Information Technology Services (ITS)
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McGill AV Service Manual

Version 4.0

March 15th, 2018

Contents

Document Revision History

Version	Date	Changes
1.0	March 12, 2014	First version.
2.0	April 09, 2014	Revised and updated for publishing as part of the McGill CFT for AV Vendor process.
2.1	May 2nd, 2014	Addition of the URL for the McGill Facilities Design Standards.

2.2	October 29th, 2014	More specific definition of Crestron lighting presets; Beginning of a section for Blinds control; Statement about private installation of VC systems
2.3	December 11th, 2014	Addition of a section for control of blinds and shades and implementation of such for the Crestron UI
2.4	December 16th, 2014	Integration of the new ITS Policy for Securing AV devices in the Classroom; under the Security section
2.5	December 24th, 2014	Addition of a section for LRS. (Section 3.6)
2.6	February 25th, 2015	Update of Title; removal of comments
3.0	Sept. 24th, 2015- Feb.,2016	Major Revision of Section 5; other minor revisions
3.1	February 26th, 2016	Minor revision in section 1.1 by request of McGill Procurement Services
4.0	March 15th, 2018	Review and revision of complete document to update to currently used products and processes

Definitions

ICS: A unit within McGill Information Technology Services (ITS), responsible for desktop computing.
ITS Needs Assessment: McGill's non-technical document defining the ITS requirements of the users on a new installation project, as elicited by NCS-AV.
ITS: Information Technology Services at McGill; comprised of multiple units including the group involved in the installation and maintenance of AV: NCS-AV. (ICS is another unit within ITS)
McGill: Herein referred as the client, Owner.
NCS-TIS: Service owner for network, telephony, security and AV. The AV division of Network Communication Services- Telecommunication Infrastructure Systems produces AV designs for new classroom projects, and is often involved in support, maintenance and repair of AV systems on campus.
Scope of Work: A document that provides detailed statements and descriptions of the work content for the project requirements.

Standards: A collection of requirements that encompass properties of components and systems that are intended to ensure an accepted degree of functionality and longevity.
Supplier: Pre-selected Suppliers are all the vendors that have been qualified through the CFT (Call For Tender) exercise for AV Suppliers by McGill University.
User: A student or staff member of McGill University.

SECTION 1: Introduction

1.1 General

This manual is proprietary to Information Technology Services (ITS) of McGill University. It is required that this document not be used for any purpose other than preparing quotations for McGill University, and serving as a technical reference for the delivery of AV projects.

This document is the McGill University specification manual for all AV designs and/or installations. The specifications set forth in this document are designed to be the minimum standard of McGill University AV installations. They are to be viewed as general requirements and specifications, and are expected to be reviewed periodically to allow for adjustments in today's ever growing and changing AV industry.

This manual shall be the reference for AV design, and/or installation contracts for New Installation projects and Maintenance awarded to Suppliers under the following cases:

1.1.1 New Installations:

Generally, as far as new installation projects are concerned, the exact nature of the interaction between McGill University and the AV Supplier is varied. The different types of interaction are essentially based on which parts of the project, AV specific, are carried out by McGill University directly and which parts are the responsibility of the AV Supplier.

1.1.1.1 Design/Installation

AV design on new projects will be done in one of the following ways:

1.1.1.1.1 The AV system design shall be provided to the Supplier by McGill University, and the Supplier shall procure and install all equipment specified by the provided design;

1.1.1.1.2 The AV system design shall be done by one Supplier, and the procurement and integration of all equipment specified in that design shall be done by a second supplier. (In this case, NCS-AV acts as subject matter expert (SME) on behalf of the university, with final approval on the AV solutions proposed, and the acceptance of the installation.);

1.1.1.1.3 In exceptional cases only, the Supplier may be called upon to do the AV system design as well as the supply and installation of all equipment. (As with the previous case, NCS-AV acts as subject matter expert (SME) on behalf of the university, with final approval on the AV solutions proposed, and the acceptance of the installation.)

1.1.1.2 Programming of AV Automation Systems (Crestron)

As with design, there are different ways in which McGill University will interact with the AV Supplier concerning the programming of Crestron automation systems on campus. The different models currently employed with regards to Crestron programming are as follows:

1.1.1.2.1 The McGill Standard Crestron UI shall be provided to the AV Supplier in a compiled state, complete with a SIMPL Windows program, to be run in Slot 2 of the Crestron processor. The AV supplier will provide the Crestron programming necessary for the control of the rest of the AV system, to be run in Slot 1 of the Crestron processor. Communication between the touch panel and the program provided by the AV Supplier will be accomplished via "Ethernet Intersystem Communications".

1.1.1.2.2 The McGill Standard Crestron User Interface (UI) shall be provided to the AV Supplier in an uncompiled state, and the AV Supplier shall provide all Crestron programming necessary to make the user interface and AV system function accordingly. All proposed changes to the McGill Crestron UI to be approved by NCS-AV prior to implementation. (This model is relevant for custom installations only.)

1.1.1.2.3 McGill University shall provide all programming necessary (User Interface and Control programs) for the function of the AV system. The AV Supplier shall supply and install all necessary AV equipment.

1.1.2 Service and Repairs

At times, the AV Supplier may be called upon to provide service and/or repairs to AV capable rooms on campus. The nature of the interaction between McGill University and the AV Supplier with respect to service and repairs is dependent on whether the work is to be done in a new room or in an existing room:

1.1.2.1 Maintenance of new rooms

For service and/or repair of recently renovated rooms, the AV Supplier shall act in accordance with the service agreement agreed upon as part of the renovation project. The details of such agreements are agreed upon on a per project basis. (Typically, the Supplier provides a 1-year warranty for labour.)

1.1.2.2 Maintenance of existing rooms

In the case of existing rooms on campus, without a prior service agreement of some kind, McGill ITS will manage the interaction with the AV Supplier directly.

1.2 McGill Environment

McGill University is comprised of three different campuses defined as Downtown, Gault, and Macdonald Campus. Across the three campuses, McGill owns and manages approximately 380 classrooms.

1.3 Scope of Work

1.3.1 Design

1.3.1.1 Depending on the contract, a Supplier may only be required to design a new AV system for installation. This design shall be based on the requirements listed in the 'IT Needs Assessment' document provided by ITS on a per project basis, and shall also satisfy the specifications listed in this McGill AV service manual.

1.3.1.2 The design of an AV system shall include the following elements:

a) Specification of all audio, video and control (automation) equipment, adhering to the standardized equipment referenced in this manual. Any equipment specified by the Supplier that is not referenced in this manual shall be subject to the approval of Network and Communications Services – Audio Visual (NCS-AV).

b) Specification of all sizes and locations of video displays and/or projection screens based on sight lines in the room and the requirements listed in the McGill 'IT Needs Assessment' document.

c) Specification of all audio, video and control cabling and termination hardware required, insuring that it meets the standardized equipment listed in this manual and the requirements listed in the McGill 'IT Needs Assessment' document.

d) Specification of all equipment cabinets and or racks, supporting devices (hooks, trays and raceways), and all other related devices required for the installation. The equipment specified by the Supplier is subject to the approval of NCS- AV.

e) Other particular elements may be required on a per project basis.

1.3.1.3 Drafting of system schematics (VISIO or CAD) showing the exact nature of interconnects between all audio, video and control devices. These schematics shall indicate the approximate location of the AV equipment within the system. Subject to the approval of NCS-AV.

1.3.1.4 Drafting of drawings (floor plans, including elevations, in VISIO or CAD) showing the general location of the main AV system components (ex. Projectors, screens, cameras, speakers, microphones, equipment racks); Subject to the approval of NCS-AV.

1.3.1.5 Creation of documents or drawings (VISIO or CAD) specifying the requirements and locations for electrical, network, as well as conduits and junction boxes and backing boxes required for those services; as required by the AV system.

1.3.1.6 Creation of documents specifying BTU heat loads for all equipment, in order for the mechanical engineer on the project to specify the required cooling or ventilation.

1.3.2 Installation

Depending on the contract, a Supplier may only be responsible for equipment installation. McGill University, or another Supplier, will provide the design, thus section 1.3.1 is not applicable, and only section 1.3.2 will apply.

1.3.2.1 The Supplier shall remove all existing AV equipment and coordinate its return to McGill University in accordance with the instructions in the AV design documents, on a per project basis.

1.3.2.2 The Supplier shall procure and install all audio, video and control equipment, as specified in the AV design documents/drawings.

1.3.2.3 The Supplier shall supply, install and terminate all audio, video and control cable. The Supplier shall include termination of any custom fabricated cabling, ensuring that cabling meets the standardized products and practices referenced in this manual.

1.3.2.4 As required by the AV design drawings, the Supplier shall provide the podium. (Please see the construction requirements in section 3.12)

1.3.2.5 Prior to ordering the equipment specified in the AV design documents, the Supplier shall provide shop drawings for each piece of equipment, for approval by NCS-AV.

1.3.2.6 The Supplier shall **not** install any AV equipment as part of their mandate if the installation site is not suitably clean, or otherwise ready to accept the equipment. (I.e. The site should be free of dust from the construction phase of the project.) If the site is not clean, the AV supplier shall immediately notify the Project Manager in writing, with NCS-AV in copy.

1.3.2.7 The Supplier shall coordinate onsite with representatives of other professions or trades (architects, electricians, etc.) to determine if any changes to electrical service and/or conduits may be necessary in order to perform the proper installation of AV equipment and/or infrastructure. The Supplier must report any discrepancies found between the supplied installation drawings and what is required for installation onsite to NCS-AV.

1.3.2.8 The Supplier shall secure projectors, monitors, document cameras and any other valuable equipment with security device kits as indicated in the design drawings, and as per Section 4.5 (Security) of this manual. These kits shall be **Tryten 401136, Computer lock kit T1 Light- with key and lock #45**.

1.3.2.9 When required, the Supplier shall program the automation system (Crestron), such that the requirements listed in McGill's 'IT Needs Assessment' document and in Section 5 of this manual are satisfied. Subject to approval by NCS- AV.
Note: As per section 1.1.1.2, on some projects, McGill may produce some or all of the Crestron programming.

1.3.2.10 The Supplier shall provide snapshots of all user interface pages for the automation system (Crestron), developed by the Supplier directly, to NCS-AV for approval prior to implementation in the programming.

1.3.2.11 The Supplier shall program the Digital Signal Processing (DSP) unit(s), where applicable, such that the requirements specified in the 'IT Needs Assessment' document and the system schematics are met, on a per project basis.

1.3.2.12 The Supplier is responsible for ensuring that all installed equipment has been updated with the most recent firmware.

1.3.2.13 McGill University shall provide the Supplier with an IP table indicating which IP addresses and network jacks to use with each piece of equipment requiring network service. The Supplier shall connect and configuring the equipment in accordance with the information provided therein.

1.3.2.14 The Supplier shall apply McGill Asset tags (provided by McGill) on each piece of audio, video and control equipment in the system. This Asset tag information is to be recorded in the in the IP table and returned to McGill as part of the end of project deliverables (see section 1.3.2.19.2)

1.3.2.15 The Supplier shall apply unique identification labels (provided by the Supplier) on both ends of each audio, video, network, and control cable making up the system. These cable labels shall correspond with the labeling as indicated on the system schematics referenced in section 1.3.2.19.1 of this manual. The Supplier shall use labels that properly adhere to the cable (For example: **RHINO Flexible Nylon ½ sku 18490**)

1.3.2.16 The Supplier shall test the AV system equipment and programming, and shall complete and return the "AV System Inspection sheet" provided by McGill University, as a means of indicating that the room is conformant to the University's standards and is ready for inspection by NCS-AV.

1.3.2.17 Once NCS-AV has performed an inspection of the AV system; a report will be produced listing any deficiencies requiring correction. The Supplier shall correct all listed deficiencies, and shall return an updated version of the deficiency report to NCS-AV, listing in writing the corrective actions the Supplier has undertaken, on a per item basis. Upon receipt of the updated deficiency reports, NCS-AV will verify that all deficiencies

have been resolved to its satisfaction. The Supplier shall return to correct any remaining deficiencies until NCS-AV indicates that all deficiencies have been resolved.

1.3.2.18 Unless otherwise specified, the Supplier shall provide of a minimum warranty of 12 months (1 year) on all types of delivered services, including labour.

1.3.2.18.1 For projects managed by McGill Facilities, this warranty period shall begin upon the signing of provisional acceptance.

1.3.2.18.2 For projects managed by NCS-AV directly, this warranty period shall begin upon NCS-AV's written confirmation that the installation is functional and has been completed to the University's satisfaction.

1.3.2.19 The Supplier shall deliver the following End of Project Deliverables prior to the definitive acceptance of the project:

1.3.2.19.1 'As-built' system schematics. (NCS-AV will provide the Supplier with the construction drawings in modifiable format, VISIO or CAD, and the Supplier will update these with the as-built information and will return them to NCS-AV.)

1.3.2.19.2 The IP Table provided by NCS-AV on a per project basis, completed by the Supplier containing the following information for all AV equipment installed:

a) Manufacturer

b) Model number

c) Serial number

d) MAC address

e) Unique McGill Asset Tag ID number

1.3.2.19.3 'Uncompiled' Crestron programming code (Crestron patches) for any programs created by the Supplier, including the .rsd file.

1.3.2.19.4 Digital Signal Processor (DSP) programming created by the Supplier, as applicable.

1.3.2.19.5 Username/Password information for all equipment installed/configured by the Supplier.

1.3.2.19.6 The Supplier shall provide all remote controls and documentation for equipment that is installed by them to NCS-AV, as provided to them by the equipment manufacturers.

1.3.2.19.7 The Supplier shall provide a document indicating the duration of the warranty they are extending to the installation, clearly indicating the starting date of the warranty.

