provide equipment or material which is not suitable in this respect.

3.7 Cutting, Patching and Excavation:

- a. Cut and patch all walls, partitions, floors, pits and chases in wood and masonry as indicated or required by the contract documents or as directed by the Engineer.
- b. Obtain approval of Engineer prior to cutting of steel, wood or other structural member.
- c. Complete all necessary excavation and backfilling incidental to work of Division 15.
- d. Openings through concrete structures shall be "core bored"; where 3 or more openings penetrate in the same location the concrete may be sawed. All penetrations shall be re-sealed around pipes with "WATER-PLUG" by Thoro with top surface finished smooth.
- e. Where paved surfaces are to be removed for installation of materials and equipment as a part of this contract, said paved surfaces shall be removed and replaced at the expense of the subcontractor requiring its removal. See Section 15056, "Earthwork" for requirements.

3.8 Removal of Rubbish:

- a. During construction keep the job site clean and remove all rubbish.

- b. Upon completion of work leave the premises and work in a clean and acceptable condition. Remove all tools, scaffolding, materials and rubbish from the building and site. Clean all pipe chases. Remove all plaster, concrete, cement, etc. from exposed and concealed pipe, hangers and equipment prior to painting and/or concealment.

3.9 Lubrication, Refrigerant and Oil:

- a. Provide a complete charge of correct lubricant for each item of equipment requiring lubrication.
- b. Provide complete and working charge of proper refrigerant, free of contaminants, into each refrigerant system. After each system has been in operation long enough to insure completely balanced conditions, check the charge and modify it for proper operation as required.
- c. Provide a complete charge of special oil for refrigeration use, suitable for operation with refrigerant, in each compressor.

3.10 Product Delivery, Storage and Handling:

- a. Deliver and store equipment and products in factory wrapped packages which properly protect equipment against weather, dirt and damage. Materials shall not be stored in contact with ground or floor.
- b. Handle equipment carefully to avoid damage to motors, components, enclosures and finish. Do not install damaged units; replace and return damaged units to manufacturer.

3.11 Noise and Vibration:

- a. Select equipment to operate with minimum noise and vibration. If objectionable noise or vibration is produced or transmitted to or through the building structure by equipment, piping, ducts or other parts of work, rectify such conditions without cost to the Owner.

3.12 Tests:

- a. Include all tests specified and/or required under laws, rules and regulations of all departments having jurisdiction. Tests shall also be performed as indicated herein and other sections of the specifications.
- b. After all mechanical systems have been completed and put into operation, subject each system to an operating test under design conditions to insure proper sequence and operation throughout the range of operation. Make adjustments as required to insure proper functioning of all systems.
- c. All parts of the work and associated equipment shall be tested and adjusted to work properly and be left in perfect operating condition.
- d. Correct defects disclosed by these tests without any additional cost to the Owner. Repeat tests on repaired or replaced work.
- e. Maintain a log of all tests being conducted and have it available for review by the Engineer. Log to indicate date, type of tests, duration, and defects noted and when corrected.
- f. Special tests on individual systems are specified under individual sections.

- g. Mechanical Contractor shall provide personnel, tools and equipment and assist the Test and Balance Contractor in making any adjustments necessary to meet the test and balance requirements.

3.13 Operating and Maintenance Instructions:

- a. Secure three copies of operating and maintenance instructions, service manuals, and parts lists applicable to each item of equipment furnished. Deliver three bound sets for the Owner's use. Include nameplate data and design parameters in operation and maintenance manuals. Clearly distinguish between information which applies to the equipment and information which does not apply. Delivery of required documents is a condition of final acceptance.
- b. Provide detailed, step-by-step written instructions to direct the operator in operating procedures for initial start-up, normal shutdown, extended shutdown and extreme ambient temperature condition. Provide four copies of these instructions with laminated plastic protective cover.

