ADDENDUM NO. 3

GENERAL:
Bidders are requested to attach this Addendum to the inside front cover of each Project Manual.

Please inform all concerned that the Documents are modified by this Addendum.

Acknowledge receipt of this Addendum by inserting number and date in space provided on the Bid Form.

The following revisions, additions, and clarifications are hereby a part of the Contract Documents and supersede or otherwise modify the provisions of the published Project Manual and Drawings, dated August 19, 2005 and Addendum Number 1 dated September 6, 2005 from The Agency and Addendum Number 2 dated September 12, 2005.

The Pre-Bid Conference was held August 30, 2005. A copy of the agenda and roster of attendees is included under ATTACHMENTS. Attendance to the pre-bid conference was not mandatory for bidding contractors.

Responses to the Pre-Bid Questions are included in the ATTACHMENTS.

CHANGES TO THE PROJECT MANUAL

Section 01810 – GENERAL COMMISSIONING REQUIREMENTS
Add the attached specification section.

Section 01815 – MECHANICAL SYSTEMS COMMISSIONING
Add the attached specification section.

Section 01816 – ELECTRICAL SYSTEMS COMMISSIONING
Add the attached specification section.

Section 01817 – BAS COMMISSIONING
Add the attached specification section.
Section 08950 – STRUCTURAL INSULATED TRANSLUCENT SANDWICH PANEL SKYLIGHT SYSTEM:
Delete and replace entire section with SECTION 08633 - FIBERGLASS-SANDWICH-PANEL SKYLIGHTS attached hereto and made part of this Addendum.

Section 11490 – GYMNASIUM EQUIPMENT
Part 2.1.A.2 – Add the following acceptable manufacturer provided they meet the requirements of the specifications: “AALCO Athletic Equipment”.

Section 15430 – PLUMBING SPECIALTIES
Part 1.2, A-10 – Delete “Floor sinks” and substitute “Trench drains.”
Part 2.9 – Add the following:
“P. Cleanout in wood gymnasium flooring shall be Josam Model #58364 or equal.”
Part 2.10 – Delete paragraph in its entirety and substitute the following:
2.10 Trench Drains
A. Manufacturers:
1) Josam Co.
3) Watts Industries, Inc.
4) Zurn Industries, Inc.
B. Cast iron body with light-duty, stainless steel grate equal to Josam Model #152205 with stainless steel locking mechanism equal to Josam Model #152531. Provide bottom outlet and deep seal P-trap of material to match piping system.

Part 2.12, D – Delete “cast” and substitute “satin or polished.”

Section 15710 – HEAT EXCHANGERS
Part 1.2, A – Add “and steam-to-water water heaters for domestic hot water.”
Part 2.1, A – Delete paragraph and substitute:
“Manufacturers: Subject to compliance with requirements, products provided by manufacturers other than those listed may be acceptable:

Part 2.1, A – Add the following:
2. Steam-to-water water heaters:
a. Adamson Global Technology Corp.
b. Armstrong Fluid Handling
c. Patterson-Kelley Co.

Part 2 – Add the following:
2.3 STEAM-TO-WATER WATER HEATERS
A. Water Heater shall be a factory-assembled package rated to heat the scheduled flow rate of water to the scheduled water temperature and control outlet temperature to ±4°F. Entire water heater shall be factory-assembled and – tested requiring only connection to services. Manufacturer shall guarantee all components and workmanship for one year from date of startup. Tube bundle assembly shall be guaranteed for 10 years against failure from thermal shock, mechanical failure, or erosion. Pressure vessel shall be guaranteed for 20 years against leakage.
B. Heater shall include water heater with support, ASME-rated pressure and temperature relief valve, bronze circulator pump pre-wired with pilot lighted ON/OFF switch operating at 115 volts/60Hz/single phase, double solenoid temperature limit system, flexible foam insulation with PVC jacket, automatic temperature control system, steam pilot operated temperature control valve, float and thermostatic trap, domestic water thermometer direct-mounted with thermowell, and steam pressure gauge with shut-off cock.

C. Materials: Shell and double wall tubes - 90/10 copper nickel. Tube sheet and shell connections - solid copper alloy.

Section 15900 – BUILDING AUTOMATION SYSTEM
Part 2.4 – Delete paragraphs F and G in their entirety.
Part 1.4 – Add the following paragraph:
   “D. BAS and network area controllers shall be installed in Space 2020 Mechanical Room. Coordinate final location with Owner.”

Section 15940 – SEQUENCE OF CONTROL
1. Part 1.18 – Delete paragraph in its entirety.
2. Part 1.25 – Delete paragraph B and substitute:
   “B. Reporting: The BAS shall receive available alarm events through dry contacts on emergency generator. Record and archive alarms for the most recent twelve month period.”

Section 15995 – MECHANICAL SYSTEMS COMMISSIONING REQUIREMENTS
Add the attached specification section.

Section 15999 – BAS COMMISSIONING REQUIREMENTS
Add the attached specification section.

Section 16995 – ELECTRICAL SYSTEMS COMMISSIONING REQUIREMENTS
Add the attached specification section.

REVISIONS TO THE DRAWINGS

Drawing P2.01
Revised piping layout. Refer to Addendum drawing AD3- P1 attached.

Drawing P4.01
Delete Trench Drain Detail and replace with Addendum drawing AD3-P2 attached.

Drawing M0.02
PACKAGED PUMPING SYSTEM – Delete entire schedule and replace with schedule on attached Addendum drawing AD3-M1.
AIR-COOLED CHILLER SCHEDULE, Design Flow Rate for CH-1 and CH-2 – Delete “422” and substitute “360.”

Drawing M4.01
Detail 8/Chiller Piping Diagram – Delete motorized control valve.

Drawing M5.02
Steam/Hot Water System Schematic – Delete variable-frequency drive on both P-3 and P-4 and substitute a combination starter/disconnect for both P-3 and P-4. BAS control points for each starter will include a binary output for start/stop and a binary input for motor status.

Drawing M6.01
1. Unit Heater - Delete control diagram.
2. Emergency Generator Monitoring – Delete “Modbus or Bacnet as provided on generator and substitute binary input alarm control point.
3. Lighting Control – Delete control diagram and replace with Addendum drawing AD3-M2 attached.

Drawing E5.4
Panelboard Schedule EL2(1), Circuit 36 – Delete “Spare” and substitute “BAS Control Panels.”

ADDITIONAL CLARIFICATIONS AND INFORMATION:

1. The Contractor is to remove the existing electric line supplying power from Lower Frazer Parking Area to light poles in Upper Frazer Parking area. Location of existing electric power supply line is to be provided by Longwood University to the Contractor. A new power service to feed The Upper Frazer Parking Lot lights will be provided and installed from the Small Business Development Center by Longwood University prior to the Lower Frazer lights demolition by the Contractor. Contractor to coordinate with University personnel.

CONTRACTOR/BIDDER RAISED QUESTIONS
- (See ATTACHMENTS for Pre-Bid Question Forms and Associated Responses: 5 Total)

ATTACHMENTS
- Section 01810 – General Commissioning Requirements
- Section 01815 – Mechanical Systems Commissioning
- Section 01816 – Electrical Systems Commissioning
- Section 01817 – BAS Commissioning
- Section 08633 – Fiberglass Sandwich Panel Skylights
- Section 15995 – Mechanical Systems Commissioning Requirements
• Section 15999 – BAS Commissioning Requirements
• Section 16995 – Electrical Systems Commissioning Requirements
• Addendum Drawing AD3-P1
• Addendum Drawing AD3-P2
• Addendum Drawing AD3-M1
• Addendum Drawing AD3-M2
• 5-Pre-Bid Question Forms and Responses
• Pre-Bid Agenda
• Pre-Bid Attendee Sign-in Sheet

End of ADDENDUM NO. 3
SECTION 01810 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. OPR and BoD documentation prepared by Owner and Architect contain information related to this Section.

1.2 SUMMARY

A. This Section includes general requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.

B. Related Sections include the following:

1. Division 1 Section “Mechanical Systems Commissioning” for specific requirements for commissioning mechanical systems.

2. Division 1 Section “BAS Commissioning” for specific requirements for BAS commissioning.

3. Division 1 Section “Electrical Systems Commissioning” for specific requirements for commissioning electrical systems.

4. Division 15 Section "Mechanical Systems Commissioning Requirements" for contractor requirements for commissioning mechanical systems.

5. Division 15 Section "BAS Commissioning Requirements" for contractor requirements for BAS commissioning.

6. Division 16 Section “Electrical Systems Commissioning Requirements” for contractor requirements for commissioning electrical systems.

1.3 DEFINITIONS

A. BoD: Basis of Design.

B. BAS: Building Automation System.

C. CxA: Commissioning Authority.

D. OPR: Owner's Project Requirements.

E. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.
F. TAB: Testing, Adjusting, and Balancing.

1.4 COMMISSIONING TEAM

A. Members Appointed by Contractor(s): Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of the Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner:
   1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
   2. Representatives of the facility user and operation and maintenance personnel.
   3. Architect and engineering design professionals.

1.5 OWNER'S RESPONSIBILITIES

A. Provide the OPR documentation to the CxA and Contractor for use in developing the commissioning plan; systems manual; operation and maintenance training plan; and testing plans and checklists.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:
   1. Coordination meetings.
   2. Training in operation and maintenance of systems, subsystems, and equipment.
   3. Testing meetings.
   4. Demonstration of operation of systems, subsystems, and equipment.

C. Provide the BoD documents, prepared by Architect and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.6 CONTRACTOR'S RESPONSIBILITIES

A. Provide utility services required for the commissioning process.

B. Contractor shall assign representatives with expertise and authority to act on behalf of the Contractor and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
   1. Participate in construction-phase coordination meetings.
   2. Participate in maintenance orientation and inspection.
   3. Participate in operation and maintenance training sessions.
   4. Participate in final review at acceptance meeting.
   5. Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
   6. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
7. **Review and approve final commissioning documentation.**

C. **Subcontractors shall assign representatives with expertise and authority to act on behalf of subcontractors and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:**

1. Participate in construction-phase coordination meetings.
2. Participate in maintenance orientation and inspection.
3. Participate in procedures meeting for testing.
4. Participate in final review at acceptance meeting.
5. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a weekly basis throughout the construction period.
6. Provide information to the CxA for developing construction-phase commissioning plan.
7. Participate in training sessions for Owner's operation and maintenance personnel.
8. Make updated Project Record Documents available to the CxA on site.
9. Gather and submit operation and maintenance data for systems, subsystems, and equipment to the CxA, as specified in Division 1 Section "Operation and Maintenance Data."
10. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures and participate in testing of installed systems, subsystems, and equipment.

D. **Prepare operation and maintenance training program and provide qualified instructors to conduct operation and maintenance training.**

### 1.7 **CxA’S RESPONSIBILITIES**

A. Organize and lead the commissioning team.

B. Prepare a construction-phase commissioning plan. Collaborate with Contractor and with subcontractors to develop test and inspection procedures. Include design changes and scheduled commissioning activities coordinated with overall Project schedule. Identify commissioning team member responsibilities, by name, firm, and trade specialty, for performance of each commissioning task.

C. Review and comment on submittals from Contractor for compliance with the OPR, BoD, Contract Documents, and construction-phase commissioning plan. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the OPR and BoD.

D. Convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss progress of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The CxA shall prepare and distribute minutes to commissioning team members and attendees within five workdays of the commissioning meeting.

E. At the beginning of the construction phase, conduct an initial construction-phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for operation and maintenance submittals; operation and maintenance training sessions; TAB Work; and Project completion.

