

# grc architects

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## Tender Addendum 001

**Project:** CFIA AUDITORIUM, BREAK AREAS & C-WING  
MILLWORK

**Issued:** October 16, 2017

**Owner:** CFIA

**GRC Project No.:** 1217

**Precedence:** This addendum forms an integral part of the documents describing all aspects of the work and is to be read in conjunction therewith. However, if points arise which are at variance with previously issued information this Addendum shall take precedence.

**Acknowledgement:** Signify that you have received this Addendum by listing the Addendum number and date in the appropriate space on the Tender Form.

**Object:** The purpose of this addendum is:  
.1 Clarify information provided in the specifications.  
.2 Distribute new drawings and Schedules as applicable.

**Distribution:** (Tick all that apply)

<input checked="" type="checkbox"/> Owner	CFIA	<input type="checkbox"/> Civil
<input checked="" type="checkbox"/> Mechanical	Pageau Morel	<input type="checkbox"/> Landscape
<input checked="" type="checkbox"/> Electrical	Pageau Morel	<input type="checkbox"/> General Contractors

The following clarification relates to the specifications and drawings previously issued

**1. Attachments:**

1. Specification Section 01 91 13 GENERAL COMMISSIONING (CX) REQUIREMENTS.

**2. Description:**

1. Refer to attached specification related to commissioning for the project.

**Prepared By:**



**Eric Laflamme**

**1 General**

**1.01 GENERAL**

- .1 Commissioning (Cx) is a planned program of tests, procedures and checks carried out systematically on all equipment and integrated systems of the project. Cx is performed at various stages of the project, including pre-functional checks and functional performance verification. Objectives:
  - .1 Verify installed equipment, systems and integrated systems operation in accordance with contract documents and design criteria and intent.
  - .2 Ensure appropriate documentation is compiled into the O & M manuals.
  - .3 Effectively train O&M staff.
- .2 Contractor assists in Cx process, providing equipment data, providing test results and operating equipment and systems as directed by the Cx Agent, troubleshooting and making adjustments as required.
  - .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interacting with each other as intended in accordance with Contract Documents and design criteria.
  - .2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.
  - .3 The Commissioning Agent will schedule and lead Cx meetings that are to be independent of the project meetings. The number of Cx meetings for this project is anticipated to be no more than two (2). Attendance at the Cx meetings is mandatory for the General Contractor, Electrical Contractor, and Mechanical Contractor(s).

**1.02 COMMISSIONING OVERVIEW**

- .1 Cx activities supplement field quality and testing procedures described in other relevant technical sections.
- .2 Cx is conducted in concert with activities performed during each stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities include transfer of critical knowledge to facility operational personnel.
- .3 The Cx process shall be applied to all building systems, including heating, cooling, ventilation, plumbing and power distribution as it pertains to the scope of work associated for the project. For each system, each component shall be tested individually and then the complete system shall be commissioned. The detailed list of equipment and systems to be commissioned is to be developed by the Commissioning Agent.

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**1.03 OWNER DESIGNATED (CONSULTANT TEAM) COMMISSIONING AGENT**

- .1 Scope of work for Cx Agent:
  - .1 Review Consultant's tender documents. This review is not an engineering peer review of the design but merely a review to identify any items that will affect the commissioning process or the owner's operation and maintenance of the building systems.
  - .2 Review of mechanical and electrical shop drawings
  - .3 Attend and chair the commissioning meetings
  - .4 Develop a commissioning schedule and list of systems to be commissioned
  - .5 Develop Cx forms for use as contractor check lists indicating systems and equipment are ready for dynamic testing and functional testing (system performance verification) forms. Checklist forms are developed by the Cx Agent and filled out by the contractor. Performance verification forms are developed by the Cx Agent and completed by the Cx Agent with assistance by the respective sub-trades who supplied and installed the equipment.
  - .6 Witness all equipment start-ups (performed by the manufacturer) and all system testing performed by the contractor, including balancing.
  - .7 Review all testing reports from the contractor, such as: balancing reports, equipment startup reports, pressure tests, etc.
  - .8 Coordinate and lead the building systems functional performance verification testing. Review results and provide comments or recommendations for any supplemental work or system modifications.
  - .9 Review O & M manuals
  - .10 Coordinate, lead and record the Operations Staff training sessions
  - .11 Submit a final commissioning report with all Cx forms, test results and comments/recommendations.