3.14 Project Record Documents:

- a. Preparation: Maintain at the job site a separate set of white prints of the contract drawings for the sole purpose of recording the "as-built" changes and diagrams of those portions of work in which actual construction is significantly at variance with the contract drawings. Mark the drawings with a No. B or softer pencil. Prepare, as the work progresses and upon completion of work, drawings clearly indicating locations of various piping, valves, ductwork, traps, equipment, and other pertinent items, as installed. Include flow-line elevation of sewer lines. Record underground and underslab piping installed, dimensioning exact location and elevation of such piping.
- b. Deliver: At conclusion of project, provide without cost to Owner as-built reproducibles of original mechanical drawings. Delivery of as-built reproducibles is a condition of final acceptance. In addition to final as-built drawings, each month during construction deliver current marked-up prints to the Engineer.

3.15 Training:

- a. Upon completion of work, and at time designated by the Owner's representative, provide services of competent representatives of the Contractor to instruct Owner's representative in the operation and maintenance of the entire system.
- b. The following is the minimum amount of training to be provided for new mechanical systems:

- HVAC Control Systems – See Specification Section 15900.
 - VAV Boxes - 16 hours
 - Variable Speed Drives - 16 hours
 - HVAC Air Handling Units, Fans, Other Mechanical - 16 hours
 - Fire Sprinkler Systems - 16 hours
 - Plumbing – 4 hours.

- c. Training sessions shall be videotaped and tapes given to the Owner.

3.16 Service:

- a. Perform service work during the guarantee period to include the following: adjustment or replacement of all defective materials and equipment furnished; replacement of any loss of refrigerant; lubrication; cleaning of strainers.
 - 1. Cleaning of air filters is limited to 30 days after final acceptance of the project.
 - 2. Perform service quarterly and provide the Owner with a written report.
- b. Provide full service and preventive maintenance per manufacturers instructions for first 5 years following substantial completion for the following equipment: chillers, boilers.

3.17 Air Conditioning System Operation:

- a. Contractor shall strictly adhere to the following procedures when HVAC equipment is used by the Contractor during construction:
 - 1. Contractor shall notify the Owner in writing of his intent to use the equipment to dehumidify the building and control air borne contaminants.
 - 2. For each piece of equipment a record log shall be maintained which indicates starting date and every day of operation. Log shall indicate all service and maintenance work done on the equipment.
 - 3. Filters shall be in place and replaced as recommended by the manufacturer. Record of filter change to be maintained at each filter location and air moving equipment. Filters shall be extended surface pleated type as specified in Section 15880.
 - 4. In the case of high dust loads caused by brooming, sanding, etc.:
 - a) Acoustical ceilings in return air plenums shall not be installed.
 - b) Filters shall be located to protect all ductwork and equipment.
 - 5. Upon completion of the work, and prior to substantial completion inspection, the interior of units shall be vacuum cleaned, coils and drain pans washed.
 - 6. Upon completion of the work, if Engineer deems necessary, all ductwork shall comply with the cleaning verification tests in Section 15844 or shall be decontaminated in accordance with the requirements of that Section.
 - 7. After cleaning operations, all air handling equipment and ductwork shall be tested for contamination as specified in Section 15844.
 - 8. All costs for filtration, cleaning, testing, re-cleaning and re-testing shall be borne by the Contractor.

3.18 Instructions:

- a. Included within the scope of Division 15 is work where equipment and/or materials are furnished or required by this Division and installed under another Division (designated by the Contractor). It is the responsibility of the Contractor to see that all such work is included in the contract bid amount and completed during construction.
- b. Each Contractor shall visit the building (site) and fully familiarize himself with existing

conditions and account for these conditions in the submitted bids.

- c. Schedule interruptions in utility services well in advance to suit the Owner's convenience and obtain approval from the Engineer. Utility interruptions may require overtime work on the part of the Contractor. Include this overtime work as a requirement of Division 15. No additional compensation will be allowed for such overtime work.
- d. The Contractor shall coordinate the work and the work schedule on a weekly basis with the Owner.
- e. The General Contractor shall provide and install additional structural framing and reinforcing required at all roof penetrations and roof openings to support roof-mounted equipment.
- f. All wiring, electrical equipment (motor starters, disconnects, conduit, switches, etc.) required in Division 15 shall be furnished and installed under Division 16, except where otherwise noted.