1.3.3 Service and Repairs

Depending on the contract, a Supplier may only be responsible for service and repairs on existing AV installations.

1.3.3.1 Given a malfunctioning room, the Supplier shall troubleshoot the AV system and relevant infrastructure in order to determine the cause of the problem.

1.3.3.2 If the malfunction is due to equipment or infrastructure, the AV Supplier shall supply replacement equipment or parts, matching the original manufacturer and model details as possible. The AV Supplier shall suggest replacement equipment models as necessary, subject to NCS- AV approval.

1.3.3.3 If the malfunction is due to Crestron or DSP programming, the AV Supplier shall review and correct the programming, in order to resolve any problems. Any changes made to any existing program by the AV Supplier shall be subject to approval by NCS-AV.

1.3.3.4 The AV Supplier shall provide NCS-AV with a written report detailing the exact nature of the problems, the solutions to those problems, as well as the uncompiled versions of any programming modified to resolve the reported problems.

SECTION 2: Operational Procedures

2.1 New Installations

Further to section 1.1, Suppliers will be awarded new installation projects in different project management structures. McGill Facilities (or their General contractor) will manage certain projects, while NCS-AV will manage other projects directly.

In the case of projects managed by McGill Facilities or General contractor, NCS-AV will act as the AV professional, producing AV designs, overseeing installation, and giving final approval on the installation phases of the project with respect to AV. On occasion, a Supplier may be mandated to produce the AV design for a project, while a second Supplier is mandated to procure and integrate the equipment. In such cases, NCS-AV will act as a consultant on the project and will retain the right of final approval on the design and integration phases of the project with respect to AV.

2.2 Maintenance, Service and Repair

Maintenance and Repair of AV systems across campus is managed by McGill ITS. NCS-AV is the unit within ITS mandated to award contracts for AV service and/or repair.

2.3 Delivery of Service

Upon reception of a request for service, the Supplier responsible for delivery of the AV services shall establish communication with their McGill site contact before starting their work, to ensure no interference to ongoing business is caused by the work. After completion of the service, the Suppler shall advise the McGill site contact that the work has been completed before the Supplier leaves the site. Any addition or modification requested by the McGill site contact shall be pre-approved by the Order issuer (NCS-AV or McGill Facilities Project Management) before being carried out.

2.3.1 Deficiencies

Deficiencies identified before the project sign-off and deferred at McGill's request; and deficiencies identified after the project sign-off; shall be corrected according to a schedule agreed upon with McGill. This work should not interfere with any scheduled classes.

2.4 Business Hours

For the purpose of consulting on AV design; consulting on or managing new AV installations; or managing maintenance of existing AV installations; the NCS-AV business hours are Monday to Friday from 09:00 to 17:00. Suppliers can generally access work sites between 08:00 and 18:00. Main lower campus (area defined as being between Sherbrooke St, Peel St, Dr. Penfield and University St) is available for delivery of material only between 07:00 and 11:00 Monday to Friday by entering through the Milton Gate. Any activity outside these specified hours will require specific arrangements.

2.5 Delivery Timeframe

2.5.1 Service agreements for New Installations

The delivery time of each individual project shall vary by its scope and timeline. Whenever possible, delivery dates will be announced on orders sent to the Supplier. The Supplier shall be responsible to follow the project timeline announced by McGill Facilities and /or its affiliates. If for any reason the Supplier cannot provide the goods and services within the required timeframe they shall advise McGill as soon as possible so that alternate measures may be taken.

2.5.2 Service agreements for Service and Repairs

The Supplier may be called upon to provide service or repairs within their provided warranty period on a new installation; or be given a mandate for service and repair of an existing room on campus directly by NCS. NCS shall define the priority level of the incident requiring the service and/or repair when in communication with the Supplier, on a per incident basis, as per the following sections:

2.5.2.1 High-priority service/repair

Any request for service related to an incident that McGill University believes will impact its service to its users must be processed based on the following levels of priority:

a. Priority Level 1:
   Response time: 4 hours
   Definition: The room is non-operational, causing cancellation of class.

b. Priority Level 2:
   Response time: 8 hours (1 business day)
   Definition: Functions within the room's system are not operational, but classes are not interrupted.

2.5.2.2 Low-priority service/repair

Any request for service related to an incident that McGill University believes will not directly impact its service to its users will be processed as soon as possible, given the availability of the Classroom.

2.6 As-Built Information Return

2.6.1 New projects

For as-built information requirement pertaining to new installation projects, see the requirements for End of Project Deliverables in section 1.3.2 of this manual. The as-built information must be submitted before the definitive acceptance of the project.

2.6.2 Maintenance and Repairs

In the case of service requests for maintenance, as-built information shall be provided immediately after the completion of the work. The information should include any changes or corrections to any information provided to the Supplier by McGill.

2.7 Labour

2.7.1 General

The Supplier agrees to only use staff who are fully trained, qualified and experienced for the design, installation, termination, and testing of AV and Control equipment and infrastructure. The Supplier must comply with all municipal, provincial and Canadian legislation in place such as rules, laws, by-laws and decrees in place. The Supplier must be possess the ASP certification.

2.7.2 Project Manager/Site Supervisor

The Supplier shall have a designated Project Manager/Site Supervisor, who will be assigned to each project, from start to finish. The Project Manager/Site Supervisor interacts with all McGill

University contacts (McGill Facilities, ITS, etc.) to coordinate and ensure proper and timely delivery of all work assigned by McGill to the Supplier. This Project Manager/Site Supervisor shall have a minimum of 5 years' experience in AV/Control cabling.

2.7.3 Designated Account Manager

The Supplier shall have a designated Account Manager assigned permanently to the McGill account. This Account Manager has the responsibility of coordinating and preparing price requests from McGill, and handles all administrative matters (invoicing, payments, as-built information, estimates, etc.). The Account Manager shall have a minimum of 5 years' experience in AV design and or installation.

2.7.4 Subcontractors

The Supplier shall use only the Supplier's own staff on all McGill projects, unless authorization has been given by NCS-AV to use subcontracted workers for specific elements within a project. The Supplier shall request authorization in writing, and shall provide relevant information regarding subcontractors (CV) before the work to be subcontracted commences.

2.8 Service Interruption

2.8.1 Continuity of Services

The Supplier shall take no action that will interfere with, or interrupt ongoing business, classes or any other activity taking place at McGill. The Supplier shall be diligent to keep noise to a minimum inside and outside of McGill University buildings. If disruption cannot be avoided and is judged unacceptable by the end users, arrangements shall be made to have the work done outside regular business hours. Refer to section to 2.8 for more details.

2.8.2 Scheduled Shutdowns

The Supplier will be required to make arrangements with designated McGill contacts for all work requiring shutting down services. All shutdowns are to be scheduled in such manner as to minimize downtime to McGill University end users.

2.8.3 Service interruption

Should the Supplier inadvertently interrupt services during the process of carrying out the assigned work, the Supplier is required to advise McGill immediately and to take diligent action in order to ensure prompt restoration of service.

2.8.4 Incidents

Should accidents inadvertently happen (broken ceiling tiles, furniture, etc…); the Supplier is required to advise McGill immediately and to take diligent action in order to ensure prompt restoration.

2.9 Project Meetings

At least one representative of the Supplier shall be expected to attend specific construction site meetings, unless otherwise specified by McGill.

2.10 Access to Premises

The Supplier shall be responsible for securing their required access to McGill buildings and facilities. The Supplier shall make parking arrangements with the Parking Office directly.

The Parking Office coordinates are:
3465 Durocher Street
Room # 116
Montreal, Quebec H2X 2C6
Tel: 514.398.4559
Fax: 514.398.2144
http://www.mcgill.ca/parking/

Occasionally, intervention of a McGill representative may be required. The Supplier's Project Manager/Site Supervisor shall request any such intervention in writing to McGill Facilities or NCS-AV. Requests shall be submitted at least 2 business days in advance so that arrangements can be secured with other McGill departments.

The Supplier shall abide by the MSP (McGill Service Provider) policy, and shall ensure that all Project Managers, Site Supervisors and sub-contractors have an appropriate MSP ID badge with their picture. Project Managers, Site Supervisors and sub-contractors shall be responsible for providing access to their employees. The Supplier shall incur any costs associated with this procedure. Arrangements for this process shall be made through the Security Office with the cooperation and sponsorship of McGill Facilities or NCS-AV.

The McGill Service Provider policy can be found at the following URL:

http://www.mcgill.ca/adminhandbook/administrative-policies-and-procedures/id-cards-service-providers

2.11 Sustainability Program

In an effort to promote and support sustainability at McGill, McGill Facilities and NCS-AV request that all cabling and components removed from McGill premises during construction/demolition projects be reviewed and analyzed for validity of future use before being disposed of in the appropriate manner. The Supplier shall provide proof of appropriate disposal of material to McGill as part of the as-built information.

2.12 Construction Safety & Fire Regulations

2.12.1 General

While present and working on McGill premises, the Supplier shall provide and maintain the appropriate safety equipment required to deliver the services. The Supplier shall conform and abide by the safety recommendations and prevention procedures of the CSST and/or Construction Association of Canada and/or any other program regulating the industry. Upon request from McGill and or the General Contractor of a project, the Supplier shall prepare and provide their safety manual at no extra cost to McGill University.

2.12.2 McGill EHS Specifics

The Supplier shall comply with the rules and procedures put in place by the McGill EHS office (Environmental Health and Safety), as posted at http://www.mcgill.ca/ehs/, particularly concerning working in the presence of asbestos (see Section 6: Appendix A).

2.12.3 McGill Facilities Specifics

The Supplier shall comply with the rules and procedures put in place by McGill Facilities, published as the Facilities Ancillary Services Safety Manual available at:

http://www.mcgill.ca/ehs/programs-and-services/facilities-safety/facilities-management-ancillary-services-safety-manual

2.13 Cutting and Remedial Work

2.13.1 General

The Supplier shall provide and maintain all necessary fire extinguishers when necessary. Special permits are required. Refer to the Campus Public Safety website:

https://www.mcgill.ca/campussafety/fire-prevention

2.13.2 Hot Work Policy

2.13.2.1 Definition

Hot work is defined as any welding, cutting, grinding or any other activity involving open flames, sparks or other ignition sources which may cause smoke or fire or which may trigger detection systems.

2.13.2.2 Exemption

Workshops equipped with appropriate fire prevention and suppression facilities are exempt from the requirement for Hot Work Permits.

2.13.2.3 Obtaining a Hot Work Permit

Hot work may only begin upon the issue of a Hot Work Permit, available from the Departments of Facilities Management and Facilities Development.

2.13.2.4 Displaying the Hot Work Permit

The Hot Work Permit must be displayed in a visible location any time hot work is in progress. Failure to display this permit will result in an immediate stoppage of work. The Permit is valid only for the time period displayed on the Hot Work Permit.

2.13.2.5 Completion of Work

Upon completion of hot work and final fire check, return the used permit to the issuing department.

2.14 Temporary Facilities

McGill University will not allocate any temporary facility that would be used for office space, storage, lunch room and/or any other usage to the Supplier staff. The Supplier is to provide this type of facility at his own cost and outside of McGill property.

2.15 Inspections

McGill representatives will do inspections of work done by the Supplier. These inspections may be done with or without the Supplier's representatives present. These inspections may be performed with or without prior notice to the Supplier, and may result in deficiency lists. Any deficiency list will be sent to the Supplier, who should then take steps to resolve the deficiencies. The period during which to perform deficiency correction will be specified on the list. If, for any reason, the Supplier cannot resolve the deficiencies within the specified period, they must advise McGill University as soon as possible and propose a new timeline. Any newly proposed timeline is subject to approval by McGill University.

2.16 Coordination

The Supplier is responsible for all the coordination required with the General Contractor and or other trades involved in the delivery of the installation.

2.17 Work in Existing and Heritage Buildings

1) Buildings will remain in full use and occupancy throughout the duration of the work.
2) Maintain existing exits and provide proper and safe means of egress from all parts of existing buildings to open spaces at all times, subject to the approval of jurisdictional authorities.
3) All work must be done in accordance with the building work schedule and approval of local authorities (Building Director's office).
4) Execute work as quietly as possible in and around existing buildings at all times. Schedule noisy operations outside local business operations.
5) Protection of existing buildings shall be substantial enough to prevent damage.
6) Protection shall include equipment, furniture and other similar, hardware, trim and supplies, whether fixed to a building or not.
7) Take all precautions to ensure that no structural damage is caused to existing buildings by demolition, alteration work or by new construction.

8) Take all reasonable measures, including all those required by the authorities having jurisdiction, to protect *HERITAGE* buildings when undergoing work.
9) Take all reasonable measures, including all those required by the authorities having jurisdiction, to protect the employees, the public and those employed in the work from bodily harm.
10) Comply with Section 2.13 on cutting, drilling, coring and patching for work in the buildings.
11) Remove debris from sites immediately as it accumulates. Ensure that during removal operations through the existing buildings, that existing work is not damaged; and dirt, debris and dust is not spread.
12) Ensure that existing services are not damaged during construction.
13) Do not interrupt services (telecom/AV, electrical, mechanical and other) of the existing building, except for temporary shutdowns to make connections to new work, and as approved by prior arrangements with the clients and McGill Facilities, General contractor or NCS- AV. Give notice as per Section 2.8.
14) Should existing services be accidently uncovered and disrupted, make complete restoration immediately, and provide adequate protection to avoid further disruption until alternative means of providing permanent continuation of the services are made.
15) Unless otherwise specified, restore the services on which the work is performed to their original condition.
16) Protect furniture, carpet, etc.
17) Identify equipment of value that could get damaged or stolen, and take appropriate action.

