



Commissioning Report

Illinois Conference Center Expansion

UNIVERSITY OF ILLINOIS at URBANA – CHAMPAIGN



Facilities & Services; Engineering Services; Quality Assurance Division



**For New Construction & Major
Renovations**
(LEED-NC) Version 4.0

U.S. Green Building Council

1015 18th Street NW, Suite 805
Washington, DC 20036

(202) 828-7422 Phone (202) 828-5110 Fax

www.usgbc.org

info@usgbc.org

leedinfo@usgbc.org

www.leedbuilding.org

LEED® is a registered trademark of the U.S. Green Building Council.

Table of Contents

Executive Overview Commissioning Verification	4
COMMISSIONING AUTHORITY	4
COMMISSIONING PROCESS.....	4
OPR - REVIEW	5
BASIS OF DESIGN - REVIEW	6
Incorporating Changes during design	7
COMMISSIONING PLAN – DEVELOPMENT / IMPLEMENTATION	7
GENERAL LIST OF SYSTEMS INSPECTED / COMMISSIONED	7
COMMISSIONING SCOPING MEETING	7
COMMISSIONING SCOPE OF WORK	8
SUBMITTALS - CONSTRUCTION PHASE	8
Verification of Installation during Construction	9
Pre-Functional Checklists, Tests and Startup	9
REQUIREMENTS LEADING TO FUNCTIONAL TESTING.....	9
FUNCTIONAL TEST PROCEDURES (DEVELOPED by CxA).....	10
PREREQUISITES FOR FUNCTIONAL PERFORMANCE TESTING.....	10
EXECUTION OF FUNCTIONAL TESTING PROCEDURES	11
O&M Manual Requirements	12
SYSTEM COMMISSIONING SUMMARY.....	12
Commissioning Issues Log	13
RESOLVING COMMISSIONING ISSUES AND RETESTING	13

DEFERRED TESTING.....	13
FINAL ACCEPTANCE.....	14
FINAL COMMISSIONING REPORT	14
CONTINUAL VERIFICATION DURING WARRANTY PHASE.....	14
WARRANTY PERIOD & 10 MONTH REVIEW	14
LESSONS LEARNED REVIEW	14
CONTACT INFORMATION	15
APPENDIX A – OWNER’S PROJECT REQUIREMENTS	16
APPENDIX B – BASIS OF DESIGN	17
APPENDIX C – FUNCTIONAL TEST PROCEDURES	18
APPENDIX D – Building Equipment Schedule	19
APPENDIX E – CONSTRUCTION TEAM	21
APPENDIX F – PROJECT TEAM.....	21
APPENDIX G – F&S COMMISSIONING & INSPECTION GROUP	21
APPENDIX H – PRE-FUNCTIONAL & FUNCTIONAL TEST EXAMPLES	22
Appendix I – Partial listing of CxA Review of Shop Drawings, Submittals	33
Appendix J - Issues Log.....	35
APPENDIX K - E x a m p l e BAS Graphics Verification	42
Appendix L – O&M Manuals	46

Executive Overview Commissioning Verification

The University of Illinois is committed to commissioning the mechanical and electrical systems required for the reliable, safe, and secure operation of the Illinois Conference Center Expansion facility. Additionally, other components and systems in respective Divisions (sub-grade, foundation, structure, roofing, window assemblies, etc.), have been inspected by the City of Champaign. This process verifies these systems are complete and functioning properly as per the Design intent upon project completion.

Supporting documentation for the Systems identified for required Commissioning have been included with the Final O&M Manuals.

Project Progress as well as RFPs, Issues and Deficiencies were tracked and logged throughout the project. A summary snapshot of the Issues Log was provided as an example under Appendices O & P. There are no remaining critical functional issues affecting or impeding contractual obligations for this project.

The Design Review process completed jointly by the Commissioning Staff, the F&S Engineering Design Review Staff as well as the Conference Center Staff is further discussed later in this report as having reviewed the Design Documents for the intent of meeting the Project's intent (Program Statement / OPR) and subsequent Basis of Design BOD.

The Submittal Review process was subsequently completed independently coincident by the Commissioning Staff, the F&S Engineering Design Review Staff in parallel with the AE Design Team. The F&S Commissioning Staff provided their review and comments for all divisions of work not just for MEP areas.

Brian Huckstep, the Commissioning Lead Inspector for this Project also confirmed receipt of a Draft Set of O&M final Documentation from the Contractors. Red Line "as-builts" were reviewed and are now being used by the AE to create Record Drawings as part of their (AE) contract.

COMMISSIONING AUTHORITY

Brian Huckstep was the designated Commissioning Authority and primary author of this Report. He has been active with the University's Facilities and Services Quality Assurance Group, Inspection and Commissioning Services group providing Commissioning and Inspections and QA since joining the group in September 2007. The University continues to average in excess of (2) major new-construction projects (buildings) annually during his same tenure. The University has received USGBC LEED certification on previous major projects ranging from Silver to Platinum to date. Major Projects equate to buildings typically larger than 50,000 sq. ft. Mr. Huckstep does not report to or have any accountability to the University Construction / Construction Management Division or the University Planning Division. Mr. Huckstep also is independent of the AE Design group and independent of all Contractors.

Mr. Huckstep, as well as five Inspectors and one other Lead Inspector report to Mr. John Summers, the Associate Director for the F&S Quality Assurance Division of the University. Mr. Brian Huckstep is the Lead Inspector for this Project and also became LEED Accredited in 2008. Brian was the LEAD inspector and CxA for Ikenberry Residence Hall Phase C&D and Ikenberry Commons Residence Hall #2. Both of those projects were LEED certified.

Jointly, this group executes the Commissioning and Inspection Services for the University and may also call upon F&S Technical Trades to assist with testing services. This project is the twenty sixth University of Illinois at Urbana-Champaign project seeking LEED certification.

COMMISSIONING PROCESS

The University of Illinois Urbana-Champaign enacted this process initially in 1999 primarily following the basis of ASHRAE Guide 0.

Design Phase:

Commissioning activities began during the design phase of the project and will continue through the

warranty period.

As with this Project, the Commissioning Team's Services Agreement commences work on each Capital Construction Project on Campus with Planning and Design including reviewing the OPR and BOD. This Project and each Project exceeding \$5 million shall also follow and pursue USGBC LEED certification at least Silver or higher. All Design Phase AE submittals are reviewed by the Cx Team in parallel with the F&S Engineering group; neither are on the AE Design contracted team.

Construction Phase:

Equipment Submittals, cut-sheets and shop drawings were reviewed, in parallel, by the Project AE and the Commissioning Team. The latter phases in the overall commissioning process consisted of the Commissioning Team systematically documenting specified components and as-designed systems verifying they have been installed, started up properly and then functionally tested to additionally verify proper operation.

The U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) program has identified Fundamental Commissioning as a prerequisite (compulsory) process to be included in every LEED certified project. As part of the commissioning process, the project will be seeking US Green Building Certification under LEED Version 4.0 for this project that will require Fundamental Building Systems Commissioning.

This Summary covers the overall outcome of the Commissioning process for the Project, any history of deficiencies, outstanding issues, seasonal testing as may be scheduled at later date(s), functional performance of systems and verification by the CxA of the design meeting the OPR, Basis of Design as well as required documentation, training and overall compliance by the contractors. Each of these areas will be addressed with brief a summary, any analysis and recommendation.

OPR - REVIEW

The OPR is a follow-up overview to the University's Project Scope, relative to the building architecture and systems selected for commissioning. It was utilized to establish a baseline of performance expectations to which the actual installed performance is compared.

This OPR reflected the underlying assumptions and requirements that became represented in the construction documents. The OPR was initially developed by the Planning Division and confirmed by the AE at the owner's request, and may be found in Appendix A.

The Commissioning Authority is not responsible for design concept, design criteria or compliance with codes. The Commissioning Authority does not verify the designers' calculations or proof schematics or layouts in detail. The Commissioning Authority uses his or her knowledge to provide input into the areas checked. For example, the Commissioning Authority does not verify appropriate pipe or duct sizing, but may provide comments on unusually tight or restrictive duct layouts and bends or a poor location of a static pressure sensor.

In addition to the OPR citing directly related Codes and University Standards for energy efficiency environmental quality, the University-Required Program Statement (precedent and foundation of the OPR) clearly sets the requirements for Environmental and Sustainable Goals.

OCCUPANCY REQUIREMENTS

The Illinois Conference Center Expansion facility will be for conferences, events, meetings, etc. Environmental conditions will be consistent with ASHRAE Standards cited below.

PERFORMANCE REQUIREMENTS

Mechanical Design Codes & Standards

- All local codes and ordinances

- Latest issue of American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Handbooks on "Fundamentals" and "Systems"
- Applicable ASHRAE Standards including Standards 62 and 90.1
- Underwriters Laboratories (UL)
- Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
- American Society for Testing and Materials (ASTM)
- American National Standards Institute (ANSI)
- Air Conditioning and Refrigeration Institute (ARI)
- American Society of Mechanical Engineers (ASME)
- Occupational Safety and Health Administration (OSHA)
- National Fire Protection Association (NFPA)
- National Electrical Manufacturer's Association (NEMA).

Electrical Design Codes & Standards

- All local codes and ordinances
- National Electrical Code
- American National Standards Institute
- American Society for Testing and Material
- Electrical Testing Laboratories
- Illuminating Engineering Society
- Institute of Electrical and Electronics Engineers
- Occupational Safety and Health Administration
- National Electrical Manufactures Association
- National Fire Protection Association
- Underwriters Laboratories
- Americans with Disabilities Act

BASIS OF DESIGN - REVIEW

The BOD for this project was developed by the Engineer of Record for Illinois Conference Center Expansion and may be found in Appendix B.

Groundwork for the BOD started early in the Programming phase comparing various HVAC concepts suitable for this Project.

The CxA, with the assistance of the FM, GC, OR/PM and A/E, discussed the Basis of Design Summary for those building systems selected for commissioning during the Design Phase and documenting commissioning related comments and Engineer responses. While not specifically identifying each Design Review Comment as having come from or on behalf of the BOD, the formal contracted process by the F&S QA reviewers is to evaluate the Design and thus the BOD, for OPR - Scope and University Standards' compliance. Knowing revisions are often not completed in time for the next milestone, the formal review process for this Campus requires multiple reviews for "back-checking" not just one review midway or near the end of Design.

The BOD covered the following areas: Architecture, Site, Structural, Plumbing, Domestic Water, Sanitary, Storm Water, Fire Protection, Utilities, HVAC and Controls, Testing and Balancing, Electrical, Lighting and Lighting Control, Communications, Alarm and Emergency Generator.

Overall, the design was reviewed and comments provided by the F&S Commissioning team and the F&S Engineering group at each milestone SD, 50%CD, 95%CD, Bid Set and Addenda. Responses are required from the AE Design Team for each phase Pre-construction through Bid Set. Comments for Bid Set and any Addenda focus specifically to what was not yet evident or missed by the Design team commensurate of prior reviews.

The BOD complied with the University requirements. The Design also integrated VAV terminal boxes. Design Review Comments reminded the Engineer to meet the more stringent .4% occurrence of local design weather data.

Roles, responsibilities, additional detailed requirements and procedures were provided in the project specifications. These contract documents describe the process in more detail and also provide general instruction covering Construction Checklists, Test Procedures, forms, and other requirements used to guide the commissioning activities.

The General Commissioning plan was authored by the CxA with oversight from the AE for their due-diligence. The GC provided quality control and scheduling to the Project with only minor interpretation differences on timing of Documentation to the CxA.

References were also developed for the technical specification sections to integrate the commissioning process with the project technical requirements. The process was perceived adequately integrated with the normal construction process, (pre-functional checks, start-up activities, functional tests etc.).

Incorporating Changes during design

Changes were incorporated by the Design Team as recommended by the Owner and the FS Design Review and Commissioning Groups.

COMMISSIONING PLAN – DEVELOPMENT / IMPLEMENTATION

The Cx Plan explained roles and responsibilities of all associated participants; the CxA scope of work, listing of systems to be inspected and commissioned with expected documentation from the respective participants. The two documents as well as the Equipment Progress Log were also used to track and verify receipt of Contractor deliverables from Submittals, I-O&Ms, Pre-functional Checklists, Startups, Contractor tests, Functional Performance Tests (CxA witnessed sequences and operations filling out the FPTs.) The Project Architect also maintained a Submittal (approval) Log.

The final version of the Project's Cx Plan was authored by the Commissioning Authority (CxA), and supplemented by the University Project Manager (PM), and Contractors throughout the construction process as deemed appropriate to eventually form this overall Project Commissioning Record culminated at the end of the project. Throughout the commissioning process, the CxA revised the specific commissioning procedures and forms as deemed necessary to suit project field conditions and actual approved manufacturer's equipment, to incorporate test data, procedural results, and scheduling for the commissioning tasks.

GENERAL LIST OF SYSTEMS INSPECTED / COMMISSIONED

1. Utilities: (Electrical, Chilled Water, Heating Hot Water, Domestic Water, Communications, Alarm, Interior/Exterior Lighting, Plumbing System)
2. Building HVAC Systems: (RTUs, Boilers, Exhaust Fan, VAV's)
3. Building Automation System (managing, controlling, trending, graphics)

COMMISSIONING SCOPING MEETING

The "Kick off" meeting occurred on 01/27/20. The respective representatives of the GC, CA, PM, A/E and the Mechanical, Electrical, were in attendance. Each building system to be commissioned was addressed, including commissioning requirements, anticipated start-up schedules and completion. All parties agreed

on the scope of work, tasks, schedules, deliverables, and responsibilities and lines of reporting and communication for implementation of the Commissioning Plan during the scoping meeting.

The CxA-finalized Commissioning Plan used the information gathered from the scoping meeting. The initial commissioning schedule was developed along with a detailed timeline by the GC. The timeline was adjusted as construction progressed.

COMMISSIONING SCOPE OF WORK

In accordance with the Universal F&S Agreement to provide Commissioning Services on all major Capital Projects on the Campus for the University (in existence since 1999), the FSQA Inspection and Commissioning Group primarily follows ASHRAE Guide 0 with additional scope commencing with multiple reviews during Design; reviews (all) submittals; inspection of all construction; witnessing/verifying installations, startups, functional sequences and general performance in accordance with the BOD for utilities and MEP as well as specialty items i.e. elevators etc..

Commissioning activities in the Construction Phase proceeded from lower to higher levels of complexity. For each discrete subsystem or system, testing at the lower level was completed prior to starting the next higher level of tests. In general, the order of testing from lowest to highest was as follows:

1. Witness Static "Contractor" tests
2. Verify Completion of Construction (MEP) Pre-functional Checklists
3. Witness Start-ups
4. Verify documentation of Control point-to-point checks
5. Verify Balancing Documentation
6. Witness and verify documented Functional Performance Procedures
7. Verify Training
8. Confirm / recommend Acceptance (Substantial Completion)
9. Acknowledge ready for Occupancy (Substantial Completion Concurrence)
10. Verification during construction; this project achieved the following objectives according to the Contract Documents:
 - Ensure that applicable equipment and systems were installed properly and received adequate operational checkout by installing contractors.
 - Verify and document proper functional operational performance of equipment and systems.
 - Ensure that O&M documentation is complete or acknowledged date to be updated with updates.
 - Verify and document that systems and assemblies perform according to the BOD & OPR.
 - Verify that adequate and accurate system and assembly Record Documentation is provided / or acknowledged date to be provided to the owner.
 - Verify that operation and maintenance personnel and occupants are properly trained.
 - Utilize quality-based sampling techniques to detect systemic problems.

SUBMITTALS - CONSTRUCTION PHASE

The general contractor provided the CxA with major equipment electronic IO&M submittals for review/approval prior to installation. This equipment documentation typically included typical installation and start-up procedures, performance data and temperature control drawings where relevant. The subcontractors, GC, A/E and the Commissioning Authority discussed RFIs and change orders for potential impact to the OPR and/or operating parameter changes; added control strategies; sequences of operation, that was thought to affect commissioned systems. Commissioning submittal comments are also shown in Appendix I.