F. Observe and inspect construction and report progress and deficiencies. In addition to compliance with the OPR, BoD, and Contract Documents, inspect systems and equipment installation for adequate accessibility for maintenance and component replacement or repair.
G. Prepare Project-specific test and inspection procedures and checklists.

H. Schedule, direct, witness, and document tests, inspections, and systems startup.

I. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.

J. Certify date of acceptance and startup for each item of equipment for start of warranty periods.

K. Review Project Record Documents for accuracy. Request revisions from Contractor to achieve accuracy. Project Record Documents requirements are specified in Division 1 Section "Project Record Documents."

L. Review and comment on operation and maintenance documentation and systems manual outline for compliance with the OPR, BoD, and Contract Documents.

M. Videotape and edit training sessions.

N. Videotape construction progress including hidden shafts.

O. Prepare commissioning reports.

P. Assemble the final commissioning documentation, including the commissioning report and Project Record Documents.

1.8 COMMISSIONING DOCUMENTATION

A. Index of Commissioning Documents: CxA shall prepare an index to include storage location of each document.

B. OPR: A written document, prepared by Owner, that details the functional requirements of Project and expectations of how it will be used and operated. This document includes Project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.

C. BoD Document: A document, prepared by Architect, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

D. Commissioning Plan: A document, prepared by CxA, that outlines the schedule, allocation of resources, and documentation requirements of the commissioning process, and shall include, but is not limited to the following:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the commissioning processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting commissioning plan.

2. Description of the organization, layout, and content of commissioning documentation (including systems manual) and a detailed description of documents to be provided along with identification of responsible parties.

3. Identification of systems and equipment to be commissioned.

4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
5. Identification of items that must be completed before the next operation can proceed.
6. Description of responsibilities of commissioning team members.
7. Description of observations to be made.
8. Description of requirements for operation and maintenance training, including required training materials.
9. Description of expected performance for systems, subsystems, equipment, and controls.
10. Schedule for commissioning activities with specific dates coordinated with overall construction schedule.
11. Identification of installed systems, subsystems, and equipment, including design changes that occurred during the construction phase.
13. Process and schedule for completing prestart and startup checklists for systems, subsystems, and equipment to be verified and tested.
14. Step-by-step procedures for testing systems, subsystems, and equipment with descriptions for methods of verifying relevant data, recording the results obtained, and listing parties involved in performing and verifying tests.

E. Test Checklists: CxA shall develop test checklists for each system, subsystem, or equipment including interfaces and interlocks, and include a separate entry, with space for comments, for each item to be tested. Prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. Provide space for testing personnel to sign off on each checklist. Specific checklist content requirements are specified in Division 1 Section “HVAC Commissioning Requirements.” Each checklist, regardless of system, subsystem, or equipment being tested, shall include, but not be limited to, the following:

1. Name and identification code of tested item.
2. Test number.
3. Time and date of test.
4. Indication of whether the record is for a first test or retest following correction of a problem or issue.
5. Dated signatures of the person performing test and of the witness, if applicable.
6. Individuals present for test.
7. Deficiencies.
8. Issue number, if any, generated as the result of test.

F. Certificate of Readiness: Certificate of Readiness shall be signed by Contractor, Subcontractor(s), Installer(s), and CxA certifying that systems, subsystems, equipment, and associated controls are ready for testing. Completed test checklists signed by the responsible parties shall accompany this certificate.

G. Test and Inspection Reports: CxA shall record test data, observations, and measurements on test checklists. Photographs, forms, and other means appropriate for the application shall be included with data. CxA shall compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.

H. Corrective Action Documents: CxA shall document corrective action taken for systems and equipment that fail tests. Include required modifications to systems and equipment and revisions to test procedures, if any. Retest systems and equipment requiring corrective action and document retest results.

I. Issues Log: CxA shall prepare and maintain an issues log that describes design, installation, and performance issues that are at variance with the OPR, BoD, and Contract Documents. Identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.

1. Creating an Issues Log Entry:
a. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.
b. Assign a descriptive title of the issue.
c. Identify date and time of the issue.
d. Identify test number of test being performed at the time of the observation, if applicable, for cross-reference.
e. Identify system, subsystem, and equipment to which the issue applies.
f. Identify location of system, subsystem, and equipment.
g. Include information that may be helpful in diagnosing or evaluating the issue.
h. Note recommended corrective action.
i. Identify commissioning team member responsible for corrective action.
j. Identify expected date of correction.
k. Identify person documenting the issue.

2. Documenting Issue Resolution:
   a. Log date correction is completed or the issue is resolved.
   b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
   c. Identify changes to the OPR, BoD, or Contract Documents that may require action.
   d. State that correction was completed and system, subsystem, and equipment is ready for retest, if applicable.
   e. Identify person(s) who corrected or resolved the issue.
   f. Identify person(s) documenting the issue resolution.

3. Issues Log Report: On a periodic basis, but not less than for each commissioning team meeting, CxA shall prepare a written narrative for review of outstanding issues and a status update of the issues log. As a minimum, CxA shall include the following information in the issues log and expand it in the narrative:
   a. Issue number and title.
   b. Date of the identification of the issue.
   c. Name of the commissioning team member assigned responsibility for resolution.
   d. Expected date of correction.

J. Commissioning Report: CxA shall document results of the commissioning process including unresolved issues and performance of systems, subsystems, and equipment. The commissioning report shall indicate whether systems, subsystems, and equipment have been completed and are performing according to the OPR, BoD, and Contract Documents. The commissioning report shall include, but is not limited to, the following:
   1. Lists and explanations of substitutions; compromises; variances in the OPR, BoD, and Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. This report shall be used to evaluate systems, subsystems, and equipment and shall serve as a future reference document during Owner occupancy and operation. It shall describe components and performance that exceed requirements of the OPR, BoD, and Contract Documents and those that do not meet requirements of the OPR, BoD, and Contract Documents. It may also include a recommendation for accepting or rejecting systems, subsystems, and equipment.
   2. OPR and BoD documentation.
   3. Commissioning plan.
   4. Testing plans and reports.
   5. Corrective modification documentation.
   6. Issues log.
   7. Completed test checklists.
8. Listing of off-season test(s) not performed and a schedule for their completion.

K. Systems Manual: CxA shall gather required information and compile systems manual. Systems manual shall include, but is not limited to, the following:

1. OPR and BoD, including system narratives, schematics, and changes made throughout the Project.
2. Final commissioning plan.
3. Commissioning report.

1.9 SUBMITTALS

A. Commissioning Plan Prefinal Submittal: CxA shall submit three hard copies of prefinal commissioning plan. Deliver one copy to Contractor, one to Owner, and one to Architect. Present submittal in sufficient detail to evaluate data collection and arrangement process. One copy, with review comments, will be returned to the CxA for preparation of the final construction-phase commissioning plan.

B. Commissioning Plan Final Submittal: CxA shall submit two three hard copies and two sets of electronically formatted information of final commissioning plan. Deliver one hard copy and one set of discs to Owner, one hard copy and one set of discs to contractor, and one hard copy to Architect. The final submittal must address previous review comments. The final submittal shall include a copy of the prefinal submittal review comments along with a response to each item.

C. Test Checklists and Report Forms: CxA shall submit sample checklists and forms to Contractor quality-control manager and subcontractors for review and comment. Submit three copies of each checklist and report form.

D. Certificates of Readiness: CxA shall submit Certificates of Readiness.

E. Test and Inspection Reports: CxA shall submit test and inspection reports.

F. Corrective Action Documents: CxA shall submit corrective action documents.

G. Prefinal Commissioning Report Submittal: CxA shall submit three hard copies of the prefinal commissioning report. Include a copy of the preliminary submittal review comments along with CxA's response to each item. CxA shall deliver one copy to Owner, one hard copy to contractor, and one copy to Architect. One copy, with review comments, will be returned to the CxA for preparation of final submittal.

H. Final Commissioning Report Submittal: CxA shall submit three hard copies and one set of electronically formatted information of the final commissioning report. CxA shall deliver one hard copy and one set of discs to Owner, one copy to the contractor, and one copy to Architect. The final submittal must address previous review comments and shall include a copy of the prefinal submittal review comments along with a response to each item.

1.10 QUALITY ASSURANCE

A. Instructor Qualifications: Factory-authorized service representatives, experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment.

B. Test Equipment Calibration: Comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following
damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated within six months prior to use.

1.11 COORDINATION

A. Coordinating Meetings: CxA shall conduct monthly coordination meetings of the commissioning team to review progress on the commissioning plan, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.

B. Pretesting Meetings: CxA shall conduct pretest meetings of the commissioning team to review startup reports, pretest inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested.

C. Testing Coordination: CxA shall coordinate sequence of testing activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

D. Manufacturers' Field Services: CxA shall coordinate services of manufacturers' field services.

1.12 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

A. Training Preparation Conference: Before operation and maintenance training, CxA shall convene a training preparation conference to include Owner's operation and maintenance personnel, Contractor, and subcontractors. In addition to requirements specified in Division 1 Section "Demonstration and Training," perform the following:
   1. Review the OPR and BoD.
   2. Review installed systems, subsystems, and equipment.
   3. Review instructor qualifications.
   4. Review instructional methods and procedures.
   5. Review training module outlines and contents.
   6. Review course materials (including operation and maintenance manuals).
   7. Inspect and discuss locations and other facilities required for instruction.
   8. Review and finalize training schedule and verify availability of educational materials, instructors, audiovisual equipment, and facilities needed to avoid delays.
   9. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

B. Training Modules: Develop an instruction program that includes individual training modules for each system, subsystem, and equipment as specified in Division 1 Section "Demonstration and Training."

1.13 SYSTEMS TO BE COMMISSIONED

A. Mechanical Systems
   1. Air-cooled Chillers
   2. Air Handling Units
   3. Terminal Units (sampling of 5 randomly selected units)
   4. Exhaust Fans
5. Unit Heaters
6. Relief Vents (sampling of 2 randomly selected vents)
7. Steam PRV Valves
8. Shell and Tube Heat Exchanger
9. Condensate Pump

B. Plumbing Systems
1. Water Heaters
2. Hot Water Recirculation Pump
3. Elevator Sump Pump
4. Domestic Water Booster Pump Set
5. Backflow Preventer
6. Floor Drains

C. Fire Protection
1. Fire Pump
2. Jockey Pump
3. Fire Pump Controller

D. Electrical System
1. Ground Fault Protection System
2. Transformers
3. Transfer Switches
4. Generator
5. TVSS
6. Low Voltage Relay Panels
7. Switchboard (MDS)
8. Panelboards
9. Grounding System
10. Elevator System
11. Fire Alarm System

E. BAS System

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01810
SECTION 01815 - MECHANICAL SYSTEMS COMMISSIONING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. OPR, BoD, and BoD-HVAC documentation prepared by Owner and Architect contains requirements that apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for commissioning the HVAC system and its subsystems and equipment. This Section supplements the general requirements specified in Division 1 Section "General Commissioning Requirements."

B. Related Sections include the following:
   1. Division 1 Section "General Commissioning Requirements" for general requirements for commissioning processes that apply to this Section.
   2. Division 15 Section "Mechanical Systems Commissioning Requirements" for mechanical contractor requirements for commissioning mechanical systems.

1.3 DEFINITIONS

A. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor, plus consultant/design professionals responsible for design of HVAC, electrical, communications, controls for HVAC systems, and other related systems.

B. BoD: Basis of Design.

C. BoD-HVAC: HVAC systems basis of design.

D. CxA: Commissioning Authority.

E. OPR: Owner's Project Requirements.

F. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.

G. TAB: Testing, Adjusting, and Balancing.

H. Commissioning Plan: Document that defines the commissioning process. This document is developed by the CxA with input from the contractor and subcontractors.
I. Functional Performance Testing: The process of determining the ability of the mechanical systems to operate in accordance with their design intent and the system’s ability to respond to operational transients.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. See Division 15 Section "Mechanical Systems Commissioning Requirements" for contractor responsibilities.