SECTION 3: Standardized Products

Audio, video, control equipment and infrastructure of various kinds has been standardized by McGill in an effort to maximize the ease of use for the students and staff of the University, and to provide continuity between AV systems from room to room. Within this document, where it is not mentioned that an equivalent product may be used, the Supplier shall supply only the product specified. In some cases, due to special project requirements, equipment proposed by the Supplier may fall outside of this standardization; however, this is subject to approval by NCS-AV. Any equipment not specified in this section is also subject to approval by NCS-AV.

3.1 Cable

General Note: All cabling shall be fire rated FT4 when run within EMT conduit. Should there be a case requiring cabling to be run outside EMT conduit; a fire rating of FT6 shall be required on all cabling.

3.1.1 Video Cable

3.1.1.1 Coaxial cable

Coaxial cable for Analog and Digital video applications shall be of RG-6/U type, 75 Ohm, Plenum rated. **Belden 1695A** or Delco equivalent. This cable shall be terminated with crimp style BNC or RCA connectors of the type specified in section 3.2.

3.1.1.2 HDMI cable

HDMI cable shall be of the pre-molded type and shall be HDMI Version 1.4 compatible or later. There is no set manufacturer for this cable type; however, the specifications of the selected cable should be equivalent to those of the Extron HDMI M-M Pro series cables. **Note:** All HDMI cables shall have locking connectors, with the exception of those installed for the User's Laptop to connect to.

3.1.1.3 VGA cable

VGA cable shall be predominantly of the pre-molded type, unless there is a special requirement for a custom assembly.

1. Pre-molded type: there is no set manufacturer; however, the specifications of the selected cable should be equivalent to those of the Extron VGA M-M MD series cables.

2. Custom assembly: any custom assembly of a VGA cable shall use a product equivalent to Extron MHRVGA cable, or MHRVGAP (Plenum).

*In both of the above cases, the cable must allow for the extension of computer-video signals **and** EDID bits.

3.1.1.4 DVI cable

DVI cables shall be of the pre-molded type. There is no set manufacturer for this cable type; however, the specifications of the selected cable should be equivalent to those of the Extron DVID SL Pro series cables.

3.1.1.5 S-Video cable

S-Video cables shall be of the pre-molded type. There is no set manufacturer for this cable type; however, the specifications of the selected cable should be equivalent to those of the Extron MHR-2 SVM-M series cables for within a conduit, or MHR-2P SVM-M for plenum applications.

3.1.1.6 DisplayPort cable

Display port cables shall be of the pre-molded type. Typically, since DisplayPort connections are more commonly used for computer graphics resolutions, and the AV systems on campus at McGill commonly use HDMI as the prevalent connection type for digital video, a DisplayPort to HDMI adapter cable is used. In such a case (ex. Podium PC), **Kramer C-DPM/HM** series cables shall be used.

3.1.1.7 HDbaseT cable

If available, the Supplier shall use the HDbaseT cabling made by the manufacturer of the equipment using the cable. If the manufacturer in questions does not make HDbaseT cabling, the Supplier shall recommend an alternate product, subject to approval by NCS-AV. (Example for Crestron equipment: Crestron DM-CBL-8G-NP [non-plenum], or DM-CBL-8G-P [Plenum].)

3.1.2 Audio Cable

3.1.2.1 General

The composition of audio cables depends on the intended installation/use of the cable, which fall into two different cases:

1. Permanent installation: Fixed in a conduit or behind a wall, the cable will not move after the initial installation, or need to stand up to any significant abuse. In this case, it would be preferable to have a foil-shielded cable.

2. Movable installation: Moved regularly, potentially walked on, and needs to stand up to abuse that is more significant. In this case, a braided shield would be preferable.

3.1.2.1 Microphone Cables

Microphone level cables shall be 75 Ohm, Star Quad (4 conductor):

1. Permanent: Canare L-4E6AT or equivalent Belden product. (Foil shield)
2. Movable: Canare L-4E6S or equivalent Belden product. (Braided shield)

3.1.2.2 Line level audio cables (Balanced)

Balanced analog line level audio cables shall be 75 Ohm (2 conductor):

1. Permanent: Canare L-2E5AT or equivalent Belden product (Foil shield)
2. Movable: Canare L-2T2S or equivalent Belden product (Braided shield)

3.1.2.3 Line level audio cables (Unbalanced)

Unbalanced analog line level audio cables shall be 75 Ohm impedance. For most applications involving unbalanced audio, 2 channels (Stereo: Left and Right) will be on the same cable. If this is the case, and the cable is custom, the same cables as specified above in 3.1.2.2 shall be used (2 channels), and terminated using the connectors specified in section 3.2. If pre-molded cables are used then the following shall apply:

1. Terminated with 3.5mm (TRS) connectors: There is no set manufacturer for this cable type, however, the specifications of the selected cable should be equivalent to those of the Extron Mini Audio Cables series (Model 'A Mini/2', etc.) **Note: This example is not relevant when considering the audio pullout cable within a cable cubby at a podium. (Please see section 4.7.4)**

2. Terminated with (2x) RCA connectors: There is no set manufacturer for this cable type, however, the specifications of the selected cable should be equivalent to those of the Extron RCA Audio Cables series (Model 'A RCA/6', etc.)

*Unbalanced connections involving cable runs that exceed 15' in length shall be converted from unbalanced to balanced and then back to unbalanced again at the destination.

3.1.2.4 Digital audio cables

Digital audio cables, intended to carry formats such as AES/EBU, SP/DIF, etc., shall be 110 Ohm (2 conductor):

1. Permanent: **Canare DA202AT** or equivalent Belden product (Foil shield)
2. Movable: **Canare DA202** or equivalent Belden product (Braided shield)

3.1.2.5 Speaker cable

Depending on the type of speaker, active or passive, there are two different cable types specified for speakers:

1. Active speakers: The same cable as specified in section 3.1.2.2 should be used.
2. Passive speakers: Depending on the cable run length, most applications should use a 14 or 16 AWG cable, Belden 1307A (2 conductor) or Canare 4S8 (4 conductor)

3.1.3 Control Cable

3.1.3.1 Serial control cable

For custom cable assemblies for RS-232 or RS-422 serial control, **Belden 1419A** or equivalent shall be used.

3.1.3.2 Crestron control cables

For all control cables required for Crestron automation systems, **only Crestron certified products shall be used**.

3.1.4 Network cable

For audio, video or control implemented via network cabling (Example: AVB installations) only **Belden 2412** (FT4) or **Belden 2413** (FT6) shall be used.

3.2 Connectors

3.2.1 Video connectors (in-line)

3.2.1.1 BNC connectors

Coaxial cables for analog and digital video applications, and some types of digital audio applications, must be terminated with 75 Ohm BNC crimp type connectors only. **Canare BCP-C55A** or Neutrik equivalent.

3.2.1.2 HD15 (15 pin) connectors

HD15 (D-sub 15 pin) connectors for custom VGA or RGB cable assemblies shall be solder type, and shall have a metal housing with the appropriate stand-off screws or thumb screws.

3.2.1.3 RCA connectors

RCA connector for terminating coaxial cable shall be 75 Ohm crimp type connectors only. **Canare RCAP-C53** or Neutrik equivalent.

3.2.1.3 Pre-molded connectors (HDMI, DVI)

For HDMI and DVI connectors, only cables of the pre-molded type shall be used. Please see sections 3.1.1.2 and 3.1.1.4 for specifications.

3.2.2 Audio connectors (in-line)

3.2.2.1 XLR connectors

Neutrik XX series, solder type XLR connectors shall be used for balanced audio connections of the following types:

1. Microphone:
    a. Male: **Neutrik NC3MXX-B** (black metal housing, gold contacts)
    b. Female: **Neutrik NC3FXX-B** (black metal housing, gold contacts)

2. Line Level:
    a. Male: **Neutrik NC3MXX-BAG** (black metal housing, silver contacts)
    b. Female: **Neutrik NC3FXX-BAG** (black metal housing, silver contacts)

3. Digital:
    a. Male: **Neutrik NC3MXX** (nickel housing, silver contacts)
    b. Female: **Neutrik NC3FXX** (nickel housing, silver contacts)

3.2.2.2 RCA connectors

As specified in section 3.1.2.3 (Line level audio cables (Unbalanced)), audio cables terminated with RCA connector will predominantly be of the pre-molded type, unless there is special requirement for a custom cable assembly. Custom cable assemblies shall use the following connectors, depending on what kind of cable they are terminated on:

1. Coaxial cable: please see section 3.2.1.3.
2. Other audio cable: Canare F-09 or F-10 (solder type) or Neutrik equivalent.

3.2.2.3 1/4 inch TS connectors

For 1/4 inch unbalanced connections, the solder type Neutrik NP2X-BAG (black shell) or Canare F-15 shall be used.

3.2.2.4 1/4 inch TRS connectors

For 1/4 inch balanced connections, the solder type Neutrik NP2X-BAG (black shell) or Canare F-16 shall be used.

3.2.2.5 3.5mm (1/8 inch) TRS connectors

As specified in section 3.1.2.3 (Line level audio cables (Unbalanced)), stereo unbalanced audio cables terminated with a 3.5mm TRS connector shall use the solder type Canare F-12 connector.

3.2.2.6 speakON connectors

For use with passive speaker systems where the speakers use the twist-lock style connections, the following Neutrik speakON SPX series connectors shall be used, depending on the selected speaker cable:

1. 2 conductor: Neutrik NL2FX
2. 4 conductor: Neutrik NL4FX

3.2.3 Control connectors (in-line)

3.2.3.1 DB9 (9 pin) connector

For custom RS-232 cable assemblies, a solder type DB9 (D-sub 9 pin) connector with metal housing and appropriate standoff screws or thumb screws shall be used.

3.2.4 Panel connectors

3.2.4.1 *General*

All panel connectors shall be of the **Neutrik D series**. Connection types not available in the D series, but required to be mounted on a panel shall be specified by the Supplier, subject to approval by NCS-AV.

3.2.4.1 Video

The panel connectors for video are as follows:

1. BNC: **NBB75DFB** (grounded) or **NBB75DFIB** (isolated).
2. RCA: **NF2D-B-4** (yellow insolation washer)

3.2.4.2 Audio

The panel connectors for audio are as follows:

1. XLR (Microphone):
    a. Male: **NC3MD-L-B-1** (Black metal housing, gold contacts)
    b. Female: **NC3FD-L-B-1** (Black metal housing, gold contacts)

2. XLR (Line level, analog):
    a. Male: **NC3MD-L-BAG-1** (Black metal housing, silver contacts)

b. Female: **NC3FD-L-BAG-1** (Black metal housing, silver contacts)

3. XLR (Digital audio):
    a. Male: **NC3MD-L-1** (Nickel housing, silver contacts)
    b. Female: **NC3FD-L-1** (Nickel housing, silver contacts)

4. RCA:
    a. **NF2D-B-9** (white insolation washers)
    b. **NF2D-B-2** (red insolation washers)

5. 1/4 inch TS and TRS: **NJ3FP6C-BAG** (Black metal housing, silver contacts)

6. speakON:
    a. 2 conductor: **NL2MD-H** or **NL2MD-V**
    b. 4 conductor: **NL4MD-H-1** or **NL4MD-V**

3.2.4.3 Network

Panel mount connectors specified for use with network cables terminated in RJ45 line connectors shall be **Neutrik NE8FDV-B**.

3.3 Video Equipment

3.3.1 Projectors

3.3.1.1 General

All projectors shall be commercial grade **Panasonic** products, at a minimum able to project a resolution of 1920x1080 60p.

3.3.1.2 Standard (Long) Throw

Standard (Long) throw projectors shall be commercial grade Panasonic products, and shall at minimum be capable of projecting a resolution of 1920x1080 60p. The projector shall include the valet service. (Example: Panasonic PT-EZ770)

3.3.1.3 Short Throw Projectors

The **Epson Powerlite** series shall be used when short throw projectors are required. Should there be a requirement for the short throw projector to project full HD resolution; or should another manufacturer be required, since the projector is part of an Interactive Board assembly (See section 3.3.7.3), exceptions may be made. All exceptions subject to approval by NCS-AV.

3.3.2 Projector/Display Mounts

3.3.2.1 Projector mounts

Chief brand projector mounting products shall be used for mounting long throw projectors, unless otherwise approved by NCS-AV.

3.3.2.2 Display mounts

When mounting flat panel displays, either ceiling or wall mounts may be used, depending on the required application. **Chief** products or approved equivalent shall be used.

3.3.2.3 Monitor Arms

On projects with NCS standard Large podia (sections 3.12 and 4.7), and where a podium computer has been specified (section 4.7.4); a desk mounted monitor arm is required for the display. The **Ergotron 45-241-026** monitor arm shall be used in this case.

3.3.3 Projection screens

All projection screens, including manual, electric, rear projection and other specialty screens shall be manufactured by Da-Lite, with an aspect ratio of 16:9 or 16:10, unless due to specific requirements and approved by NCS-AV.

3.3.3.1 Manual

Manual screens shall be Da-Lite Model C.

3.3.3.2 Motorized

Whenever possible, electric projection screens shall have low voltage controllers built into the screen, with the motor assemblies recessed into the ceiling, and shall have Da-Lite's Standard Silent Drive System. (Example: Da-Lite Tensioned Advantage Electrol)

3.3.3.3 Ceiling/Wall mount

When it is not possible to recess the projection screen into the ceiling, ceiling or wall mounting the motor assembly is possible. These screens shall have Da-Lite's Standard Silent Drive System. (Example: Da-Lite Tensioned Contour Electrol)

3.3.3.4 Acoustically perforated

When the design of an AV system requires that a projection screen be mounted in such a way that it is installed in front of one or more speakers, thus obstructing the audio path, an acoustically perforated screen shall be used. (Examples in sections 3.3.3.2 and 3.3.3.3 both have acoustically perforated versions)

3.3.3.5 Fixed Screens

If there are no requirements that the screen be moved, such as to access a blackboard or whiteboard behind the screen, the screen may be permanently fixed to the wall. (Example: Da-Lite Cinema Contour). On occasion, most likely in conjunction with the use of an Ultra short throw projector, white boards may be used as the projection surface. (Example: Da-Lite IDEA series screens)

3.3.4 Video Displays

3.3.4.1 General

There are no specific standard models of video display that have been selected by McGill; however, all video monitors must be commercial grade Panasonic products, at a minimum 1920x1080 60p in resolution. Depending on the requirements and budget, the following types of video display may be used (models listed are examples only).