Verification of Installation during Construction

Site Observation

The FSQA Commissioning Inspection Group made periodic site visits to witness equipment and system installations, spot checking completed Construction Checklists submitted by the contractors.

The CxA / Lead Inspector / commissioning group attended selected planning and nearly all job-site meetings in order to remain informed on construction progress and to update parties involved in commissioning.

This process started at the beginning of the Construction Phase and continued through the current occupancy and operations (Warranty) period with actual verification of operational sequences and overall performance.

The Illinois Conference Center expansion is now operating with no known active problems or complaints as of this Report.

Verification during the construction of this project achieved the following specific objectives according to the Contract Documents:

- That applicable equipment and systems were installed properly and received adequate operational checkout by the installing contractors.
- HVAC, electrical, plumbing and domestic water system each completed Contractor Checklists (Functional Checklist), Manufacturer's startups (as specified) with Mfr. Supervision on VFD drives (as specified), emergency generation, and sequential functional testing with operational BAS graphics have been reviewed by the Cx group
- See Listing of completed Startup Checklists and Functional Test Procedures in Appendix H.

Pre-Functional Checklists, Tests and Startup

Construction Checklists (CC) [Pre-Functional Procedures] The CCs are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., oil levels OK, fan belt tension, labels affixed, gages in place, sensor calibration, etc.). However, many Construction Checklist items entail simple testing of the function of a component, a piece of equipment or system which will be combined with the manufacturer's start-up checklist.

The contractor is required to provide a full checkout for each major piece of MEP equipment. In general, the contractors are to complete CCs for all equipment and systems prior to formal performance testing of equipment or subsystems of the given system.

These checklists were verified by the Commissioning team as having been completed by the installers.

Example Contractor Tests and Startup Procedures may be found in Appendix H. The Lead Inspector has verified Startup procedures were properly followed and related documentation has been included within each hardbound O&M Manual.

REQUIREMENTS LEADING TO FUNCTIONAL TESTING

The following sequential priorities were followed that would also not conflict with LEED goals:

- Equipment is not (and was not) "temporarily" started (for heating or cooling), until installation checklist items and all manufacturers' pre-start procedures are (were) completed. Additionally moisture, dust and other environmental and building integrity issues have been fully addressed / controlled.
- System verification testing was not begun until Construction Checklists (Pre-Functional Checklists) and approved plans for Start-up and initial TAB and subsequent Startup(s) were accepted by the CxA for the HVAC system.

- The controls system and equipment it controls were not functionally tested until all points had been calibrated and Construction Checklists were completed. Minor questions pending resolution did not prevent system checkout and commissioning from proceeding.
- Equipment operation was not allowed until the envelope was completely enclosed and ceilings were complete, and the IAQ Plan was fully met.
- TAB was not performed until the controls system had been started, calibrated, sufficiently functionally tested, and approved by the A/E.

FUNCTIONAL TEST PROCEDURES (DEVELOPED by CxA)

Overview

Functional testing is the dynamic testing of components and systems (rather than just components) ideally under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through the control system's sequences of operation and components are verified to be responding as the sequences state. The CxA develops Test Procedures in a sequentially written format for Contractor testing and documenting of the actual performance witnessed by the CxA.

Functional testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers. The CxA will follow the specifications and use judgment where needed to determine which method is most appropriate. According to the specifications, not all pieces of identical equipment necessarily receive in-depth testing.

PREREQUISITES FOR FUNCTIONAL PERFORMANCE TESTING

The following as-applicable prerequisite checklist items are required to be listed on respective associated test form(s) and be completed prior to being checked off by the Commissioning Authority (CxA) prior to functional testing.

Checklist for GC/CxA prior to Functional Testing

Post Startup Pre-Requisites for Functional Performance Testing	GC Verified	CxA Verified
All related equipment has been started up and start-up reports have been submitted and approved by the A/E and Construction Checklists have completed by contractor.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
All control system functions for this and all interlocking systems are programmed and operable per contract documents, including final set-points and schedules with debugging, loop tuning and sensor calibrations completed.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Piping system flushing complete and required report approved.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Water treatment system complete and operational.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Test and balance (TAB) complete and approved for the Hydronic and air systems.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
All A/E punch-list items for this equipment corrected or at least confirmed for resolve.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Safeties and operating ranges reviewed by Operations.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Test requirements and sequences of operation included.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Sufficient clearance around equipment for servicing.	<input type="checkbox"/>	<input type="checkbox"/>
Record of all values for pre-test set-points changed to accommodate testing has been made and a check box provided to verify return to original values (control parameters, limits, delays, lockouts, schedules, etc.).	<input type="checkbox"/>	<input type="checkbox"/>
Other miscellaneous checks of the CC checklist and start-up reports completed successfully.	<input type="checkbox"/>	<input type="checkbox"/>

EXECUTION OF FUNCTIONAL TESTING PROCEDURES

Overview and Process

For any given system, prior to performing functional testing, the CxA will wait until the respective CC has been submitted with the necessary signatures, confirming that the system is ready for functional testing.

Each Contractor shall conduct a thorough and systematic performance test of each individual element, subsystem, and total system, in the presence of the Architect/Engineer and Owner. Test(s) shall demonstrate that all systems and components operate, in all reasonable respects and comply with the requirements of the contract documents. Notably test all control, alarm, and specialty systems integral to or necessary for the proper functioning of the building.

- The control system is tested before it is used to verify performance of other components or systems.
- The air balancing and water balancing is completed and systems “debugged” before functional testing of air-related or water-related equipment or systems.
- Testing commences from components to subsystems to systems and finally to interlocks and connections between systems.

The contractor performs the testing and the CxA oversees and witnesses the functional testing of all equipment and systems according to the OPR and the Specifications. The CxA ensures the FT is documented. This Project required the Contractors to make ready for witnessing by pretesting, documenting their FT procedures and sending them to the CxA for review before agreeing to schedule the final witness testing.

The completed Functional Test Procedures reside in Appendix H.

Change orders for this Project have not hampered or substantially altered the intent of the Project or the Commissioning process.

The University Facilities and Services Inspectors were involved throughout the construction Process observing installation, Contractor (pressure) tests, startups, and witnessing of operational / Functional testing.

The Controls Contractor submitted their point to point checkout / verification sheets and their graphic based control logic sheets. The CxA has requested additional Controls Contractor verification proving calibration has been completed for all devices. This was provided by the CC.

Testing and Balance reports. The TAB Report was submitted 10/1/20. Final TAB Reports were provided with Final O&M Manuals.

Verify and document proper functional operational performance of equipment and systems.

- The FSQA Cx team witnessed the Temperature Control Contractor point-to-point checkouts.
- Lighting and Lighting-Control were verified to be properly operating and witnessed by the CxA.
- Other “Non-LEED” systems such as the fire alarm, architecture structure, windows, doors, hardware, meeting rooms, and other mechanical / electrical services function properly.

O&M Manual Requirements

The requirements for the Manuals were incorporated into the project specifications as noted earlier.

As of this Report, the Lead Inspector verifies the Owner has received acceptable O&M Manuals. Refer to Appendix L.

SYSTEM COMMISSIONING SUMMARY

With respect to their Division of responsibility, each Contractor was required to conduct and record a functional test of each individual (major) element, subsystem, and total system, then repeat the same procedure matching this data in the presence of the Architect/Engineer, CxA and Owner (at the Owner's option to attend).

Completed Testing demonstrated respective systems and components operated in all reasonable respects and comply with the intent of the contract documents.

Testing (including control, alarm, and specialty systems) integral to or necessary for the proper functioning of the building, included but was not limited to:

- All Electrical Systems including lighting; (Note that Electrical Systems involved testing early on and are associated with the Pre-Functional Phase or Contractor Testing.)
- Building Automation Systems Control
- HVAC.
- Plumbing & Domestic Water
- *(Non-LEED Testing performed by F&S QA)*
 - Fire Alarm System*
 - Subgrade utilities (pressure tests)*

Refer to Appendix C for a List of completed major mechanical and electrical FT Procedures.

In accordance with the Specifications, the CxA would require the Contractor to correct or adjust deficiencies in operation noted during testing and required resolution prior any retest.

The following concerns were resolved by the Engineer, Contractors and Manufacturers.

- The RTUs were installed without Preheat Coils before the Heat Recovery Wheels and the Chilled Water Coils. The mechanical contractor removed the Heating Coils and installed them in the proper place in the units to resolve the issue to prevent freezing issues.
- There were a few areas where access to the VAVs and control valves was an issue for maintenance and for our team to be able to do the commissioning. Larger Access panels were installed and a platform was built and installed above one of the ceilings.

To summarize, all systems now control as per the Specifications, operate and function in accordance with the Project's scope and requirements.

- Lighting and related control function as designed.
- The HVAC has been functioning.
- Ventilation has been monitored along with utilities being used.
- Heating (re-heating) has been functioning since early summer.

Verify that adequate and accurate system and assembly documentation is provided to the owner. See also Verification of Installation & performance of Systems Checklist.

- We have received electronic (PDF) Draft set of O&M Manuals which include one-line diagrams and the Pre-Functional and Functional Forms for the Project.

- The Architect has received the final As-Built drawings to complete the Project Record Drawings.

Utilize quality-based sampling techniques to detect systemic problems.

The BAS DDC Inspecting Supervisor verifies sampling was performed in accordance with Specifications. Periodic monitoring using the BAS Graphics in addition to onsite inspections were used to identify potential issues.

All issues and requested changes have been addressed. Those that have not either been corrected or scheduled for resolution will remain on the Punch List until resolved or accepted by the Owner.

Commissioning Issues Log

The Issues Log may also be known as deficiency or non-conformance reports. Note that as Issues are resolved the subsequent published log may only include outstanding items. During this project we noted 53 issues that needed to be addressed during commissioning of the project. The items noted are closed as of the writing of this report.

Commissioning Issues are submitted as soon as they are discovered during the Construction and Occupancy and Operations Phases. All open issues must be satisfied by the Contractor in order to be closed by the PM for Contract to be closed out.

The Issues Log then summarizes the issues and provides issue status at-a-glance for those outstanding items. Refer to Appendix J for example and current status.

RESOLVING COMMISSIONING ISSUES AND RETESTING

The Inspectors and CxA recorded deficiencies identified during the verification testing on an issues list and reported to the owner. The deficiency report includes some detail of the components or systems found to be non-compliant with the parameters of the test plans.

Corrections of minor deficiencies identified may be made during the test(s) at the discretion of the CxA with the concurrence of the owner. In such cases the deficiency and resolution will be documented accordingly. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.

For identified deficiencies:

If there is no dispute on the deficiency and the responsibility to correct it:

The contractor corrects the deficiency and notifies the CxA that the equipment is ready to be retested. The CxA reschedules the test and the test is repeated.

If there is a dispute about a deficiency or who is responsible:

The deficiency is documented on the issues form and a copy given to the GC/OR. Resolutions are made at the lowest management level possible. Final interpretive authority is with the GC/OR and the A/E. The CxA documents the resolution process.

Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency and notifies the CxA that the equipment is ready to be retested. The CxA reschedules the test and the test is repeated until satisfactory performance is achieved.

An Issues Log has been compiled between the GC and the Lead Inspector. It was summarized and was continually updated. Completed issues may either “roll off” or hidden such as row hiding in an Excel spreadsheet. Refer to Appendix J for an excerpt of the Issues Log.

DEFERRED TESTING

Unforeseen / Deferred Tests: If any test cannot be completed due to the building structure, required occupancy condition, or other deficiency, the functional testing may be delayed upon approval of the owner. These tests are conducted in the same manner as the seasonal tests as soon as possible.

Seasonal Testing: Seasonal variation in operations or control strategies may require additional testing during the opposite season to verify performance of the HVAC system and controls. During the warranty

period, seasonal testing and other deferred testing is completed as required to fully test all sequences of operation. F&S QA and the Owner coordinate these activities. Tests are executed and documented, with deficiencies corrected by the appropriate contractors. Any final adjustments to the O&M manuals and as-builts due to the testing are subsequently completed as the case may be by the Contractor or later by the Owner.

Construction contracts require participation of the Contractors throughout the Warranty period as discoveries arise. In this case occupancy did not occur until September. Accordingly, Contractors will still be expected to participate / resolve any latent deficiencies.

FINAL ACCEPTANCE

Architect/Engineer make the final inspection with the General Contractor to ensure completion of all contract requirements. The Lead inspector and CxA verifies that any outstanding items are complete, before the contractors can receive their final payments.

FINAL COMMISSIONING REPORT

After completion of all commissioning activities, the Commissioning Authority issues this report becoming the Final Report documenting the overall results of the commissioning process.

The CxA recommends acceptance of the completed commissioning process and related documentation as provided to the owner.

See Appendix K showing example graphics confirming stable operation.

CONTINUAL VERIFICATION DURING WARRANTY PHASE

Verification during and post construction of this project is intended to achieve the following specific objectives according to the Contract Documents:

- Ensure that applicable equipment and systems are installed properly and receive adequate operational checkout by installing contractors.
- Verify and document proper performance of equipment and systems.
- Ensure that O&M documentation is complete.
- Verify and document that systems and assemblies perform according to the OPR.
- Verify that adequate and accurate system and assembly documentation is provided to the owner.
- Verify that operation and maintenance personnel and occupants are properly trained.
- Utilize quality-based sampling techniques to detect systemic problems.
- Verify proper coordination among systems and assemblies.

The CxA verifies the above objectives have been achieved and where applicable additional documentation has been provided.

WARRANTY PERIOD & 10 MONTH REVIEW

During the warranty period, seasonal testing and other deferred Contractor testing required are to be completed according to the specifications. Tests are executed and deficiencies corrected by the appropriate subs and witnessed by the CxA group. Any final adjustments to the O&M manuals and as-builts due to the testing are made at that time by the contractors. In accordance with the University standard F&S Services agreement, approximately 10 months into the warranty period, a one day review session is to be held on site to review systems operation with O&M staff prior to expiration of the warranty. 10th Month Warranty Review Walkthrough is designated to include the results of this session.

LESSONS LEARNED REVIEW

After completion of all commissioning activities and before the end of the warranty period, a 'lessons' learned review is to be held on site with the Commissioning Team in attendance. The purpose of the review session is to obtain honest, objective, and constructive feedback on the effectiveness of the

commissioning process used and changes that will improve the delivered project.

CONTACT INFORMATION

Refer to Appendix E – Contacts for Construction Team,
Refer to Appendix F – Contacts for Project Team,
Refer to Appendix G – Contacts for the Commissioning Team.

ILLINOIS CONFERENCE CENTER EXPANSION

APPENDIX A – OWNER’S PROJECT REQUIREMENTS

Owner’s Project Requirements (OPR) Illinois Conference Center Expansion

Contents

INTRODUCTION.....	3
Purpose	3
Needs Assessment	3
Project Description Update & Goals	3
PROJECT-SPECIFIC DESIGN GOALS	4
OCCUPANCY & USE	4
SUSTAINABILITY & ENERGY EFFICIENCY.....	5
BUILDING SITE	5
TRANSPORTATION & PARKING	6
BUILDING ENVELOPE.....	6
INDOOR ENVIRONMENTAL QUALITY.....	6
TELECOMMUNICATIONS AND AUDIO/VISUAL SYSTEMS.....	7
SECURITY	7
HAZARDOUS MATERIALS	7
FURNISHINGS AND EQUIPMENT (F&E).....	8
COMMISSIONING, INSPECTION & QUALITY ASSURANCE	8
CONSTRUCTION COMPLETION AND TURNOVER	8
OPERATION & MAINTENANCE	9
OWNER TRAINING.....	9
POST-OCCUPANCY AND WARRANTY	9

INTRODUCTION

Purpose

This Owner’s Project Requirements (OPR) document outlines functional requirements of the project and expectations of how the facility and its systems will be used and operated. The OPR is required for LEED certification of the project, but also serves three broader vital purposes:

1. Provides the design team with information necessary to develop the Basis of Design (BOD) during program verification and/or schematic design, which serves as a “road map” for development of the design and construction documents.
2. Provides the commissioning (Cx) team with tangible benchmarks to measure success & quality.
3. Serves, along with the BOD and contractor deliverables such as “as-built” documents, as the foundation for the Systems Manual outlined below.