1.5 COMMISSIONING DOCUMENTATION

A. See Division 1 Section "General Commissioning Requirements", and Division 15 Section "Mechanical Systems Commissioning Requirements" for Commissioning Documentation.

1.6 SUBMITTALS

A. See Division 1 Section "General Commissioning Requirements", and Division 15 Section "Mechanical Systems Commissioning Requirements" for Submittals.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 COMMISSIONED SYSTEMS TESTS

A. HVAC

1. Air-cooled Chillers
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Testing of the sequence of operation and all control strategies
      2) Verify proper startup and shutdown of equipment in normal operation and during and recovery from power failure.

2. Air Handling Units
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Testing of the sequence of operation and all control strategies
      2) Verify proper startup and shutdown of equipment in normal operation and during and recovery from power failure.
      3) Verify operation during simultaneous heating/cooling operation.
      4) Verify correct airflows at 25% of randomly selected air terminals.
         a) Failure of 10% of tested air terminals shall constitute a test failure. TAB contractor shall re-balance system and submit results to CxA for review.

3. Terminal Units (sampling of 5 randomly selected units)
a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
b. Perform Functional Performance Testing as required by the Commissioning plan.
c. The testing shall include, but not be limited to:
   1) Testing of the sequence of operation and all control strategies
   2) Verify proper startup and shutdown of equipment in normal operation and during and recovery from power failure.
   3) Verify air flow.
   4) Verify operation in cooling and heating modes.
   5) Verify correct airflows at 25% of randomly selected air terminals.
      a) Failure of 10% of tested air terminals shall constitute a test failure. TAB contractor shall re-balance system and submit results to CxA for review.
d. Failure of 2 terminal units to operate as designed will constitute a test failure. The contractor shall re-test all terminal units and report results to the CxA for review.

4. Exhaust Fans
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify proper startup and shutdown of equipment in normal operation and during and recovery from power failure.
      2) Verify air flow.

5. Unit Heaters
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Testing of the sequence of operation and all control strategies
      2) Verify proper startup and shutdown of equipment in normal operation and during and recovery from power failure.
      3) Verify air flow.

6. Relief Vents (sampling of 2 randomly selected vents)
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify operation of vent.
   d. Failure of any vent to operate properly shall constitute a test failure. The contractor shall re-test all vents and report results to the CxA for review.

7. Steam PRV Valves
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify operation of valves through all ranges of steam demand.

8. Shell and Tube Heat Exchanger
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify heat exchanger can supply required hot water flow through all ranges of hot water demand.
      2) Verify operation at minimum and maximum steam pressures.

9. Condensate Pump
a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
b. Perform Functional Performance Testing as required by the Commissioning plan.
c. The testing shall include, but not be limited to:
   1) Verify condensate pump operates at required flow rates.

B. Plumbing
1. Water Heaters
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify set points and recovery rate.

2. Hot Water Recirculation Pump
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify flow rate and control of pump.
      2) Verify pump's ability to ensure adequate hot water to a random sampling of 25% of plumbing fixtures.

3. Elevator Sump Pump
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify flow rate and control of pump.
      2) Verify all pump alarms operate as required.

4. Domestic Water Booster Pump Set
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify flow rate and control of pump.
      2) Verify pump can maintain proper pressure in domestic water system at maximum demand.

5. Backflow Preventer
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify backflow preventer operates as designed.

6. Floor Drains
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify floor drain is capable of draining 5 gallons of water in 15-25 seconds.

C. Fire Protection
1. Fire Pump
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
1) Verify fire pump testing as required by the local authority having jurisdiction.

2. Jockey Pump
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify jockey pump testing as required by the local authority having jurisdiction.

3. Fire Pump Controller
   a. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
   b. Perform Functional Performance Testing as required by the Commissioning plan.
   c. The testing shall include, but not be limited to:
      1) Verify fire pump controller testing as required by the local authority having jurisdiction.

END OF SECTION 01815
SECTON 01816 - ELECTRICAL SYSTEMS COMMISSIONING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. OPR, BoD, and BoD-Electrical documentation prepared by Owner and Architect contains requirements that apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for commissioning the Electrical system and its subsystems and equipment. This Section supplements the general requirements specified in Division 1 Section "General Commissioning Requirements."

B. Related Sections include the following:

1. Division 1 Section "General Commissioning Requirements" for general requirements for commissioning processes that apply to this Section.
2. Division 16 Section "Electrical Systems Commissioning Requirements" for specific requirements for commissioning mechanical systems.

1.3 DEFINITIONS

A. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor, plus consultant/design professionals responsible for design of HVAC, electrical, communications, controls for HVAC systems, and other related systems.

B. BoD: Basis of Design.

C. BoD-Electrical: Electrical systems basis of design.

D. CxA: Commissioning Authority.

E. OPR: Owner's Project Requirements.

F. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.

G. Commissioning Plan: Document that defines the commissioning process. This document is developed by the CxA with input form the contractor and subcontractors.

H. Functional Performance Testing: The process of determining the ability of the Electrical systems to operate in accordance with their design intent and the system's ability to respond to operational transients.
1.4 CONTRACTOR'S RESPONSIBILITIES

A. See Division 16 Section "Electrical Systems Commissioning Requirements" for contractor responsibilities.

1.5 COMMISSIONING DOCUMENTATION

A. See Division 1 Section "General Commissioning Requirements", and Division 16 Section "Mechanical Systems Commissioning Requirements" for Commissioning Documentation.

1.6 SUBMITTALS

A. See Division 1 Section "General Commissioning Requirements", and Division 16 Section "Electrical Systems Commissioning Requirements" for Submittals.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 COMMISSIONED SYSTEMS TESTS

A. Ground Fault Protection System
   1. Verify all Division 16 testing has been completed and a Certificate of Readiness has been completed.
   2. Perform Functional Performance Testing as required by the Commissioning plan.

B. Transformers
   1. Verify all Division 16 testing has been completed and a Certificate of Readiness has been completed.
   2. Perform Functional Performance Testing as required by the Commissioning plan.

C. Transfer Switches
   1. Verify all Division 16 testing has been completed and a Certificate of Readiness has been completed.
   2. Perform Functional Performance Testing as required by the Commissioning plan.

D. Generator
   1. Verify all Division 16 testing has been completed and a Certificate of Readiness has been completed.
   2. Perform Functional Performance Testing as required by the Commissioning plan.

E. TVSS
   1. Verify all Division 16 testing has been completed and a Certificate of Readiness has been completed.
   2. Perform Functional Performance Testing as required by the Commissioning plan.

F. Low Voltage Relay Panels
   1. Verify all Division 16 testing has been completed and a Certificate of Readiness has been completed.
2. Perform Functional Performance Testing as required by the Commissioning plan.

G. Switchboard (MDS)
   1. Verify all Division 16 testing has been completed and a Certificate of Readiness has been completed.
   2. Perform Functional Performance Testing as required by the Commissioning plan.

H. Panelboards
   1. Verify all Division 16 testing has been completed and a Certificate of Readiness has been completed.
   2. Perform Functional Performance Testing as required by the Commissioning plan.

I. Grounding System
   1. Verify all Division 16 testing has been completed and a Certificate of Readiness has been completed.
   2. Perform Functional Performance Testing as required by the Commissioning plan.

J. Elevator System
   1. Verify all Division 16 testing has been completed and a Certificate of Readiness has been completed.
   2. Perform Functional Performance Testing as required by the Commissioning plan.

K. Fire Alarm System
   1. Verify all Division 16 testing has been completed and a Certificate of Readiness has been completed.
   2. Perform Functional Performance Testing as required by the Commissioning plan.

END OF SECTION 01815
SECTION 01817 - BAS COMMISSIONING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. OPR, BoD, and BoD-HVAC documentation prepared by Owner and Architect contains requirements that apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for commissioning the BAS and its subsystems and equipment. This Section supplements the general requirements specified in Division 1 Section "General Commissioning Requirements."

B. Related Sections include the following:
   1. Division 1 Section "General Commissioning Requirements" for general requirements for commissioning processes that apply to this Section.
   2. Division 15 Section "BAS Commissioning Requirements" for contractor requirements for BAS commissioning.

1.3 DEFINITIONS

A. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor, plus consultant/design professionals responsible for design of HVAC, electrical, communications, controls for HVAC systems, and other related systems.

B. BoD: Basis of Design.

C. BoD-Mechanical: Mechanical systems basis of design.

D. CxA: Commissioning Authority.

E. OPR: Owner's Project Requirements.

F. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.

G. Commissioning Plan: Document that defines the commissioning process. This document is developed by the CxA with input form the contractor and subcontractors.

H. Functional Performance Testing: The process of determining the ability of the BAS to operate in accordance with their design intent and the system’s ability to respond to operational transients.
1.4 CONTRACTOR'S RESPONSIBILITIES

A. See Division 15 Section "BAS Commissioning Requirements" for contractor responsibilities.

1.5 COMMISSIONING DOCUMENTATION

A. See Division 1 Section "General Commissioning Requirements", and Division 15 Section "BAS Commissioning Requirements" for Commissioning Documentation.

1.6 SUBMITTALS

A. See Division 1 Section "General Commissioning Requirements", and Division 15 Section "BAS Commissioning Requirements" for Submittals.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 COMMISSIONED SYSTEMS TESTS

A. BAS

1. Verify all Division 15 testing has been completed and a Certificate of Readiness has been completed.
2. Perform Functional Performance Testing as required by the Commissioning plan.

END OF SECTION 01817
SECTION 08633 - FIBERGLASS-SANDWICH-PANEL SKYLIGHTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of Contract, including General and Supplemental Conditions of the Contract for Capital Outlay Projects, Commonwealth of Virginia and Division 1 Specification Sections (General Requirements), apply to this Section.

1.2 SUMMARY
   A. This Section includes aluminum-framed skylights incorporating translucent, insulating, fiberglass sandwich panels.
   B. Related Sections include the following:
      1. Division 7 Section "Joint Sealants" for sealants installed at skylight perimeters.

1.3 PERFORMANCE REQUIREMENTS
   A. General: Provide skylights capable of withstanding loads and thermal and structural movements indicated without failure. Failure includes the following:
      2. Sandwich-panel deflection exceeding manufacturer's recommended limits or causing panel failure.
      3. Thermal stresses transferred to the building structure.
      4. Noise or vibration created by thermal and structural movement and wind.
      5. Loosening or weakening of fasteners, attachments, and other components.
   B. Supporting-Frame-Member Deflection Limits: As follows:
      1. Deflection of the entire length of framing members in direction normal to skylight plane is limited to 1/180, unless otherwise indicated.
      2. Deflection of the entire length of framing members for spans exceeding 20 feet (6 m) is limited to 1/240 of clear span.
   C. Structural Loads: Provide skylights, including anchorage, capable of withstanding the effects of the following design loads when supporting full dead loads:
      1. Wind Loads: As indicated.
      2. Snow Loads: As indicated.
      3. Roof Loads: As follows:
         a. Concentrated Load: 300 lbf (1335 N) applied to skylight at location that produces the most severe stress or deflection.
         b. Live Load: As indicated.
   D. Thermal Movement: Provide skylights that allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, sealant failure, and other detrimental effects.
      1. Temperature Change (Range): 120 deg F ambient; 180 deg F (100 deg C) material surfaces.
   E. Air Infiltration: Provide skylights with maximum air leakage of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of surface when tested according to ASTM E 283.
F. Water Penetration: Provide skylights that do not evidence water penetration when tested according to ASTM E 331 at a minimum static pressure differential of 20 percent of positive design wind load, but not less than 15lbf/sq. ft.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions, profiles, and finishes of skylight components.