3.3.4.2 LCD

LCD monitors shall be equivalent to the Panasonic TH-42LF5U. Depending on the requirements, size and feature set will vary.

3.3.4.3 LED

LED monitors shall be equivalent to the Panasonic TH-55LFV50U. Depending on the requirements, size and feature set will vary.

3.3.4.4 Plasma

Plasma monitors shall be equivalent to the Panasonic TH-42PF50U. Depending on the requirements, size and feature set will vary.

3.3.5 Video cameras

3.3.5.1 General

As with projectors, and video displays, video cameras shall be commercial grade Panasonic products, unless there are requirements that cannot be met by Panasonic's range of products. Selection of a different product shall be subject to approval by McGill University. Video cameras shall be able to output 1920x1080 60p at a minimum.

3.3.5.2 Movable cameras

Cameras that are operated manually by the user must be easy to use and durable. The camera should have the required audio and video outputs to interface with the AV system without the use of any in-line adapters, or special breakout cables. The camera shall be able to be mounted on a standard tri-pod or used handheld. (Example: **Panasonic AG-AC160A** or **Wolfvision Eye 12**)

3.3.5.3 Fixed cameras

In applications where the video camera does not need to be manually repositioned, a fixed camera shall be specified. This camera can be ceiling or wall mounted, but shall be able to output 1920x1080 60p at a minimum. (Example: **Panasonic AW-HE2PJ**)

3.3.5.4 Mechanical cameras

When the remote control of a video camera is required, a Pan/Tilt/Zoom (PTZ) camera shall be used. (Example: **Sony EVI-D70** or **Panasonic AW-HE40H**)

Unless otherwise specified by the requirements of the project, the camera shall be controlled via the AV automation system (Crestron touch panel)

3.3.6 Video switchers and routers

3.3.6.1 General

On occasion, there are requirements for user operated video presentation switchers or routers for analog and digital signal types including, but not limited to: VGA (or RGB), DVI, HDMI. In this case **Kramer Electronics** products, capable of handling a minimum resolution of 1920x1080 60p, shall be specified.

3.3.7 Document Cameras

3.3.7.1 General

Unless otherwise specified in the requirements of a project, classroom AV systems shall have a document camera located at a podium. This document camera shall have the following specifications:

- Discrete on and off function
- Compatibility with IR or RS-232 control
- Securable RS-232 connector (via screws)
- Motorized optical zoom
- Output a resolution of at least 1080 60p

3.3.7.1.1 Desktop Document Cameras

In classrooms where a document camera may be mounted on a desk or on a podium, the model specified shall be the **Wolfvision VZ-8+.**

3.3.7.1.2 Ceiling mount Document Cameras

As an alternative to the desktop document camera, the **Wolfvision Eye 14** ceiling mount document camera may be used; however, special lighting must be considered for this option, since the camera does not come equipment with its own lighting.

3.3.8 Interactive Displays

3.3.8.1 General

There are currently many interactive display products of various styles in the market place. Until recently, McGill University used SMART products exclusively; however, at this time, the university is evaluating a variety of products in the categories of interactive display in an effort to establish new standardized products. The following sections give examples of products used by the University recently. Should the Supplier wish to recommend a product other than that specified in the design for a project, NCS-AV would be happy to review it. Any such

recommendations are subject to approval by NCS-AV, and shall be at a resolution of 1920x1080p at a minimum.

3.3.8.2 Interactive monitors

On recent projects, NCS-AV has been specifying the NEC E232WMT touch monitor. In some medium sized classroom installations, an interactive monitor is installed at the podium to provide two functions. The monitor allows the presenter to see the video source that has been selected for display through the AV system. In addition to this, the monitor allows the presenter to use their fingers to control the PC it is connected to.

Note: In the case of the NEC E232WMT's integration on a podium within a classroom, it shall only be integrated for use with the Podium PC. The NEC E232WMT shall be fed a video signal from one of the PC's two video outputs, while the PC's second video output shall feed the room's AV system directly.

3.3.8.3 Interactive white boards

In lieu of the previous standard interactive whiteboard products by SMART Technologies, the University has moved to specifying interactive projectors. The **Epson Brightlink Pro** series shall be specified when interactive whiteboards are required. These interactive ultra-short throw projectors offer the presenter digital inking via a stylus or finger, digital whiteboard functionality, control of the connected computer, and many other features all on a large (up to 100 inch diagonal) surface. The interactive projector is mounted on the wall for general viewing, and is generally connected directly to a Local computer. Depending on the exact nature of the project's requirements for the AV system, this interactive projector may or may not be controlled by the AV system's automation.

3.3.9 Other AV Components

3.3.9.1 Blu-ray Players

In audio visual installations where a dedicated Blu-ray Player is required, **Panasonic DMP-BD** series players shall be used.

3.4 Audio Equipment

3.4.1 General

The audio equipment listed below represents the equipment that the user will come into contact with or operate directly. It is understood by McGill that other audio equipment will be required in order for the system to function. Any audio equipment specified by the Supplier that is not mentioned in this list shall be subject to approval by NCS-AV.

3.4.2 Microphones

3.4.2.1 Wired

There are several different applications for wired microphones with respect to AV installations on campus. Wired microphone are specified by the following categories:

3.4.2.1.1 Tabletop (Podium- Gooseneck)

Tabletop wired microphones, also called gooseneck microphones, are permanently installed at the podium in rooms large enough to require sound reinforcement in order for the presenter to be heard by the students. These microphones can also be installed in smaller rooms where the Lecture recording system has been installed in order to capture the presenter's audio. In such cases the microphones shall be **Shure MX418/C**.

3.4.2.1.2 Tabletop (Student- Push to Talk)

Some classrooms, notably those with Videoconferencing capabilities, require microphones in the student seating areas. In cases such as this, the **Shure MX-392/O** Push to Talk (PTT) shall be used.

3.4.2.1.3 Headset

In the past, headset microphones were often installed at the classroom's podium, in lieu of the fixed table top microphone, to allow the presenter more flexibility. This is no longer a standard feature installed by ITS, unless required specifically on a project. In that case, the headset microphone shall be the **Shure WH20XLR.**

3.4.2.1.4 Ceiling mount

Ceiling mount microphones are necessary for some installations involving the Lecture Recording System (LRS), to capture questions for the student seating area properly. In some cases, ceiling mount microphones are used with Videoconferencing systems. The ceiling mount microphone shall be the **Shure MX202WP** (includes preamplifier) or equivalent, subject to approval by NCS-AV.

3.4.2.2 Wireless

Wireless microphones can be used in many classrooms and lecture halls on campus. McGill is in the process of switching from the previous standard across campus (the Audio Technica ATW R2100a **D-band**) to Shure QLX series microphone systems. As with the previous wireless microphone product, the same receiver model (**Shure QLXD4-G50**) will be installed as a standard across campus in order to allow professors to sign out transmitters (body pack: **QLXD1;** or handheld: QLXD2) and keep them for the semester. The most prevalent transmitter type on campus will be the body pack (QLXD1) with a headset microphone (Shure SM35-TQG). By September 2019, all rooms on campus equipped with wireless microphones will have the new Shure products.

3.4.3 Loudspeakers

3.4.3.1 General

There are no set standard manufacturers for Loudspeakers; however, the examples given in the sections below give basic guidelines on the specifications required. All speakers specified by the vendor shall be subject to approval by McGill University.

3.4.3.2 Active

Active speakers are deployed in medium and large sized classrooms, as well as lecture halls and auditoriums. (Example: **QSC K series** (medium sized rooms) or equivalent, and **QSC KW series** (Large rooms) or equivalent.)

3.4.3.3 Passive

3.4.3.3.1 Ceiling mount

Round speakers flush mounted into the ceiling are to be used in small and medium sized rooms only. Unless there are space constraints in the ceiling 6 or 8 inch diameter speakers shall be used in sufficient quantity to provide audio coverage to every seat in the room. (Example: **Tannoy CVS series** or **Crestron Saros IC6T**)

3.4.3.3.2 Wall mount

In large rooms, it is not sufficient to rely on the ceiling mounted speakers from section 3.4.3.3.1 for audio playback and sound reinforcement. For large rooms, wall mounted speakers or speakers hung from the ceiling shall be used. (Example: **QSC AD-S82H** or better)

3.4.4 Amplifiers

3.4.4.1 General

As with speakers, there is no set standard for audio amplifiers; however the amplifier should be able to provide at least (2x) 180W of power. (Example: **Crest Audio CPX Series** or better). The Supplier may specify an amplifier of different manufacturer and model than that of the listed example; however, it is subject to approval by NCS-AV.

3.4.5 Transformer Isolators

In cases where there are unbalanced audio connections, McGill University may require the use of transformer isolation to eliminate RF or Grounding issues. Transformer isolation (1:1) between the laptop and the system, shall be implemented whenever there is an unbalanced analog audio connection provided (3.5mm TRS). Depending on the system in question, McGill may require the use of transformer isolation between the system and inputs to the amplifiers driving the speakers (in the case of passive speakers) or the inputs of the speakers themselves (in the case of active speakers). The transformer isolation shall be the **RDL AV-HK1** or equivalent.

3.4.6 Digital Signal Processing (DSP) systems

3.4.6.1 General

There are several different kinds of Digital Signal Processing (DSP) systems that have been deployed across the campus to date. If a DSP engine is required as part of the function of the AV system, the Supplier will typically specify one of the following manufacturers: **Biamp (including Nexia), Peavy Media Matrix, Symetrix, Polycom, QSC or Crestron**. Selection of DSP systems are subject to approval by NCS-AV.

3.5 Videoconferencing systems

3.5.1 General

There is currently no standard manufacturer for videoconferencing at McGill University. The pace at which the technology is changing in the field of Videoconferencing/Web conferencing has made it impractical to specify model information for exact systems. Existing videoconferencing systems on campus have either been integrated into the automated AV systems, or are operated as stand-alone systems. The Supplier shall specify either a **Polycom** or a **Cisco** system for videoconferencing.

****Note:** In the case of private installation of videoconferencing systems, the users shall be required to retain their own service contracts. ITS recommends a duration of three (3) years on service contracts related to videoconference systems. ****

3.6 Lecture Recording Systems (LRS)

3.6.1 General

Across campus, some public classrooms are equipped with Lecture Recording Systems (LRS). These systems are computers that are physically located in the classroom's AV equipment rack or podium, and are part of a centrally automated system via the McGill network.

There are two different room types equipped with LRS: "two source" and "one source" rooms. A "two source" room is a room equipped with an AV system capable of displaying two input sources simultaneously, on at least two display screens; while a "one source" room is a room with a system able to display one input source at a time, on at least one display. Some general requirements for attributes and implementation of LRS with the AV system in a classroom follow:

3.6.1.1 LRS systems in either room type shall capture the same video feeds that shown on the main displays in the room. (Unless otherwise required by the project as stipulated in the AV design drawings or IT Services Needs Assessment document.)

3.6.1.2 The audio fed to the LRS shall match what is heard in the room; microphone mutes and unmutes, and audio from the selected input source shall match what is heard in the room.

3.6.1.3 The video feeds from the AV system to the LRS shall be scaled such that a fixed resolution of 1920x1080 p60 is fed to the LRS inputs. (Unless otherwise required by

the project as stipulated in the AV design drawings or IT Services Needs Assessment document.)

3.6.1.4 Within the AV system, there shall be a discreet level control for the audio being fed to the LRS. This level control shall be located on the Crestron touch panel, in the hidden page containing the audio controls.

3.6.1.5 The audio fed from the AV system to the LRS shall be transformer isolated to avoid potential problems with different electrical grounding.

3.6.2 LRS in "Two Source" Rooms

The LRS deployed in a "two source" room shall be a one rack unit (RU), rack-mounted computer. This computer shall have two (2) HDMI inputs for the video fed from the AV system, and one 3.5 mm audio connection for audio.

3.6.3 LRS in "One Source" Rooms

The LRS deployed in a "one source" room shall be a rack-mounted computer of exactly the same specification as that for the "two source" rooms (Section 3.6.2). In the case of the standard "one source" room, however, only one of the two HDMI inputs will be used. The second HDMI input shall be present for possible future use, or for any possible exceptional user requirements such as "talking head". The LRS in a "one source" room shall have a 3.5 mm connection for the audio being fed by the AV system.

3.6.4 LRS Systems with "Talking Head"

In legacy LRS deployments on campus, some systems have what is referred to as "Talking head". This term refers to an LRS system in which one of the inputs has been dedicated to a camera showing the presenter. In this implementation, two video feeds are recorded: 1) The video of the presenter; 2) The feed from the AV system. Since the camera on the presenter is a fixed source to the recorder, and the user can only change the source from the room's AV system, this system is still considered "One Source".

A dedicated camera on the presenter (or "Talking head") is no longer a standard LRS configuration deployed on campus. This option shall only be implemented if required by the user on a case by case basis.

3.6.4.1 "Talking Head" in "Two Source" rooms

At this time, since only two-input LRS recorders are available; if a dedicated presenter camera ("Talking head") is required in a "Two Source" room, it shall only be implemented as one of the inputs into the AV system, or shall replace one of the two room feeds.

3.6.4.2 "Talking Head" in "One Source" rooms

If a dedicated presenter camera is required by the user in a "one source" room, it shall be implemented within the AV system in the follow way:

1) The output of the camera shall be split using a 1x2 distribution amplifier.