The Owner will develop and update the OPR through program verification and schematic design, or until the Commissioning Authority (Cx) assumes responsibility for refining and augmenting the OPR throughout design, construction, and the post-occupancy period of one year following Substantial Completion of construction. As decisions are made during the life of the project, this document shall be updated to reflect the current requirements of the University.

The Owner is Fox/Atkins Development, LLC (F/A). Primary users and stakeholders include the University Housing (UH) and I Operations LLC (I Ops). The entities responsible for project management and delivery are Dodds Company (DC) and Fox/Atkins Development, LLC (F/A). The organizations responsible for operation and maintenance of the facility are I Operations, LLC and the University of Illinois Facilities and Services (F&S).

Needs Assessment

The existing Conference Center is an excellent asset which has generated nearly \$3 million in operating profit for the University by I Operations since its opening.

There is a need for conference space that can house 750+ attendee events in Champaign-Urbana.

Exploratory meetings followed by working sessions with user groups have corroborated this need and provided valuable feedback to ensure success.

Adding an additional gross 14,000 SF of space would maximize potential revenues without sacrificing existing Illinois Conference Center meeting space.

Adding space to the existing conference center is the most expedient way to accommodate meetings and other events with attendance of over 750 persons and advance further economic development for the community.

Current facility carpet was installed as part of the original construction and will be replaced as part of this project. The A/V system in the existing facility has had operational issues since the facility was opened and will be updated in tandem with the expansion.

Project Description Update & Goals

Provide a larger, more flexible exhibit hall space, pre-function area, and back of house support space including a staging kitchen, ware-washing, receiving, and additional storage. Also, the expansion will

provide more small meeting rooms and conference rooms, public restrooms, and a coat room. The site will contain additional parking while providing delivery truck access to the new expansion and improving truck/vehicle access to TDFC IV (existing building).

- Provide up to 14,000 GSF of dividable Exhibit Hall space with folding, acoustically adequate partitions
- Provide Pre-function Space to accommodate the anticipated audiences for the exhibit halls & meeting rooms
- Provide adequate support space for serving the exhibit halls
- Provide smaller Meeting Rooms (800 SF & 1000 SF)
- Provide one 300 SF Conference Room
- Provide Reception area
- Provide new accessible restrooms
- Provide Coat Room
- Provide adequate MEP, A/V, and IT support space

Building Area:

- Original Building: 38,550 GSF
- Expansion Area: 32,500 GSF
- Total Building Area: 70,050 GSF

PROJECT-SPECIFIC DESIGN GOALS

1. Flexibility and Future Expansion:
 - a. The proposed facility will expand the existing conference center and provide the community with access to a size of event space that is not currently available in Champaign-Urbana.
 - b. Provide event spaces with the flexibility to meet guest needs.
2. Quality and Context:
 - a. The University seeks a design that replicates the quality of the current Illinois Conference Center.
 - b. The exterior design must be sensitive to the orientation and character defining features of the existing nearby buildings.
 - c. Interior spaces must provide functionality, accessibility, and a superior environment with high indoor air quality and proper acoustics.

OCCUPANCY & USE

The anticipated hours of operation will be 6AM-11PM 7 days a week.



COMMISSIONING REPORT

ILLINOIS CONFERENCE CENTER EXPANSION

APPENDIX B – BASIS OF DESIGN



Design Narrative

ILLINOIS CONFERENCE CENTER ADDITION

June 14, 2019

Preliminary Scope Outline

The new single-story addition is approximately 33,500 sq. ft. and consists of six (6) interconnected exhibit halls, a large pre-function space, meeting rooms, break-out spaces, offices and other supporting spaces.

Structural & Architectural

A. SUBSTRUCTURE

Foundations

- I. Standard Foundations (Pending Geotechnical Investigation)
 - a. Shallow cast-in-place concrete spread footing for columns
 - b. Shallow cast-in-place concrete continuous footing for walls
- II. Slab on Grade
 - a. Sub-grade preparation extent and procedure pending geotechnical investigation
 - b. 5" slab thickness. Thicknesses may vary due to usage of areas
 - c. WWF or structural fiber reinforcement
 - d. Thickened slab below stair stringers and interior non-load bearing masonry walls

B. SHELL

Superstructure

- I. Floor Construction
 - a. Concrete on composite metal deck (10 foot maximum span), steel beams, girders and columns
 - b. Sample framing is indicated on attached **Structural Sketch**
- II. Roof Construction
 - a. Metal deck (5 foot maximum span), open-web steel joists, beams and girders
 - b. At mechanical locations, concrete on composite metal deck (4" total thickness) supported by steel beams and girders are expected
- III. Extended Canopy
 - a. Steel framing consists of channels, angles, HSS and/or joist chords
- IV. Main Wind Force Resisting System
 - a. Steel braced frames
- V. Other Structural Notes
 - a. The tall volume spaces shall be constructed of bearing pre-cast concrete panels with thin brick and simulated stone appearance through integral concrete dyes.

Exterior Enclosure

- I. Wall Assembly
 - Option 1
 - Impact Resistant Gypsum Board

Page 1

Design Narrative

- 6" Mt. Stud /16-18ga @16" O.C.
- Dens Glass Gold Sheathing (5/8")
- Spray on AVM Barrier (Synthetic)
- 3" Polyiso
- 1 1/2" Air Space
- Veneer – Cast Stone or Brick

Note: Modular Cast Stone – 12"x24" size – rough cut/buff color
Brick – Modular/Standard color

Exterior Windows

- I. Aluminum Framing
 - a. Clear anodized finish
 - b. Manufacturers: Basis of Design
 - i. Kawneer - 1600 System 1 w/horizontal sun shelf 30" deep (in select locations) and 451T (typical storefront).
 - c. Heavy Duty Aluminum Entry Doors w/continuous geared hinges.
- II. Perimeter Sealant: Silicone (Dow 756 SMS)
- III. Testing
 - a. Assume water / air testing for 2% of openings.

Glazing

- I. Double Glazed – Double Coated Silver Low-E (Tinted)
 - a. 1" Insulated Glass
 - b. Manufacturers: Basis of Design
 - i. Guardian glass
 1. 1/4" Gray, 1/4" Argon, 1/4" Clear
 2. LowE on third surface
 3. Thermally improved spacer - Warm Edge

Cavity Closure

- I. Location: Both jambs and sill assuming steel lintel at head
- II. Stainless Steel

Exterior Doors

- I. Aluminum
 - a. Fully glazed – Insulated glass
 - b. 8'-0" Height
- II. Insulated Hollow Metal
 - a. Painted
 - b. Galvanized (inside and outside jamb)
 - c. Polyisocyanurate core
- III. Insulated coil doors
 - a. C.H.I. 20 Gage Series 6000 Insulated Coil Door
 - i. Profile: Flat, Insulated 2 1/2" High x 13/16" Deep
 - ii. No vision lights
 - iii. Electric operator
 - iv. Safety Devices: Photoelectric sensor, electric edge-four wire.
 - v. Factory Finish

Page 2



COMMISSIONING REPORT

















ILLINOIS CONFERENCE CENTER EXPANSION

APPENDIX C – FUNCTIONAL TEST PROCEDURES

Construction Phase Start-Up Sheets & Functional Test Forms

► Conference Center ► Conference Center Addition ► Functional Test Forms

☐ Name

-  Conference Center Addition Packaged Boiler FT
-  domestic_water_heater_construction_checklist
-  ERU-1 Pre-functional Checklist
-  ERU-2 Pre-functional Checklist
-  Fans Functional Performance Test
-  FT- ERU-1 -Seq of Operations
-  FT- ERU-2 -Seq of Operations
-  heat_exchanger_rev1
-  Lighting Controls Functional Test
-  Photovoltaic Checklist
-  Plumbing Fixtures
-  Pumps Functional Performance Test
-  RTU-1 Pre-functional Checklist
-  RTU-2 Pre-functional Checklist
-  VAV Box Functional Performance Test
-  VFD Functional Performance Test



COMMISSIONING REPORT

ILLINOIS CONFERENCE CENTER EXPANSION

APPENDIX D – Building Equipment Schedule

Equipment Tag	Description
Toilet Accessory Schedule	
Hand Driers	Dryer, Mounted For Hand Drying
Plumbing Fixture Schedule	
WC-1	Accessible Water Closet
WC-2	Water Closet
UR-1	Accessible Urinal
L-1	Accessible Lavatory W/ Sensor Faucet
L-2	Accessible Lavatory
MB-1	Janitors Mop Receptor
EWC-1	Recessed Accessible Electric Hi-Lo Water Cooler W/ Remote Chiller
HB-1	Hose Bibb
Water Heater (Gas Fired) Schedule	
WH-1	Gas Water Heater
Thermostatic Mixing Valve	
TMV-1	Manufacturer: Leonard
TMV-2	Manufacturer: Leonard
Hot Water Recirculation Pump	
HWCP-1	Manufacturer: Taco
Schedule of Packaged Modular Boilers	
B-1	Boilers
B-2	Boilers
Roof Top Unit	
RTU-1	Model# RN-075-3-0-OWON -EHL
RTU-2	Model# RN-031-3-0-OWON -EHL
Schedule of Energy Recovery Units	
ERV-1	Energy Recovery Units
ERV-2	Energy Recovery Units
Schedule of Water to Water Plate Heat Exchangers	
HX-1	Heat Exchangers
Schedule of Fans	
EF-1	Fan
Pump Schedule	
CWP-1,2	Cold Water Pump
HWP-1,2	Heat Water Pump
HWP-3,4	Heat Water Pump
Variable Air Volume Box Schedule	



COMMISSIONING REPORT

ILLINOIS CONFERENCE CENTER EXPANSION

V1-1	Variable Air Volume Box
V1-2	Variable Air Volume Box
V1-3	Variable Air Volume Box
V1-4	Variable Air Volume Box
V1-5	Variable Air Volume Box
V1-6	Variable Air Volume Box
V1-7	Variable Air Volume Box
V1-8	Variable Air Volume Box
V1-9	Variable Air Volume Box
V1-10	Variable Air Volume Box
V2-1	Variable Air Volume Box
V2-2	Variable Air Volume Box
V2-3	Variable Air Volume Box
V2-4	Variable Air Volume Box
V2-5	Variable Air Volume Box
V2-6	Variable Air Volume Box
V2-7	Variable Air Volume Box
V2-8	Variable Air Volume Box
V2-9	Variable Air Volume Box
V2-10	Variable Air Volume Box
V2-11	Variable Air Volume Box
V2-12	Variable Air Volume Box

Misc.

Lighting Controls
Electrical Panels
Electrical Outlets
VFD's
PVs

Lighting Controls
Electrical Panels
Electrical Outlets
Variable Frequency Drives
Photovoltaic Solar Panels



COMMISSIONING REPORT

ILLINOIS CONFERENCE CENTER EXPANSION

APPENDIX E – CONSTRUCTION TEAM

Division of Work

[Division 01 - General Work](#)

[Division 02 - Plumbing Work](#)

[Division 03 - Heating, Piping, Refrigeration, and Temperature Control Work](#)

[Division 04 - Ventilation and Air Distribution Work](#)

[Division 05 - Electrical Work](#)

Contractor

Dodds Company

Reliable Plumbing and Heating Co

Reliable Plumbing and Heating Co

Reliable Plumbing and Heating Co

Davis Electric

APPENDIX F – PROJECT TEAM

Conference Center Team

Developer	Fox/Atkins Development, LLC
General Contractor/Cost Estimating	Dodds Company
Architect of Record	Cordogan Clark & Associates
Interiors	Aria Group
Site Civil Engineering	Precision Engineering
Exterior Landscape	Jim Schmidt, former UIUC Horticulture Specialist & Crop Sciences Professor

APPENDIX G – F&S COMMISSIONING & INSPECTION GROUP


Name	Title	Phone	Email
Brian Huckstep	Lead Inspector/Construction Superintendent LEED AP	(217) 333.1852	bdhuckst@illinois.edu
Jonathan Jakobsson	Lead Inspector/Construction Superintendent	(217) 265-6849	jakobssn@illinois.edu
Randy Bachert	Mechanical Construction Superintendent	(217) 714-9489	rlbacher@illinois.edu
Josh Pllum	Electrical Construction Superintendent	(217) 300-0617	jpllum@illinois.edu
Randy Grace	Mechanical Construction Superintendent	(217) 244-5079	rgrace@illinois.edu
John Summers	Associate Director	(217) 244-9990	summersj@illinois.edu
Dave Lancaster	Electrical Construction Superintendent	(217) 300-2347	dlancast@illinois.edu
Bryan Elliott	Mechanical construction Superintendent	(217) 300-0028	belliot1@illinois.edu



Commissioning Report ILLINOIS CONFERENCE CENTER EXPANSION

APPENDIX H – PRE-FUNCTIONAL & FUNCTIONAL TEST EXAMPLES

RTU- example:

12/13/2020	AHU Pre-functional Checklist RTU-1		Date: 9/1/20		
		Project: Conference Center Addition			
Description	Yes	No	N/A	Initials	Comments
1 Cabinet and General Installation					
2 Permanent labels affixed, including for fans	X				
3 Casing condition good: no dents, leaks, door gaskets installed	X				
4 Access doors close tightly - no leaks	X				
5 Boot between duct and unit tight and in good condition	X				
6 Vibration isolation equipment installed & released from shipping locks	X				
7 Maintenance access acceptable for unit and components	X				
8 Sound attenuation installed			X		
9 Thermal insulation properly installed and according to specification	X				
10 Instrumentation installed according to specification (thermometers, pressure gages, flow meters, etc.)	X				
11 Clean up of equipment completed per contract documents	X				
12 Filters installed and replacement type and efficiency permanently affixed to housing—construction filters removed	X				
Valves, Piping and Coils					
13 Pipe fittings complete and pipes properly supported	X				
14 Pipes properly labeled	X				
15 Pipes properly insulated	X				
16 Strainers in place and clean	X				
17 Piping system properly flushed	X				
18 No leaking apparent around fittings	X				
19 All coils are clean and fins are in good condition	X				
20 All condensate drain pans clean and slope to drain, per spec	X				
21 Valves properly labeled	X				
22 Valves installed in proper direction	X				
23 OSAT, MAT, SAT, RAT, chilled water supply sensors properly located and secure (related OSAT sensor shielded)	X				
24 Sensors calibrated	X				
25 Motors: Premium efficiency verified, if spec'd?	X				
26 P/T plugs and isolation valves installed per drawings	X				
Fans and Dampers					
27 Supply fan and motor alignment correct	X				
28 Supply fan belt tension & condition good	X				
29 Supply fan protective shrouds for belts in place and secure	X				
30 Supply fan area clean	X				
31 Supply fan and motor properly lubricated	X				
32 Return/exhaust fan and motor aligned	X				
33 Return/exhaust fan belt tension & condition good	X				
34 Return/exhaust fan protective shrouds for belts in place and secure	X				
35 Return/exhaust fan area clean	X				
36 Return/exhaust fan and motor lube lines installed and lubed	X				
37 Filters clean and tight fitting	X				
38 Filter pressure differential measuring device installed and functional (magnahelic, inclined manometer, etc.)			X		
39 Smoke and fire dampers installed properly per contract docs (proper location, access doors, appropriate ratings verified)			X		
40 All dampers close tightly	X				