B. Shop Drawings: For skylights, include plans, elevations, sections, details, and attachments to other Work.
   1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Initial Selection: Manufacturer's color charts consisting of sections of units showing the full range of colors available for the following:
   1. Factory-finished aluminum.
   2. Fiberglass sandwich panels.

D. Samples for Verification: For each exposed finish required, in same thickness and material indicated for the Work and in size indicated below. If finishes involve normal color variations, include sample sets consisting of two or more units showing the full range of variations expected.
   1. Factory-Finished Aluminum: 12-inch- (300-mm-) long sections.
   2. Fiberglass Sandwich Panels: 12-inch- (300-mm-) square units.

E. Cutaway Sample: Of framing intersection, made from 12-inch- (300-mm-) long lengths of full-size components and showing details of the following:
   1. Primary framing members.
   2. Joinery.
   4. Fiberglass sandwich panels.
   5. Methods of drainage.

F. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

G. Field Test Reports: Indicate and interpret test results for compliance with requirements.

H. Product Test Reports: From a qualified testing agency indicating skylights comply with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer to assume engineering responsibility who has specialized in installing skylights similar to those indicated for this Project and who is acceptable to manufacturer.
   1. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the Commonwealth of Virginia and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of skylights that are similar to those indicated for this Project in material, design, and extent.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
D. Product Options: Drawings indicate size, profiles, and dimensional requirements of skylights and are based on Kalwal Corporation. Other manufacturers' skylight systems that comply with requirements may be considered. Refer to Division 1 Section "Substitutions."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Sandwich-Panel Fire-Test-Response Characteristics: Provide fiberglass sandwich panels identical to those tested for the following fire-test-response characteristics per test method indicated below by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Plastic Self-Ignition Temperature: 650 deg F (343 deg C) or more when tested per ASTM D 1929.
2. Interior-Face Burning Extent: 1 inch (25 mm) or less per ASTM D 635.
3. Interior-Face Surface Burning: Flame-spread and smoke-developed ratings of not more than 50 and 250, respectively, per ASTM E 84.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." Review methods and procedures related to skylights including, but not limited to, the following:

1. Inspect and discuss condition of preparatory work performed by other trades.
2. Review structural load limitations.
3. Review skylight curb structural requirements.
4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
5. Review required testing procedures.
6. Review weather and forecasted weather conditions and procedures for unfavorable conditions.
7. Review protection of adjacent roof areas.

1.6 PROJECT CONDITIONS

A. Field Measurements: Where skylights are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of skylights that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:

1. Structural failures.
2. Deterioration of metals, metal finishes, fiberglass sandwich panels, and other materials beyond normal weathering.
3. Water leakage, defined as uncontrolled water appearing on normally exposed interior surfaces of skylights from sources other than condensation. Water controlled by flashing and gutters and drained back to the exterior and that cannot damage adjacent materials or finishes is not water leakage.
4. Warranty Period: Five years from date of Substantial Completion.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Major Industries, Inc.

2.2 MATERIALS AND PRODUCTS

A. Aluminum: Alloy and temper recommended by manufacturer for use and finish indicated, and as follows:


B. Battens, Brackets, and Reinforcements: Manufacturer's standard high-strength aluminum units.

C. Exposed Flashing and Closures: Aluminum sheet, minimum 0.060 inch (1.5 mm) thick.

D. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories; compatible with adjacent materials.

1. Movement Joints: Provide slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.
2. Aluminum-Retaining-Cap or Batten Fasteners: ASTM A 193/A 193M, Series 300 stainless-steel screws; type as recommended by manufacturer.
4. Shims: Nonstaining, nonferrous shims compatible with adjacent materials, for installing and aligning skylight.

E. Skylight-System Gaskets and Joint Fillers: Manufacturer's standard permanent gaskets and joint fillers for sliding, compression, and nonmoving joints.

F. Skylight-System Sealants: Compatible with components with which sealants come in contact and recommended by skylight and sealant manufacturers for this use.

G. Bituminous Paint: Cold-applied asphalt mastic paint complying with SSPC-Paint 12, except containing no asbestos, and formulated for 30-mil (0.8-mm) thickness per coat.

H. Fiberglass Sandwich Panels: 2-3/4 inches (70 mm) thick with uniformly colored, translucent, fiberglass-reinforced-polymer face sheets permanently attached to a grid core using adhesive.

1. Erosion Protection: Manufacturer's standard
2. U-Value: Not more than \[0.29 \text{ Btu/sq. ft. x h x deg F}\] per ASTM C 236.
3. Grid Core: Aluminum I-beams complying with ASTM B 221 (ASTM B 221M) and in alloy and temper recommended by manufacturer.
4. Grid Pattern: **Inline rectangle, nominal 12 by 24 inches (305 by 610 mm).**
5. Adhesive: Waterproof, heat-and-pressure-resin type with tensile bond strength of 750 psi (5.2 MN/sq. m) when tested according to ASTM C 297 after aging according to ASTM D 1037, and
Shear bond strength of 700 psi (4.8 MN/sq. m) when tested according to ASTM D 1002 after aging according to ASTM D 1183.

6. **Impact Resistance**: No failure at impact of **60 ft. x lbf** (81 J) according to free-falling ball impact test using a 3-1/2-inch- (88.9-mm-) diameter, 6.3-lb (2.9-kg) ball.

7. **Color Stability**: Not more than 3.0 units Delta E after 60 months when tested according to ASTM D 2244.

8. **Interior Face Color**: Crystal

9. **Exterior Face Color**: White

2.3 **FABRICATION**

A. **Aluminum Components**: As follows:
   1. Fabricate components that, when assembled, will have accurately fitted joints with ends coped, mitered, or butted to produce hairline joints free of burrs and distortion.
   2. Fabricate components to accommodate expansion, contraction, and field adjustment and to provide for minimum clearance and shimming at skylight perimeter.
   3. Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
   4. Fit and assemble components to greatest extent practicable before finishing.
   5. Reinforce members as required to retain fastener threads.
   6. Where fasteners are exposed to view from interior, countersink fastener heads and finish them to match framing.
   7. Before shipping, shop assemble, mark, and disassemble components that cannot be permanently shop assembled.

B. Fabricate flashing with weatherproof expansion joints and corners.

C. Prepare framing to receive anchor and connection devices and fasteners.

D. **Fiberglass-Sandwich-Panel Fabrication**: As follows:
   1. Laminate face sheets to grid core under a controlled heat-and-pressure process with straight adhesive bonding lines that cover the width of core members and that have sharp edges.
   2. White spots indicating lack of bond at intersections of grid core members are limited in number to 4 for every 40 sq. ft. (3.7 sq. m) of panel and limited in diameter to 3/64 inch (1.2 mm).
   3. Fabricate with grid pattern that is symmetrical about centerlines of each panel.
   4. Fabricate panel to allow condensation within the panel to escape.
   5. Reinforce panel corners.

2.4 **ALUMINUM FINISHES**

A. **General**: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. **Finish designations prefixed by AA** comply with the system established by the Aluminum Association for designating aluminum finishes.

C. **High-Performance Organic Finish**: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605 (formerly 605.2).

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
      1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION
   A. Metal Protection: As follows:
      1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
      2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
      3. Where aluminum will contact pressure-treated wood, separate dissimilar materials by methods recommended by manufacturer.

3.3 INSTALLATION
   A. General: Comply with manufacturer's written instructions for protecting, handling, and installing skylight components.
      1. Fit aluminum component joints to produce hairline joints free of burrs and distortion.
      2. Rigidly secure non-movement joints.
      3. Accommodate thermal and mechanical movements.
      4. Install framing components to drain water passing joints and to drain condensation and moisture occurring or migrating within skylight system to the exterior.
      5. Coordinate installation of insulation and flashings at skylight perimeters to maintain continuity of thermal and water barriers.
      6. Set continuous flashings in a full sealant bed, unless otherwise indicated. Comply with requirements in Division 7 Section "Joint Sealants."

   B. Erection Tolerances: Install skylight components true in plane, accurately aligned, and without warp or rack. Adjust to comply with the following tolerances:
      1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 10 feet (3 mm in 3 m); over total length.
      2. Alignment: Where surfaces abut in line and at corners and where surfaces are separated by less than 3 inches (76 mm) < limit offset from true alignment to less than 1/32 inch (0.8 mm) otherwise, limit offset from true alignment to 1/8 inch (3.2 mm)

   C. Install sealants according to sealant manufacturer's written instructions to provide weatherproof joints. Install joint fillers behind sealant as recommended by sealant manufacturer.

3.4 FIELD QUALITY CONTROL
A. Testing Agency: **Owner will engage** a qualified independent testing and inspecting agency to perform field quality-control tests and to prepare test reports.

B. Water-Spray Test: Test skylights according to procedures in AAMA 501.2.

C. Repair or replace Work that does not pass testing or that is damaged by testing; and retest Work.

3.5 **CLEANING**

A. Clean skylights inside and outside, immediately after installation, according to manufacturer's written recommendations.
   
   1. Remove temporary protective coverings and strippable coatings from factory-finished metal surfaces and fiberglass sandwich panels. Remove labels and markings from all components.

END OF SECTION 08633
SECTION 15995 – MECHANICAL SYSTEMS COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. OPR, BoD, Commissioning Plan, and BoD-HVAC documentation prepared by Owner and Architect contains requirements that apply to this Section.

1.2 SUMMARY

A. This Section includes requirements that must be met prior to performing the Function Performance testing of mechanical systems, and outlines the mechanical contractors responsibilities in performing Functional Performance tests.

B. This Section supplements the general requirements specified in Division 1 Section "General Commissioning Requirements."

C. Related Sections include the following:

1. Division 1 Section "General Commissioning Requirements" for general requirements for commissioning processes that apply to this Section.
2. Division 1 Section “Mechanical Systems Commissioning” for specific requirements for commissioning mechanical systems.

1.3 DEFINITIONS

A. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor, plus consultant/design professionals responsible for design of HVAC, electrical, communications, controls for HVAC systems, and other related systems.

B. BoD: Basis of Design.

C. BoD-HVAC: HVAC systems basis of design.

D. CxA: Commissioning Authority.

E. OPR: Owner's Project Requirements.

F. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.

G. TAB: Testing, Adjusting, and Balancing.
H. Commissioning Plan: Document that defines the commissioning process. This document is developed by the CxA with input from the contractor and subcontractors.

I. Functional Performance Testing: The process of determining the ability of the mechanical systems to operate in accordance with their design intent and the system’s ability to respond to operational transients.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. The following responsibilities are in addition to those specified in Division 1 Section "General Commissioning Requirements."

B. Mechanical Contractor:

1. Attend commissioning meetings scheduled by the CxA to facilitate the commissioning process.

2. Provide submittals, equipment installation instructions, startup and testing documentation to the CxA as required by the contract documents and requested by the CxA.

3. Provide O&M Manuals within 60 days of approved equipment submittals.

4. Thoroughly start-up, test, adjust, and balance systems and equipment prior to Functional Performance testing.
   a. Start-up procedures shall be in accordance with Contract Documents, manufacturer’s written instructions, and reference or industry standards.
   b. Provide skilled technicians qualified to do the work required.
   c. Provide factory trained/authorized technicians where required by the contract documents or the equipment manufacturer’s written instructions.
   d. Notify CxA when systems are to be tested and energized.