**1.04 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS**

- .1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the un-functional system, including related systems as deemed required by Consultant, to ensure effective performance.
- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

**1.05 COMMISSIONING PHASES**

- .1 During Construction:
  - .1 Coordinate provisions for commissioning as directed by the Cx Agent
  - .2 Locate and install equipment and system components to facilitate the Cx activities
  - .3 Attend Cx meetings and provide equipment data and system information as requested
  - .4 Inform the Cx Agent of any discrepancies or deficiencies on finished works
- .2 Before start of functional performance verification:

- .1 Ensure installation of related components, equipment, and entire system is complete.
- .2 Fully understand Cx requirements and procedures.
- .3 Understand completely design criteria and intent and special features.
- .4 Submit complete start-up documentation to Cx Agent.
- .5 Ensure systems have been cleaned thoroughly.
- .6 Complete TAB procedures on systems, submit TAB reports to Cx Agent for review.
- .7 Ensure "As-Built" system schematics and O & M information are available.

**1.06 CONFLICTS**

- .1 Report conflicts between requirements of this section and other sections to Consultant before start-up and obtain clarification.
- .2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

**1.07 SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Provide additional documentation relating to Cx process required by Consultant.

**1.08 COMMISSIONING DOCUMENTATION**

- .1 Provide completed and reviewed Cx documentation to Cx Agent.

**1.09 COMMISSIONING SCHEDULE**

- .1 Comply with the Cx schedule as developed by the Cx Agent
- .2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
  - .1 Approval of Cx reports.
  - .2 Verification of reported results.
  - .3 Repairs, retesting, re-commissioning, re-verification.
  - .4 Training.

**1.10 STARTING AND TESTING**

- .1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

**1.11 WITNESSING OF STARTING AND TESTING**

- .1 Provide 2 days notice prior to commencement.
- .2 Cx Agent to witness start-up and testing. The Consultant may wish to be present and is welcome to attend.
- .3 Tests to be performed and documented by sub-trades, suppliers and equipment

manufacturers.

## **1.12 MANUFACTURER'S INVOLVEMENT**

- .1 Factory testing: manufacturer to:
  - .1 Coordinate time and location of testing.
  - .2 Provide testing documentation for review by Consultant.
  - .3 Obtain written review of test results and documentation from Consultant before delivery to site.
- .2 Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Consultant
  - .1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
  - .2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.
- .3 Integrity of warranties:
  - .1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
  - .2 Verify with manufacturer that testing as specified will not void warranties.

## **1.13 PROCEDURES**

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in following distinct phases:
  - .1 Included in delivery and installation:
    - .1 Verification of conformity to specification and approved shop drawings.
    - .2 Visual inspection of quality of installation.
  - .2 Start-up: follow accepted start-up procedures.
  - .3 Operational testing: document equipment performance.
  - .4 System PV: include repetition of tests after correcting deficiencies.
  - .5 Post-substantial performance verification: to include fine-tuning.
- .3 Documents require tests on approved functional performance verification forms.
- .4 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Consultant. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
  - .1 Minor equipment/systems: implement corrective measures approved by Consultant
  - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Consultant.
  - .3 If evaluation report concludes that major damage has occurred, Consultant shall reject equipment.
    - .1 Rejected equipment to be removed from site and replaced with new.
    - .2 Subject new equipment/systems to specified start-up procedures.

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**1.14 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS**

- .1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.
- .2 With assistance of manufacturer, develop written maintenance program and submit to Consultant for review before implementation.
- .3 Operate and maintain systems for length of time required for commissioning to be completed.
- .4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

**1.15 TEST RESULTS**

- .1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.
- .2 Provide manpower and materials, assume costs for re-commissioning.