1



Commissioning Report ILLINOIS CONFERENCE CENTER EXPANSION

41	Balance damper linkages have minimum play			x		
42	Low limit freeze stat sensor located to deal with stratification & bypass	x				
	Ducts (preliminary check)					
43	Sound attenuators installed			x		some VAV Boxes have Sound Att
44	Duct joint sealant properly installed	x				
45	No apparent severe duct restrictions	x				
46	Turning vanes in square elbows as per drawings	x				
47	OSA intakes located away from pollutant sources & exhaust outlets	x				
48	Pressure leakage tests completed			x		
49	Branch duct control dampers operable	x				
50	Ducts cleaned as per specifications	x				
51	Balancing dampers installed as per drawings and TAB's site visit	x				
	Electrical and Controls					
52	Pilot lights are functioning	x				
53	Power disconnects in place and labeled	x				
54	All electric connections tight	x				
55	Proper grounding installed for components and unit	x				
56	Safeties in place and operable	x				
57	Starter overload breakers installed and correct size	x				
58	Sensors calibrated (see below)	x				
59	Control system interlocks hooked up and functional	x				
60	Smoke detectors in place	x				
61	All control devices, pneumatic tubing and wiring complete	x				
	VFD					internal to unit
62	VFD powered (wired to controlled equipment)			x		
63	VFD interlocked to control system			x		
64	Static pressure or other controlling sensor properly located and per drawings and calibrated			x		
65	Static pressure or other controlling sensor calibrated			x		
66	Drive location not subject to excessive temperatures			x		
67	Drive location not subject to excessive moisture or dirt			x		
68	Drive size matches motor size			x		
69	Internal setting designating the model is correct			x		
70	Input of motor FLA represents 100% to 105% of motor FLA rating			x		
71	Appropriate Volts vs Hz curve is being used			x		
72	Accel and decel times are around 10-50 seconds, except for special applications. Actual decel = _____ Actual accel = _____			x		
73	Lower frequency limit at 0 for VAV fans and around 10-30% for chilled water pumps. Actual = _____			x		
74	Upper frequency limit set at 100%, unless explained otherwise			x		
75	Unit is programmed with full written programming record on site			x		
	TAB					
76	Installation of system and balancing devices allowed balancing to be completed following specified NEBB or AABC procedures and contract documents	x				
	Final					
77	Smoke and fire dampers and unpowered TU's are open			x		
78	Startup report completed with this checklist attached	x				
79	Safeties installed and safe operating ranges for this equipment provided to the commissioning agent	x				



Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION

	12/13/2020					
80	If unit is started and will be running during construction: have quality filters on RA grills, etc. to minimize dirt in the ductwork and coils and in any finished areas. Verify moisture migration is not a problem, due to improper pressures between spaces.	x				
81	Supply fan rotation correct	x				
82	Return/exhaust fan rotation correct	x				
83	Fans > 5 Hp Phase Checks:	x				
84	(%Imbalance = $100 \times (\text{avg.} - \text{lowest}) / \text{avg.}$)					
85	Record all 3 voltages in cell. Imbalance less than 2%?	x				473/474/474
86	Record full load running amps for each fan. _____ rated FL amps x _____ svc factor = _____ (Max amps). Running less than max?					13.6/14.6
87	Return /exhaust fan acceptable noise & vibration	x				
88	Supply fan has no unusual noise or vibration	x				
89	Inlet vanes aligned in housing, actuator spanned, modulate smoothly and proportional to input signal and EMS readout			x		
90	All dampers (OSA, RA, EA, etc.) stroke fully without binding and spans calibrated and BAS reading site verified (follow procedure in Calibration and Leak-by Test Procedures). List dampers checked: _____			x		
91	Valves stroke fully and easily and spanning is calibrated (follow procedure in Calibration and Leak-by Test Procedures). List each actuated valve here when spanned: _____					
92	_____					
93	Valves verified to not be leaking through coils when closed at normal operating pressure (follow procedure in Calibration and Leak-by Test Procedures).	x				
94	The HOA switch properly activates and deactivates the unit	x				
95	Specified sequences of operation and operating schedules have been implemented with all variations documented	x				
96	Specified point-to-point checks have been completed and documentation record submitted for this system	x				



Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION



RTU-1 SEQUENCE OF OPERATION

Facilities & Services

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Project: U19127 Illinois Conference Center Expansion

RTU-1 Functional Test Procedure

RTU-1 Sequences of Operation

Occupancy:

- The unit shall be scheduled from a seven-day schedule to meet the needs of the occupants.

[Select] Pass

[Revision note]

Unoccupied/ disabled mode:

- The supply fan will be disabled. The cooling will be disabled. The preheat will remain enabled if the OA temp is below the preheat enable setpoint. Outside air and relief damper will be closed. Return air damper will be open.
- If the minimum space temperature falls below 60°F (adj.), the RTU supply will start and run in the normal mode. The OA damper will be closed and the exhaust fan will remain off when the unit is running in the unoccupied mode.
- If the maximum space temperature rises above 80°F (adj.), the RTU supply will start and run in the normal mode. The OA damper will be closed and the exhaust fan will remain off when the unit is running in the unoccupied mode.

[Select] Pass

[Revision note]

Safeties. Interlocks:

- If the manual reset high or low pressure safeties trip. The fans and cooling will be disabled and the RTU will be in its unoccupied/ disabled mode.

[Select] Pass

[Revision note]

Temp control sequence:

- Chilled water cooling mode: When OA temp is no longer suitable for free cooling, OA temp above 68°F to 72°F dry bulb or enthalpy above 22-24 btu/lb. Note: comparing OA and RA enthalpy and using the air that contains the least amount of total heat is also acceptable.
- The DA temp control loop shall modulate the chilled water valve cooling to control at the DA temp at the DA setpoint.
- Mixed air dampers will be at minimum position and preheat will be locked out.
- Combined chilled water cooling economizer mode: When OA temp is suitable for free cooling OA temp below 68°F to 72°F dry bulb and enthalpy below 22-24 btu/lb. Note: comparing OA and RA enthalpy and using the air that contains the least amount of total heat is also acceptable.
- The DA temp control loop shall modulate the economizer to maintain DA temp setpoint. If the economizer is at 100% and the DA temp is above setpoint the chilled water cooling will modulate to meet the DA temp setpoint. The economizer shall be 100% open before the chilled water valve is allowed to open. The preheat will be locked out.

[Select] Pass

[Revision note]

Economizer mode: Below 55°F OA temp:

- The DA temp control loop shall modulate the economizer to maintain DA temp setpoint. A mixed air low limit loop shall prevent the MA temp from dropping below the MA setpoint. The MA setpoint shall be the same as the DA setpoint minus 2°F (adj.).
- The preheat coil will modulate to maintain the preheat temp at the preheat setpoint. The preheat temp setpoint shall be the same as the MA temp setpoint minus 2°F (adj.). The control loop shall be sequenced so that the economizer is at minimum position before the preheat valve is opened.
- Chilled water cooling will be locked out below 55°F OA temp and preheat will be locked out above 50°F OA temp.

[Select] Pass

[Revision note]

Preheat mode: Preheat will be locked out above 50°F OA temp:

- When preheat is not in use due to the OA temp above the enable setpoint the preheat valve shall be locked out. When the OA Temp is below 50°F (adj.), the preheat coil pump will start.



Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION



RTU-1 SEQUENCE OF OPERATION

Facilities & Services

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

- When OA temp is below 50°F the preheat valve will modulate to control the preheat at the preheat setpoint.

[Select] Pass

[Revision note]

RA humidity control sequence:

- The DA temp setpoint shall be reset to lower the setpoint on rise in RA humidity. Per ASHRAE the setpoint shall not exceed 65 % RH. Setpoint may be lower for comfort reasons.

[Select] Pass

[Revision note]

Supply fan and exhaust fan speed control:

- On startup, the fan shall be ramped up to prevent over pressuring the duct. The discharge static sensor shall be mounted 2/3rd down the supply duct. The supply fan shall modulate to control the supply static at setpoint of 1.25" w.c. (adj.).
- The return fan VFD will be enabled whenever the supply fan VFD is running. The return fan VFD shall modulate to maintain an offset with the supply fan VFD speed of 10% (adj.).

[Select] Pass

[Revision note]

Alarms and alarm reporting/paging:

- All DDC system paged alarms shall include building # equipment # and mech. Room # in the text.

[Select] Pass

[Revision note]

Minimum requirements:

- Fan speed shall not reduce to below 35% (adj.) when RTU/space is in unoccupied mode. RTU supply fan shall cycle to avoid fan speeds below 30%.

[Select] Pass

[Revision note]

Reliable Mechanical	12/8/20	Alpha Controls	
Mechanical Contractor	Date	Controls Contractor	Date
Davis Electric	12/8/20		
Electrical Contractor	Date	Sheet Metal Contractor	Date

Approvals. This filled-out checklist has been reviewed.

Brian Huckstep	12/8/20		
Commissioning Authority	Date	Owner's Representative	Date

END OF SEQ OF OPR
RTU-1



Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION

Lighting Controls:

Functional Performance Test:
Lighting Control
University of Illinois at Urbana-Champaign
U19127 Illinois Conference Center Expansion

1. Participants:

Date	Person	Organization	Participant Signature
14-Sep	Tony Crumrine	KSA Lighting	
16-Sep	Tony Crumrine	KSA Lighting	

2. System Description

A. Rooms are controlled by local occupancy sensors, photocells and switches (including multi-level and dimmer switches). Time delays are adjustable for a range of 1 to 30 minutes. In selected spaces with no "night lights," emergency fixtures are controlled to come on during a loss of power.

3. Test Prerequisites:

Prerequisite	Complete Y / N	Notes:
Pre-functional checklists have been completed.	Y	
These functional test procedures have been reviewed by the installing contractor.	Y	

4. Sequence of Operation Review / Test

A. Refer to contract documents and control shop drawings for sequence of operation.

5. Functional Testing Record

A. Switched Control - No occupancy sensor (Put test results in Table 1)

Step No.	Test Procedure	Expected Results	Pass Y / N	Remarks/ Actual Response
1)	Verify system is ready for operational testing and is off.	a. Lights are off	Y	
2)	Turn on light switch	a. Lights turn on	Y	

B. Occupancy Sensor Control (all remaining sequences) (Put test results in Table 1)

Step No.	Test Procedure	Expected Results	Pass Y / N	Remarks/ Actual Response
1)	Verify device time delay and sensitivity settings by area have been set by Contractor	a. 1 to 30 minutes	Y	20 min time delay
2)	Enter space controlled by occupancy sensor when the lights are off	a. Lights turn on (or last switched state) b. Lights turn off when a light is shined in photocell (where applicable)	Y	Lights in Corridors and Restrooms are auto on to last state. Lights in conference rooms are manual on.
3)	Where provided, verify override switch operates and/or dims lights	a. Lights turn off and back on and/or dim as required	Y	
4)	Exit space	a. After time delay has expired, lights turn off (note time delay)	Y	

C. Loss of Power test

Step No.	Test Procedure	Expected Results	Pass Y / N	Remarks/ Actual Response
1)	Cause building to lose power	a. Emergency lights receive backup power b. Emergency lights turn on automatically	Y	
2)	Restore power to building	a. Lights transfer back to normal power and resume normal operation	Y	

--END OF TEST--

[illegible]



Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION

Plumbing:

Domestic Water Heater Construction Checklist

Project:	U19127 Illinois Conference Center Expansion
----------	---

Submittal / Approvals

Submittal. The above equipment and systems integral to them are complete and ready for functional testing. The checklist items are complete and have been checked off only by parties having direct knowledge of the event, as marked below, respective to each responsible contractor. This construction checklist is submitted for approval, subject to an attached list of outstanding items yet to be completed. A Statement of Correction will be submitted upon completion of any outstanding areas. None of the outstanding items preclude safe and reliable functional tests being performed. **List attached.**

Reliable Mechanical Co.	9/1/20		
Mechanical Contractor	Date	Controls Contractor	Date
Electrical Contractor	Date	Plumbing Contractor	Date
TAB Contractor	Date	General Contractor	Date

Construction checklist items are to be completed as part of startup & initial checkout, preparatory to functional testing.

- This checklist does not take the place of the manufacturer's recommended checkout and startup procedures or report.
- If this form is not used for documenting, one of similar rigor shall be used.
- Contractors assigned responsibility for sections of the checklist shall be responsible to see that checklist items by their subcontractors are completed and checked off.

Approvals. This filled-out checklist has been reviewed. Its completion is approved with the exceptions noted below.

Brian Huckstep	12/8/20		
Commissioning Authority	Date	Owner's Representative	Date

Domestic Water Heater Information					
Make	A.O. Smith		Model Number	BTH-199 300	
Serial Number	2016118987657		Gallons	100	
Recovery Rate	235		GPM		Delta T
Fuel	Gas	<input checked="" type="checkbox"/>	Electric	<input type="checkbox"/>	Steam
					<input type="checkbox"/>
Recirculating Pump Information					
Make	Taco		Model Number	112	

Hot Water Heater Construction Checklist

Page 1 of 3



Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION

Serial Number	112-074			GPM	112	Head	22
Volts/Phase	115	Function	Recirc.	Service Area			
Motor Hp	1/3	Motor Eff		RPM	3450	Amps	4.9
Comments:							

Associated Checklists					
Plumbing Piping	<input checked="" type="checkbox"/>	Plumbing Fixtures	<input checked="" type="checkbox"/>	Domestic Water Booster System	<input type="checkbox"/>
Other	<input type="checkbox"/>	Other	<input type="checkbox"/>	Other	<input type="checkbox"/>
Comments:					

Requested documentation submitted	Rec'd	Comments
Manufacturer's cut sheets	<input checked="" type="checkbox"/>	
Performance data (pump curves, coil data, etc.)	<input checked="" type="checkbox"/>	
Installation and startup manual and plan	<input checked="" type="checkbox"/>	
O&M manuals	<input checked="" type="checkbox"/>	
Sequences and control strategies	<input checked="" type="checkbox"/>	
Comments:		

Installation Checks		
Check if Acceptable; Provide comment if unacceptable	NA	Comment
General		
Installation is per manufacturers instructions	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Manufacturers recommended spare parts are provided	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Equipment label permanently affixed	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pump lubricated	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pump turns freely	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pumps in place and properly supported	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pipes are supported independently of the pump	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Seismic anchoring installed and functional where applicable (non-short circuiting)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Isolation valves and piping specialties installed	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pressure / temperature relief valves installed per specification	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Shaft seal is leak free	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pump detail checked against the drawings and all devices, gages and appurtenances are in place	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Insulation installed per requirements	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION

Installation Checks		
Check if Acceptable; Provide comment if unacceptable	NA	Comment
Electrical and Controls		
Power disconnect is located within site of the unit it controls and labeled	<input checked="" type="checkbox"/>	<input type="checkbox"/>
All electric connections tight	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Grounding installed for components and unit	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Safeties installed and operational	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Starter overload breakers installed and correct size	<input checked="" type="checkbox"/>	<input type="checkbox"/>
All control devices and wiring complete	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Control system interlocks connected and functional	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Installation per manufacturer's instructions	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pump rotates in the correct direction	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sensors and Gages		
Temperature and pressure gages and sensors installed	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Piping gages, BAS and associated panel temperature and pressure readouts match.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Comments:










Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION

TAB Report Example:

