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1 INTRODUCTION
This document outlines the Architectural, Mechanical and Electrical Commissioning Plan for the CCIS 2 project to meet LEED requirements. The plan includes defines the role of University staff, timing for retention of a Commissioning Manager, requirements for design reviews, requirements for commissioning reports and commissioning check sheets for the Architectural, Mechanical, and Electrical equipment, equipment vendor start-up reports, and construction correspondence affecting the project commissioning and third party testing results and documentation required to report this information.

University of Alberta has an internal commissioning process that has been refined for many recently completed large capital projects. This process ensures that University maintenance and operations personnel will be actively involved in commissioning of the CCIS 2 project. Initial design reviews, provision of specification requirements and interaction related to technical requirements will come from University personnel. The Director of Infrastructure will take an active role in defining of the commissioning program and setting up the overall commissioning plan.

The commissioning plan will include retaining a commissioning manager (CM), third party specialty testing agencies, use of supplier / vendor testing programs, hands on testing by University staff, follow up through the warranty period on outstanding or seasonal issues and a post occupancy review of the facility.

2 COMMISSIONING PHILOSOPHY
The philosophy which governs the commissioning program is a firm belief that an appropriately planned and executed commissioning program will promote the reduction of problems and system deficiencies characteristic of newly constructed facilities.

This philosophy incorporates commissioning into the earliest phases of design with involvement of key personnel from the University in design reviews, recommendations for types of systems, components, accessibility and operating requirements. During the Construction phase the commissioning program will incorporate systematic static and dynamic testing of each system and its interrelated and interacting components. The testing activities are carried out within the framework of a clearly defined commissioning program. Participants are informed of their respective roles and responsibilities. Each activity is performed until each system is proven capable of operating at an optimum condition. This operational state meets both the engineering design intent, and the requirements of the end users.

This commissioning program philosophy seeks to meet the objective of delivering to the University, for final acceptance, a finished product that is essentially free from operational deficiencies. Overall responsibility for the commissioning program lies with the University of Alberta; Department of Infrastructure who will work with the Project Management Office (PMO) for the CCIS 2 project.

The commissioning program schedule is dependent on the design and construction schedules and is an ongoing process as the architectural, mechanical and electrical systems are designed and installed. The commissioning program is designed to be flexible and responsive to each discipline and the user’s needs.

The commissioning program includes University Infrastructure, Operations and Utilities personnel. Involvement of the maintenance personnel in the commissioning as part of the process and through training seminars results in fewer problems, faster turnover, assured knowledge transfer and a higher level of confidence in operating the systems.
3 DEFINITIONS

The following definitions are applied to the commissioning process:

**Commissioning Manager (CM)** The service firm and its resources (internal and external) that provides the planning, preparation, implementation and management of the detailed commissioning plan.

**Commissioning Plan** A comprehensive document developed by the University and refined by the CM which defines the commissioning activities, contains a description of building systems, contains equipment, system and integrated system check sheet forms affirming that systems are operating as designed, and the seasonal commissioning documents.

**Out of Contract Tests** Testing requirements that are not covered as part of the construction documents but that are required to be carried out by certified agencies. Examples would be high voltage testing programs, air quality testing and building envelope-testing programs.

**In Contract Tests** Testing requirements that are defined in the contract documents that are a contractor responsibility to carry out. In contract test results would be documented on the same check sheets as those used for the final system sign off by members of the commissioning team. Examples would be Fire Alarm Verification Inspection and systems balancing.

**Check Sheets** Architectural / Mechanical / Electrical check sheets that are specific to components, systems and integrated systems for the project that are used for verifying and testing of the work. Check sheets are to comply with the University's master library of check sheets.

In the University commissioning process, separate check sheets are not generated for the contractor, consultant and Commissioning Manager / Owner. All parties work from common check sheets for each system.

**Check Sheet Management Program** The database management program that will be used for generating check sheets for use by the contractor, consultant and the CM during the commissioning process.

**Contractor Start-Up Program** Contractor / supplier checking of the physical installation of the work and reviewing the completion of system installation and readiness for start-up prior to Commissioning Manager inspection activities occurring.