**1.16 START OF COMMISSIONING**

- .1 Notify Consultant at least 5 days prior to start of Cx.
- .2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

**1.17 INSTRUMENTS / EQUIPMENT**

- .1 Submit to Consultant for review:
  - .1 Complete list of instruments proposed to be used.
- .2 Provide equipment as required to complete work.

**1.18 COMMISSIONING PERFORMANCE VERIFICATION**

- .1 Carry out Cx:
  - .1 Under actual operating conditions, over entire operating range, in all modes.
  - .2 On independent systems and interacting systems.
- .2 Cx procedures to be repeatable and reported results are to be verifiable.
- .3 Follow equipment manufacturer's operating instructions.
- .4 EMCS trending to be available as supporting documentation for performance verification.

**1.19 WITNESSING COMMISSIONING**

- .1 Cx Agent to witness activities and verify results. The Consultant may wish to attend and is welcome.

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**1.20 AUTHORITIES HAVING JURISDICTION**

- .1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.
- .2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.
- .3 Provide copies to Consultant within 5 days of test and with Cx report.

**1.21 EXTRAPOLATION OF RESULTS**

- .1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Consultant in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

**1.22 EXTENT OF VERIFICATION**

- .1 Provide manpower and instrumentation to verify up to 30 % of reported results, unless specified otherwise in other sections.
- .2 Number and location to be at discretion of Consultant and/or Cx Agent.
- .3 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.
- .4 Review and repeat commissioning of systems if inconsistencies found in more than 20 % of reported results.
- .5 Perform additional commissioning until results are acceptable to Consultant and Cx Agent.

**1.23 REPEAT VERIFICATIONS**

- .1 Assume costs incurred by Consultant for third and subsequent verifications where:
  - .1 Verification of reported results fail to receive Consultant's approval.
  - .2 Repetition of second verification again fails to receive approval.
  - .3 Consultant deems Contractor's request for second verification was premature.
  - .4 Re-testing / Re-verification of test results at the start of the heating season and the start of the cooling season for the first year after building has been turned over to owner as it applies to any work associated with new heating/cooling equipment for the project.

**1.24 SUNDRY CHECKS AND ADJUSTMENTS**

- .1 Make adjustments and changes which become apparent as Cx proceeds.

- .2 Perform static and operational checks as applicable and as required.

**1.25 DEFICIENCIES, FAULTS, DEFECTS**

- .1 Correct deficiencies found during start-up and Cx.
- .2 Report problems, faults or defects affecting Cx to Consultant in writing. Stop Cx until problems are rectified.

**1.26 COMPLETION OF COMMISSIONING**

- .1 Upon completion of Cx leave systems in normal operating mode.
- .2 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Consultant and Cx Agent.

**1.27 ACTIVITIES UPON COMPLETION OF COMMISSIONING**

- .1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

**1.28 TRAINING**

- .1 In accordance with respective specification sections. The Cx Agent will provide a training schedule and it is the respective Contractors responsibility to ensure proper trained personnel and agenda related to operating & maintenance is provided for the Owner's Operating Personnel. The Cx Agent will attend as well and record the training for future reference by the Owner.

**1.29 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS**

- .1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

**1.30 OCCUPANCY**

- .1 Cooperate fully with Consultant during stages of acceptance and occupancy of facility.

**1.31 INSTALLED INSTRUMENTATION**

- .1 Use instruments installed under Contract for TAB and PV if:
  - .1 Accuracy complies with these specifications.

**1.32 PERFORMANCE VERIFICATION TOLERANCES**

- .1 Application tolerances:
  - .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria, except for special areas, to be within +/- 10 % of specified values.
- .2 Instrument accuracy tolerances:
  - .1 To be of higher order of magnitude than equipment or system being tested.



- .3 Measurement tolerances during verification:
  - .1 Unless otherwise specified actual values to be within +/- 2 % of recorded values.

**END OF SECTION**