<div><div>2020</div><div><h3>G Squared Solutions, Inc.</h3><h2>Test and Balance Report</h2><p>UIUC I Hotel Convention Center Expansion</p></div><div><p>Clint Walker G Squared Solutions, Inc. 9/29/2020</p></div></div>	<h3>General Project Information</h3> <table><tr><td>Project:</td><td>UIUC I Hotel Convention Center Expansion 1900 S. First Street Champaign, IL 61820</td></tr><tr><td>Architect:</td><td>Cordogan, Clark & Associates, Inc. 960 Ridgeway Avenue Aurora, Illinois 60506</td></tr><tr><td>Engineer:</td><td>GHR Engineers and Associates 1615 S Neil Street Champaign, Illinois 61820</td></tr><tr><td>Mechanical Contractor</td><td>Reliable Mechanical Company 1411 Interstate Drive Champaign, Illinois 61820</td></tr><tr><td>Test and Balance Firm</td><td>G Squared Solutions, Inc. 9090 Highway 13 West Carrier Mills, IL 62917</td></tr><tr><td>Test & Balance Supervisor:</td><td>Clint Walker (618) 926 0324 clint.gquared@gmail.com TAB8 Certified Contractor # TB0476810C TAB8 Certified Supervisor # TB1071596S TAB8 Certified Technician #BB1071596T</td></tr></table>	Project:	UIUC I Hotel Convention Center Expansion 1900 S. First Street Champaign, IL 61820	Architect:	Cordogan, Clark & Associates, Inc. 960 Ridgeway Avenue Aurora, Illinois 60506	Engineer:	GHR Engineers and Associates 1615 S Neil Street Champaign, Illinois 61820	Mechanical Contractor	Reliable Mechanical Company 1411 Interstate Drive Champaign, Illinois 61820	Test and Balance Firm	G Squared Solutions, Inc. 9090 Highway 13 West Carrier Mills, IL 62917	Test & Balance Supervisor:	Clint Walker (618) 926 0324 clint.gquared@gmail.com TAB8 Certified Contractor # TB0476810C TAB8 Certified Supervisor # TB1071596S TAB8 Certified Technician #BB1071596T
Project:	UIUC I Hotel Convention Center Expansion 1900 S. First Street Champaign, IL 61820												
Architect:	Cordogan, Clark & Associates, Inc. 960 Ridgeway Avenue Aurora, Illinois 60506												
Engineer:	GHR Engineers and Associates 1615 S Neil Street Champaign, Illinois 61820												
Mechanical Contractor	Reliable Mechanical Company 1411 Interstate Drive Champaign, Illinois 61820												
Test and Balance Firm	G Squared Solutions, Inc. 9090 Highway 13 West Carrier Mills, IL 62917												
Test & Balance Supervisor:	Clint Walker (618) 926 0324 clint.gquared@gmail.com TAB8 Certified Contractor # TB0476810C TAB8 Certified Supervisor # TB1071596S TAB8 Certified Technician #BB1071596T												

<div><div></div><div><h3>Table Of Contents</h3><p>PROJECT: UIUC I Hotel Convention Center LOCATION: Champaign, IL</p><p>DATE: 9/30/2020 CONTACT: Clint Walker AUTHOR: Clint Walker</p></div></div> <div><h3>Table Of Contents</h3><table><tr><td>1 Ventilation Notes.pdf</td><td>1</td></tr><tr><td>2 Roof Top Unit</td><td>2</td></tr><tr><td>2.1 RTU-01</td><td>2</td></tr><tr><td>2.2 RTU-01/Exhaust Fan at 38 Hertz & RAD at 55%</td><td>4</td></tr><tr><td>2.3 RTU-01/Supply Fan at 53 Hertz & OAD at 45%</td><td>5</td></tr><tr><td>2.4 RTU-01/V1-01</td><td>7</td></tr><tr><td>2.5 RTU-01/V1-02</td><td>8</td></tr><tr><td>2.6 RTU-01/V1-03</td><td>9</td></tr><tr><td>2.7 RTU-01/V1-04</td><td>10</td></tr><tr><td>2.8 RTU-01/V1-05</td><td>11</td></tr><tr><td>2.9 RTU-01/V1-06</td><td>12</td></tr><tr><td>2.10 RTU-01/V1-07</td><td>13</td></tr><tr><td>2.11 RTU-01/V1-08</td><td>14</td></tr><tr><td>2.12 RTU-01/V1-09</td><td>15</td></tr><tr><td>2.13 RTU-01/V1-10</td><td>16</td></tr><tr><td>2.14 RTU-02</td><td>17</td></tr><tr><td>2.15 RTU-02/Exhaust Fan at 35 Hertz & RAD at 85%</td><td>19</td></tr><tr><td>2.16 RTU-02/Supply Fan at 52.4 Hertz & OAD at 15%</td><td>20</td></tr><tr><td>2.17 RTU-02/V2-01</td><td>22</td></tr><tr><td>2.18 RTU-02/V2-02</td><td>23</td></tr><tr><td>2.19 RTU-02/V2-03</td><td>24</td></tr><tr><td>2.20 RTU-02/V2-04</td><td>25</td></tr><tr><td>2.21 RTU-02/V2-05</td><td>26</td></tr><tr><td>2.22 RTU-02/V2-06</td><td>27</td></tr><tr><td>2.23 RTU-02/V2-07</td><td>28</td></tr><tr><td>2.24 RTU-02/V2-08</td><td>29</td></tr><tr><td>2.25 RTU-02/V2-09</td><td>30</td></tr><tr><td>2.26 RTU-02/V2-10</td><td>31</td></tr><tr><td>2.27 RTU-02/V2-11</td><td>32</td></tr><tr><td>2.28 RTU-02/V2-12</td><td>33</td></tr><tr><td>3 Energy Recovery Unit</td><td>34</td></tr><tr><td>3.1 ERV-01</td><td>34</td></tr><tr><td>3.2 ERV-02</td><td>35</td></tr><tr><td>4 Fan Unit</td><td>36</td></tr><tr><td>4.1 EF-01</td><td>36</td></tr><tr><td>5 Hydronic Notes.pdf</td><td>37</td></tr><tr><td>6 Hydronic Pump</td><td>38</td></tr><tr><td>6.1 HW Pump-01</td><td>38</td></tr><tr><td>6.2 HW Pump-02</td><td>39</td></tr></table></div> <div><p>G Squared Solutions Inc.</p></div>	1 Ventilation Notes.pdf	1	2 Roof Top Unit	2	2.1 RTU-01	2	2.2 RTU-01/Exhaust Fan at 38 Hertz & RAD at 55%	4	2.3 RTU-01/Supply Fan at 53 Hertz & OAD at 45%	5	2.4 RTU-01/V1-01	7	2.5 RTU-01/V1-02	8	2.6 RTU-01/V1-03	9	2.7 RTU-01/V1-04	10	2.8 RTU-01/V1-05	11	2.9 RTU-01/V1-06	12	2.10 RTU-01/V1-07	13	2.11 RTU-01/V1-08	14	2.12 RTU-01/V1-09	15	2.13 RTU-01/V1-10	16	2.14 RTU-02	17	2.15 RTU-02/Exhaust Fan at 35 Hertz & RAD at 85%	19	2.16 RTU-02/Supply Fan at 52.4 Hertz & OAD at 15%	20	2.17 RTU-02/V2-01	22	2.18 RTU-02/V2-02	23	2.19 RTU-02/V2-03	24	2.20 RTU-02/V2-04	25	2.21 RTU-02/V2-05	26	2.22 RTU-02/V2-06	27	2.23 RTU-02/V2-07	28	2.24 RTU-02/V2-08	29	2.25 RTU-02/V2-09	30	2.26 RTU-02/V2-10	31	2.27 RTU-02/V2-11	32	2.28 RTU-02/V2-12	33	3 Energy Recovery Unit	34	3.1 ERV-01	34	3.2 ERV-02	35	4 Fan Unit	36	4.1 EF-01	36	5 Hydronic Notes.pdf	37	6 Hydronic Pump	38	6.1 HW Pump-01	38	6.2 HW Pump-02	39	<div><div></div><div><p>Date: 09/30/20</p><p>From: Clint Walker President, G Squared Solutions, Inc.</p><p>Re: UIUC - I Hotel Convention Center Ventilation Job Notes</p><p>G Squared Solutions, Inc. was contracted to perform the testing, adjusting and balancing of the above referenced project. The ventilation job notes are as follows:</p><ol style="list-style-type: none">1. The Alpha BAS system limits the RTUs to 90percent of the max supply fan and return fan speeds. The final readings on the RTU reports reflects this. I elected not to force the fans higher as the units had no issue cooling the space.2. The design of the ERVs were slightly altered per the design engineer. The design exhaust air at the RTUs was also slightly altered per the design engineer. This was completed in order to keep the building pressure under control.<p>If you have any questions or concerns feel free to call (618-926-0324) or email clint.gquared@gmail.com me.</p><p>Sincerely,</p><p> Clint Walker</p></div></div>
1 Ventilation Notes.pdf	1																																																																														
2 Roof Top Unit	2																																																																														
2.1 RTU-01	2																																																																														
2.2 RTU-01/Exhaust Fan at 38 Hertz & RAD at 55%	4																																																																														
2.3 RTU-01/Supply Fan at 53 Hertz & OAD at 45%	5																																																																														
2.4 RTU-01/V1-01	7																																																																														
2.5 RTU-01/V1-02	8																																																																														
2.6 RTU-01/V1-03	9																																																																														
2.7 RTU-01/V1-04	10																																																																														
2.8 RTU-01/V1-05	11																																																																														
2.9 RTU-01/V1-06	12																																																																														
2.10 RTU-01/V1-07	13																																																																														
2.11 RTU-01/V1-08	14																																																																														
2.12 RTU-01/V1-09	15																																																																														
2.13 RTU-01/V1-10	16																																																																														
2.14 RTU-02	17																																																																														
2.15 RTU-02/Exhaust Fan at 35 Hertz & RAD at 85%	19																																																																														
2.16 RTU-02/Supply Fan at 52.4 Hertz & OAD at 15%	20																																																																														
2.17 RTU-02/V2-01	22																																																																														
2.18 RTU-02/V2-02	23																																																																														
2.19 RTU-02/V2-03	24																																																																														
2.20 RTU-02/V2-04	25																																																																														
2.21 RTU-02/V2-05	26																																																																														
2.22 RTU-02/V2-06	27																																																																														
2.23 RTU-02/V2-07	28																																																																														
2.24 RTU-02/V2-08	29																																																																														
2.25 RTU-02/V2-09	30																																																																														
2.26 RTU-02/V2-10	31																																																																														
2.27 RTU-02/V2-11	32																																																																														
2.28 RTU-02/V2-12	33																																																																														
3 Energy Recovery Unit	34																																																																														
3.1 ERV-01	34																																																																														
3.2 ERV-02	35																																																																														
4 Fan Unit	36																																																																														
4.1 EF-01	36																																																																														
5 Hydronic Notes.pdf	37																																																																														
6 Hydronic Pump	38																																																																														
6.1 HW Pump-01	38																																																																														
6.2 HW Pump-02	39																																																																														



Commissioning Report ILLINOIS CONFERENCE CENTER EXPANSION

Appendix I – Partial listing of CxA Review of Shop Drawings, Submittals

Example of Submittal Reviews

FROM	SUBJECT	RECEIVED
FandS EQA Com...	FW: Illinois Conference Center Expansion - U19127 - 28 30 00-2-0 Fire Alarm(voice)-SD drawings merged Facilities and Services have some comments regarding the submittal below. We would appreciate your assistance in getting the appropriate corrections	Thu 4/16/2020 3:13 PM
Youakim, Joseph Y	RE: Illinois Conference Center Expansion - U19127 - 28 30 00-2-0 Fire Alarm(voice)-SD drawings merged This submittal is rejected for the following reason:	Wed 4/15/2020 2:41 ...
Youakim, Joseph Y	RE: Illinois Conference Center Expansion - U19127 - 28 30 00-1-0 Fire Alarm(voice)-PD equipment I have no comments on this submittal. Thanks, Joseph Joseph Y Youakim, P.E., LEED AP Electrical Engineer, Quality Assurance - Facilities and Services E	Wed 4/15/2020 2:27 ...
Youakim, Joseph Y	RE: Illinois Conference Center Expansion - U19127 - 26 24 16-1-0 Panelboards This submittal is rejected for the following reasons:	Wed 4/15/2020 1:57 ...
Youakim, Joseph Y	RE: Illinois Conference Center Expansion - U19127 - 26 51 00-3-0 Lighting Controls I have no comments on this submittal. Thanks, Joseph Joseph Y Youakim, P.E., LEED AP Electrical Engineer, Quality Assurance - Facilities and Services E	Wed 4/15/2020 10:20...
Youakim, Joseph Y	RE: Illinois Conference Center Expansion - U19127 - 26 51 00-1-0 Light Fixture Submittal-pages-1-53, 26 51 ... I have no comments on this submittal. Thanks, Joseph Joseph Y Youakim, P.E., LEED AP Electrical Engineer, Quality Assurance - Facilities and Services E	Wed 4/15/2020 10:08...
Koric, Sanja Thanks!	RE: FW: Illinois Conference Center Expansion - U19127 - 230913.33-01-00_Temperature Control	Mon 4/13/2020 5:18 ...
FandS EQA Com...	FW: FW: Illinois Conference Center Expansion - U19127 - 230913.33-01-00_Temperature Control These responses went to the EQA comments mailbox. Thought you'd want to see them too.	Mon 4/13/2020 4:26 ...
Reddington, Do...	RE: FW: Illinois Conference Center Expansion - U19127 - 230913.33-01-00_Temperature Control Dave, As a follow-up on the comments we are receiving from our C&I group, can you send me responses indicating how the project team intends to ac	Mon 4/13/2020 3:49 ...
David Mauck	Re: FW: Illinois Conference Center Expansion - U19127 - 230913.33-01-00_Temperature Control Will forward to Reliable and Alpha Controls.	Mon 4/13/2020 3:45 ...
FandS EQA Com...	FW: Illinois Conference Center Expansion - U19127 - 230913.33-01-00_Temperature Control Facilities and Services have some comments regarding the submittal below. We would appreciate your assistance in getting the appropriate corrections	Mon 4/13/2020 3:09 ...
Koric, Sanja Brian,	RE: Illinois Conference Center Expansion - U19127 - 230913.33-01-00_Temperature Control This submittal is APPROVED AS NOTED. Please forward comments as needed to the team.	Mon 4/13/2020 2:50 ...
FandS EQA Com...	FW: Illinois Conference Center Expansion - U19127 - 237416.13-01-00-HVAC-1-AAON Facilities and Services have some comments regarding the submittal below. We would appreciate your assistance in getting the appropriate corrections	Mon 4/6/2020 4:16 PM
FandS EQA Com...	FW: Illinois Conference Center Expansion - U19127 - 237223.19-01-01-HVAC-2-Renewaire Facilities and Services have some comments regarding the submittal below. We would appreciate your assistance in getting the appropriate corrections	Mon 4/6/2020 4:16 PM
FandS EQA Com...	FW: Illinois Conference Center Expansion - U19127 - 237416.13-01-00-HVAC-1-AAON Facilities and Services have some comments regarding the submittal below. We would appreciate your assistance in getting the appropriate corrections	Mon 4/6/2020 4:16 PM
FandS EQA Com...	FW: Illinois Conference Center Expansion - U19127 - 237223.19-01-01-HVAC-2-Renewaire Facilities and Services have some comments regarding the submittal below. We would appreciate your assistance in getting the appropriate corrections	Mon 4/6/2020 4:16 PM
FandS EQA Com...	FW: Illinois Conference Center Expansion - U19127 - 233600-01-00-HVAC-3-CTR VAV'S Facilities and Services have some comments regarding the submittal below. We would appreciate your assistance in getting the appropriate corrections	Mon 4/6/2020 4:15 PM
FandS EQA Com...	FW: Illinois Conference Center Expansion - U19127 - 233600-01-00-HVAC-3-CTR VAV'S Facilities and Services have some comments regarding the submittal below. We would appreciate your assistance in getting the appropriate corrections	Mon 4/6/2020 4:15 PM
FandS EQA Com...	FW: Illinois Conference Center Expansion - U19127 - 232123-01-00-HVAC-4-Hydronic Pumps Specialties Facilities and Services have some comments regarding the submittal below. We would appreciate your assistance in getting the appropriate corrections	Mon 4/6/2020 4:12 PM
FandS EQA Com...	FW: Illinois Conference Center Expansion - U19127 - 232123-01-00-HVAC-4-Hydronic Pumps Specialties Facilities and Services have some comments regarding the submittal below. We would appreciate your assistance in getting the appropriate corrections	Mon 4/6/2020 4:12 PM
Keller, Thomas Je...	RE: Illinois Conference Center Expansion - U19127 - 237416.13-01-00-HVAC-1-AAON Brian,	Mon 4/6/2020 11:31 ...



Commissioning Report ILLINOIS CONFERENCE CENTER EXPANSION

Brian,

This submittal is **APPROVED AS NOTED**. Please forward comments as needed to the team.