**Extended Inspections** Systematic detailed inspections of mechanical and electrical systems and components carried out under the Commissioning Program by personnel from the CM team. Site personnel will utilize check sheets for recording installation deficiencies on a component system basis. Timing of extended inspections is tied to construction progress and occurs once contractor checks have been completed.
<table>
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<th><strong>Acceptance Inspections</strong></th>
<th>A series of formal inspections carried out for systems that result in acceptance of the work as complete.</th>
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<td><strong>Performance Testing</strong></td>
<td>Performance tests are specific hands-on tests conducted with test instruments, to prove that the systems as installed meet the design intent and specified operating requirements. Some performance tests are carried out as “in contract” tests, others are carried out as third party certification tests and others will be conducted on selected pieces of equipment and / or systems by the CM and members of the team. Several tests such as black out or fail over tests are conducted to demonstrate the totally installed facility and all related components. In the case of a failed test the cause of the failure must be remedied and the test repeated until it is successful at no additional cost to the project</td>
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The commissioning program includes the Architectural, Mechanical, Structural and Electrical contractors, design architects and engineers, equipment vendors, Commissioning Manager, and the University of Alberta commissioning personnel.

During the design phases of the project select University personnel will input into the design of the project. At approximately 50% and 75% design development review meetings will be called with each design discipline and key University stakeholders to review system concepts. Feedback from the design and specification reviews will be reviewed by the design team for incorporation into the project. Items that the design team can not incorporate or that vary from the University design standards will be documented through a variance report process.

During the construction of the CCIS 2 facility, the Commissioning Manager, and the Architectural, Mechanical, Structural and Electrical contractors, or designated representatives, complete the static portion of the commissioning program. This includes verifying that the products used on site comply with the shop drawings and performance documents and that the nameplate data is recorded on the data collection sheets. The installation of the equipment should also be reviewed to ensure that it meets code per manufacturer recommendations and good trade practices. Input from the maintenance personnel can also identify any installations that require additional service access. All installation deficiencies are then to be remedied to ensure that at the time of start-up there are no surprises. Typically university personnel will be involved in 50% of the site activities related to commissioning for all disciplines and will be 100% responsible for items such as vibration testing, digital control system testing and fire alarm verification.

When the equipment start up phase commences with the equipment vendor's representatives will be on site to participate in the dynamic / performance testing phases of the project. The vendor's start-up reports are required prior to the CM or the University personnel undertaking their activities related to performance testing. Vendor start up sheets are to inserted into the commissioning manual by the contractor.

Commissioning reports outlining findings, progress and areas requiring design review are submitted to Owner and Project Manager.

Once the commissioning of the building is complete, the completed commissioning plan is submitted as part of the final project documentation.

5 RELATED SPECIFICATION ITEMS

The University will provide standard commissioning specification sections for Architectural, mechanical and electrical systems for use by the design team for incorporation into the project documents.

Once retained the Commissioning Manager will review the specifications and design documents and provide a summary of potential operational / performance testing issues to the Owner and project Manager for forwarding to the Design Team to assist in developing and documenting the requirements for Commissioning of the Project.

6 GENERAL

6.1 Commissioning Objectives

The following summarizes the commissioning objectives:

- Involvement of University personnel early in the design phase of the project for design reviews and input on systems / equipment types.
- To bring the architectural, mechanical and electrical systems from a state of static completion to a state of dynamic operation. Static Completion includes verifying that the products used on site comply with the shop drawings and performance documents, that the nameplate data is recorded on the data collection sheets, and that the installation of the equipment meets code, and is in conformance with manufacturer recommendations and good trade practices.
LEED Commissioning Program

- To verify conformance to Contract requirements.
- To confirm the installations meet the design intent, minimum code requirements, referenced standards and guidelines.
- To compile all testing documents and records.
- To ensure the completed facility meets user stated requirements.

6.2 Commissioning Team

The Commissioning Team shall consist of (senior representatives from):

- Commissioning Manager
- University of Alberta Building Trades
- University of Alberta Director of Infrastructure or delegate
- University of Alberta Project Manager
- Project Team
- Other specialty Designers and Contractors as required
- Representatives from University Facilities Management, Utilities and Operating Departments

6.3 Roles and Responsibilities

6.3.1 Commissioning Manager (CM)

.1 The CM shall be an external firm reporting to the University of Alberta who will act as the leader of the commissioning team during the construction phase of the project.

.2 The CM shall modify and document the Commissioning Plan.

.3 The CM is to develop and publish a clear description of the role and responsibilities of each member of the Commissioning Team, and a list of the deliverables expected of each member.

.4 Conduct a review of the contract documents for the purpose of:
   a. Listing all "In-Contract" testing that has been carried within the project documents
   b. Identifying modifications or changes in system design or specification requirements that are required to address operational issues, system balancing, and elements that are missing and required under the commissioning program for system performance testing (including load simulation requirements).
   c. Design considerations that should be reviewed by the design team, as the element identified could affect overall system performance.
   d. Assist in incorporating commissioning elements in the Contract Documents
   e. Review the various change orders prior to their issuance for inclusion of the required in-contract commissioning activities.