END OF SECTION

16010 ELECTRICAL GENERAL PROVISIONS

1.0 GENERAL:

1.1 General Requirements:

- a. General Conditions, Supplementary Conditions, applicable provisions of Division 1, General Requirements, and other provisions and requirements of the contract documents apply to work of Division 16, Electrical.
- b. Applicable provisions of this section apply to all sections of Division 16, Electrical.
- c. All Division 16 sections shall be considered to be integrated with each other.
- d. Investigate all alternates, addenda and allowances as they relate to work of Division 16.
- e. Approval of the subcontractors will be based on experience, qualifications and financial responsibility.

1.2 Quality Assurance:

a. General:

1. It is the intent of the drawings and specifications to obtain a complete, operable and satisfactory installation.
2. All materials shall be new, be properly labeled and/or identified and be in full compliance with the contract documents.
3. All work shall comply with applicable Codes and Standards.
4. Manufacturer's model names and numbers used in this Division of the specifications are subject to change per manufacturer's action. Contractor shall therefore verify them with manufacturer's representative before ordering any product or equipment.

b. Manufacturers:

Firms regularly engaged in manufacture of electrical equipment with characteristics and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

c. Installer:

A firm with at least 5 years of successful installation experience on projects with installation work similar to that required for the project.

e. UL and NEMA Compliance:

Provide products which have been listed and labeled by Underwriters Laboratories and comply with NEMA standards.

f. Certification, Equipment Performance:

Provide equipment whose performances, under specified operating conditions, are

certified by manufacturer.

1.3 Code Requirements:

- a. Perform work in accordance with applicable statutes, ordinances, codes, and regulations of governmental authorities having jurisdiction. Applicable codes include the following:
 1. National Electrical Code (2008).
 2. Regulations of the Electric Utility Concerning Electrical Installations.
 3. Occupational Safety and Health Regulations (OSHA).
 4. National Fire Codes:

NFPA 01, Fire Prevention Code
NFPA 70E, Electrical Safety Requirements for Employee Workplaces
NFPA 72, National Fire Alarm Code
NFPA 101, Life Safety Code

The NFPA Standards in effect shall be as listed or adopted by the appropriate authority having jurisdiction.
 5. American National Standards Institute (ANSI).
 6. Institute of Electrical and Electronics Engineers (IEEE).
 7. National Electrical Manufacturers Association (NEMA).
 8. National Electrical Safety Code (NESC).
 9. Underwriters' Laboratories (UL).
 10. Florida Building Code (2007, with 2009 supplements).
 11. Florida Administrative Code:

Chapter 4A-3, F.A.C., the State Fire Prevention Code
 12. Handicapped Accessibility:

American National Standard Institute A117.1

Florida Americans with Disabilities Accessibility Implementation Act as described in Florida Accessibility Code for Building Construction, Florida Department of Community Affairs
- b. Resolve, in writing, any code violation discovered in contract documents with the Engineer prior to bidding. After award of the contract, make any correction or addition necessary for compliance with applicable codes at no additional cost to Owner.
- c. Conflicts: Where there is a conflict between the contract document and an applicable "CODE", the "CODE" shall govern except where the requirements of the contract documents are more stringent; where there is a conflict between the contract drawings and the contract specifications, the most stringent shall govern.

- d. The installer shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus and drawings required to comply with all applicable laws, ordinances, rules and regulations.

1.4 Permits, Fees and Inspections:

- a. Obtain and pay for all permits and inspections.

1.5 Reference Specifications and Standards:

- a. Materials which are specified by reference to Federal Specifications; ANSI; Federal Standards; or other standard specifications must comply with latest editions, revisions, amendments or supplements in effect on date bids are received. Requirements in reference specifications and standards are minimum for all equipment, material and work. In instances where capacities, size or other feature of equipment, devices or materials exceed these minimums, meet listed or shown capacities.
- b. Whenever a reference is made to a standard, installation and materials shall comply with the latest published edition of the standard at the time project is bid unless otherwise specified herein.