5. Perform all Functional Performance Tests required by the contract documents.
   a. Coordinate testing with electrical and BAS testing.
   b. Manipulate systems and equipment to facilitate testing.
   c. Provide instrumentation necessary to perform functional performance tests.
   d. Maintain trends and monitor the facility throughout the testing period.
   e. Forward trends to the CxA for analysis every week throughout the testing period.
   f. Diagnose problems that occur during the testing period. Remedy deficiencies expeditiously and notify GC, owner, and CxA when completed.
   g. Maintain record documentation of any configurations, set ups, parameters etc, that change throughout the testing period.
   h. Record all test results as required by the contract documents. After satisfactory completion of tests, submit completed test results to CxA for review.

6. Schedule Functional Performance Test Demonstrations for witnessing by the CxA and the owner.
   a. After satisfactory completion of a Functional Performance Test, the Contractor shall schedule a demonstration test that shall be witnessed by the owner and the CxA.
   b. If a Functional Performance Test fails, determine cause of failure.
      1) If test must be repeated due to failure caused by contractor work or materials, reimburse the owner for billed costs for the participation in the repeated demonstration by the owner and or the CxA.

7. Provide representative for off season testing as required by CxA.
8. Respond to Warranty issues as required by Division 1 and the General Conditions.
   a. Diagnose problems that occur during the warranty period. Remedy deficiencies expeditiously and notify GC, owner, and CxA when completed.
   b. Maintain record documentation of any configurations, set ups, parameters etc, that change throughout the warranty period.

C. TAB Contractor:
   1. Review the Contract Documents with the CxA before developing TAB procedures.
      a. Verify the following:
         1) Accessibility of equipment and components required for TAB Work.
         2) Adequate number and placement of duct balancing dampers to allow proper balancing while minimizing sound levels in occupied spaces.
         3) Adequate number and placement of balancing valves to allow proper balancing and recording of water flow.
         4) Adequate number and placement of test ports and test instrumentation to allow reading and compilation of system and equipment performance data needed to conduct both TAB and commissioning testing.
         5) Air and water flow rates have been specified and compared to central equipment output capacities.
      b. Identify discontinuities and omissions in the Contract Documents.
      c. This review of the Contract Documents by the TAB Subcontractor satisfies requirements for a design review report as specified in Division 15 Section "Testing, Adjusting, and Balancing."
   2. Provide the CxA a detailed Test and Balance plan within 6 weeks of completing the design review report.
      a. Test and Balance plan shall meet all requirements of Division 15 section Testing, Adjusting, and Balancing.
   3. Provide a TAB technician to work at the direction of Commissioning Authority for up to 40 hours to assist in Functional Performance Test Demonstrations.
   4. Maintain record documentation of any configurations, set ups, parameters etc, that change throughout the testing period.
   5. Provide representative for off season testing as required by CxA.
   6. Respond to Warranty issues as required by Division 1 and the General Conditions.
      a. Maintain record documentation of any configurations, set ups, parameters etc, that change throughout the warranty period.
   7. Provide personnel as required by the CxA

1.5 COMMISSIONING DOCUMENTATION

A. The following are in addition to documentation specified in Division 1 Section "General Commissioning Requirements."
B. BoD HVAC: Owner will provide BoD-HVAC documents, prepared by design team and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

C. Test Checklists: CxA with the assistance of the commissioning team shall develop test checklists for HVAC systems, subsystems, and equipment, including interfaces and interlocks with other systems. CxA shall prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. In addition to the requirements specified in Division 1 Section "General Commissioning Requirements," checklists shall include, but not be limited to, the following:

1. Calibration of sensors and sensor function.
2. Testing conditions under which test was conducted, including (as applicable) ambient conditions, set points, override conditions, and status and operating conditions that impact the results of test.
3. Control sequences for HVAC systems.
4. Strength of control signal for each set point at specified conditions.
5. Responses to control signals at specified conditions.
6. Sequence of response(s) to control signals at specified conditions.
7. Electrical demand or power input at specified conditions.
9. Expected performance of systems, subsystems, and equipment at each step of test.
10. Narrative description of observed performance of systems, subsystems, and equipment. Notation to indicate whether the observed performance at each step meets the expected results.
11. Interaction of auxiliary equipment.
12. Issues log.

1.6 SUBMITTALS

A. The following submittals are in addition to those specified in Division 1 Section "General Commissioning Requirements."

B. Provide O&M Manuals, equipment installation, startup, and testing instructions within 30 days of receiving approved equipment submittals.

C. Provide completed check lists verifying all equipment has been installed in accordance with manufacturer’s written instructions.
   1. Check lists will be developed from manufacturer’s written installation instructions and shall be provided for use to the contractor as part of the Commissioning Plan.

D. Provide documentation that all mechanical components have been tested in accordance with the contract documents. Provide documentation that testing and startup required by a factory authorized technician has been completed.
   1. Check lists required for verification of mechanical component testing and startup shall be provided for use to the contractor as part of the Commissioning Plan.

E. Provide documentation verifying that all hydronic and plumbing systems have been installed, tested, and flushed in accordance with the contract documents. These systems shall be considered complete and operational and ready for Functional Performance Testing.
   1. Check lists required for verification of system installation, testing and flushing shall be provided for use to the contractor as part of the Commissioning Plan.
F. Provide documentation verifying that all duct systems have been installed, tested, and cleaned in accordance with the contract documents. These systems shall be considered complete and operational and ready for Functional Performance Testing.
   1. Forms required to provide verification of system installation, testing and cleaning shall be provided for use to the contractor as part of the Commissioning Plan.

G. Testing Procedures: CxA shall submit detailed testing plan, procedures, and checklists for each series of tests. Submittals shall include samples of data reporting sheets that will be part of the reports.

H. Certificate of Readiness: CxA shall compile certificates of readiness from each Contractor certifying that systems, subsystems, equipment, and associated controls are ready for testing.

I. Certificate of Completion of Installation, Prestart, and Startup: CxA shall certify that installation, prestart, and startup activities have been completed. Certification shall include completed checklists provided by TAB Contractor as specified in Division 15 Section "Testing, Adjusting, and Balancing."

J. Certified Pipe Cleaning and Flushing Report: CxA shall certify that pipe cleaning, flushing, hydrostatic testing, and chemical treating have been completed.

K. Test and Inspection Reports: CxA shall compile and submit test and inspection reports and certificates, and shall include them in systems manual and commissioning report.

L. Corrective Action Documents: CxA shall submit corrective action documents.

M. Certified TAB Reports: CxA shall submit verified, certified TAB reports.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTING PREPARATION

A. Prerequisites for Testing:
   1. Certify that HVAC systems, subsystems, and equipment have been completed, calibrated, and started; are operating according to the OPR, BoD, and Contract Documents; and that Certificates of Readiness are signed and submitted.
   2. Certify that BAS installation has been completed and calibrated; are operating according to the OPR, BoD, and Contract Documents; and that pretest set points have been recorded.
   3. Certify that TAB procedures have been completed, and that TAB reports have been submitted, discrepancies corrected, and corrective work approved.
   4. Verify that HVAC equipment field quality-control testing has been completed and approved.

B. Testing Instrumentation: Install measuring instruments and logging devices to record test data for the required test period. Instrumentation shall monitor and record full range of operating conditions and shall allow for calculation of total capacity of system for each mode of operation.
3.2 TESTING

A. Test systems and intersystem performance after test checklists for systems, subsystems, and equipment have been developed and approved.

B. Coordinate testing with electrical and BAS testing.

C. Perform each test as directed by written test procedures.

D. Notify CxA and owner prior performing tests.

E. Systems to be tested:
   1. Mechanical Systems
      a. Air-cooled Chillers
      b. Air Handling Units
      c. Terminal Units (sampling of 5 randomly selected units)
      d. Exhaust Fans
      e. Unit Heaters
      f. Relief Vents (sampling of 2 randomly selected vents)
      g. Steam PRV Valves
      h. Shell and Tube Heat Exchanger
      i. Condensate Pump
   2. Plumbing Systems
      a. Water Heaters
      b. Hot Water Recirculation Pump
      c. Elevator Sump Pump
      d. Domestic Water Booster Pump Set
      e. Backflow Preventer
      f. Floor Drains
   3. Fire Protection
      a. Fire Pump
      b. Jockey Pump
      c. Fire Pump Controller

END OF SECTION 15995
SECTION 15999 – BAS COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. OPR, BoD, Commissioning Plan, and BoD-HVAC documentation prepared by Owner and Architect contains requirements that apply to this Section.

1.2 SUMMARY

A. This Section includes requirements that must be met prior to performing the Function Performance testing of BAS systems, and outlines the BAS contractor’s responsibilities in performing Functional Performance tests.

B. This Section supplements the general requirements specified in Division 1 Section “General Commissioning Requirements.”

C. Related Sections include the following:

1. Division 1 Section "General Commissioning Requirements" for general requirements for commissioning processes that apply to this Section.

2. Division 1 Section “BAS Commissioning” for specific requirements for BAS commissioning.

1.3 DEFINITIONS

A. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor, plus consultant/design professionals responsible for design of HVAC, electrical, communications, controls for HVAC systems, and other related systems.

B. BoD: Basis of Design.

C. BoD-HVAC: HVAC systems basis of design.

D. CxA: Commissioning Authority.

E. OPR: Owner's Project Requirements.

F. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.

G. TAB: Testing, Adjusting, and Balancing.

H. Commissioning Plan: Document that defines the commissioning process. This document is developed by the CxA with input from the contractor and subcontractors.
I. Functional Performance Testing: The process of determining the ability of the mechanical systems to operate in accordance with their design intent and the system’s ability to respond to operational transients.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. The following responsibilities are in addition to those specified in Division 1 Section “General Commissioning Requirements.”

B. Attend commissioning meetings scheduled by the CxA to facilitate the commissioning process.

C. Review, with the CxA, control designs for compliance with the OPR and BoD, controllability with respect to actual equipment to be installed, and recommend adjustments to control designs and sequence of operation descriptions.

D. Provide submittals, equipment installation instructions, startup and testing documentation to the CxA as required by the contract documents and requested by the CxA.

E. Provide O&M Manuals within 60 days of approved equipment submittals.

F. Thoroughly start-up, test, and calibrate the BAS prior to Functional Performance testing.
   1. Start-up procedures shall be in accordance with Contract Documents, manufacturer’s written instructions, and reference or industry standards.
   2. Provide skilled technicians qualified to do the work required.
   3. Provide factory trained/authorized technicians where required by the contract documents or the equipment manufacturer’s written instructions.
   4. Notify CxA when systems are to be tested and energized.

G. Perform all Functional Performance Tests required by the contract documents.
   1. Coordinate testing with electrical and HVAC testing.
   2. Manipulate systems and equipment to facilitate testing.
   3. Provide instrumentation necessary to perform functional performance tests.
   4. Maintain trends and monitor the facility throughout the testing period.
   5. Forward trends to the CxA for analysis every week throughout the testing period.
   6. Diagnose problems that occur during the testing period. Remedy deficiencies expeditiously and notify GC, owner, and CxA when completed.
   7. Maintain record documentation of any configurations, set ups, parameters etc, that change throughout the testing period.
   8. Record all test results as required by the contract documents. After satisfactory completion of tests, submit completed test results to CxA for review.

H. Schedule Functional Performance Test Demonstrations for witnessing by the CxA and the owner.
   1. After satisfactory completion of a Functional Performance Test, the Contractor shall schedule a demonstration test that shall be witnessed by the owner and the CxA.
   2. If a Functional Performance Test fails, determine cause of failure.
      a. If test must be repeated due to failure caused by contractor work or materials, reimburse the owner for billed costs for the participation in the repeated demonstration by the owner and or the CxA.

I. Provide representative for off season testing as required by CxA.

J. Respond to Warranty issues as required by Division 1 and the General Conditions.
1. Diagnose problems that occur during the warranty period. Remedy deficiencies expeditiously and notify GC, owner, and CxA when completed.
2. Maintain record documentation of any configurations, set ups, parameters etc, that change throughout the warranty period.