The comments and notes are as following:

1. TC contractor- Alpha to include Freeze protection sequence as listed below.
2. TC contractor-Alpha to provide excel spread sheet with all listed controllers used on this project to obtain IP addresses and instance numbers.

Safeties, interlocks:

- 1. If the fire alarm panel or duct mounted smoke detectors indicate a fire or smoke, the fans shall be disabled and the RTU shall be in its unoccupied/disabled mode (by the fire alarm contractor).
- 2. If the manual reset high or low pressure safeties trip on the supply fan, or if the manual low reset pressure safety trips on the exhaust fan, the fans shall be disabled and the RTU shall be in its unoccupied/disabled mode.
- 3. LL-35: If the manual reset LL-35 trips, the RTU supply fan and exhaust fan shall be disabled. The OA dampers and exhaust dampers shall be closed. The return air damper shall be 100% open. The preheat shall remain in control. Coil pumps shall be enabled. The chilled water valve shall only open if the LL-40 is also tripped.
- 4. LL-40: If the auto reset LL-40 trips, the CHW valve shall go to its predetermined position (25-30% open). All mixed air dampers and preheat shall remain under normal control. If the LL-40 is tripped and the safety relay is de-energized due to a controller issue, the normally-open CHW valve shall go 100% open.
- 5. All safety devices will send an alarm to the owner.

Thank you,

Sanja Koric

Mechanical – Controls Engineer, UIUC F&S Engineering Services QA

From: FandS Shop Drawing Review

Sent: Wednesday, April 01, 2020 10:43 AM

To: Bachert, Randall L; Bauer, Robbie Timothy; Cardenas, Benjamin (FandS); Cler, Kristi L; Cope, Cynthia Fay; DeLorenzo, Stacey; Drain, Matthew M; Elliott, Bryan S; Grace, Randall Scott; Huckstep, Brian D; Jakobsson, Jonathan H; Koebel, Louise Ann; Lackey, Brent A; Lancaster, Dave; Pllum, Joshua; Spencer, Jessica Ann; Terven, Roger D; Welch, Ryan B; Whittaker, Tracy; Youakim, Joseph Y

Cc: Bryant, Robert W; Burgin, Thomas E II; Finet, Brian Curtis; Grant, Guy R; Green, David Mark; Keaton, Bruce; Keller, Thomas Jeffery; Koric, Sanja; Peacock, Lisa Marie

Subject: Illinois Conference Center Expansion - U19127 - 230913.33-01-00_Temperature Control

*We have received **ELECTRONIC** submittals for the following:*

[230913.33-01-00 Temperature Control](#)



Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION

Appendix J - Issues Log

Item #	Issue Type	Description	Location	Completion Date
1	Glass	Cracked clerestory glazing pane - glass broke during installation - Will install 11/27 at 7am	Existing Vestibule	Arrow
2	Lighting	Lamps in cove lights to match color of pendant lights	100	25-Sep
3	Paint touch up	Clean fire proofing/another coat in electrical room	101	26-Sep
4	Cleaning Needed	Wipe down panels, raceway, & XFMR. Sweep debris and loose fire proofing from floor	101	30-Sep
6	Flooring	Loose floor base	102	2-Oct
7	Paint touch up	Clean fire proofing/another paint coat	102	30-Sep
8	Caulking	Clean up joint at charging counter	103	26-Sep
9	Paint touch up	Paint touch up at soffit	103	26-Sep
10	Flooring	Seal floor	104	5-Oct
11	Caulking	Caulk around penetrations	104	30-Sep
12	Electrical	Replaced damaged light switch cover plate	104	25-Sep
13	Paint touch up	Repaint portion of north wall patched around Door 104	104	26-Sep
14	Caulking	Caulk behind base	107	1-Oct
15	Paint touch up	Paint touch up at soffit above door - 107/108	110	26-Sep
16	Caulking	Caulk at wood panel - between 107/108	110	26-Sep
17	Paint touch up	Paint touch up by window	108	1-Oct
18	Caulking	Behind floor base	109	1-Oct
19	General	Gaps between pre-cast and drywall - paint	109	30-Sep
20	Paint touch up	Paint touch up at soffit above reception desk	109	30-Sep
21	Caulking	Caulk sills	105	30-Sep
22	General	Peephole needs to be added to door - received 10/7 - completed by 10/9	105	9-Oct
23	AV	Custom plate for AV connections - Ordered 9/28, ships 10/12	105	CV Lloyd
24	AV	Projector screen housing needs to be adjusted to close and open cleanly	105	27-Sep
25	General	Peephole needs to be added to door - received 10/7 - completed by 10/9	106	9-Oct
26	Electrical	Outlet face plate missing	106	25-Sep
27	Paint touch up	Paint touch up & caulking around sills, general	106	30-Sep
28	Glass	Damaged glass panes (east), replace damaged panes - Ordered 10/6, installing 10/21	106	Arrow
29	AV	Decoder for signage player needs to be replaced	107	27-Sep
30	Wall Repair	Clean up precast	111	1-Oct
31	General	Touch up blemishes in gypsum board on east wall	111	26-Sep



Commissioning Report ILLINOIS CONFERENCE CENTER EXPANSION

32	General	Loose sprinkler head	112	26-Sep
33	Caulking	Clean up caulk at curtain wall sill	112	2-Oct
34	Electrical	Relocated white LED light fixtures from the soffit of EX-2/3 - 1 of two complete - Ordered 10/7	112	19-Oct
35	General	Missing sprinkler head at EX 3 door	112	25-Sep
36	Paint touch up	Paint touch up at header in women's restroom	127	1-Oct
37	Caulking	Caulk around floor drain in women's restroom	127	25-Sep
38	Flooring	Walk-off carpet missing	128	25-Sep
39	Caulking	Caulk around floor drain in men's restroom	126	25-Sep
40	Paint touch up	Paint touch up at alcove in men's restroom	126	30-Sep
41	General	Replace damaged finished wood lavatory panel (north)	126	25-Sep
42	General	Hufcor partitions not sealing properly on north-south run. Hufcor installing level closure. Began work today, will be completed tomorrow.	EX-1/2	Dodds
43	Paint touch up	Touch up paint with joint compound in Exhibit hall	EX 1-6	26-Sep
45	General	Provide escutcheon plate on waste piping to conceal annular space	114	26-Sep
46	Caulking	Caulk floor drain in men's restroom	115	25-Sep
47	Wall Repair	Cracked ceiling at alcove in men's restroom	115	1-Oct
48	Caulking	Caulk floor drain in women's restroom	116	25-Sep
49	Flooring	Floor base missing	117	25-Sep
50	General	Repair wall behind chilled water piping	117	30-Sep
51	Insulation	Complete insulation of piping in 117	117	26-Sep
52	Plumbing	Complete piping drains for boiler piping	117	26-Sep
53	General	Install piping labels, valve tags, flow arrows	117	5-Oct
54	Electrical	Cut & Cap empty conduits	117	2-Oct
55	General	Floor hatch missing	200	2-Oct
56	Cleaning Needed	Finish cleaning in boiler/mech room	200	2-Oct
57	General	Clean up door head detail, add trim	200	1-Oct
58	Paint touch up	Touch up paint in IT room	118	2-Oct
59	General	Handicap push button is crooked. Straighten out	119	25-Sep
60	Electrical	Exterior ADA door does not work/respond to push plates	119	25-Sep
61	Paint touch up	Drywall seams along walls are visible - Started 10/5, will be complete Wed pm	120	7-Oct
62	Lighting Fixture	Wall sconce piece missing	121	25-Sep
63	Acoustical Ceiling	Adjust ceiling tile	121	1-Oct



Commissioning Report ILLINOIS CONFERENCE CENTER EXPANSION

64	Glass	Glazing panel (west most window) has welding splatter. Panel ordered 10/6, installing 10/21	121	Arrow
65	Paint touch up	Touch up paint at joint compound	122	1-Oct
66	Paint touch up	Touch up paint on wood wall base	122	26-Sep
68	General	Install internal temperature monitoring hanging thermometers for walk-in cooler unit - scheduled for today (10/16)	124	UI Housing
69	General	Install soap & paper towel dispensers at each location	124	UI Housing
70	General	Install required hand washing signage at both hand washing sinks - Monday	124	5-Oct
71	Flooring	Clean/repair epoxy flooring	124	25-Sep
72	General	Install hooks for hanging mops and brooms off floor - scheduled for today (10/16)	125	UI Housing
75	General	Replace damaged bottom metal closure panel at curtainwall. Possibly use thicker gauge. 10/21	112	Arrow
76	Cleaning Needed	Clean up pylon & window head band	North Exterior	30-Sep
74	General	Need escutcheon ring (painted) at sprinkler pipe wall penetration in receiving	123	1-Oct
77	Cleaning Needed	Clean up transom seal/caulk	North Exterior - Vestibule	30-Sep
78	Cleaning Needed	Clean up caulk at spandrel	North Exterior - Curtain Wall	26-Sep
79	Cleaning Needed	Mullions don't line up at the bottom. Straighten out	North Exterior - Curtain Wall	2-Oct
80	General	Provide weep vents between ACM panel soffit and curtain wall head as detailed. Completion set for 10/12	North Exterior - Curtain Wall	Arrow
81	Cleaning Needed	Hydraulic fluid leaked onto sidewalk	North Exterior	1-Oct
83	Cleaning Needed	Caulk door 123C frame	East Exterior - Receiving	1-Oct
84	Cleaning Needed	Caulk door 122B frame	South Exterior - Service	1-Oct



Commissioning Report ILLINOIS CONFERENCE CENTER EXPANSION

85	Caulking	Caulk at door 121 frame	South Exterior - 121	1-Oct
87	Glass	Glazing panel has different hue. Replace	South/West Exterior - 104	2-Oct
88	Glass	Curtainwall is missing horizontal mullion	West Exterior - 119	2-Oct
89	Cleaning Needed	Clean roof coping and secure	South/West Exterior	1-Oct
90	General	Standing conduits outside existing vestibule	South/West Exterior	30-Sep
91	General	Provide drainage rock mix where roof drains exit above ground through pre-cast panels	Exterior	2-Oct
94	Cleaning Needed	At mechanical "bathtub" roof, clean pre-cast panels	200	2-Oct
95	Cleaning Needed	Cleanup all yellow glue residue around roof coping	Roof	1-Oct
96	Cleaning Needed	Cleanup roof canyon	Roof Canyon	25-Sep
97	General	Drain needs cap on canopy - Mike Meislahn	Canopy	5-Oct
98	Cleaning Needed	Remove ladder from roof canyon	Roof Canyon	1-Oct
99	General	Crooked handicap button inside existing vestibule	Existing Vestibule	1-Oct
100	Paint touch up	Touch up paint above mirrors in men's restroom - completed same time as west hallway	115	5-Oct
101	Caulking	Re-caulk above glass of inner door in vestibule 119	119	1-Oct
102	HVAC	Install pre-heat coils for RTU - Installation of coil completed. New piping box to be built, insulated, and installed by 11/11.	Roof	Reliable
103	Door	Replace locks on non-main vestibule exteriors doors - Installed this week	103/119/128	6-Oct
104	Electrical	Light shade in Exhibit Rm 4 needs replaced - was hit with lift - replacing 10/7	EX 4	7-Oct
106	General	Pre-function window replacement - arriving 10/19, installing 10/21 at latest	112	Arrow
105	General	Mirror replacement for Men's RR 115 - Shipped 10/29. Arrival and installation	115	Wingle



Commissioning Report ILLINOIS CONFERENCE CENTER EXPANSION

107	HVAC	Piping was not fire caulked or sealed between rooms and hallways. Will verify fire wall was caulked properly 10/21		Reliable
109	HVAC	All thread for hangers was not trimmed for piping and duct.	116	14-Oct
108	HVAC	No pipe ID was installed.	116 or 200	14-Oct
110	HVAC	VAV access panels ordered 11/16 - will be shipped directly to I Operations. Access panels will be here 12/8 and install will be complete by end of day 12/8		Reliable
111	HVAC	No pipe ID was complete in the penthouse.	200	14-Oct
112	HVAC	Glycol hot water VFD's were not labeled properly.	200	Davis Elec
113	HVAC	The penthouse mechanical room where the boilers are located does not have any exhaust or cooling, The outside air temperature was around 50 degs and the room was 99 Degs. The VFD and other equipment will not hold up to this heat. I cannot image how hot it will be in the summer months. A/E needs to review. - Fan arrived 11/18, DE installing today and tomorrow, will be completed 12/1	200	Reliable
114	HVAC	Outside the women restroom there is pipe insulation the needs complete. - Will be completed 10/27	120	Reliable
115	HVAC	Pneumatic piping above the ceiling for safeties is just strung across ceiling not supported or protected - Will be complete 11/23	120	Reliable
116	HVAC	Domestic water meter is still not working and is in bypass! This needs to be addressed ASAP		14-Oct
117	HVAC	Grab handle on the former hinge side of each door, and add a highly visible sign to each door that reads "NOT A HINGED DOOR. LIFT OUT CAREFULLY" - handles installed today, tags have not yet arrived.	200	Reliable
118	General	Corner damage in 112 needs to be repaired.	112	14-Oct
119	Paint	The vanity walls in each of the east Restrooms need to be repainted - Wingle to begin 10/19	126/127	19-Oct
120	Paint	The paint on the door frame for the east women's Restroom needs to be touched up.	127	19-Oct
121	Paint	Touchups needed in Honors & Graduate Boardroom near electrical outlets	105/106	19-Oct
122	General	Walk-in cooler - Cooler door installed, Wingle finishing drywall today. I Ops staff to tape, mud and paint 11/11	123	KEC
124	General	Install of air curtain above the receiving overhead door - shipped 11/17, arriving Tuesday, Reliable and DE installing on Wednesday.	123	Reliable & Davis
125	Flooring	Carpet bubbling up in Exhibit Hall #2 - TSI will resolve - completing 10/19	EH2	19-Oct



Commissioning Report ILLINOIS CONFERENCE CENTER EXPANSION

126	Flooring	Carpet needs to be tucked under door frame - TSI will resolve - completing 10/19	107	19-Oct
127	General	Address the groove in the wall base in the east corridor - to be complete EOD 10/16	128	19-Oct
130	General	Garbage enclosure - plans approved - concrete to be poured tomorrow 11/10	East Exterior - Receiving	iops
133	HVAC	Tap appears to be pulling lose from duct. Will be completed 10/21		Reliable
134	HVAC	Wall penetration unsealed-typical of all locations. Will be completed 10/21		Reliable
136	HVAC	Leftover screws inside unit. - Will complete 10/21		Reliable
137	HVAC	Considerable amount of what appears to be drywall dust inside unit and filter- concern of dirty return duct and condition of recovery wheels inside unit. - Will be cleaned and new filters in place 10/21		Reliable
138	HVAC	bird screen on o/a intake of unit bowing in areas - Will be completed 10/21		Reliable
139	General	Restroom doors have settled and some to not line up.	114/115 & 128/129	Wingle/Pat
140	HVAC	Door on discharge of unit leaks, several areas where whistling from air leaks---was a pressure test performed? - Will seal off door 11/23		Reliable
141	General	Roof tear in membrane		ACR
142	HVAC	RTU-2 - All penetrations need sealed inside the unit. Around the old reheat piping and up through the unit roof. This was not sealed from the time it was installed throughout the weekend. The unit needs to be checked out because of the rain we got this weekend.	RTU	Reliable
143	HVAC	The new piping in both RTU's inside and out need insulated	RTU	Reliable
144	HVAC	The valves in the ceiling of the restrooms that feed these units are still inaccessible and cannot be verified by the control contractor of the Uofl	116	Reliable
145	HVAC	The chilled water piping in RTU has not been insulated	RTU	Reliable
146		In the penthouse mechanical room the sprinkler pipe and fire alarm conduit needs sealed.		Davis Electric
147		Roof drain needs cleaned out.		Reliable
148	HVAC	RTU 2 - pressed fittings were used for the chilled water. They have not been replaced - current condition reviewed and accepted by F&S	RTU	Reliable
149	HVAC	There are valves in the preheat piping for RTU2 that are outside and under the cover when it is installed. Are these going to be easily accessible?	RTU	Reliable
150	HVAC		RTU	Reliable