2) One half of the camera split shall be implemented as an input into the AV system.
3) The other half of the camera split shall be connected directly to the second HDMI input on the LRS.

3.7 Local Recording Systems

In some installations, there are requirements for audio and video recording systems, controlled locally by the user. At this time, the preferred product, which may be integrated directly into and controlled by the Crestron automation system, is the **Crestron Capture-HD-Pro**.

3.8 Wireless Presentation Systems

By McGill's definition, "wireless presentation system" is the term given to a device, hard wired into the AV system, that connects to a mobile device brought by the user (I.e. Laptop, Tablet, Smartphone) via WIFI and allows the user's device to be displayed through the AV system. At this time, there is no standardized product yet selected for this category. Until such time as a product is selected, however, the Crestron AirMedia (AM-101) shall be used when this function is required.

3.9 Automation systems

3.9.1 General

Crestron systems are used exclusively across campus for the automation of AV systems. The Supplier shall specify and/or supply all Crestron equipment as necessary, given the requirements and the AV design; subject to the approval of NCS-AV.

3.9.2 Control Surfaces

3.9.2.1 Button Panel Control Surfaces

In rooms without a podium, where small AV systems with limited input sources are installed; one option is to use a button panel controller, flush mounted in the wall. The button panel that shall be used in this case is the **Crestron MPC-M5**. Please see section 5.2.3 of this manual for the standard button layout and behaviour.

3.9.2.2 Touch Panel Control Surfaces

3.9.2.2.1 Desk mount

In rooms where there is a podium or a main desk, touch panel controls shall be used. These touch panels shall be secured to the podium or desk via the appropriate table top kit, swivel mount and security screws. The size of the touch panel will vary by project. (Example: **Crestron TSW series**)

3.9.2.2.2 Wall mount

In rooms with either a compact podium, or no podium at all, a lockable wall mount touch panel may be used as an alternative to the Crestron MPC-M5 or the Crestron Fliptop. In such a case, the **Crestron TSW series** shall be used.

3.9.2.2.3 Crestron Fliptop controllers

In rooms where a compact podium is preferable, the automation touch panel may be built into the lid of the table monument (cable cubby). In cases such as these, the Crestron Fliptop shall be used (Model: FT-TS600). In rooms where it is not necessary to use a separate processor, the Fliptop model with the built in processor shall be used. (Model: FT-TSC600)

3.9.3 Other Crestron Components

Given the vast amount of products available from Crestron, and the variety of scenarios in which they are used on campus at McGill University, it is not possible to list all models used at this time. For all equipment types other than those listed above, models selected shall be subject to approval by NCS-AV.

3.10 Equipment racks

For most projects, the majority of the equipment will be housed in an equipment rack either inside the room or in an AV/Telecom closet. This equipment rack shall be a **Middle Atlantic** product.

*For standard installation practice of equipment in equipment racks, please see section 4.

3.11 Monuments

3.11.1 Table monuments

There is no set standard for table monument products currently. However, a product equivalent to **Extron's Cable Cubby** series or the Crestron FT-600 shall be used. Subject to approval by NCS-AV

3.11.2 Floor monuments

As with table monuments, there is currently no set standard; however, products from Crestron or Extron may be used with approval from NCS-AV.

3.12 Podia (Standard)

3.12.1 General

For public classroom projects, NCS-AV has designed, in consultation with McGill Facilities Design services, and Teaching and Learning Services (TLS), standard podia. As referenced in

section 4.7.1, these standard podia shall be used on all public classroom projects where a podium is required; no modifications to this design shall be made without approval by NCS-AV. Depending on the size and envisioned usage of the room itself, there are two sizes of standard podia proposed by NCS-AV: Small and Large. For private projects, custom podia may be designed by the project; however, they should following the design criteria listed in section 4.7.5.

The following sections outline the general requirements and specifications for the standard NCS-AV podia

3.12.1.1 Required Documents and Product samples

3.12.1.1.1 The Supplier must provide specification sheets of all products used in the construction of the podium.

3.12.1.1.2 The Supplier must provide shop drawings for all elements of cabinetry, exposed joints and hardware.

3.12.1.1.3 The Supplier must provide two (2) samples of each specified plastic laminate for colour approval by architecture.

3.12.1.1.4 All finishes, laminates and colours must be approved by architecture before the podium is constructed.

3.12.1.2 Plywood

3.12.1.2.1 All plywood used in the construction of the podium must be free of urea formaldehyde, and must come from renewable forests.

3.12.1.2.2 The Supplier must use integrated furniture plywood: Douglas fir (foliated Douglas), in compliance with the CSA0121 standard, must be standard construction grade, 8% moisture content at the time of manufacture, and must be ¾ inch thick.

3.12.1.3 Laminate

3.12.1.3.1 Desktops must be made of solid phenolic counter, with decorative laminate top sheet (Example: Compact by Formica), 19mm thick, and must be polished.

3.12.1.3.2 Laminates for flat vertical surfaces, and for the Audio-Visual cabinet must conform to the NEMA LD3 standard, HGS grade, and must be 1.2mm thick.

3.12.1.3.3 Compensation sheets must be at least 0.5mm thick, or must match the same colour and thickness as the top sheet that has been specified on the project.

3.12.1.3.4 Laminate adhesives must be contact adhesive, and must in compliance with the CAN/CGSB-71-20 standard. The VOC emission tests shall be conducted in accordance with ASTM D2369 and ASTM 2832.

3.12.1.4 Hardware

3.12.1.4.1 The locks on the front and back doors of the Audio-Visual cabinet must be Hafele 101TA.

3.12.1.4.2 Concealed hinges shall be: "Euro" hidden module type 107º by Blum, with total overlay, or approved equivalent.

3.12.1.5 Grills

3.12.1.5.1 Metal grills must have perforations that are hexagonal or offset round

3.12.1.5.2 Grills shall be at least of 50% open area.

3.12.1.5.3 All grills shall be made from 16 gauge steel sheeting, and shall be powder coated (electrostatic coating)

3.12.1.6 Electric frames

3.12.1.6.1 The frame of the large standard podium shall have two (2) legs/feet, and shall be the MultiTable ModDesk Pro, or equivalent. Subject to approval by NCS-AV.

3.12.1.6.2 The frame shall be compatible with a desktop dimension of 30" x 60"

3.12.1.6.3 The frame shall be able to mechanically raise and lower the podium desktop within a range of 30" to 47" inches in height.

3.12.1.6.4 The frame shall have a load bearing capacity of 300 lbs.

3.12.1.6.5 The speed at which the frame moves must be 2" per second or better.

3.12.1.6.6 The frame shall be powered by 120V AC

3.12.1.6.7 The frames feet shall be on casters.

3.12.1.6.8 The frame shall have a controller with a digital readout of the height, and with the following buttons: up, down, 3 memory presets.

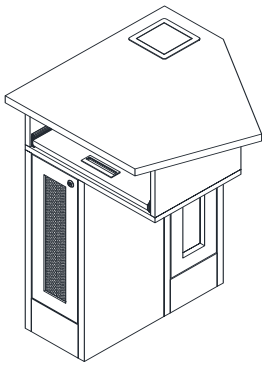
3.12.1.6.9 The frame must have a silent motor (45dB A or less).

3.12.1.6.10 The frame must be certified UL or CSA.

3.12.2 Standard Podia

As mentioned previously, there are currently two sizes of NCS-AV standard podium: small and large. Within each size of podium, there are two models: Left and Right. This left or right designation refers to the side of the podium on which the AV equipment rack or cabinet located. The particular podium needed, and all of its dimensions will be specified in the AV design drawings on a per project basis.

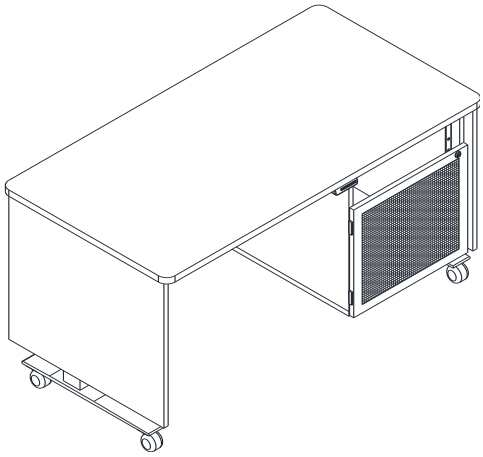
3.12.2.1 Small Podium



3.12.2.1.1 The small podium is constructed of integrated laminated plywood on the inside and outside. It may contain a computer, document camera, connections for a laptop, and an AV rack. It has two access doors, one of which is ventilated. It is ideal for small classrooms where space is limited.

3.12.2.1.2 Please refer to section 3.12.1 for the contruction details.

3.12.2.2 Large Podium



3.12.2.2.1 The large podium is specified for most medium to large rooms or auditoriums. These rooms can be traditional classrooms, or of the more modern "active learning" type. The podium is constructed in laminated plywood on the inside and outside, with a desktop of solid phenolic. The podium may be equipped with a monitor on an articulated arm, a document camera, a microphone, cable cubby with laptop connections, a computer, and a Lecture Recording device. An AV equipment cabinet is integrated, and in some rooms, includes all of the equipment

necessary for the proper functioning of the room. (Some rooms have an additional equipment rack elsewhere in the installation, used in conjunction with that of the podium.) The large podium has two vented access doors, and an electric frame with two legs allowing the unit to be raised and lowered.

3.12.2.2.2 Please refer to section 3.12.1 for the construction details.

3.12.2.2.3 Holes must be made in the desktop of the podium to accommodate the cable cubby, microphone, document camera security bolt, monitor arm base, and grommets for cable pass-throughs. The wiring for the IT help phone and the Crestron touch panel must not be visible; therefore, holes in the desktop are needed directly under them. On the underside of the AV equipment cabinet, a grommet/cable pass-through is required for infrastructure to come into the equipment cabinet from the rest of the equipment elsewhere in the room. The location of the holes referenced is shown in the AV design drawings; however, no holes are to be made without approval from the architect and NCS-AV.

3.13 Network Switches

Network switches for AV, or otherwise, shall be subject to approval by McGill NCS. NCS shall provide the network switch and subsequent network jacks needed by the AV system for communication and control.

SECTION 4: Installation Practices

4.1 General

This section of the manual is intended to be used as a reference to the Supplier, for the installation of equipment and infrastructure related to audio, video and control. The detail listed in this section serves to give the Supplier an idea of common practice in AV installation campus-wide, and is intended as the minimum reference for quality. All aspects of installation are subject to inspection and approval by McGill University.

4.2 Video Projector Mounts & Screens

4.2.1 General

Largely, rooms on campus will require the projector to be ceiling mounted. Occasionally, a projection booth may be found in the room, in which case, the projector may be ceiling mounted or floor mounted. Screen size (width) should be approximately:

Screen Width = $\frac{\text{Distance from Screen to Last Seat}}{4}$

4.2.2 Mounting

4.2.2.1 Screens

Electric screens must be anchored to the ceiling slab. If this is not possible, screen brackets must be attached to a ¾ inch piece of plywood the width of the screen. The plywood must then be secured to the gypsum walls using a minimum of 8 toggle bolts.

4.2.2.2 Projector mounts

Projector mounts must be installed at an appropriate distance from the projection screen, so that the correct image size is approximately in the middle of the specified projector's zoom range.

4.2.2.2.1 The projector mount shall be installed such that the vertical position of the projector lens is level with the top edge of the screen's projection surface, or at a position prescribed by the projector manufacturer, with **no** digital correction employed (keystone or arc).

4.2.2.2.2 Projector mounts must be secured to the cement slab, or other foundational element, in the floor or ceiling such that if a false or suspended ceiling exists, it is not part of the support. Mounts should be secured to the slab or other secure surface with appropriate fastenings (e.g. Lag Bolts).

4.2.2.2.3 For maintenance purposes, the projector mount must not block access to the projector's service areas. The mount must allow for changing the projector lamp and for cleaning the filter without removing the projector from the mount.

4.3 Infrastructure

4.3.1 Cables

4.3.1.1 Cable runs

Cables shall be pulled in a continuous run. No cable splices shall be permitted. No female to female adapters shall be used in the case where a new cable run exceeds the length of an existing cable. In cases where a signal type does not permit the necessary cable run length, extender or converter devices may be used, as approved by McGill University.

4.3.1.2 Cable bends

Cable bends shall respect the minimum bend radius stipulated by the manufacturer. During installation, the cables shall not be kinked or bent past their specified minimum bend radius. If no bend radius information is supplied by the manufacturer, a minimum bend radius of four (4) times the cables diameter shall be used.

4.3.1.3 Cable dressing

Cables not run within a conduit or Panduit style wire mold product shall be dressed in a tidy and secure fashion. Any cabling runs terminated inside an equipment rack shall be dressed, utilizing any cable management products available inside the rack, and shall be strain relieved using velcro ties.

4.3.1.4 Cable Termination

All cables must be properly terminated, such that there are no exposed wires, in order to avoid any shorting between conductors. Heat shrink tubing or rubber sleeving, such as Hellermann sleeves shall be used on all conductors that do not come with their own outer jackets by default. (Example: ground wire within a multicore cable.) Heat shrink tubing shall also cover any transition between outer jackets and the internal pairs or conductors of a cable.

4.3.1.5 Balanced and Unbalanced Audio wiring conversions

There are several different scenarios where balanced audio needs to be passively converted to unbalanced audio and vice versa. Please see the following sections and subsequent diagrams

4.3.1.5.1 Balanced output to unbalanced input (Mono)

For balanced to unbalanced mono audio connections, connect the positive (tip) to the positive contact. Connect the ground (sleeve) to the ground contact. Do not connect the ground (sleeve) to the negative contact.