1.6 Contract Documents:

- a. The drawings and specifications are complimentary, each to the other, and the work required by either shall be included in the Contract as if called for by both.
- b. Examine all drawings and specifications carefully before submitting a bid. Architectural drawings and Existing conditions take precedence over electrical drawings with reference to building construction. If discrepancies or conflicts occur between drawings, or between drawings and specifications, notify the Engineer in writing prior to bid date; however, the most stringent requirement shall govern.
- c. For purposes of clearness and legibility, drawings are essentially diagrammatic and, although size and location of equipment are drawn to scale wherever possible, Contractor shall make use of all data in all of the contract documents and shall verify this information at the building site.
- d. The drawings indicate required size and points of termination of conduits and suggest proper routes to conform to structure, avoid obstructions and preserve clearances. However, it is not intended that drawings indicate all necessary offsets, and it shall be the responsibility of the Contractor to make the installation in such a manner as to conform to structure, avoid obstructions, preserve headroom and keep openings and passageways clear, without further instructions or cost to the Owner.
- e. Furnish, install and/or connect with appropriate services all items shown on any drawing without additional compensation.
- f. Consider the terms "provide" and "install" as synonymous with "furnish and install".
- g. Concealed Work: Where the word "concealed" is used in connection with wiring, conduits, equipment and the like, the word is understood to mean hidden from sight as in chases, furred spaces or above suspended ceilings. "Exposed" is understood to mean open to view.

- h. Any and all questions about a subcontractor's scope of work responsibility shall be addressed to and answered by the General Contractor.
- i. Questions About Construction Documents: Any and all questions shall be submitted through the proper channels IN WRITING and, in turn, shall be answered by the Engineer in writing. All telephone conversations shall be considered unofficial and, as such, shall not be considered official or binding responses to Contractor's questions.
- j. The drawings indicate generally the locations of material and equipment. These drawings shall be followed as closely as possible. The Electrical Contractor shall coordinate the work under this section with the architectural, structural, plumbing, heating and air conditioning Contractors, and the drawings of other trades for exact dimensions, clearances and roughing-in locations. This Contractor shall cooperate with all other trades in order to make minor field adjustments to accommodate the work of others. No additional cost will be considered for work which must be relocated due to conflicts with the work of the trades. In case interference develops, the Engineer will decide which equipment, piping, etc., must be relocated, regardless of which was installed first. Contractor shall insure that all concrete forming, inserts and/or sleeves required by work of this Division in or through work of another Division of this Specification shall be timely placed so that progress is not hindered. All cutting, repairing or rearranging of structural members or reinforcing for installation of work of this Division shall be coordinated with and performed with direction of the Engineer and any damage or weakening caused by this work shall be repaired equal to original condition or design. Contractor shall not cut until approval from the Engineer is obtained.
- k. If directed by the Engineer, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.
- l. Changes which are required or desired which are materially different from the obvious intent of the drawings or specifications will not be permitted except for those instances where it is necessary to avoid interferences and only where specifically approved by the Engineer.
- m. The Engineer reserves the right to make reasonable changes in location of all outlets, lighting fixtures and switches prior to roughing in and final placement.
- n. All dimensions, except those specifically provided on electrical plans, together with locations of doors, windows, louvers, etc. shall be taken from Architectural Drawings and verified at sites before ordering any material or closing in any work. Any difference found between dimensions on drawings and/or actual measurements shall be brought to the attention of the Engineer before proceeding.

1.7 Work Included:

a. New Work:

- 1. The scope of the work consists of the furnishing and installing of complete electrical systems - exterior and interior - including miscellaneous systems. The Electrical Contractor shall provide all supervision, labor, materials, equipment, machinery, and any and all other items necessary to complete the systems. The Electrical Contractor shall note that all items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items of equipment as indicated on the drawings and as required for complete systems.