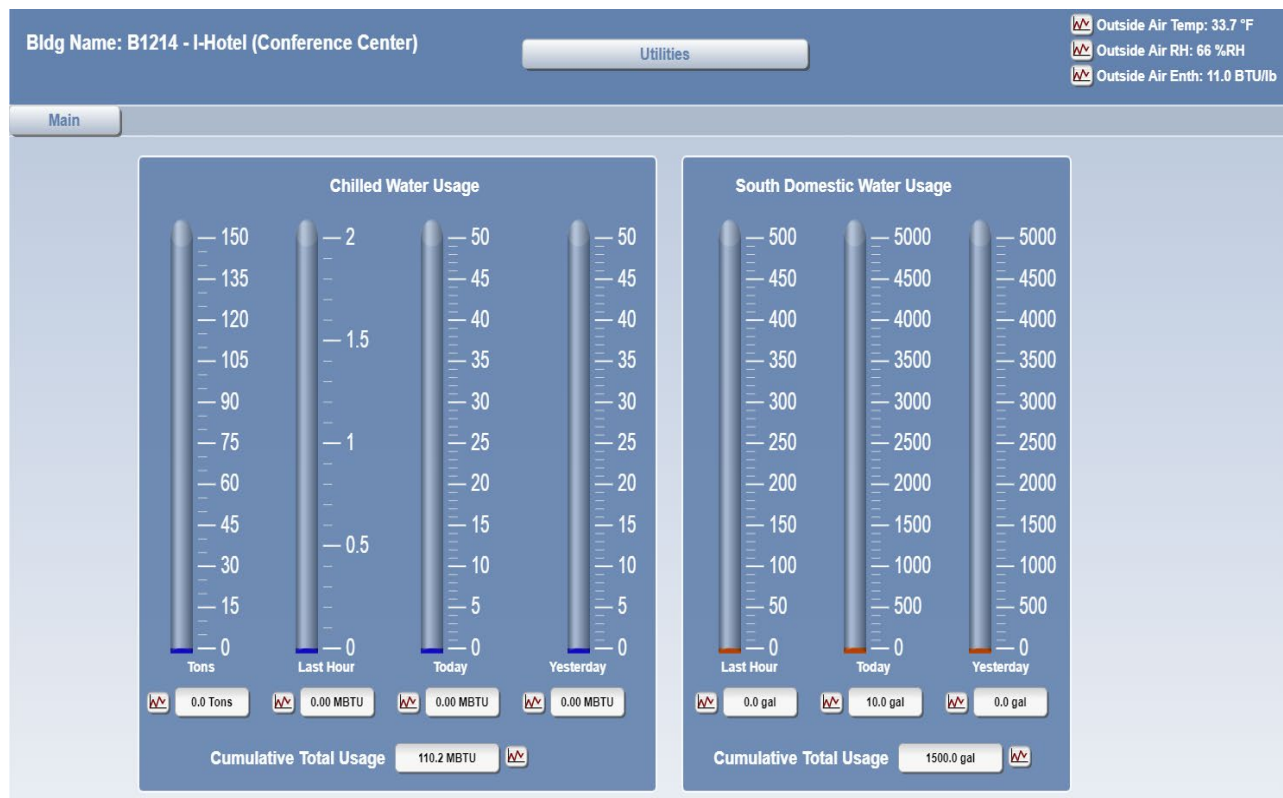
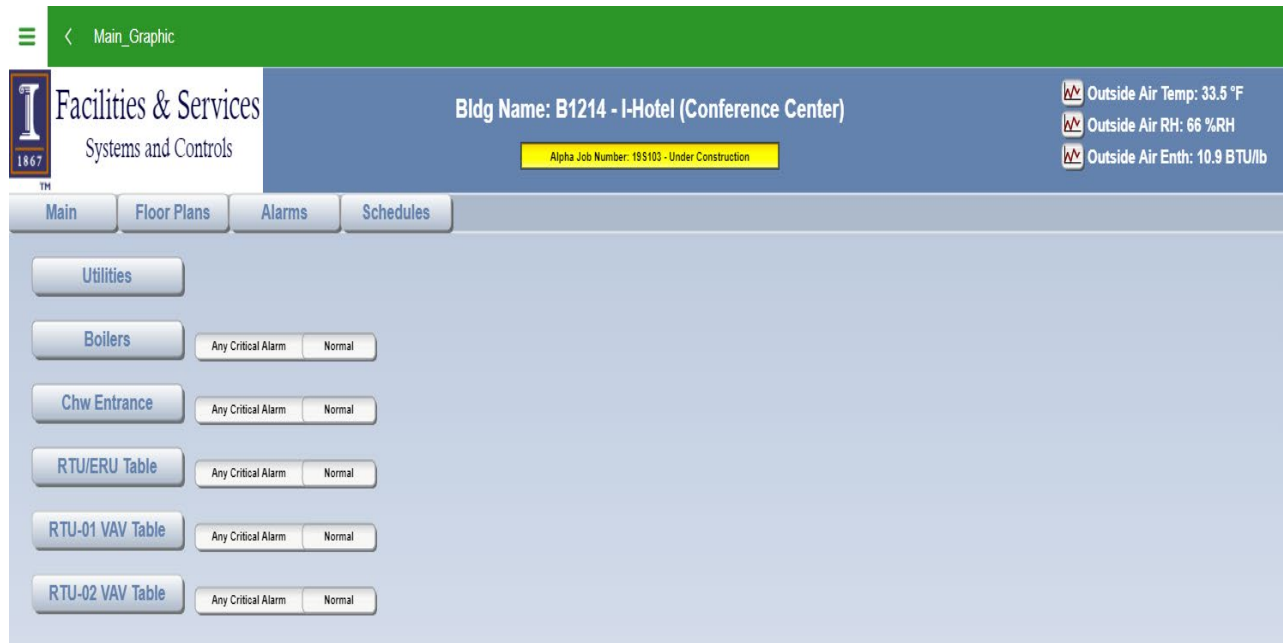
Commissioning Report ILLINOIS CONFERENCE CENTER EXPANSION

		The filters for RTU2 were not installed properly and had falling out. The energy wheels are now dirty and should be cleaned properly		
152	HVAC	The mechanical room is still overheating approximately 96 deg when we were up there	200	Reliable
151		The emergency stop has not had the cover installed.		Davis Electric
152		Complete missing pipe insulation above hallway		Reliable
153		Test and tag the sprinkler backflow device - scheduled for Monday between 8a-9a		Reliable
154		Install wedge to prevent water from standing on back side of pipe box. (On top of RTU) - will be completed tomorrow	RTU	Reliable
155		Install and shim new door gaskets to prevent doors leaking as per discussion on sight - Gaskets will be installed Monday		Reliable
156		Sweep interior of unit from pipe install(shavings, etc.) - will be completed tomorrow		Reliable
157		Modify piping to allow filter removal. - Randy Grace, Reliable, A&K Insulation and Pat will trim insulation and re-tape piping for easier access to filters		Reliable



Commissioning Report ILLINOIS CONFERENCE CENTER EXPANSION

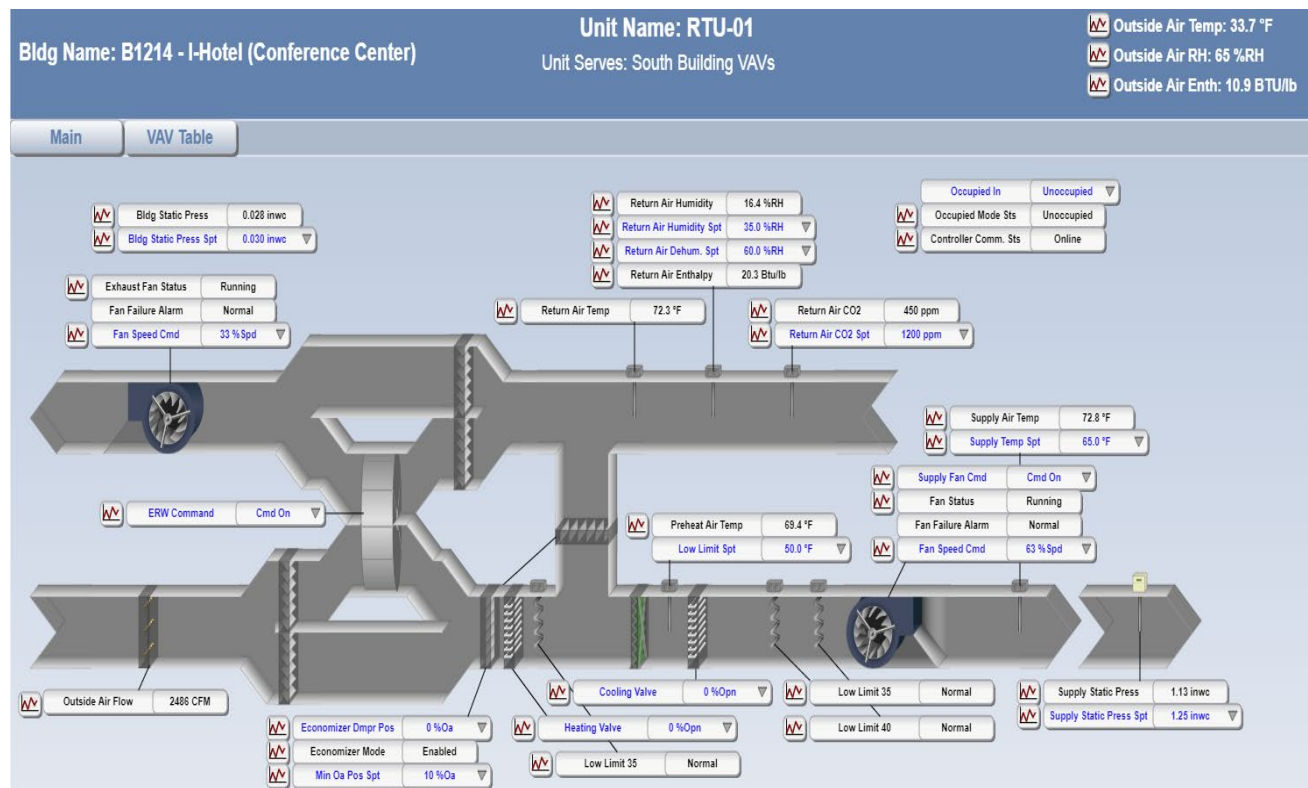
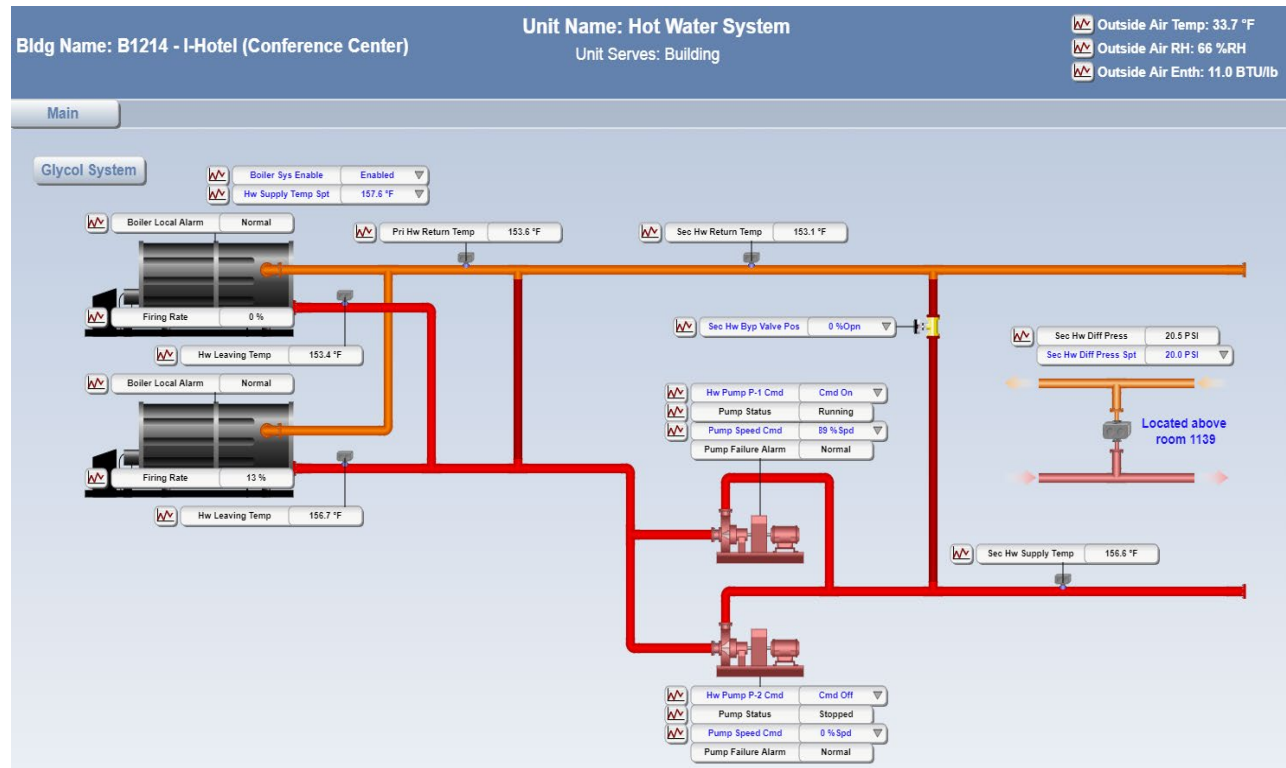
APPENDIX K - E x a m p l e BAS Graphics Verification





Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION





Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION

Bldg Name: B1214 - I-Hotel (Conference Center)

Outside Air Temp: 33.7 °F

Outside Air RH: 65 %RH

Outside Air Enth: 10.9 BTU/lb

Main

RTU-01

RTU-01 VAV Table

Unit Name	Unit Serves	Supply Temp	Supply Temp Spt	Heating Call	Cooling Call	OA Damper	SaFan Speed	SaFan Status	RaFan Speed	RaFan Status	Occupied Mode
RTU-01	South Building VAVs	72.8 °F	65.0 °F	0 %Opn	0 %Opn	0 %Oa	63 %Spd	Running	33 %Spd	Running	Unoccpied

Unit Name	Unit Serves	Room Temp	Room Htg Spt	Room Clg Spt	Hw Valve Pos	Discharge Tempo	Air Flow	Air Flow Spt	Dmpr Cmd	Dmpr Pos	Occupied Mode
VAV-1-1	Exhibit Hall	73.4 °F	72.0 °F	74.0 °F	0 %Opn	73.2 °F	952 CFM	900 CFM	21 %Opn	21 %Opn	Occupied
VAV-1-2	Exhibit Hall	71.1 °F	70.0 °F	72.0 °F	0 %Opn	73.1 °F	884 CFM	900 CFM	33 %Opn	33 %Opn	Occupied
VAV-1-3	Exhibit Hall	71.1 °F	70.0 °F	72.0 °F	0 %Opn	73.0 °F	941 CFM	900 CFM	27 %Opn	27 %Opn	Occupied
VAV-1-4	Exhibit Hall	72.5 °F	70.0 °F	72.0 °F	0 %Opn	73.2 °F	1480 CFM	1487 CFM	36 %Opn	35 %Opn	Occupied
VAV-1-5	Exhibit Hall	70.9 °F	70.0 °F	72.0 °F	0 %Opn	73.3 °F	885 CFM	900 CFM	29 %Opn	30 %Opn	Occupied
VAV-1-6	Exhibit Hall	72.9 °F	72.0 °F	74.0 °F	0 %Opn	73.2 °F	952 CFM	900 CFM	20 %Opn	20 %Opn	Occupied
VAV-1-7	Corridor 112	70.3 °F	70.0 °F	72.0 °F	0 %Opn	73.0 °F	159 CFM	150 CFM	24 %Opn	23 %Opn	Occupied
VAV-1-8	Kitchen Restrooms	66.6 °F	72.0 °F	74.0 °F	100 %Opn	101.0 °F	204 CFM	200 CFM	48 %Opn	47 %Opn	Occupied
VAV-1-9	Staging Kitchen 124	70.2 °F	70.0 °F	72.0 °F	36 %Opn	101.1 °F	300 CFM	304 CFM	32 %Opn	31 %Opn	Occupied
VAV-1-10	Receiving 123	67.6 °F	71.0 °F	73.0 °F	29 %Opn	100.5 °F	149 CFM	150 CFM	22 %Opn	21 %Opn	Occupied