4.3.1.5.2 Unbalanced output to balanced input (Mono)

For unbalanced to balanced audio mono connections, split the ground conductor (sleeve) into two conductors and attach one to the negative (ring) contact and the other to the ground (sleeve) contact. The positive conductor should be connected to the positive contact.

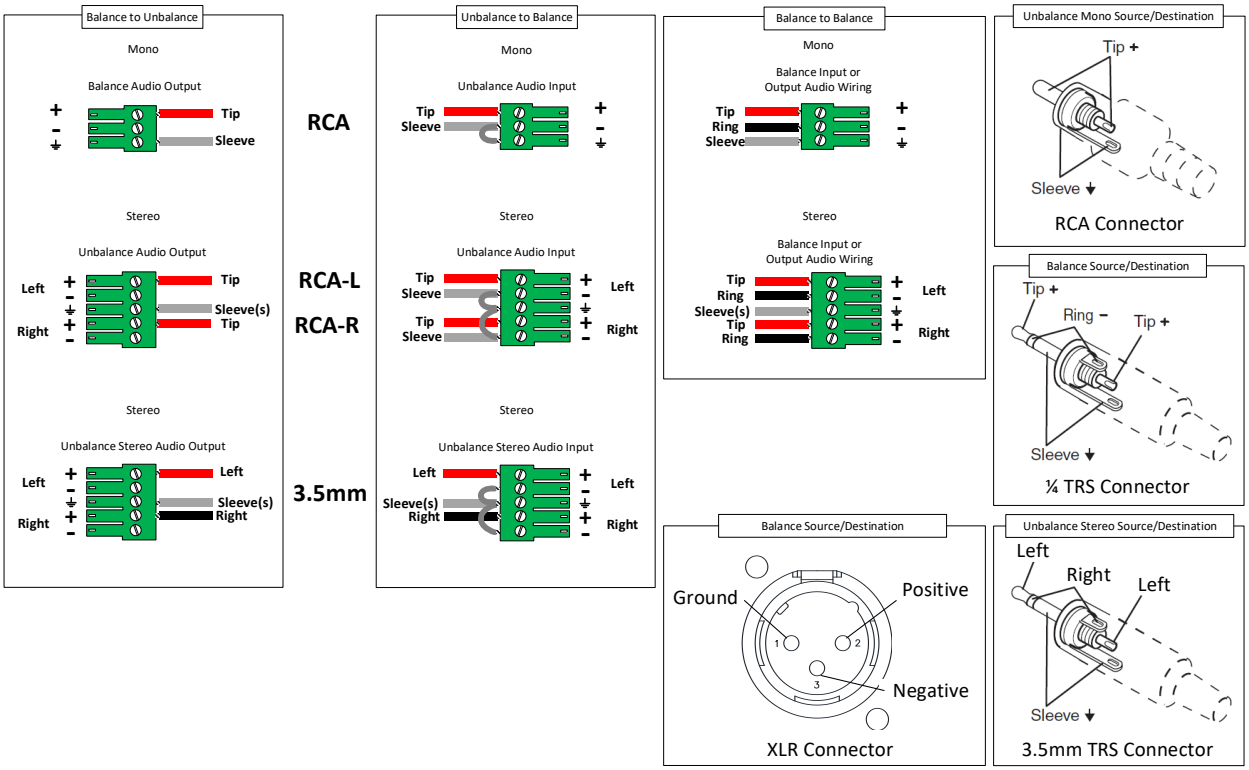
4.3.1.5.3 Balanced output to unbalanced input (Stereo)

For balanced to unbalanced stereo connections, the positive conductor of the left channel is connected to positive contact (tip). The positive conductor of the right channel is connected to the negative contact (ring). The ground conductors of both channels should be summed and connected to the ground contact (sleeve). The negative conductors of each input channel should not be connected.

4.3.1.5.4 Unbalanced output to balanced input (Stereo)

For unbalanced to stereo connections, the positive conductor (tip) is connected to the positive contact for the left channel. The negative conductor (ring) is connected to the positive contact for the right channel. The ground conductor (sleeve) is split into four conductors, which are connected to the negative (ring) and ground (sleeve) contacts of the left **and** right channels.

4.3.1.5.5 Diagrams



4.3.2 Connector panels

All wall mounted panels for connecting to audio and video services (example: additional microphones, auxiliary AV input or out panels) must have a receptacle box with an appropriate amount of space allocated for infrastructure behind the panel.

4.3.3 Conduits

All audio, video and control cable runs, not terminated at both ends within the same equipment rack or a connected rack, shall be run inside dedicated conduit of appropriate size, minimum 3/4 inch inner diameter. These conduit runs will be provided by the project (electrician), based on the design requirements. In cases where it is not possible to use conduit, a surface mounted cable raceway product shall be provided by the AV Supplier, and routed in an aesthetically pleasing manner. All conduit or surface raceway products used shall respect the minimum cable bend radius (specified by the manufacturer) of the cable run inside it. Where conduit/Panduit products need to bend around corners, only wide radius (45 degree) bends shall be installed. This is subject to approval by McGill.

4.3.4 Service loops

All cabling connected to equipment and connector panels should have enough slack to allow for servicing of the equipment or panel without disconnecting it from the cabling. In the case of rack mounted equipment, the service loop must be long enough to pull the equipment out of the rack in order disconnect it from the infrastructure for servicing.

4.3.5 Wall panel connections for Laptop (Umbilical)

In rooms where the AV requirements are minimal, and only projection from a laptop is required, a wall panel providing the necessary connectivity shall be installed. This wall panel shall be equipped with a bundle of cables of appropriate length for the room, covered in a braided nylon sleeve, which will serve to connect the user's laptop to the projector. This bundle or 'umbilical' will contain the following cables:

- VGA (HD15 Male to Male)
- HDMI, Version 1.4 (Male to Male)
- 3.5mm stereo audio cable (Male)
- Cat5 Network cable

4.4 Labeling

4.4.1 Equipment

The Supplier shall label all audio, video and control equipment will a McGill label showing a unique ID number. These labels shall be provided by McGill University. The Supplier shall provide the unique ID numbers assigned to each piece of equipment to the University by completing the information in the provided IP Table document and returning it.

4.4.2 Cables

One label shall be applied to each end of all cables installed by the Supplier. The labels shall not be hand written, shall be black text on white backgroung, and shall be equivalent to Panduit Self-Laminating label products (Example: **DYMO RHINO Flexible Nylon ½ inch, sku 18490)** . Within each room's AV system, each cable shall have a unique number assigned to it. The cable numbers shall be alpha numeric, with identifiable prefixes and number ranges as follows:

- Network: LAN-000
- HDMI: HDMI-100
- DVI: DVI-150
- Power: POW-200
- USB: USB-300
- Serial control: RS-400
- Crestnet: CRES-450
- Crestron Digital Media: DM-500
- Audio: AUD-600
- VGA: VGA-700
- SDI: SDI-750
- Contact closure: CC-800
- Infrared: IR-850
- Fiber Optics: FO-900

The Supplier shall indicate the unique cable number of each cable installed, on the as-built system schematics (as per section 1.3.2).

4.5 Security

4.5.1 Security of AV equipment (outside of an equipment closet)

For most classroom AV installations, Information Technology Services (ITS) requires the use of security devices as an effort to protect the AV equipment installed in the room, or on the podium, from theft or vandalism. The common security devices used on campus, and their required usages, can be found in the sections below. Currently, the most prevalent security device kits used for securing AV equipment in the classrooms are the **Tryten 401136, Computer lock kit T1 Light- with key and lock #45**. The AV Supplier shall procure and install these kits as indicated in the design drawings.

4.5.1.1 Security Devices

4.5.1.1.1 Padlock with Security Cable

Description: Reinforced aircraft cable loop with a security padlock.
Cost: $50 per unit including installation.

4.5.1.1.2 HASP with Padlock and Security Cable

Description: An anti-theft "puck" with a cable loop securely fastened to the equipment, secured with a padlock and security cable.
Cost: **$**80 per unit including installation.

4.5.1.1.3 Kensington lock assembly

Description: A combination or key lock device that fits into the standard Kensington security slot on equipped devices. Can be used in combination with the Padlock and security cable.
Cost: $25 per unit including installation.

4.5.1.2 Implementation of Security Devices

The following sections of this document are intended as general guidelines outlining the types of equipment required to be fitted with security devices, and which security devices should be used in each case. On occasion, exceptional circumstances may result in the need to deviate from these guidelines. In such cases, the means of securing the equipment will be subject to approval by ITS.

4.5.1.2.1 Projectors, Video Displays and Interactive Whiteboards

For Projectors, Video Displays and Interactive Whiteboards, ITS requires the use of security devices; since without the afore mentioned devices, the classroom AV systems are effectively rendered unusable. Here are the requirements by device:

4.5.1.2.1.1 Long throw projectors

Average cost of unit: ~$7500 (List)

Security: Security cables with padlocks are required. McGill standardized products in this category come equipped with a cable loop built into the projector.

4.5.1.2.1.2 Ultra-short throw projectors:

Average cost of unit: ~$2300 US

Security: Kensington lock/cable are required. The McGill standardized product in this category is equipped with a Kensington security slot.

4.5.1.2.1.3 Wall mount video displays:

Average cost of unit: ~$1500-$3000, depending on size of unit

Security: HASPs with padlocks and security cables are required.

4.5.1.2.1.4 Interactive Whiteboards:

Average cost of unit: ~$6500

Security: Kensington lock/cables or padlocks with security cables are required.

4.5.1.2.2 Video Cameras

To date, no security devices have been used to secure video cameras, such as Pan-Tilt-Zoom (PTZ) cameras. Security devices are not used due to the fact that these cameras, by their nature, move and therefore their function might be inhibited.

4.5.1.2.3 Podium Equipment

In medium and large sized classrooms, the podium is the "control center" for the presenter, and as such, it is populated with various equipment often operated directly by the presenter. The following sections depict how security for this equipment shall be implemented:

4.5.1.2.3.1 Crestron Touch Panels

Average cost of unit: ~$2000, depending on size of unit.

Security: Crestron touch panels shall be securely fixed to the desktop surface of the podium using Crestron's Table Top Kit, with the security screws, and the Swivel Mount Kit. Or, in the case of the Crestron TSS-752 wall mount touch panel, it shall be secured to the wall using the provided security bracket.

4.5.1.2.3.2 Document Camera:

Average cost of unit: ~$6000

Security: The document camera shall be secured to the podium using a mounting bolt on the underside of the unit (provided with the unit). The unit will be affixed with a Kensington lock.

4.5.1.2.3.3 Interactive Displays:

Average cost of unit: ~$3000

Security: Mounted on a monitor arm, secured with a Kensington lock. The McGill standardized product in this category comes equipped with a Kensington lock slot.

4.5.1.2.3.4 Computers and Monitors: (see next section)

4.5.1.2.4 Computers and Monitors

Campus wide, computers are deployed in a number of different configurations. In classrooms large enough to warrant a podium, there are often local computers available for use by the presenter. This podium computer may or may not have a monitor dedicated to it, depending on the configuration of the room. Other classrooms have computers at each student seat.

The means of securing computers and monitors largely depends on the furniture they are mounted in.

Average cost of equipment: Varies

Security: Where possible, the computer tower and monitor shall be secured using one common security device. This security device shall consist of a security cable and a padlock and/or a Kensington lock.

4.5.1.3 Exceptions to the Requirement for Security Devices

There are certain situations where security devices may not be required or possible, such as:

4.5.1.3.1 The equipment is very hard to access:

- Equipment is secured within a locked equipment rack
- Equipment is secured within a locked AV closet
- Ceiling mounted projectors/cameras are mounted high enough to require scaffolding for access
- Equipment is otherwise securely fastened to furniture

4.5.1.3.2 Another means of security is in place:

- Lenel card readers are installed
- Security cameras cover the area
- Lab managers or other staff are always present

4.5.1.3.3 The equipment itself has moving parts making it impossible to attach a security device

4.5.2 Keys

Due to the large number of rooms on campus ITS has standardized the keys required to access equipment in a variety of situations:

4.5.2.1 Telecom/AV equipment closets

The lock on the door to all Telecom/AV equipment closets on campus shall be keyed with the Medeco KB key. The exception to this shall be Telecom/AV closets also containing some kind of electrical service, which will most likely be keyed with the Medeco KC key.

4.5.2.2 AV equipment racks

AV equipment racks that are not located in a secure area, such as a Telecom/AV equipment closet, shall be supplied with locking doors. The standardized product for equipment racks are Middle Atlantic products (please see sections 3.10 and 4.8 of this manual). The standard Middle Atlantic rack door keys shall be used to lock and unlock equipment racks of this type.

In the case where an equipment rack is provided with a door other than a Middle Atlantic product, the same type of lock as specified in section 4.5.2.3 of this manual shall be used.

4.5.2.3 AV cabinets/Podiums

On occasion, when there is a small amount of equipment deployed, purpose built AV cabinets may be used instead of equipment racks. In such cases, these cabinets shall have locking doors, with **Häfele 101TA** locks only. This same lock shall be used on both the front and back doors of any podia deployed in a classroom on campus.

4.6 Electrical

4.6.1 General

In cases where McGill Facilities Management are not involved in a project, the following sections outline how electrical work is to be carried out with respect to AV installations.

4.6.2 The projector must have one 120V AC outlet on or inside the ceiling. In the case where the projector is mounted in a location that is too high to be easily accessible, the outlet should be switched with a Leviton 1201-L series key switch on the wall, near the AV System, to allow the projector and/or any Crestron equipment installed in the ceiling to be reset.

4.6.3 All cabinets, rolling carts, podiums, etc., should have a sufficient number of electrical outlets to provide power to all accessories on or around them, including a laptop.

4.6.4 All electrical equipment (including relays, lighting fixtures, dimmers, etc.) should be of selected brands, models, and specifications to conform to campus standards (see Facilities Design Standards for McGill University: http://www.mcgill.ca/buildings/design-standards/).