2. It is the intention of the Specifications and Drawings to call for finished work, tested, and ready for operation.
3. Any apparatus, appliance, material or work not shown on drawings but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered and installed by the Contractor without additional expense to the Owner.
4. Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the Contractor's estimate, the same as if herein specified or shown.
5. All wiring and electrical equipment (motor starters, disconnects, switches, conduit, etc.) required in Division 15 shall be furnished and installed under Division 16, except where otherwise noted.

b. Demolition:

1. Unless otherwise noted, remove all electrical materials and equipment from areas indicated for demolition.
2. Remove unused conduit to the extent necessary to accommodate new work and where conduit is visible above the floor line. Existing unused conduit which is concealed, or which does not interfere with the work, may remain in place. Seal abandoned lines that remain in place behind walls or floor surfaces. Remove existing unused wires.
3. Materials and equipment to be demolished, except items specifically listed to be relocated or delivered to the Owner, become the property of the Contractor.
4. Existing electrical services and controls to items being removed by others must be disconnected as a requirement of this section.

1.8 Materials and Equipment:

- a. Furnish new and unused materials and equipment manufactured in the U.S.A. Where two or more units of the same type or class of equipment are required provide units of a single manufacturer.
- b. Only manufacturer's products specified hereinafter or listed in an addenda, prior to the acceptance of bids, shall be furnished and installed under this contract.

1.9 Substitutions and Prior Approval:

- a. Requests for substitutions shall be submitted to the Engineer's office at least ten (10) days prior to the date for receipt of bids. These requests will be reviewed by the Engineer and an addendum, listing acceptable manufacturers, shall be issued prior to receipt of bids. The listing of acceptable manufacturers only allows a manufacturer to bid the project with a product that meets the Engineer's specifications as interpreted by the Engineer. Said product shall be called an "approved equal" product. All information submitted shall contain information identical to shop drawing submittals and shall list any and all differences from the specified item. Failure to make this listing shall automatically disqualify the product submitted. Note: Should the Engineer not have an up-to-date copy of the manufacturer's general engineering catalog, an adequate

evaluation of the requested substitution cannot be made in the allotted time and the product will not be considered.

- b. Substitutions submitted after the prescribed time for prior approval will not be considered.
- c. All substitutes or alternate manufacturers' products must meet detailed specifications, size and arrangement of equipment specified. Equipment must fit allocated space. Only products equal to that specified will be considered.
- d. If the approved equal substitution contains differences or omissions not specifically called to the attention of the Engineer, those features shall be added to the substituted product at the Contractor's expense.

1.10 Additional Work:

Design is based on equipment as described in the drawings and specifications. Any required changes in foundation bases, electrical requirements, wiring, conduit, connections, controls, openings, etc., shall be paid for by this Contractor.

1.11 Guarantee:

- a. Guarantee work and equipment for one year from the date of final acceptance of the project, and during that period make good any faults or imperfections that may arise due to defects or omissions in materials or workmanship.
- b. Where electrical equipment is covered by guarantee and/or warranty, furnish the manufacturer's copy.
- c. Furnish a "Certificate of Compliance" from the fire alarm supplier/installer. Fire alarm installer is required to submit separate set of drawings to Fire Marshall for approval.

2.0 PRODUCTS:

Not used.

3.0 EXECUTION:

3.1 Workmanship:

Install materials and equipment in a professional manner. The Engineer may direct replacement of items which, in his opinion, do not present a professional appearance. Replace or reinstall items at the expense of the Contractor.

3.2 Supervision of Work:

Perform all work under the direct supervision of an experienced, qualified superintendent. The Engineer has the right to remove a superintendent who, in his opinion, is not satisfactory.

3.3 Connecting to Work of Others:

Examine all work installed by others where it applies to work of Division 16. Notify the Engineer if conditions exist which prevent satisfactory results. Start of work by the Contractor shall be construed as acceptance by him of all claims or questions as to suitability of the work of others to receive his work.