1.5 COMMISSIONING DOCUMENTATION

A. The following are in addition to documentation specified in Division 1 Section "General Commissioning Requirements."

B. BoD HVAC: Owner will provide BoD-HVAC documents, prepared by design team and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

C. Test Checklists: CxA with the assistance of the commissioning team shall develop test checklists for HVAC systems, subsystems, and equipment, including interfaces and interlocks with other systems. CxA shall prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. In addition to the requirements specified in Division 1 Section "General Commissioning Requirements," checklists shall include, but not be limited to, the following:

1. Calibration of sensors and sensor function.
2. Testing conditions under which test was conducted, including (as applicable) ambient conditions, set points, override conditions, and status and operating conditions that impact the results of test.
3. Control sequences for HVAC systems.
4. Strength of control signal for each set point at specified conditions.
5. Responses to control signals at specified conditions.
6. Sequence of response(s) to control signals at specified conditions.
7. Electrical demand or power input at specified conditions.
9. Expected performance of systems, subsystems, and equipment at each step of test.
10. Narrative description of observed performance of systems, subsystems, and equipment. Notation to indicate whether the observed performance at each step meets the expected results.
11. Interaction of auxiliary equipment.
12. Issues log.

1.6 SUBMITTALS

A. The following submittals are in addition to those specified in Division 1 Section "General Commissioning Requirements."

B. Provide O&M Manuals, equipment installation, startup, and testing instructions within 30 days of receiving approved equipment submittals.

C. Provide completed check lists verifying all equipment has been installed in accordance with manufacturer’s written instructions.

1. Check lists will be developed from manufacturer’s written installation instructions and shall be provided for use to the contractor as part of the Commissioning Plan.

D. Provide documentation that the BAS have been tested in accordance with the contract documents. Provide documentation that testing and startup required by a factory authorized technician has been completed.
1. Check lists required for verification of BAS testing and startup shall be provided for use to the contractor as part of the Commissioning Plan.

E. Testing Procedures: CxA shall submit detailed testing plan, procedures, and checklists for each series of tests. Submittals shall include samples of data reporting sheets that will be part of the reports.

F. Certificate of Readiness: CxA shall compile certificates of readiness from Contractor certifying that systems, subsystems, equipment, and associated controls are ready for testing.

G. Certificate of Completion of Installation, Prestart, and Startup: CxA shall certify that installation, prestart, and startup activities have been completed.

H. Test and Inspection Reports: CxA shall compile and submit test and inspection reports and certificates, and shall include them in systems manual and commissioning report.

I. Corrective Action Documents: CxA shall submit corrective action documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTING PREPARATION

A. Prerequisites for Testing:
   1. Certify that BAS have been completed and calibrated; are operating according to the OPR, BoD, and Contract Documents; and that pretest set points have been recorded.

B. Testing Instrumentation: Install measuring instruments and logging devices to record test data for the required test period. Instrumentation shall monitor and record full range of operating conditions and shall allow for calculation of total capacity of system for each mode of operation.

3.2 TESTING

A. Test systems and intersystem performance after test checklists for systems, subsystems, and equipment have been developed and approved.

B. Coordinate testing with mechanical testing.

C. Perform each test as directed by written test procedures.

D. Notify CxA and owner prior performing tests.

END OF SECTION 15999
SECTION 16995 – ELECTRICAL SYSTEMS COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. OPR, BoD, Commissioning Plan, and BoD-Electrical documentation prepared by Owner and Architect contains requirements that apply to this Section.

1.2 SUMMARY

A. This Section includes requirements that must be met prior to performing the Function Performance testing of electrical systems, and outlines the electrical contractor’s responsibilities in performing Functional Performance tests.

B. This Section supplements the general requirements specified in Division 1 Section "General Commissioning Requirements."

C. Related Sections include the following:

1. Division 1 Section "General Commissioning Requirements" for general requirements for commissioning processes that apply to this Section.
2. Division 1 Section “Electrical Commissioning” for specific requirements for commissioning Electrical systems.

1.3 DEFINITIONS

A. Architect: Includes Architect identified in the Contract for Construction between Owner and Contractor, plus consultant/design professionals responsible for design of HVAC, electrical, communications, controls for HVAC systems, and other related systems.

B. BoD: Basis of Design.

C. BoD-Electrical: Electrical systems basis of design.

D. CxA: Commissioning Authority.

E. OPR: Owner's Project Requirements.

F. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.

G. Commissioning Plan: Document that defines the commissioning process. This document is developed by the CxA with input from the contractor and subcontractors.
H. Functional Performance Testing: The process of determining the ability of the electrical systems to operate in accordance with their design intent and the system’s ability to respond to operational transients.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. The following responsibilities are in addition to those specified in Division 1 Section "General Commissioning Requirements."

B. Attend commissioning meetings scheduled by the CxA to facilitate the commissioning process.

C. Provide submittals required by the contract documents to the CxA.

D. Provide O&M Manuals, equipment installation, startup, and testing instructions within 30 days of receiving approved equipment submittals.

E. Thoroughly start-up, test, and adjust systems and equipment prior to Functional Performance testing.
   1. Start-up procedures shall be in accordance with contract documents, manufacturer’s written instructions, and reference or industry standards.
   2. Provide skilled technicians qualified to do the work required.
   3. Provide factory trained/authorized technicians where required by the contract documents, or the equipment manufacturer’s written instructions.
   4. Notify CxA when systems are to be tested and started.

F. Perform all Functional Performance Tests required by the contract documents.
   1. Coordinate testing with HVAC and BAS testing.
   2. Manipulate systems and equipment to facilitate testing.
   3. Provide instrumentation necessary to perform functional performance tests.
   4. Maintain trends and monitor the facility throughout the testing period.
   5. Forward trends to the CxA for analysis every week throughout the testing period.
   6. Diagnose problems that occur during the testing period. Remedy deficiencies expeditiously and notify GC, owner, and CxA when completed.
   7. Maintain record documentation of any configurations, set ups, parameters etc, that change throughout the testing period.
   8. Record all test results as required by the contract documents. After satisfactory completion of tests, submit completed test results to CxA for review.

G. Schedule Functional Performance Test Demonstrations for witnessing by the CxA and the owner.
   1. After satisfactory completion of a Functional Performance Test, the Contractor shall schedule a demonstration test that shall be witnessed by the owner and the CxA.
   2. If a Functional Performance Test fails, determine cause of failure.
      a. If test must be repeated due to failure caused by contractor work or materials, reimburse the owner for billed costs for the participation in the repeated demonstration by the owner and or the CxA.

H. Provide representative for off season testing as required by CxA.

I. Respond to Warranty issues as required by Division 1 and the General Conditions.
   1. Diagnose problems that occur during the warranty period. Remedy deficiencies expeditiously and notify GC, owner, and CxA when completed.
   2. Maintain record documentation of any configurations, set ups, parameters etc, that change throughout the warranty period.
1.5 COMMISSIONING DOCUMENTATION

A. The following are in addition to documentation specified in Division 1 Section "General Commissioning Requirements."

B. BoD Electrical: Owner will provide BoD-Electrical documents, prepared by design team and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

C. Test Checklists: CxA with the assistance of the commissioning team shall develop test checklists for all electrical tests required by contract documents and the Commissioning Plan. CxA shall prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. In addition to the requirements specified in Division 1 Section "General Commissioning Requirements," checklists shall include, but not be limited to, the following:

1. Testing conditions under which test was conducted, including (as applicable) ambient conditions, set points, override conditions, and status and operating conditions that impact the results of test.
2. Electrical demand or power input at specified conditions.
4. Expected performance of systems, subsystems, and equipment at each step of test.
5. Narrative description of observed performance of systems, subsystems, and equipment. Notation to indicate whether the observed performance at each step meets the expected results.
6. Interaction of auxiliary equipment.
7. Issues log.

1.6 SUBMITTALS

A. The following submittals are in addition to those specified in Division 1 Section "General Commissioning Requirements."

B. Provide O&M Manuals, equipment installation, startup, and testing instructions within 30 days of receiving approved equipment submittals.

C. Provide completed check lists verifying all electrical equipment has been installed in accordance with manufacturer’s written instructions.
   1. Check lists will be developed from manufacturer’s written installation instructions and shall be provided for use to the contractor as part of the Commissioning Plan.

D. Provide documentation that all electrical system components have been tested in accordance with the contract documents. Provide documentation that testing and startup required by a factory authorized technician has been completed.
   1. Check lists required for verification of electrical component testing and startup shall be provided for use to the contractor as part of the Commissioning Plan.

E. Testing Procedures: CxA shall submit detailed testing plan, procedures, and checklists for each series of tests. Submittals shall include samples of data reporting sheets that will be part of the reports.

F. Certificate of Readiness: CxA shall compile certificates of readiness from Contractor certifying that systems, subsystems, equipment, and associated controls are ready for testing.

G. Certificate of Completion of Installation, Prestart, and Startup: CxA shall certify that installation, prestart, and startup activities have been completed.
H. Test and Inspection Reports: CxA shall compile and submit test and inspection reports and certificates, and shall include them in systems manual and commissioning report.

I. Corrective Action Documents: CxA shall submit corrective action documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTING PREPARATION

A. Prerequisites for Testing:
   1. Certify that all electrical work has been completed and all testing have been completed according to the OPR, BoD, and Contract Documents; and that Certificates of Readiness are signed and submitted.

B. Testing Instrumentation: Install measuring instruments and logging devices to record test data for the required test period. Instrumentation shall monitor and record full range of operating conditions.

3.2 TESTING

A. Test systems and intersystem performance after test checklists for systems, subsystems, and equipment have been developed and approved.

B. Coordinate testing with mechanical testing.

C. Perform each test as directed by written test procedures.

D. Notify CxA and owner prior performing tests.

E. Systems to be tested:
   1. Ground Fault Protection System
   2. Transformers
   3. Transfer Switches
   4. Generator
   5. TVSS
   6. Low Voltage Relay Panels
   7. Switchboard (MDS)
   8. Panelboards
   9. Grounding System
   10. Elevator System
   11. Fire Alarm System

END OF SECTION 16995
<table>
<thead>
<tr>
<th>Name</th>
<th>Quantity</th>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package A</td>
<td>3</td>
<td>Pump</td>
<td>Site 1</td>
</tr>
<tr>
<td>Package B</td>
<td>2</td>
<td>Valve</td>
<td>Site 2</td>
</tr>
<tr>
<td>Package C</td>
<td>1</td>
<td>Motor</td>
<td>Site 3</td>
</tr>
</tbody>
</table>

*Note: The table above represents the schedule for the HVAC system.*
LIGHTING CONTROL

TYPICAL FOR EACH RELAY CONTROL PANEL. REFER TO ELECTRICAL DRAWINGS FOR CONTACTOR LOCATIONS AND WIRING DIAGRAMS.
PREBID QUESTION FORM

PROJECT: STUDENT RECREATION CENTER
Loc: Wood University
Fairville, Virginia
Project Code: 214-16420-2

DATE: 9-12-05

(Note: Bidders must make inquiries at least six working days prior to time set for the receipt of bids.)

The following question concerns: (indicate)

Drawing(s): Sheet (number) A0-02
Specifications: Section (number) ___ Page ___

WALL SECTIONS 3 & 4 ON A0-02 SHOW CONCRETE WALL.
STRUCTURAL SECTIONS SHOW MASONRY WALL. WHICH IS CORRECT?
ALSO THERE IS NO STRUCTURAL DETAIL FOR 5/A0-02.