.4 The CM shall develop check sheets specific to the requirements of this project.

.5 The CM shall develop a outline of commissioning events that can be added to the construction schedule. It is understood that the progress of construction will drive the ability for commissioning activities to occur. The CM is to outline critical sequential events and estimated testing duration periods. The commissioning plan shall be reviewed and updated as required.

.6 The CM shall lead and be responsible to ensure that the commissioning activities are carried out in accordance with the commissioning plan.
6.3.2 The CM is responsible for:

1. Assembling the Commissioning Team.
2. Arranging, chairing and recording and distributing minutes of commissioning meetings.
3. Preparing the Commissioning Plan
4. Preparing the Commissioning Plan / Event Schedule (CPS).
5. Preparing and scheduling remediation action in cases of test failure; preparing and scheduling re-testing as required.

6. Static Commissioning:
The CM utilizing the resources of their staff and University Building Trades conducts regular site visits during construction to monitor equipment and system installations, to provide feedback regarding serviceability of equipment being installed, and to integrate feedback from University Infrastructure, Operations and Utilities Representatives regarding systems and equipment.

7. Witnessing/Verifying:
1. All equipment start-up and collection of all manufacturers start-up reports.
2. Testing/balancing measurements and procedures.
3. All tests in the plan and contract documents, and initial all test documents at time of test.
4. Signing off all systems verification forms.
5. Vetting of University findings prior to inclusion in the system test reports

8. Training:
1. Coordinate the equipment training seminars.
2. Arrange for the provision of additional training where required.

9. Seasonal Commissioning:
Seasonal commissioning of system will be undertaken to confirm performance of system under the design load conditions in which the system must perform.

10. Commissioning Reports:
The CM will ensure that the various commissioning reports, described in a later section, are completed and submitted as scheduled.

6.3.3 Consultant:
1. Provide the information required to develop the equipment, system, and integrated system check sheets.
.2 Collaborate with the Commissioning Manager to the extent required that they will provide a written statement affirming that the building systems are operating in accordance with the design intent.

.3 Assume responsibility for the ultimate performance of building systems insofar as the systems meet the owner’s expressed requirements for the building.

.4 Review:
   a. Construction and manufacturer’s Shop drawings.
   b. Testing procedures as identified within the Contract documents, prior to the execution of tests.
   c. Operating/maintenance data prepared and or assembled by the contractors.

6.3.4 Contractor:

   .1 Verify that all materials and manpower necessary are arranged for in order to implement commissioning, including subcontractors, manufacturers and specialists.

   .2 Integrate the commissioning events into the construction schedule (CPS) including schedule for carrying out seasonal commissioning in a timely manner.

   .3 Arrange for participation of all personnel in carrying out seasonal commissioning.

   .4 Participate in all commissioning meetings (including the representatives of each subcontractor and specialist as required).

   .5 Carry out all commissioning activities described further in this Commissioning Plan and in Specifications.

   .6 Prepare:
     a. System Check Sheets (SCS)- Participating with the CM to prepare Equipment, System, and Integrated Systems Check Sheets.
     b. Equipment Start-up and Acceptance Report-In conjunction with subcontractors and their equipment suppliers and vendors.

   .7 Review:
     a. Construction and manufacturer's Shop drawings.
     b. Testing procedures as identified within the Contract documents, prior to the execution of tests.
     c. Operating/maintenance data prepared and or assembled by the contractors.

6.3.5 University Personnel:

   .1 Participate in the schematic design and design development phases of the project. Including providing of design standards and standard specification sections.

   .2 Participate in static testing to become familiar with equipment being installed.

   .3 Conduct specialized “hands on” testing programs.

   .4 Participate in classroom and on-site training sessions.

   .5 Observe start-up procedures.

   .6 Participate in and/or conduct tests as defined in the Matrix and coordinated by the Commissioning Manager.
7 MEETINGS

.1 During the design process commissioning reviews will be undertaken by University personnel at two formal review meetings.

.2 During the construction phase commissioning meetings will be added as a line item to the regularly scheduled construction meetings (generally every two weeks) commencing at 65% construction.

.3 Commissioning will be added as a separate agenda item to the construction project meetings shall take place until work has been completed, including seasonal and warranty items.