Bldg Name: B1214 - I-Hotel (Conference Center)

Unit Name: ERU-02

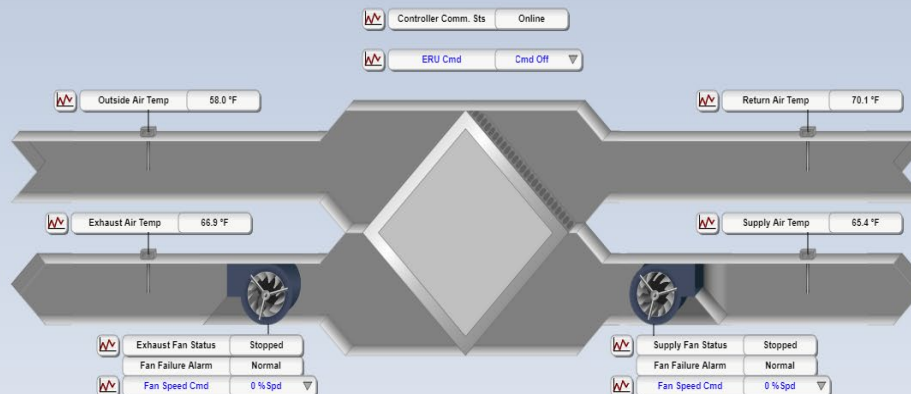
Unit Serves: North Building

Outside Air Temp: 33.7 °F

Outside Air RH: 65 %RH

Outside Air Enth: 10.9 BTU/lb

Main





Commissioning Report

ILLINOIS CONFERENCE CENTER EXPANSION

Bldg Name: B1214 - I-Hotel (Conference Center)

Schedules

Outside Air Temp: 33.7 °F
Outside Air RH: 65 %RH
Outside Air Enth: 10.9 BTU/lb

Main

Building Calendar
Current Value: Normal Day

RTU-01 (Fall/Spring)	RTU-02 (Fall/Spring)
Current Value: Unoccupied Next Value: Occupied Next Transition Time: December 15, 2020 6:00 AM	Current Value: Unoccupied Next Value: Occupied Next Transition Time: December 15, 2020 6:00 AM
RTU-01 (Summer)	RTU-02 (Summer)
Current Value: Unoccupied Next Value: Occupied Next Transition Time: December 15, 2020 6:00 AM	Current Value: Unoccupied Next Value: Occupied Next Transition Time: December 15, 2020 6:00 AM
RTU-01 (Break)	RTU-02 (Break)
Current Value: Unoccupied Next Value: Occupied Next Transition Time: December 15, 2020 6:00 AM	Current Value: Unoccupied Next Value: Occupied Next Transition Time: December 15, 2020 6:00 AM
RTU-01 (Special Events)	RTU-02 (Special Events)
Current Value: Unoccupied Next Value: Unoccupied Next Transition Time: February 7, 2106 6:28 AM	Current Value: Unoccupied Next Value: Unoccupied Next Transition Time: February 7, 2106 6:28 AM

Bldg Name: B1214 - I-Hotel (Conference Center)



Unit Name: Chilled Water Entrance
Unit Serves: Mechanical Room

Outside Air Temp: 33.7 °F
Outside Air RH: 65 %RH
Outside Air Enth: 10.9 BTU/lb

Main

The diagram illustrates the chilled water entrance system. It shows a main supply line (blue) entering the building from the bottom left, labeled 'Building Entrance'. This line branches into two parallel paths. The upper path leads to the 'Building Return' at the top left. The lower path leads to a distribution manifold on the right, labeled 'Located above women's restroom'. Various sensors are indicated with callouts: 'Chw Supply Flow' (-0.1 gpm) on the main supply line; 'Chw S Ent Vlv Pos' (0.0 %) on the supply line; 'Chw Return Temp' (69.2 °F) on the return line; 'Chw Supply Temp' (70.2 °F) on the supply line; 'Chw Return Press' (25.5 psi) on the return line; and 'ChwDp' (-0.0 psi) on the supply line. Arrows indicate the direction of flow throughout the system.

Appendix L – O&M Manuals

 <p>1411 Interstate Drive P.O. Box 8098 Champaign, IL 61826 (217) 356-1841 Fax: (217) 356-7655</p>		 <p>1411 Interstate Drive P.O. Box 8098 Champaign, IL 61826 (217) 356-1841 Fax: (217) 356-7655</p>	
<u>OPERATING & MAINTENANCE MANUAL</u>		<u>Table of Contents</u>	
<u>Project</u> U19127 Illinois Conference Center Expansion Operations & Maintenance Manual 23 00 00 – HVAC 10/7/2020		AAON RTU Units/Energy Recovery Unit Yezek & Sons (309-691-2347)	
<u>Engineer</u> GHR Engineers 1615 S. Neil Champaign, Illinois 61820		Temperature Controls Alpha Controls (217-299-1379)	
<u>Mechanical Contractor</u> Reliable Mechanical Co. 1411 Interstate Drive Champaign, IL 61822 (217) 356-1841 RPH JOB# 14,093		Hydronic Pumps & Accessories General Pump (309-693-7444)	
		VAV Boxes/Fans Brucker Supply Co. (309-691-5160)	
		Boilers & Accessories Behrmann (314-631-4400)	
		Boiler Startup Report	
		AAON Startup Report	

U19127 Illinois Conference Center Expansion Operations & Maintenance Manual 26 00 00 – Electrical 10/7/2020		26 52 00 – Safety Lighting	
Contractors:		LHQM LED R M6	Page 138
26 00 00 – Electrical		ELM2L UVOLT SDRT	Page 142
Davis Electric			
(217)367-0250		26 56 00 – Exterior Lighting	
info@daviselectric.com		WDGE2 LED P4 40K 80CRI VW MVOLT PBBW DNAXD	Page 123
1212 E. University, Urbana, IL 61802		AFF OEL DNAXD UVOLT LTP SORT FCT	Page 128
		DSX0 LED P6 40K T3M MVOLT RPA DNAXD	Page 145
		RTA 25 8G DM19AS VD DNAXD	Page 150
		DSX0 LED P6 40K T3M MVOLT RPA DNAXD	Page 154
		RTA 25 8G DM28AS VD DNAXD	Page 163
		DSX0 LED P6 40K T3M MVOLT RPA DNAXD	Page 167
		RTA 25 8G DM49AS VD DNAXD	Page 175
		26 09 23 – Lighting Control	
		LC1.0	Page 179
		nPODM	Page 185
		nPODM DX	Page 188
		NPP16 D EFP	Page 192
		NCM 9	Page 194
		NCM PDT 10	Page 198
		NCM 10	Page 202
		NCM PDT 9 ADXX	Page 206
		NPP16 EFP	Page 210
		NP0DM 2P DX XX	Page 212
		FC3 RB 7B XX	Page 215
		FC3 75SN XXX	Page 218
		WSX PDT XX	Page 226
		Blue Box LT	Page 229
		Barcode Template	Page 231
		Davis Electric Warranty	Page 240
		26 30 00 – Facility Power Generation	
		_SMA Core1 Inverter Manual	Page 241
		BlueSun BSM360-380M-72 588	Page 306
		SMA Core 1 Datasheet	Page 308
		SolarSense Warranty	Page 310
		26 30 00 – Facility Power Generation	
		Yaskawa AV Drive Z1000	Page 319

U19127 Illinois Conference Center Expansion Operations & Maintenance Manual 26 00 00 – Electrical 10/7/2020		26 24 00 – Switchgear and panel boards	
Table of contents:		Schneider Warranty	Page 5
		Product List	Page 10
		Circuit breaker one-line	Page 14
		Distribution Transformer Elevation	Page 15
		NEMA Standards Publication PB 1.1-2007	Page 22
		26 51 00 – Interior Lighting	
		Acuity Warranty	Page 50
		Fixture List	Page 55
		EV04 40/30 AR WD LSS MVOLT EZI TRW	Page 56
		EV04 40/20 AR WD LSS MVOLT EZI TRW	Page 64
		EV04 40/20 AR WD LSS MVOLT EZI ELR TRW	Page 72
		EVO ARTC RGBW/12 4AR MD LSS 277 DMX TRW	Page 81
		2600-36-WH-H70-WHL-CC3-40K	Page 84
		2600-48-WH-H110-WHL-CC3-40K	Page 86
		LC32 120 48 RGBW FR WH DMX/RDM	Page 88
		LC32 120 12 RGBW FR WH DMX/RDM	Page 96
		LC32 120/277 48V DIM/DMX/RDM 200 XX UL / LOGIC ULDATA 25FT WH	Page 104
		CPX 2X4 4000LM 40K M2	Page 108
		PS9-A9-LED3-MO-R**-W-SC-UNV X3B DM10	Page 110
		PF180040A0X0FTGE1M06	Page 113
		Minstral 711207	Page 120
		CD5 L96 MVOLT DM 40K 80CRI WH	Page 121
		CD5 L48 MVOLT DM 40K 80CRI WH	Page 138
		LATSL A 120 L30 40K CR80 NFR WH 2C AWH PH HL	Page 131

	U19127		
	Illinois Conference Center Expansion		
	Operations & Maintenance Manual		
	27 00 00 – Telecommunications		
	27 40 00 – Audio-Visual Communications		
	10/7/2020		
Contractors:			
	27 00 00 – Telecommunications		
	Consolidated Communications		
	(217)344-4444		
	ctcservice@consolidated.com		
	1300 S Neil St, Champaign, IL 61820		
	27 40 00 – Audio-Visual Communications		
	C.V. Lloyde		
	(217)352-7031		
	service@cylloyd.com		
	702 W Killarney St, Urbana, IL 61801		
Table of contents:			
	27 00 00 – Telecommunications		
	CAT6 Certification documentation for Room 117	Page 3	
	CAT6 Certification documentation for Room 102	Page 63	
	27 40 00 – Audio-Video Communications		
	AMX - MD-702-QSG-050119	Page 229	
	AMX - N2400UserManualRev2.0	Page 231	
	AMX - N-Command_2.0_UserManualRev1.3	Page 309	
	AMX - NX-SeriesControllers.HardwareReferenceManual	Page 371	
	Artterotech - q_dn_and6io_usermanual	Page 414	
	BrightSign - XT4-datasheet-10112019	Page 433	
	BSS - BLU Series Install Guide 50808087-A	Page 435	
	Draper - SossorLift5s_Inst	Page 451	
	Draper - UltimateAccess_Inst	Page 457	
	Draper - UltimateAccessXL_Inst (1)	Page 464	
	Extron - AXI 44 AT 68-2972-01_D	Page 471	
	Extron - usb_extender_plus_series_68-2652-01_J	Page 514	
	JBL - C10_Owners_Manual_Rev_B_160314	Page 559	
	LEA_Professional_Dante_Connect_Manual_082720	Page 568	
	Listen - LT-800-Manual-20160104	Page 613	
	Logitech - meetup-reference-guide.ENG	Page 645	
	Logitech - ptz-pro-2	Page 647	
	NEC - c651q_c751q_c861q_c981q_usermanual_english	Page 671	
	NEC - p404-v404-p484-v484-p554-v554_usermanual-en	Page 751	
	NEC - PA803ULIPA703ULIPA653UL Manual	Page 826	
	NEC - PX1005OL Manual	Page 1022	
	NEC - V323-3	Page 1207	
	Shure - MXA910_guide_en-US (3)	Page 1251	
	Shure - P300_guide_en-US	Page 1320	
	Solstice-User-Guide	Page 1368	
	Tripp-Lite-Owners-Manual-753420	Page 1380	
	Tripp-Lite-Owners-Manual-781988	Page 1396	
	C.V. Lloyde Warranty	Page 1464	

	U19127	
	Illinois Conference Center Expansion Operations & Maintenance Manual 07 00 00 – Thermal and Moisture Protection 10/7/2020	
Contractors:		
07 50 00 – Membrane Roofing		
ADVANCED COMMERCIAL ROOFING INC.		
(217)344-8300		
danny.douglas@tsicfacr.com		
3611 NORTH STALEY ROAD, CHAMPAIGN, IL 61822		
 Table of contents:		
	07 54 00 – Thermoplastic Membrane Roofing	
Roof Warranty		Page 2
Roof Plan		Page 4
Thermoplastic Membrane detail		Page 7
Sure-Weld TPOReinforced Membrane		Page 14
InsulBase POLYISO		Page 18
InsulBase Tapered POLYISO		Page 19
 07 70 00 – Roof and Wall Specialties and Accessories		
Fastening and Termination Bars		Page 23
SecurFast™ Insulation Fastening Plate		Page 25
211 Seam Fastening Plates		Page 26
TPO AND PVC Low-voc ADHESIVES and SEALANTS		Page 27
SINGLE LEAF ROOF ACCESS HATCH 8 14 4 FTYPE NB-SOTB		Page 31

January 17, 2020		Application for Roofing Membrane System Warranty Notice of Award / Notice of Completion Applicator Copy	
Job Number: 1286819		Submit Draw Via: Electronically Now	
General Information		Project Status: Review	
Name of Project:	UIUC I-HOTEL CONFERENCE CENTER	Store No:	
Address:	1900 S FIRST STREET		
	CHAMPAIGN, IL 61820 USA	Counry: CHAMPAIGN	
Owner's Information		Architect's / Consultant's Information	
UNIVERSITY OF ILLINOIS			
1401 S OAK STREET			
CHAMPAIGN, IL 61820			
Email:		Email:	
Telephone:		Telephone:	
Contact:		Contact:	
General Contractor's Information		Property Manager's Information:	
DODDS COMPANY			
3001 RESEARCH ROAD			
SUITE F			
Email: newisdodds@doddscorp.com		Email:	
Telephone: (217) 356-1448		Telephone:	
Contact: NEWT DODDS		Contact:	
Authorized Applicator's Information			
ADVANCED COMMERCIAL ROOFING INC.		danny.douglas@tsicfacr.com	
3611 NORTH STALEY ROAD		Telephone: (217) 344-8300	
CHAMPAIGN, IL 61822		Fax: (800) 869-1885	
Warranty Information		Warranty Options	Other Project Information
A-Built:		Maintenance: NO	Early Bird Status:
Drawing Number:	N/A1286819	Overburden:	Site Monitoring:
Material Warranty:	0	Vegetation:	Ladder Required: NO
System Warranty:	20 TS		Security Clearance: NO
Wind Speed:	55		Job Start Date:
Quote Number:			Job Complete Date:
			Gov't Job? N
Metall Warranty Information		PV Information	Roof Garden Information
Carlsle Metal: O LF: 500		PV System: N	Roof Garden: N Soil Depth: 0.0
Metal:		Mfg:	Type: OTHER
Products:		Carlsle Solar:	Carl Overburden:
		Type of PV:	
Special Warranty Instructions:			
Corrections Posted:			
Roofer Submitted Drawing:			
UIUC I-Hotel Conference Center Carlsle Roof Drawing.pdf			
Approval Comments:			
This is to notify Carlsle that we have been awarded a contract to install the Carlsle Roof that has been specified for this building The membrane system may only be installed on a commercial, nonresidential building by a Carlsle Authorized Applicator according to Carlsle SynTec Incorporated's written specifications and must be warranted for either five (5), ten (10), fifteen (15), twenty (20) or thirty (30) years. Carlsle SynTec Incorporated 1/17/2020			