The Architect/Engineer's response is:

Construct wall sections 3 & 4/A0-02 per structural drawings.
For 5/A0-02, provide 2'-0" wide x 1'-0" thick concrete footing
with (2) #5's continuous. Top of footing shall be 1'-0" minimum below
finished grade. Wall shall be 10" masonry (12" cmu & 8" cmu) grooved
solid below grade and 4" brick 8" cmu 4" brick above grade
Vertical reinforcement is required.

All necessary responses to questions involving a change in the contract documents will be made by Addendum.

Question submitted by: DAVE SAUER 434-676-8221
Name Telephone
KENBRIDGE Const. Co. 434-676-8815
Organization Fax No.

Note: Use separate form for each question submitted.

Moseley Architect's telexer: (757) 368-2233
Attention: Gil Carpenter

214-16420-02
PREBID QUESTION FORM

PROJECT: STUDENT RECREATION CENTER  
Longwood University  
Farmville, Virginia  
Project Code: 214-16420-2

DATE: 8-30-05

(Note: Bidders must make inquiries at least six working days prior to time set for the receipt of bids.)

The following question concerns: (indicate)

[Space for drawings and specifications]

PARA H.I. SAYS FENCE WAS INSTALLED BY ANOTHER CONTRACTOR UNDER THE EARLY SITE PACKAGE WORK. H.I. A SAYS CONTRACTOR SHALL TAKE OVER RENTAL OF AND COST OF THIS FENCE & COST OF THIS FENCE AND GATE SYSTEM. CAN YOU GIVE THE COST & RENTAL OF FENCE?

The Architect/Engineer's response is:

A COPY OF THE AGENCY-PROVIDED "RENTAL AGREEMENT" IS PROVIDED IN ADDENDUM #3 FOR USE IN CALCULATING COST OF FENCE AS REQUIRED BY SPEC. SECTION D1000 "SPECIAL CONDITIONS" PART 3.1.H.

All necessary responses to questions involving a change in the Contract Documents will be made by Addendum.

Question submitted by: WOODROW HUDSON 434-676-8281
Name Telephone
KEEBLEDGE CONST. CO. 434-676-8815
Organization Fax No.

Note: Use separate form for each question submitted.

Moseley Architects telecopier: (757) 368-2233
Attention: Gil Carpenter
Rental Agreement

23220 Airport Drive
Petersburg, VA 23803

Lessee:
J Harman Saunders Construction, Inc.
P.O Box 1096
2514 Houghton Avenue
South Boston, VA 24592

Customer Phone: 434 575 0922
Customer Fax: 434 575 0288

Job Location:
Longwood College

This lease, executed this day by and between
Elite Fence, Inc., (hereinafter "Lessor"), and J Harman Saunders Construction,
(hereinafter "Lessee"). Witnesseth that the Lessor does hereby lease the following property to the Lessee
according to the terms set forth below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Feet / Qty</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 month Rental - Temporary Fence Panels - (92) ea. @ 12 ft = total feet.</td>
<td>1,104</td>
<td>4.00</td>
<td>4,416.00</td>
</tr>
<tr>
<td>Blocks (stands) for temporary fence panels</td>
<td>93</td>
<td>5.00</td>
<td>465.00</td>
</tr>
<tr>
<td>Delivery / Setup</td>
<td>92</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Customer understands that if the invoice is not paid in accordance to the terms as stated above, Elite Fence, Inc. will remove the fencing from the job location without further notice. Customer also understands that there will be a charge for any damaged or missing panels ($125.00 each) or damaged or missing stands ($25.00 each). Damaged or missing in ground fence (6.00 / ft).**

Subtotal: $4,881.00
Sales Tax (6.0%): $293.00
Total: $5,096.80

1) Lessor leases to the Lessee the property described above (hereinafter "leased property") upon the terms and conditions set forth on this page.
2) Delivery and pick up of the leased property will be by the Lessee unless otherwise noted. If delivery and pick up services are incorporated as a part of this Rental Agreement, leased property will be delivered and picked up from the job location only. Any extra trips to the job location, or to any other location, will result in additional charges to the Lessee.
3) Two weeks notice are required by the Lessee for the pickup of leased property by the Lessor.
4) All leased property is rented for the time specified only, not to exceed the expiration date shown above. If use of the leased property exceeds the specified rental period, additional charges will be incurred.
5) Elite Fence, Inc. is not responsible for any damages caused by the leased property while said property is on the job location or in the possession of the Lessor.
6) At no time should any signage, lights, or any other objects of any kind be attached to the fencing. Attaching objects to the fencing will create a weight and/or wind hazard. Elite Fence, Inc. will not be responsible for any damages caused thereby.
7) Signature of the Lessee below acknowledges full understanding of all the foregoing terms and conditions, and unconditional acceptance of them.

Signature: [Signature]
Lessor

Signature: [Signature]
Lessee
Manufactures Representative for
PERMA-PIPE / Ricwil Piping Systems
PermAlert Leak Detection Systems
Preferred Utilities Fuel Oil Systems
FLO-SAFE Polypropylene, PVDF
Chemical Pipe Systems
CALPICO Link Seals, Wall Sleeves

Mechanical Pipe Systems
145 Longwood Drive Advance, NC 27006
(336) 988-6370 (336) 988-6354 Fax Email
Palozt@hotmail.com

Fax

To: Jeffrey Hyder @ Moseley Architects
   Or Lead Mechanical Engineer
From: Tony Palozzo

Fax: 1-757-368-2233 / 1804-379-8680
Phone: 1-757-388-2800
Date: 9/6/2005

Dear Mr. Hyder, I am the local PERMA-PIPE representative, and have been in this industry for over 20 years. The specification section 15182 indicates an underground steam and condensate system, the contract drawings show a 4" steam and a 2" condensate coming out of building and tying into a 8" steam and 8" condensate on the civil drawings. The first question is the 8" steam line part of this contract? Is the 8" condensate the correct size of condensate? The notes on the civil drawings say coordinate with mechanical engineer for additional information.

Please let me know if we can submit a bid on your project.

Thank you.

Response: REFER to Appendix #2 under "Revisions to Drawings, Drawing C4.0, Item 1.

ADDITIONAL RESPONSE (9/16/05)

The questioner states the scenario correctly: "the contract drawings show a 4" steam and a 2" condensate coming out of building and tying into a 8" steam and 8" condensate on the civil drawings." That's what we want.

For his questions:
1. Is the 8" steam part of this contract? (Yes) 2. Is the 8" condensate the correct size? (Yes)
PREBID QUESTION FORM

PROJECT: STUDENT RECREATION CENTER
Longwood University
Farmville, Virginia
Project Code: 214-16420-2

DATE: 9/13/05

(Note: Bidders must make inquiries at least six working days prior to time set for the receipt of bids.)

The following question concerns: (indicate)

Drawings:
Specifications:
Sheet (number) M2-1.2 + C4.0
Section (number) Page

M2-1.2 shows 4" NPS + 2" PPR turning down to underground. C4.0 shows 8" Steam + 8" Condensate. Is the work on C4.0 part of this contract? If so, is Division 15 responsible for this work?

The Architect/Engineer’s response is:


All necessary responses to questions involving a change in the Contract Documents will be made by Addendum.

Question submitted by: MARK CHITTEDEH
Name
Telephone 434-385-1255
Organization Southern Air
Fax No. 434-385-4631

Note: Use separate form for each question submitted.

Moseley Architects telexcopy: (757) 368-2233
Attention: Gil Carpenter

214-16420-02

PREBID QUESTION FORM
PRE-BID CONFERENCE AGENDA

STUDENT RECREATION CENTER

LONGWOOD UNIVERSITY
Farmville, Virginia
Project Code 214-16420-02
(Architect’s Project No. 430240)

DATE: Tuesday, August 30, 2005
2:00 p.m.

LOCATION: Facilities Management Conference Room
Bristow Building, Room 211
Longwood University
Farmville, Virginia

I. INTRODUCTIONS

A. The Owner: Longwood University
(Capital Design & Construction)
- Galen May, Director, Cap. Plg. & Constr.  434.395.2300  434.395.2647
- Mike Montgomery, Dir., Fac. Mgmt. Srvcs.,  434.395.2740  434.395.2647
- David Pletcher, Project Manager  434.395.2297  434.395.2647
- Alan Cook, Project Inspector   434.395.2637  434.395.2647

B. Owner’s Independent Testing Agency: MACTEC Engineering and Consulting
- Michael L. Haith    804.358.7111

D. Architect of Record: Moseley Architects
- Gil Carpenter, AIA, Project Manager 757.368.2800 757.368.2233

E. Design Architect: Hastings + Chivetta
- Eric Kocher, AIA St. Louis, MO

F. Civil Engineer / Landscape Design: Draper Aden, Inc. Richmond, VA
- Tim Dean, P.E.

H. Structural Engineer: DMWP&V Richmond, VA
- Eddie Fraher, P.E.

I. Plumbing/Mechanical/Electrical Consultant: Moseley Architects
- Wes Bonafe, P.E. Richmond, VA

J. Construction Administrator: Moseley Architects
II. OWNER INTRODUCTORY COMMENTS

III. OVERVIEW OF PROJECT/DOCUMENTS

A. Summary of Work:

1. Base Bid: Construction of an approximately 74,600 SF, three-story, steel-framed recreation facility with a mezzanine. The facility is designed with poured-in-place concrete foundations and retaining walls, masonry exterior walls using primarily concrete masonry units with brick veneer and cast stone accent elements. Additionally, exterior walls also consist of metal stud with brick veneer and cast stone elements. The roof is a single-ply membrane system. Project is a LEED designed facility.

   a. Additive Bid Item No. 1: Preformed metal panel ceiling system in Gymnasium and Fitness areas.
   b. Additive Bid Item No. 2. Indoor climbing wall.
   c. Additive Bid Item No. 3. Landscaping and site furnishings.
   d. Additive Bid Item No. 4: Two Scoreboards and associated Metal Panel Wall surrounds.


D. Owner/Contractor Agreement Form: Commonwealth of Virginia Contract Between Owner and Contractor, DGS Form E & B CO-9 (05/02).

E. General Conditions: Commonwealth of Virginia General Conditions of the Construction Contract, DGS Form E & B CO-7 (06/04).

IV. BIDDING PROCEDURES:

A. Notice of Invitation for Bids (bound within Project Manual)

1. Pre-Qualified General Construction Contractors:
   a. Branch and Associates
   b. J. E. Jamerson and Sons, Inc.
   c. Kenbridge Construction Company, Inc.
   d. W. M. Jordan Construction Company

2. Pre-Qualified Mechanical Contractors:
   a. Southern Air
   b. Moore’s Electric
   c. EMC Company
   d. Climate Control

B. Instructions to Bidders: Commonwealth of Virginia DGS Form E & B CO-7A (06/04).
1. Bid bond: 5% of base bid.
2. Withdrawal or Modification of Bids: refer to Article 6 of Instructions to Bidders.

C. **Bid Form**

1. Base Bid in five (5) parts.
2. Submit bid in duplicate.
3. Bid shall be sealed in an envelope and marked on the outside with the name of the University, project title, and contractor name and license number.
4. Revision(s) permitted on outside of envelope with signature, provided that the person making the revision is specifically authorized to do so (per Article 6 in the Instructions to Bidders).
5. Award of contract will be based on Base Bid plus as many Additive Bid Items, taken in sequence, as the Owner in its discretion chooses to award. Additive Bid Items should indicate only the total cost of the item and **not** an accumulative total for Base Bid plus Additive Bid Item(s).

D. **Bid Sets:** May be obtained from Moseley Architects, 780 Lynnhaven Parkway, Suite 200, Virginia Beach, Virginia 23452.