8 DOCUMENTATION

8.1 Commissioning Plan

.1 The CM shall prepare a Commissioning Plan specific to this project, identifying all items to be commissioned together with the schedule for such commissioning.

.2 The Commissioning Plan shall be reviewed, on completion, by members of the Commissioning Team and shall be approved by the University prior to implementation.

.3 The plan shall include, but not be limited to:
   a. A discussion of the objectives of the commissioning process
   b. A listing of all “simulated load” performance tests and the method for load simulation.
   c. A listing of all items to be commissioned in matrix form indicating responsibilities (builder, University personnel, CM) for each activity.
   d. Typical commissioning check sheets for each type of equipment
   e. Commissioning Schedule
   f. Items requiring external testing, with recommendation for the testing organization
   g. Reports required
   h. Detailed formatting for the final Commissioning Report.

8.2 Commissioning Plan Schedule (CPS)

.1 The CM shall prepare a commissioning events list and provide this to the general contractor to be coordinated and integrated with the construction schedule. The commissioning event schedule can be a subset to the construction schedule in accordance with the terms in the project specifications.

.2 The CPS should be updated monthly and reviewed two (2) weeks prior to major system performance testing occurring. Copies of this schedule and updates will be distributed by the GC to:

   CM
   University Department of Infrastructure
   Project Manager
   Project Team
   General Contractor
   Design Consultants
   Sub-Contractors

.3 The commissioning activities shall be undertaken generally in the following sequence. All specified testing; balancing and adjusting must be completed prior to commencement of commissioning site activities.

   1. Prepare Commissioning Plan Schedule
2. Preparation of Equipment and System Check Sheets, and System Functional Performance Test Sheets
3. Static Commissioning Activities During Construction
4. System static review
5. Pre-Start Up Tests
6. System Functional Performance Test
7. Complete Equipment Start-Up
8. Complete Testing, adjusting and balancing
9. Commissioning Tests
10. Training
11. Record of Training
12. Submit Commissioning Documents
13. Seasonal Commissioning
   .1 Cooling System
   .2 Heating System
   .3 Air System Performance tests
   .4 System fail over test including power black out.
   .5 Emergency Generator-High Ambient Temperature Testing

8.3 Commissioning Reports

The CM and team will prepare commissioning reports each time on site and summarize activities undertaken, participants and observations and recommendations. These reports will be circulated to all members of the Commissioning Team for review.

.1 Reports Required:
   a. On-Going inspection reports to identify construction deficiencies and design considerations as separate issues.
   b. Monthly Progress Reports. The Project management Office issues monthly progress reports. The Commissioning Agent is to provide a brief overview of commissioning activities for the previous month. These reports are to be submitted by the 6th working day each month.
   c. Milestone Reports. Three reports are anticipated for this activity. Each report is to summarize the activities completed to date; on-going testing activities; outstanding construction issues, and design issues that have not been replied to.
   d. Final Reports due at substantial completion are to include all check sheets, test data, commissioning inspection reports and recommendations are to be turned over to the Project Management office. Four (4) copies of this manual are required. The reports are submitted in two phases: The initial submission covering all commissioning to the time of Facility Takeover, and the final document submitted on completion of seasonal commissioning.

.2 Final Report Format:
   a. The reports shall be contained in fabric-covered 3 ring binders.
   b. Each binder will have:
      − Permanent volume number and title on the spine.
      − Table of Contents showing the contents of all volumes.
3. Report Contents
   The following documents, where applicable, shall be included in the Interim Commissioning Report:
   
a) Commissioning Plan
b) Commissioning Plan Schedule (CPS)
c) Fire Alarm Verification Inspection Report & Certificate from Engineer of Record
d) Testing/Air Balancing Reports
e) Building envelope test report
f) Door hardware and security report
g) Factory Start-Up and Test reports
h) Manufacturer’s certificates
i) Inspection certificates
j) Equipment, Systems and Integrated Systems Check Sheets
k) Level 2 Bio-containment Commissioning Reports (if required)
l) System Component Start-Up
m) Non-Conformance reports
n) List of outstanding deficiencies
o) Remediation/Retest Reports
p) Record of Training

The Final Commissioning Report shall contain the same contents as Interim Commissioning report but shall also include:

a) Seasonal Commissioning results
b) Evaluations by the consultant of each system’s performance to the Design Intent
c) Suggestions for design improvements

8.4 System Check Sheets
   .1 The CM shall be responsible for preparation of all required System Check Sheets for the Project, including equipment, system, and integrated systems check sheets. This process will entail organizing input from the Design Consultants, Contractor, Equipment Suppliers, and Specialist Consultants.