4.6.5 All conduits should be of continuous electrical metallic tubing (EMT) type material where possible.

4.6.6 In cases where EMT is not possible, junction boxes or flexible conduit shall be installed. Should this be required, approval shall be required from McGill University prior to installation.

4.6.7 Junction boxes should not be located in hidden or inaccessible corners.

4.6.8 All conduit should be at least 3/4" inside diameter or larger. Generally, it is requested that larger conduit be installed to ensure space for future expansion.

4.6.9 Low voltage cables (i.e. audio, video, and control cables) are all required to run in a separate conduit from any AC wiring.

4.6.10 All conduit and electrical circuits should have the same ground reference.

4.6.11 In cases where power transformers are required, all audio, video, computer and control electrical circuits should be fed from the "clean" legs of the transformer, and should be free of high inductive loads. There should be no elevator motors, compressors motors, blower motors, etc., on the side of the power transformer that feeds the media equipment.

4.6.12 All electrical control circuits (per classroom) should come to a single location. This location should be large enough to house the lighting contactor's cabinet.

4.6.13 The location should be convenient for maintenance and secure from vandalism.

4.6.14 If possible, this location should be isolated from the classroom to eliminate repair and contactor noise.

4.6.15 There must be electrical circuits dedicated for the media equipment (i.e. data projectors, portable VCR's, laptops, audio amplifiers, etc.). These circuits must be brought to the equipment rack, and to the podium.

4.6.16 There should be at least one duplex outlet on each wall. If there is a projection booth, there must also be an outlet on the front, classroom side wall. In larger rooms with fixed seating on risers, an outlet should be provided on the face of the first riser (centered in the room), this for the use of overhead projectors. Another outlet should be located on the face of a riser midway back in the seating area (centered in the room).

4.6.17 Whenever possible, power and audio/video outlets shall not be floor mounted to avoid the intrusion of water and debris.

4.6.18 In classrooms with dimmable lighting (Lightolier or Lutron), the appropriate control interface with the Crestron control unit must be specified by the electrical engineer, and provided by the electrical contractor. ****Note: The design of lighting zones within a**

classroom shall be done such that lights closest to any projection screens may be turned off during projection. **

4.6.19 In the case of motorized blinds, a control interface will also be required for the Crestron control unit. Any such control interface shall be specified by the Electrical Engineer on the project, and supplied by the electrical contractor.

4.7 Podiums

4.7.1 General

Generally, classroom installations include a piece of furniture designed to accommodate the presenter's materials, and to provide the presenter with a control point in order to operate the automated AV system. At McGill, this furniture is often referred to as a Podium. The furniture itself is designed by NCS-AV, in consultation with McGill Facilities Design services, and Teaching and Learning Services (TLS). Depending on the size and envisioned usage of the room itself, there are two sizes of standard podia proposed by NCS-AV: Small and Large. (Please see section 3.12.) The standard NCS-AV podia shall be used on all public classroom projects; no modifications to this design shall be made without approval by NCS-AV. For private projects, custom podia may be designed by the project; however, they should following the design criteria listed in section 4.7.5. The podium may have some or all of the following user controllable equipment located on or inside it:

- ITS Help phone
- Crestron touch panel
- PC computer
- Interactive display
- Document camera
- Fixed microphone
- Auxiliary microphone input (XLR 3 pin – chassis mounted)
- Connections for Laptop: (VGA + Audio [3.5mm], HDMI, and Network)

4.7.2 Connections for the Laptop

The services and connections for any laptop computer brought to the podium for use are listed in section 4.7.1. These services shall be cables available to be pulled out by the user, using cable pass-through holes into a table monument with a lid, such as **Crestron FT-600** or equivalent Extron product. When the user is finished using the podium, the cables shall be pushed back into the table monument and the lid closed.

4.7.2.1 For the laptop's 3.5mm TRS audio connection, the Supplier shall use the Canare L-2T2S cable or equivalent Belden product, and Canare F-12 connector. Transformer isolation of this input into the AV system may be required.

4.7.2.2 The VGA and 3.5mm connections for the laptop shall be implemented as separate cables. For reasons of support, no VGA/audio combo cables shall be accepted.

4.7.2.3 For ease of replacement, a short passive VGA extender cable (D-sub 15 Male to Female) is often added to the end of the VGA connection available for the laptop at the podium, since the pins in this type of connection may become damaged. Heat shrink tubing shall be applied to cover the transition between the cable and the extender

4.7.3 Auxiliary connections

If the a project's requirements stipulate it, auxiliary inputs can be made available at the podium in order to accommodate the connection of legacy devices such as VHS/Audio cassette players or additional microphones. These inputs shall be mounted on panels inside the table monument if possible, and shall be compatible with the **Crestron FT-600** or equivalent Extron product.

4.7.4 Podium PC

The Podium PC, integrated into the podium, shall be provided by McGill ICS. The current ICS standard machine is the small form factor (SFF) **Lenovo ThinkCentre M900**. This computer is equipped with two full size DisplayPort outputs and one VGA output. Typically, one DisplayPort output shall feed the room's AV system via a **Kramer C-DPM/HM** series DisplayPort to HDMI cable. The computer's second DisplayPort output shall be used to feed a monitor local to the Podium, should this be required, and shall also be accomplished via a **Kramer C-DPM/HM** series DisplayPort to HDMI cable.

4.7.5 Custom Podium Design Criteria

As referenced in section 4.7.1, there may be times when projects, for private rooms, require custom podium designs. The following sections represent criteria considered by McGill ITS to be fundamental to a design that takes the function of the AV equipment, and the support and maintenance of said equipment into account:

4.7.5.1 Space considerations

4.7.5.1.1 Space on the Desktop

All podium designs shall allow enough space on the desktop of the podium for ease of use. The following shall be considered:

- The desktop of the podium shall have enough space for all user operated equipment, services, and auxiliary devices (i.e. laptops, hard drives, etc.).
- In addition to the above point, there shall be space allowed for physical documents, (i.e. books, paper, etc.).
- The desktop of the podium shall allow space for the ITS Help phone, either on the desktop itself, or within reach of the AV system's control surface.

4.7.5.1.2 Space for Infrastructure

All podium designs shall allow an appropriate amount of space for the infrastructure connecting equipment in the podium to the equipment in an AV equipment rack. The following shall be considered:

- Clearance for cables that need to move:
  - Cables connecting the podium to the rest of the AV system, when the podium goes up and down or rotates.
  - Cables for the laptop connectivity that need to slide in and out of the podium (must be easy for the user to pull out and push in, with enough clearance to reach where it needs to.)
- Space allocation for equipment not operated by the user (Automation transmitters, etc.):
  - There must be adequate space between devices, and devices must not be completely enclosed, in order to avoid overheating.
- Space allocation for possible future equipment.

4.7.5.2 Ventilation

Proper ventilation of the equipment is of great importance, especially when considering integration into enclosed or semi-enclosed spaces, such as furniture. The following shall be considered for design of a podium with AV devices integrated into it:

- There shall be appropriate circulation of air around all equipment. (I.e. Computers, automation devices, etc.)
- There shall be vents or air holes in the furniture if the equipment is at all enclosed.
- If passive venting is not satisfactory, then fans must be integrated to ensure proper airflow.

4.7.5.3 Maintenance

A podium shall be designed with a mind for future maintenance of the equipment integrated into it. The equipment must be quickly and easily accessible, and must be secured. Locking hinged access traps are recommended.

4.7.5.4 Safety

A podium design shall consider the safety of its users. The users should not have access to moving parts that may cause injury.

4.8 Equipment racks

This section describes the optimal location of an equipment rack within a facility, as well as the expected quality of the integration of the infrastructure and equipment within the rack itself.

4.8.1 Location

4.8.1.1 AV Telecom closet

Wherever possible, the equipment rack housing AV equipment shall be secured within an AV/Telecom closet, keyed with a Medeco KB key (Section 4.5.2). Ideally, this AV/Telecom closet would adjoin with the classroom, for ease of support once the room is in operation. However, there are occasions when such a telecom closet may not be directly adjoined with the room it serves, but located in a central area on the floor of the building in which it resides.

4.8.1.2 Open areas

On some projects, due to a limitation in space, it may not be possible to locate the equipment rack in a dedicated closet. In such cases, the equipment rack may be located within a common storage area, or if acceptable, within the classroom itself. In such cases, it is imperative that the equipment rack be supplied with a locking door, as per Section 4.5.2 of this manual. Special allowances may need to be made for any user operable equipment, while ensuring that the non-user operable equipment remains secure.

4.8.2 Integration of Equipment and Infrastructure

4.8.2.1 Integration of Equipment

Equipment installed within an equipment rack shall be of rack mount type wherever possible. For equipment that is not rack mountable, the equipment should be properly secured to a rack mount shelf. Rack layout designs should leave at least 1 rack unit (RU) between devices within the rack in order to avoid situations where the equipment may overheat due to close proximity. Ideally, where permitting, the equipment rack should have unused space reserved for future expansion.

4.8.2.2 Integration of Infrastructure

As per section 4.3, all cabling installed within an equipment rack shall be dressed in a tidy fashion such that their cable labels are clearly visible, and respecting all cable bend radii. The equipment rack shall be provided with all necessary cable management accessories, such that all cabling is properly strain relieved. In addition to this, all cables must be properly terminated, such that there are no exposed wires, in order to avoid any shorting between conductors. Special attention shall be paid when using tie wrap products, not to damage any cabling by over tightening.

4.8.3 Ventilation of Equipment racks

Special consideration shall be required for the ventilation of equipment racks containing AV equipment. The equipment rack shall be provided with the necessary fans in order to ensure the proper amount of airflow within the rack. Depending on the location of the equipment rack, especially for racks enclosed in small spaces, dedicated HVAC service may be required to keep the equipment from overheating. Ideally such an HVAC design should supply fresh cool air to the bottom of the rack, while removing the warmer air as it exits the top of the rack.

SECTION 5: Crestron Implementation Standards

5.1 Programming- General

This section of this manual outlines the interaction between McGill University and the AV Supplier with respect to Crestron programming.

5.1.1 Scope for Crestron Programming

Similar to the interaction between the Supplier and the University for the design of AV systems, as iterated in Section 1 of this manual, there are different models in which McGill University will interact with the AV Supplier concerning the programming of Crestron systems on campus. The different models currently employed with regards to Crestron programming are as follows:

1. The McGill Standard Crestron UI shall be provided to the AV Supplier in a compiled state, complete with a SIMPL Windows program, to be run in Slot 2 of the Crestron processor. The AV supplier will provide the Crestron programming necessary for the control of the rest of the AV system, to be run in Slot 1 of the Crestron processor. Communication between the touch panel and the program provided by the AV Supplier will be accomplished via "Ethernet Intersystem Communications".

2. The McGill Standard Crestron User Interface (UI) shall be provided to the AV Supplier in an uncompiled state, and the AV Supplier shall provide all Crestron programming necessary to make the user interface and AV system function accordingly. All proposed changes to the McGill Crestron UI to be approved by NCS-AV prior to implementation.

3. McGill University shall provide all programming necessary for the function of the AV system. The AV Supplier shall procure and integrate all necessary AV equipment.

5.1.2 General Requirements for Crestron Programming

This section depicts the high-level requirements for all Crestron programming provided by the AV supplier to McGill University. All specific requirements for the programming, in terms of system behavior, shall be outlined within section 5.2 (Crestron User Interface and Control Surface Layout).

5.1.2.1 Upon completion of a project, all Crestron programming provided by the AV Supplier will become the property of McGill University.

5.1.2.2 Upon completion of a project, the AV Supplier shall provide the uncompiled, archived version of any SIMPL Windows/VT Pro files generated as part of said project, to McGill University.

5.1.2.3 Any files provided to the AV Supplier by McGill University subsequently modified by the AV Supplier shall be renamed.

5.1.2.4 All modifications to existing or provided Crestron programs and/or user interface are subject to approval by McGill University.

5.1.2.5 Crestron programs shall not be created by any means other than SIMPL Windows/VT Pro, unless approved by McGill University prior to programming.

5.1.2.6 Upon delivery, all Crestron equipment shall be running the latest firmware.

5.2 Crestron User Interface and Control Surface Layout

5.2.1 General

As referenced in Section 3.9.2 of this manual, different types of control surfaces are deployed in classrooms on campus depending on required function of the AV systems in question. These control surfaces can be divided into two (2) broad categories: Touch panels and Button panels.

Where Crestron touch panels are used to control the AV system in a room, the McGill Standard Crestron User Interface (Section 5.2.2) shall be used.

Where Crestron button panels are used, the layout shown in Section 5.2.3 of this manual shall be respected.

5.2.2 McGill Standard Crestron User Interface

NCS-AV has developed a dynamic user interface to be used for all new projects, where automated AV systems, utilizing a touch panel control surface, are deployed.

For some projects, custom requirements may dictate that the McGill Standard Crestron User Interface must be modified. In such situations, the AV supplier may be asked to generate the custom portions of the user interface. Whenever this is the case, the AV Supplier shall adhere to the existing theme, and shall use the same buttons, faders, controls, etc., used elsewhere in the McGill interface.

****Note: All proposed changes to the McGill interface shall be approved by NCS-AV prior to implementation. ****

The McGill user interface is compatible with a 3-Series Control System or later, as it is a Crestron Smart Graphics interface.

5.2.2.1 Examples of McGill Standard Crestron User Interface

5.2.2.1.1 Home page:

5.2.2.1.2 One Source Room: (Presentation Mode- Source selection)

5.2.2.1.3 Two Source Room (Source selection)

5.2.3 Button Panel Control Surfaces

As referenced elsewhere in this manual, some projects require the use of button panels as an alternative to touch panel control surface products. In such cases, the Crestron MPC-M5 is typically used.