E. **Bid Receipt & Opening:** Sealed bids will be received at Longwood University at Room 218, Bristow Building, Redford Street at Main Street, Farmville, VA 23909. The deadline for submitting bids is **2:00 p.m. sharp (local prevailing time), as determined by the Bid Officer, September 21, 2005.** The bids will be opened publicly and read aloud beginning at 2:00 p.m. (local prevailing time), on **September 22, 2005,** at the same location.

1. **Official Timepiece:** The “official time” used for the receipt of responses is determined by reference to the clock designated by the Bid Officer. The Bid Officer shall determine when the Bid Receipt Deadline has arrived and shall announce that the Deadline has arrived and that no further bids or bid modifications will be accepted. All bids and bid modifications in the possession of the Bid Officer and his or her assistant at the time the announcement is completed are deemed to be timely, whether or not the bid envelope has been physically date/time stamped or otherwise marked by the time the Bid Officer makes the deadline announcement.

2. No bids will be received after the time designated for receipt of bids.

3. **Availability of telephones to Contractors will not be provided by the University.**

F. **Questions Prior to Receipt of Bids:**

1. Pre-Bid Question Form (bound into Project Manual).
2. All correspondence and telephone inquiries are to be directed to the Architect. Do not rely on verbal information – only on written documentation.
3. All necessary responses to questions regarding Bid Documents prior to receipt of bids will be in writing by Addendum and sent to all document holders.
4. Responses **not** in writing and **not** included in Addendum shall **not** be binding (refer to Article 2, Instructions to Bidders DGS Form E & B CO-7A).
5. Questions must reach the Architect at least six (6) days prior to receipt of bids to allow sufficient time for an addendum to reach all bidders. No addenda will be issued within that period, except one which includes postponement of the date for receipt of bids.

G. **Submittal of Work Papers:**

1. “Work Papers” must be submitted prior to the date and time established for “Opening of Bids” or the Contractor waives his right to claim an error. Indicate on the outside of the envelope that the envelope contains only the “Work Papers”.
2. “Work Papers” will be returned *(unopened)* if no error is claimed.
3. Contractors have two (2) hours following opening of bids in which to claim an error, *in writing*.

H. **Owner’s Right to Negotiate with the Low Bidder:** If award of a contract to the lowest responsive and responsible bidder is precluded because of limitations on available funds, under the provisions of Section 2.2-4318 of the Virginia Procurement Act, the Owner reserves the right to negotiate the Total Base Bid amount with the lowest responsive bidder to obtain a contract price within the available funds.

I. **Anticipated Addendum Items:**


V. **PROJECT CONDITIONS**

A. **Substantial Completion** of the entire project shall be no longer than 435 *consecutive calendar days* from the date of commencement of Work as specified in the Notice to Proceed. **Final Completion** no later than 30 days thereafter.

B. **Owner-Furnished and Contractor Installed (OFCI) Items:** Materials and/or Equipment to be furnished by the Owner for installation under this contract include, but are not limited to, the following:

1. Lock cylinders
2. Select toilet accessories as noted in the contract documents
3. Juice bar equipment unless noted otherwise in the contract documents
4. Loose equipment
5. Padlocks for overhead coiling door
6. Dance barres.

C. **Work Under Separate Contracts:** Work under separate contract(s) to be substantially complete during or immediately after work under this Contract includes, but is not limited to, the following:

1. Telephone, Data, CATV cable installation
2. Door and access card reader devices and panel installation
3. Loose furniture and equipment
4. Exterior/Interior Building signage
5. Hand-held fire extinguishers.
7. Fenced storage units.
8. Divider curtain.

C. Pervious Site Work: Some utility work was performed on site under a separate contract earlier this year. Contractor shall become familiar with that Work.

D. Schedule Constraints: Refer to Section 01000 Special Conditions. Work shall be scheduled during normal work hours, Monday through Friday, 8:00 a.m. to 5:00 p.m. Any deviations from these work hours need to be approved by the University. All necessary interruptions to the University utilities and roadways shall be kept to a minimum and shall be coordinated with the University two working days prior to the outage.

E. Geotechnical Engineering Study: Data concerning subsurface materials and conditions have been conducted by ATLANTIC GEOTECHNICAL SERVICES, INC. The report, entitled “Geotechnical Engineering Study, New Student Recreation Center, Longwood University, Town of Farmville, Virginia”, is included in the Project Manual as a matter of convenience and general information.

1. The accuracy or completeness of the data is not warranted or guaranteed by the Owner or the Architect, and in no event is it to be considered part of the Contract Documents. The Owner and Architect expressly disclaim any responsibility for the data as being representative of the conditions and materials which may be encountered.
2. If the Bidder deems the soils investigations to be inadequate or inaccurate, he may conduct his own investigation at his own expense. Prior to bid opening, bidder must inform the Owner and the Architect in writing of his concern and obtain permission in writing to conduct his investigation.

F. Hazardous Materials:

1. Asbestos: There is no known asbestos within the project Work area.
2. Lead-Based paint: There is no known lead-based paint within the project Work area.

G. Parking and Transportation: Refer to Section 01000 Special Conditions.

H. Utilities: Refer to Section 01000 Special Conditions.

I. Street Closures and Traffic Disruptions: Refer to Section 01000 Special Conditions.

J. Street Closures Protocol: Refer to Section 01000 Special Conditions.

K. Equipment and Material Storage: Refer to Section 01000 Special Conditions.

L. Protection of Existing Property and Safety: Refer to Section 01000 Special Conditions. Contractor shall meet all local, state, and federal safety regulations.
Construction means and methods shall remain the responsibility of the Contractor, as design professionals and Owner’s inspectors are neither considered nor licensed as general contractors in the eyes of the law.

M. Construction Fencing: Refer to Section 01000 Special Conditions.

N. Personnel Identification: Refer to Section 01000 Special Conditions.

O. Dust, Fume, and Noise Control: Refer to Section 01000 Special Conditions.

P. Use of Campus Facilities: Refer to Section 01000 Special Conditions.

Q. Code of Conduct: Refer to Section 01000 Special Conditions.

R. Signs and Advertisements: No signs or advertisements shall be posted on the University property unless approved by the University.

S. Site Clean-up: The contractor shall clean up the construction site at the end of each workday.

T. Blasting: Blasting will Not be allowed for rock excavation.

VI. QUESTIONS

A. The A/E will answer only those questions where the response is to direct the questioner’s attention to a particular portion of the bid documents.

B. ALL OTHER QUESTIONS SHOULD BE RECEIVED IN WRITING OR DOCUMENTED BY THE A/E AND RESPONDED TO IN WRITING IN AN ADDENDUM.

C. Two copies of all Addenda will be submitted to BCOM at the same time and by the same means as the Addenda are issued to the Bidders. Also, a copy will be sent to the Regional State Fire Marshal's Office which has jurisdiction over the project.

VII. SITE VISIT

A. Attendees are encouraged to visit the site of the proposed project to familiarize themselves with the existing conditions.

B. For site visits other than following the Pre-Bid Conference, contact David Pletcher, Longwood University’s Project Manager, 434.395.2297.
End of Agenda.
**STUDENT RECREATION CENTER**  
**LONGWOOD UNIVERSITY**  
**PRE-BID CONFERENCE ATTENDANCE SHEET**

**DATE:**  
Tuesday, August 30, 2005  
2:00 p.m.

**LOCATION:**  
Facilities Management Conference Room  
Bristow Building, Room 211  
Longwood University  
Farmville, Virginia

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<th>Name</th>
<th>Company</th>
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<tr>
<td>Bob Baxtin</td>
<td>Moseley Architects</td>
<td>804-794-7455</td>
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<tr>
<td>Tim Dean</td>
<td>Dero-Aden Associates</td>
<td>804-264-2228 Ph</td>
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<td>804-264-8773 Fax</td>
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<td>Gil Carpenter</td>
<td>Moseley &amp; St.</td>
<td>757-383-2800 Ph.</td>
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<td>Lauren Lyons</td>
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<td>Woodrow Hudson</td>
<td>KenbridgeCoast</td>
<td>434-676-8221</td>
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<td>434-676-8815 Fax</td>
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<td>Wade Amos</td>
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<td>434-385-4636 Fax</td>
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<td>David O'Lenahan</td>
<td>Longwood University</td>
<td>434-395-2097</td>
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<td>434-395-2097 (Fax)</td>
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<tr>
<td>Jaime English</td>
<td>Branch &amp; Assoc.</td>
<td>540-789-5215</td>
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<tr>
<td>Kevin O'Brien</td>
<td>TJAMERICAN</td>
<td>540-771-2611 FAX</td>
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<tr>
<td>Patrick Snyder</td>
<td>Moore's Elect+Mech</td>
<td>434-309-2542</td>
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# Pre-Bid Conference / On-Site Registry

**Project #:** 214-05-ReCenter  
**Title:** Student Rec Center  
**Buyer:** J. Crowley  
**Re: Qualified General & Mechanical Contractors**

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**Representative's Printed Name:**

**Representative's Signature:**

**Name of Firm:**

**Address of Firm:**

**Telephone Number:**

**Fascimile Number:**

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**Date:** August 30, 2005  
**Time:** AM / PM  
**Representative's Printed Name:** Jaime English  
**Representative's Signature:** Anna Blier  
**Name of Firm:** Branch & Associates  
**Address of Firm:** 3902 Franklin Road \ Roanoke, VA 24014  
**Telephone Number:** 540-909-5215  
**Fascimile Number:** 540-774-2611

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**J. E. Jamerson & Sons, Inc.**  
General Contractor & Building Supplier  
www.jejamerson.com  
Kevin O'Brien  
Project Manager  
P. O. Box 395  
402 N. Church Street  
Appomattox, Virginia 24522  
Fax: 434-352-0509  
E-mail: kobrien@jejamerson.com
# PRE-BID CONFERENCE / ON-SITE REGISTRY

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<th>Representative's Printed Name:</th>
<th>Tim Dean</th>
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<tr>
<th>Address of Firm:</th>
<th>8090 Villa Park Dr., Richmond, VA 23228</th>
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**MOSELEY ARCHITECTS**

ROBERT A. BAXTER, AIA
CONSTRUCTION CONTRACT ADMINISTRATOR
LEED® ACREDITED PROFESSIONAL

601 SOUTH LAKE BOULEVARD
RICHMOND, VA 23235
(804) 774-7556
FAX (804) 379-8600
bbaxter@moseleyarchitects.com
MOSELEYARCHITECTS.COM

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**MOSELEY ARCHITECTS**

GIL CARPENTER, AIA
SENIOR ASSOCIATE
PROJECT MANAGER

780 LYNNHAVEN PARKWAY, SUITE 200
VIRGINIA BEACH, VA 23452
(757) 385-2800
FAX (757) 386-2933
gpcarpenter@moseleyarchitects.com
MOSELEYARCHITECTS.COM

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**Representative’s Printed Name:**

| Wade Amos | David Fletcher |

**Fascimile Number:**

| 434-385-9081 | 434-395-2647 |

**Address of Firm:**

- **Southern Air Inc.**
  - 2655 Lakeside Dr.
  - Lynchburg, VA 24501

- **Longwood University**
  - 201 High Street
  - Farmville, VA 23909

**Telephone Number:**

- 434-385-1244
- 434-395-2297
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**Representative's Printed Name:** Alan Cook  
**Representative's Signature:** Alan Cook  
**Name of Firm:** Longwood University  
**Address of Firm:** Farmville, Va 23901  
**Telephone Number:** 434-395-2637  
**Fascimile Number:** 434-395-2647  
**Other:**

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**Representative's Printed Name:** Jim Simpson  
**Representative's Signature:**  
**Name of Firm:**  
**Address of Firm:**  
**Telephone Number:**  
**Fascimile Number:**  
**Other:**

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**Other:**