   .2 The CM, Consultant, and the Contractor shall be responsible for the completion of all System Check Sheets provided with this plan.

   .3 The CM will provide supplementary check sheets as required for commissioning in consultation with the Design Consultants.

8.5 Equipment Start-Up Reports
   The CM will complete the forms included in this plan in consultation with the Design Consultants and the Contractor.
   
The Contractor to furnish all equipment and take all measurements associated with the equipment start-up check sheets.
8.6 System Functional Performance Test Forms

.1 The Performance Tests (PT) will include a system design narrative, statement of test purpose and test acceptance criterion.
.2 The PT will identify the test procedure to be followed, the normal mode(s) of start up, operation and shutdown, and the failure modes.
.3 The Design Consultants will identify any required special performance tests.
.4 The CM and Designers will identify challenge tests.
.5 The CM will coordinate, conduct and witness the PT’s.
.6 The Contractor will perform all tests required by the PT’s forms.

8.7 Failure and Safe Modes Commissioning

.1 The CM will work with the Design Consultants and the Commissioning team to identify failure and emergency shut-down tests designed to establish that the facility performs as required during specified failure scenarios.
.2 The testing of any failure or emergency shut-down scenario must include an actual test of annunciation systems and recovery procedures.

8.8 Shop Drawings

.1 The Prime Consultant shall forward copies of all mechanical and electrical Shop Drawings to the CM after review.
.2 The CM shall review the Shop Drawings, make comments where necessary, and incorporate the data into the commissioning report.

9 TESTS AND START-UPS

9.1 Coordination
The CM shall maintain communication with the project team and witness the tests required by the Contract documents.

9.2 System Check Sheets
The Commissioning Plan contains the system check sheets. Insert and or include vendor and third part testing reports and documentation within the respective sections. Update the Commissioning Plan index accordingly.

9.3 Signatures
When the tests have been successfully completed the CM and the associated contractors shall sign the forms. The CM shall initial (sign) and date all test documentation.

9.4 Test Failures
The CM shall report all test failures.
The CM shall coordinate all remediation action necessary to allow for a successful test.
Unsuccessful tests shall be repeated at no additional cost to the contract until they are successful.
The CM shall witness all repeated tests.

9.5 Mechanical Systems
Start-Up Procedures: Witness the start-up procedures for all equipment within each mechanical system. Verify that the start-up procedure has been conducted according to
the equipment manufacturer’s recommendations and the procedures detailed in the contract documents.

9.6 Electrical Systems
Start-Up Procedures: Witness the start-up procedures for all equipment within each electrical system. Verify that the start-up procedure has been conducted according to the equipment manufacturer’s recommendations and the procedure detailed in the contract documents.

10 SYSTEM FUNCTIONAL PERFORMANCE TESTS

10.1 Objective:
   a. To verify the performance of systems
   b. To verify the performance of all the systems operating together to meet the building design intent.
   c. To verify Failure, Fault Tolerance, and Safe Shutdown Modes.

10.2 Architectural Systems.
Commissioning activities will be required for the following systems:
   a. building envelope
   b. security doors
   c. Level 2 and 3 Bio-Containment Envelopes (including components such as doors, door seals, ceiling tiles, windows, service penetrations, etc.)

10.3 Mechanical Systems
   a. Functional Performance Testing shall begin when all the testing, adjusting and balancing required by the Contract has been completed, and when the Consultant has acknowledged that the physical installation of components and systems being tested is substantially installed in accordance with the contract documents.
   b. The CM shall use the Building Automated Control System (BACS) as well as any other instrumentation deemed necessary for mechanical systems testing. The BACS shall be programmed to record point data over a specific time period. The CM shall evaluate the performance of the systems by reviewing the BACS recorded data and other recorded data.
   c. Tests shall be conducted systematically, e.g., starting from the primary energy system through to the HVAC, air handling, controls, etc.

10.4 Mechanical Systems Functional Performance Tests
   a. Performance tests shall begin when all the mechanical tests have been completed.
   b. The CM in consultation with the Design Consultant shall prepare the Performance Test procedures, load simulation requirements and the necessary schematics for each mechanical system.