3.4 Damage to Other Work and Personnel:

- a. Adequately protect work, equipment, fixtures, and materials. At work completion, all work must be clean and in good condition.
- b. Carry insurance as prescribed by law and as required in this specification for protection of employees, other persons, materials and equipment on the building site.
- c. Contractor shall pay for all damages caused by his personnel, including his subcontractors.

3.5 Obstructions:

- a. The drawings indicate certain information pertaining to surface and subsurface obstructions which has been taken from available drawings. Such information is not guaranteed, however, as to accuracy of location or complete information.
- b. Before any cutting or trenching operations are begun, verify with Owner's representative, utility companies, municipalities, and other interested parties that all available information has been provided. Verify locations given.
- c. Should obstruction be encountered, whether shown or not, alter routing of new work, reroute existing lines, remove obstruction where permitted, or otherwise perform whatever work is necessary to satisfy the purpose of the new work and leave existing services and structures in a satisfactory and serviceable condition.
- d. Assume total responsibility for and repair any damage to existing utilities or construction, whether or not such existing facilities are shown. Contractor to follow safe digging practices, and have proper locates performed.

3.6 Space Requirements:

Consider space limitations imposed by contiguous work in selection and location of equipment and material. Do not provide equipment or material which is not suitable in this respect.

3.7 Cutting, Patching and Excavation:

- a. Cut and patch all walls, partitions, floors, pits and chases in wood and masonry as indicated or required by the contract documents or as directed by the Engineer.
- b. Obtain approval of Engineer prior to cutting of steel, wood or other structural member.
- c. Complete all necessary excavation and backfilling incidental to work of Division 16.
- d. Openings through concrete structures shall be "core bored"; where 3 or more openings penetrate in the same location the concrete may be sawed. All penetrations shall be re-sealed around pipes with "WATER-PLUG" by Thoro with top surface finished smooth.
- e. Where paved surfaces are to be removed for installation of materials and equipment as a part of this contract, said paved surfaces shall be removed and replaced at the expense of the subcontractor requiring its removal. Replacement of the paved surface shall match the existing surface, as originally installed, in all respects. Where trenching is done through and under said paved surfaces, the trench shall be backfilled with clean, dry sand. The fill shall be uniformly compacted in horizontal layers, 6" to 9" thick to a density of 98 percent of the Standard Proctor Maximum in accordance with ASTM

Specifications D-698T. Do not use water (puddling) for compaction of fill.

3.8 Removal of Rubbish:

- a. During construction keep the job site clean and remove all rubbish.
- b. Upon completion of work leave the premises and work in a clean and acceptable condition. Remove all tools, scaffolding, materials and rubbish from the building and site. Clean all chases. Remove all plaster, concrete, cement, etc. from exposed and concealed conduits, hangers and equipment prior to painting and/or concealment.

3.9 "Fire and Smoke Rated" Walls, Floors, Roofs and Ceilings:

Where "rated" walls, floor, roofs and ceilings are penetrated or cut to install equipment, materials, devices, etc. the Contractor shall provide and install all materials required to re-establish the rating of the wall, floor, roof or ceiling to the satisfaction of the authority having jurisdiction.

3.10 Product Delivery, Storage and Handling:

- a. Deliver and store equipment and products in factory wrapped packages which properly protect equipment against weather, dirt and damage. Materials shall not be stored in contact with ground or floor.
- b. Handle equipment carefully to avoid damage to motors, components, enclosures and finish. Do not install damaged units; replace and return damaged units to manufacturer.

3.11 Noise and Vibration:

Select equipment to operate with minimum noise and vibration. If objectionable noise or vibration is produced or transmitted to or through the building structure by equipment or other parts of work, rectify such conditions without cost to the Owner.

3.12 Tests:

- a. Include all tests specified and/or required under laws, rules and regulations of all departments having jurisdiction. Tests shall also be performed as indicated herein and other sections of the specifications.
- b. After all electrical systems have been completed and put into operation, subject each system to an operating test under design conditions to insure proper sequence and operation throughout the range of operation. Make adjustments as required to insure proper functioning of all systems.
- c. All parts of the work and associated equipment shall be tested and adjusted to work properly and be left in perfect operating condition.
- d. Correct defects disclosed by these tests without any additional cost to the Owner. Repeat tests on repaired or replaced work.
- e. Maintain a log of all tests being conducted and have it available for review by the Engineer. Log to indicate date, type of tests, duration, and defects noted and when corrected.
- f. Special tests on individual systems are specified under individual sections.