10.5 Electrical Systems Functional Performance Tests
   a. The Electrical Systems Performance Tests shall begin when all the electrical tests have been completed.
   b. The CM in consultation with the Design Consultant shall prepare the Performance Test procedures. Load simulation requirements and the necessary schematics for each electrical system.
11 BUILDING OPERATOR AND TRADES TRAINING

11.1 The CM shall coordinate the training that is provided by the contractors and equipment manufacturers. This will include:

a. Develop list of critical systems for which training is essential.
b. Coordinate and organize all specified training.
c. Schedule the training sessions to avoid conflict and to allow the Building Operators and Tradesmen sufficient time to read material before each session.
d. Classroom training shall be followed immediately by hands-on training where possible.
e. Prepare and distribute agenda for each training session.
f. Provide all training materials from each sub-contractor/manufacturer for review and approval of the Commissioning Team prior to the training session to be distributed to the building operators, Infrastructure, Operations and Utilities tradesmen via the PMO office.
g. The Contractor to prepare agenda for each training session to the approval of the CM.
h. Full documentation of each training session, including attendance sheets, are to be included in the Commissioning Report.

11.2.1 The CM shall arrange for a classroom and training session aids for all training sessions, the following may be required:

a. White board and markers
b. Flip board and easel
c. Overhead projector and screen
d. Chairs and decks
e. VCR and TV

Each training session shall cover, as minimum, the following:

a. Classroom presentation followed by on-site demonstrations
b. Description of the equipment / system components
c. Demonstration of the equipment / system operation
d. Operating procedures
e. Maintenance by Building Operator
f. Maintenance provided by the manufacturer
g. Normal and special tools required for equipment servicing
h. Spare part stocked by the manufacturer and delivery schedule and location of other parts
i. Acceptable tolerances for equipment adjustment
j. Scope of the equipment warranty
k. A review of the operation and maintenance data
l. Start-up and shut-down procedures
m. Emergency procedures

Where equipment is part of a system, the training session shall identify how the equipment interacts with the system.
Building Automated Control Systems and fire protection manufacturers’ training requirements are detailed in the Contract document. The CM shall co-ordinate the training sessions required.

Additional Training:

a. The CM shall arrange with the Consultant to supplement contractors and manufacturer training whenever the CM determines that there is a need.

b. These training sessions shall be both classroom and hands-on as required.

c. Identification of additional needs may be carried out by the PM in consultation with Infrastructure, Operations and Utilities. The CA shall coordinate such training activity to ensure proper sequencing of the training program.

d. The training concept shall be reviewed by the Infrastructure, Operations and Utilities and the Project Team.

e. The CM will complete the “Record of Training”.

12 FINAL ARCHITECTURAL, MECHANICAL & ELECTRICAL SYSTEM ACCEPTANCE

12.1 Prior to Interim Acceptance, the CM will have completed all tests including the System Functional Performance Tests.

12.2 Prior to the Facility Takeover date, the CM shall assemble the completed testing forms, system performance testing forms, BACS and fire alarm system printouts, and include them in the interim commissioning report.

12.3 If a test on any equipment did not meet the Design Intent or System Functional Performance Test, the equipment shall be successfully re-tested prior to the systems acceptance.

12.4 Where necessary, the CM will coordinate with the Design Consultants to issue corrective measures if an acceptable performance is not achieved. If there is a delay in the issuing of a corrective measure the CM is to advise the Project Manager and the Director of Infrastructure.

12.5 Equipment will not be accepted until all test results are satisfactory.

12.6 CM to be available during warranty period to coordinate remediation of inadequate systems identified by the University.

12.7 The CM and the Project Team shall analyze the results of the system performance tests and submit a report on the findings to the Consultant. Where appropriate, this report shall make recommendations to improve the performance of the systems.

13 SEASONAL OR DEFERRED COMMISSIONING

13.1 After acceptance of the mechanical and electrical systems, the Seasonal Commissioning Plan shall be initiated.

13.2 The CM shall coordinate the Seasonal or Deferred Commissioning Plan with the University.

13.3 Seasonal or Deferred Commissioning shall take place within 12 months of Facility Takeover and in a period of time in which the building systems can be tested to demonstrate their performance under appropriate summer and winter outdoor design conditions.

13.4 The CM will prepare a Seasonal Commissioning Schedule, complete with calendar dates.

13.5 The overall results shall be submitted in report form to the Consultant and Project Manager summarizing this activity and an overview of the overall system performance of both mechanical and electrical systems.
13.6 Should the CM uncover problems during the seasonal tests, the report should highlight these problems and submit suggested corrective actions.

13.7 Seasonal commissioning documentation including System Check Sheets, Test Procedures, System Functional Performance Tests, are compiled in Part Four of the Commissioning Report.

END