3.13 Operating and Maintenance Instructions:

- a. Secure three copies of operating and maintenance instructions, service manuals, and parts lists applicable to each item of equipment furnished. Deliver three bound sets for the Owner's use. Include nameplate data and design parameters in operation and maintenance manuals. Clearly distinguish between information which applies to the equipment and information which does not apply. Delivery of required documents is a condition of final acceptance.
- b. Provide detailed, step-by-step written instructions to direct the operator in operating procedures for initial start-up, normal shutdown, extended shutdown and extreme ambient temperature condition. Provide four copies of these instructions with laminated plastic protective cover.
- c. Provide breaker curves for all breakers 90A and above.

3.14 Project Record Documents:

- a. Preparation. Maintain at the job site a separate set of white prints of the contract drawings for the sole purpose of recording the "as-built" changes and diagrams of those portions of work in which actual construction is significantly at variance with the contract drawings. Mark the drawings with a No. B or softer pencil. Prepare, as the work progresses and upon completion of work, drawings clearly indicating locations of major feeders, underground conduits and other pertinent items as installed.
- b. Deliver. At conclusion of project provide without cost to Owner, copies of original electrical drawings and transfer as-built changes to these. Delivery of as-builts prints and reproducibles is a condition of final acceptance. As-built changes shall be made in accordance with acceptable architectural drafting practices.

3.15 Training:

- a. Upon completion of work, and at time designated by the Owner's representative, provide services of competent representatives of the Contractor to instruct Owner's representative in the operation and maintenance of the entire system.
- b. The following is the minimum amount of training to be provided for new electrical systems:

Lighting Controls	4 hours
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3.16 Service:

Perform service work during the guarantee period to include the following: adjustment or replacement of all defective materials and equipment furnished.

3.17 Instructions:

- a. Included within the scope of Division 16 is work where equipment and/or materials are furnished or required by this Division and installed under another Division (designated by the Contractor). It is the responsibility of the Contractor to see that all such work is included in the contract bid amount and completed during construction.
- b. Each Contractor shall visit the building and fully familiarize himself with existing

conditions and account for these conditions in the submitted bids.

Contractor shall examine all adjoining existing buildings, equipment and space conditions on which his work is in any way dependent for the best workmanship and operation according to the intent of specifications and drawings. He shall report to the Engineer any condition which might prevent him from installing his equipment in the manner intended.

No consideration or allowance will be granted for failure to visit site, or for any alleged misunderstanding of materials to be furnished or work to be done.

- c. The Electrical Contractor shall examine drawings relating to work of all trades and become fully informed as to extent and character of work required and its relation to all other work in the project.
- d. The Electrical Contractor shall be responsible for all arrangements and costs for providing temporary and permanent electrical metering, main switches, and distribution panels at the site as required for construction purposes until acceptance of substantial completion. The General Contractor shall indicate prior to installation whether three phase or single phase service is required. The power consumption shall be paid for by the General Contractor.
- e. Schedule interruptions in utility services well in advance to suit the Owner's convenience and obtain approval from the Engineer. Utility interruptions may require overtime work on the part of the Contractor. Include this overtime work as a requirement of Division 16. No additional compensation will be allowed for such overtime work.
- f. The Contractor shall coordinate the work and the work schedule on a weekly basis with the Owner.
- g. The General Contractor shall provide and install additional structural framing and reinforcing required at all roof penetrations and roof openings to support roof-mounted equipment.
- h. All wiring, electrical equipment (motor starters, disconnects, conduit, switches, etc.) required in Division 15 shall be furnished and installed under Division 16, except where otherwise noted.
- i. All motors 15 HP and above shall have reduced voltage type starters.

END OF SECTION