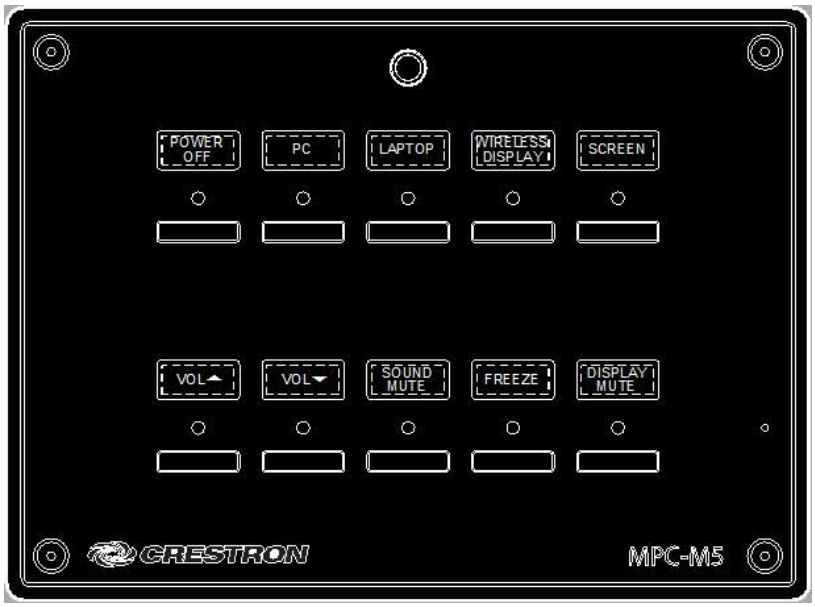
Since the MPC-M5 is a control surface with a Crestron processor built into it, the following sections will describe function and behaviour in addition to button layout.

5.2.3.1 MPC-M5

5.2.3.1.1 Button layout

The picture below shows the layout for the MPC-M5, with all buttons used.

Please Note: Not all functions may be present for every project; however, the functions present shall remain in the locations depicted below:



5.2.3.1.2 Standard behaviour

The standard behaviour that shall be implemented in the programming of an MPC-M5 button panel within rooms on campus at McGill University are as follows:

5.2.3.1.2.1 LED and Backlight behaviour

System off: The red LED above the "off" button shall be solid red. No other LEDs shall be lit.

System warm-up: Once an input source has been selected, and the system begins warming up, the selected source's LED shall start flashing. As this happens, the MPC-M5's white back lights shall start flashing as well; first, all of the backlights in one button row, then all of the backlights in the second row in an alternating fashion. This behavior shall continue until the system has finished warming up (I.e. Any projectors in the system have fully warmed up.)

System on (source selected): Once the system has finished warming up, the LED above the selected input source's button shall be solid red.

System on (switching input sources): When a new input source button is selected, the LED above it shall begin to flash until such time as the system has successfully switched to this new input source. No backlights shall flash while input sources are switched.

System shut-down: When the system is in the process of shutting down, since the user has pressed and held the "off" button for 3 seconds, the LED above the button shall flash. The backlights shall also flash as described in "System warm-up" portion of the behaviour. These behaviours shall continue until the system has shut down fully.

5.2.3.1.2.2 Auto "Unmute" behaviour

There shall be an “auto unmute” behaviour with respect to the mute button. The behaviour of these buttons shall be such that if an input source’s audio or video is muted, and another source is then selected, the newly selected source should be unmuted.

5.2.3.1.2.3 Auto “Unfreeze” behaviour
There shall be an “auto unfreeze” behaviour with respect to the Freeze button. The behaviour of this button shall be such that if an input source’s video is frozen, and another source is then selected, the newly selected source should be shown.

5.3 Crestron System Function and Behaviour

5.3.1 General

As referenced in Sections 5.1and 5.2 of this manual, the AV Supplier shall be provided with the McGill Standard Crestron User Interface, which shall depict the exact layout of the buttons and the esthetic look of the user interface on the Crestron touch panel. Using the McGill interface as a guide, some of the required system functions and behaviours will be easily understood by the Supplier; however, other functions or behaviours may need further clarification. This section is intended to provide such clarification.

5.3.2 System Start-up and Shutdown Behaviours

The following sections depict the required behaviours during system start-up and shutdown cycles of the AV system:

5.3.2.1 Starting the system shall be accomplished either by the user selecting the room mode, via the homepage on the Crestron touch panel, or in the case of rooms with only one mode, by selecting an input source to be displayed through the AV system. Note: The video portion of the system shall not start until an input source has been selected.

5.3.2.2 When the system is starting up, a ‘Please wait…The Projector is Warming Up’ message shall be shown, with an indication of the progress of the warm-up cycle. This message shall be shown for the full duration of the warm-up cycle of the projector. The message shall not hinder the user from accessing the controls for any function, other than assigning a new source to the projector(s) in question.

5.3.2.3 When the system is starting up, a default system audio level shall be recalled, in order to normalize the system. This level shall be based on the level of the “Default Start-up Level” controls, found in the hidden settings area of the Crestron touch panel interface.

5.3.2.4 System shutdown shall be accomplished via the user pressing the power button on Crestron touch panel. Once the power button has been pressed, a pop up message: “Warning! Do you want to shut the system down?” shall be triggered asking the user to confirm the system shutdown operation.

5.3.2.5 When the system is shut down by the user, a "Please wait…The Projector is Cooling Down" message shall be shown on the Crestron touch panel, with an indication of the progress of the shutdown cycle. This message shall be shown on the Crestron touch panel until such time as all projectors in the system have fully finished their cool-down cycle. The message shall not hinder the user from accessing the controls for any function, other than assigning a new source to the projector in question while the system is shutting down.

5.3.2.6 After a period of fifteen minutes has elapsed, with no signal being fed to a projector, the projector shall shut down. When this happens, the system cool down pop up message shall be shown on the Crestron touch panel. The message shall not hinder the user from accessing the controls for audio or lighting.

5.3.2.7 When the "HW-R" button is pressed on the processor, the system shall automatically perform a system shutdown process before performing a system start-up process as requested by the user.

5.3.2.8 After a power outage, the Crestron processor shall automatically perform a system initialization process. When this has been properly completed, the system shall commence a shutdown process.

5.3.2.9 An Auto shutdown function shall be performed daily at 23:30.

5.3.3 AV system modes

For rooms large enough to require AV systems with sound reinforcement or audio playback functions, the system shall have at least two (2) main modes of operation: Presentation mode, and Audio Only mode. Rooms equipped with Videoconferencing functions will also have a third mode: Videoconferencing. On occasion, there are modes of operation required for specialized installations as well. These modes of operation shall be selectable from the home page on the Crestron touch panel.

5.3.3.1 Presentation mode

The most prevalent mode for rooms across campus is Presentation mode. This mode allows the user to select and control all input devices for display on the relevant destination devices (I.e. projectors, wall mount displays.)

In the case where Presentation mode is the only mode the system operates in, the user will only be presented with a Presentation button.

5.3.3.2 Audio Only Mode

For AV systems with sound reinforcement functions (microphones) and audio playback devices, the user may choose to use only the audio functions of the system, without the need to power on the projectors, or any other part of the AV system. This is accomplished by selecting the Audio Only mode on the homepage of the Crestron touch panel.

Once this mode has been selected, only the input devices that have audio functions shall be available for selection. (Apart from any microphones present in the system.)

5.3.3.3 Videoconferencing Mode

In room systems with Videoconferencing capabilities, a Videoconferencing Mode button will also be selectable via the homepage on the Crestron touch panel. Once selected, the touch panel will prompt the user to enter a password before the system continues to start up. No projector shall warm up until the password has been entered correctly.

Typically, when in this mode, the system is devoted to Videoconferencing, with the room displays showing video of the near and far sites, and/or any content selected for display by the user. In this mode, all of the input devices (Podium laptop/PC, Document camera, etc.) shall be available for selection as content to be shared with all participants in a videoconferencing call.

5.3.3.4 Other AV System Modes

On occasion, there are other specialized modes required within the room AV system, as defined by user requirements on a per project basis. Since these modes are custom, the AV Supplier may be required to generate new portions of the Crestron user interface for the control of the required functions, as per section 5.1.2 of this manual.

5.3.3.5 Switching AV System Modes

The following sections outline some required behaviours for switching between system modes:

5.3.3.5.1 When the system has been started and is in one system mode, and another mode is selected by the user, all display devices (I.e. Projectors or Wall mount displays) common between the two modes shall remain on, while those not used in the second mode shall be shut down.

When a projector is shut down as a result of switching between system modes, a projector shut down pop up message: “Warning! The system is currently in Audio Only Mode (the system’s current mode). If you continue, you will enter Presentation Mode (New mode)! Do you wish to continue?” shall be displayed. This message shall not hinder the user from accessing the controls for the audio or lighting. Note: The audio and lighting controls in the lower tray in the home page of the Crestron user interface are only present when the system is on.

Please see section 5.2.3 of this manual for details on the relevant start-up and shutdown behaviour.

5.3.4 Input Source Control and Behaviour

5.3.4.1 General

When an input source is selected for the first time, the following tasks shall be performed by the Crestron program:

- The selected destination(s) shall be turned on;
- The relevant audio port shall be turned on;
- The projection screen(s) shall go down (if applicable);
- The relevant input shall be selected on destination device (projector or monitor);
- The correct signal routing shall be selected (audio and video);

When an input source is selected while the system is already ON, the following tasks shall be performed by the Crestron program:

- The selected destination device shall be 'woken up';
- The correct input source shall be selected;
- The correct signal routing shall be selected (audio and video);

5.3.4.2 Laptop inputs

5.3.4.2.1 The Laptop input source shall be auto selected between an HDMI input and a VGA input with audio. In the case where the two types are connected simultaneously, priority shall be given to the HDMI input. One "Laptop" button in the Crestron user interface shall select this input source.

5.3.4.2.2 If neither the Laptop HDMI nor the Laptop VGA inputs are connected to a laptop, the system shall default to the VGA input being active, so that the 3.5mm audio connection is active, even without video present on the VGA input.

5.3.4.3 PTZ Cameras

5.3.4.3.1 On system start-up, if a PTZ camera is present in the system, the camera's preset 4 shall be called by default.

5.3.4.3.2 Only presets 1 through 3 shall be user configurable on any user facing Videoconferencing or PTZ camera pages.

5.3.4.3.3 If the PTZ Camera is dedicated for use with the Lecture Recording System (LRS) in the "talking head" configuration mentioned in section 3.6.4, and it is an input into a presentation switcher or matrix (not hard wired to the LRS unit), the PTZ camera shall be routed to the LRS unit's second input by default.

5.3.4.4 Document Cameras

5.3.4.4.1 The light on the document camera shall be turned off when it is not in use (not selected), and when the user switches overall system modes.

5.3.4.4.2 The light on the document camera shall be turned on whenever it is selected. This also applies to Videoconferencing mode, where it may be selected as a "content" source.

5.3.4.4.3 Control of the document camera shall include:

- Zoom;
- Manual iris;
- Manual and Auto focus;
- User configurable camera presets.

5.3.4.5 Media Players

5.3.4.5.1 The Crestron system shall allow the user to control all media players, including but not limited to the following functions:

- Transport controls
- Navigation buttons (to navigate through menus built into the media)
- Audio mode select (if applicable)
- Subtitle
- Menu (for the player itself)
- Pop menu (Menu of the authoring on the media)
- Display

5.3.5 Destination Control and Behaviour

Generally, the term "Destination" encompasses projectors and projection screens, as well as flat panel wall mounted displays.

5.3.5.1 General

For each destination, the following controls shall be required:

- Blank Screen (formerly Video Mute- if available)
- Freeze Screen (formerly Video Freeze- if available)
- Screen Up and Down control (if applicable)

5.3.5.2 The on and off state of each projector and screen shall be controllable independently (if applicable); however, when a projector is turned off manually, the corresponding projection screen should be raised automatically.

5.3.5.3 In a two-source room, Projector on/off, Blank Screen, Freeze Screen and Projection screen up/down controls should work independently, even when the displays/projectors are linked.

5.3.5.4 When the projector is going into standby mode, it shall be 'woken up' when a new input source is selected.

5.3.5.5 The relays or closed contacts controlling the up and down commands to the projection screen controller shall stay closed for the duration necessary for the screen motor to properly react to the command. This shall be on the order of 2000 ms.

5.3.6 Audio

5.3.6.1 The system shall have one main level control (Volume), with mute control that affects all audio inputs (I.e. microphones, input sources). This control shall be located in the lower right of the Crestron interface, and shall always be accessible to the user, with the exception of when the system is off.

5.3.6.2 All audio devices (I.e. microphones, input sources) shall have level (up/down) and mute controls, as possible. In the case of the input sources, each should have a discreet control located in the hidden pages of the Crestron touch panel interface. In the portion of the user interface accessible to the users, there shall be a "Devices" level control, which is the level of the currently selected input source. This allows the user to balance between input source levels and microphone levels.

5.3.6.3 The level controls (volume) for the microphone(s) and audio playback shall be controllable when the system is in the process of warming up or shutting down.

5.3.6.4 The volume level meters beside all volume controls shall accurately represent the level of the audio playback heard through the system. For example, when the volume level meter is at 0%, then no sound is heard through the system. The meter at 100% would mean that the system was outputting its maximum sound level.

5.3.6.5 Unless there are specific requirements requesting otherwise, the audio heard through the AV system shall always follow the last selected input.

5.3.6.6 When the user engages any mute control, and a new input is selected, the system shall unmute the selected input source. (This does not apply to microphone mutes.)

5.3.6.7 When the user engages any mute control, the input shall be unmuted when the level controls are pressed.

5.3.7 Videoconferencing (VC)

As referenced in Section 5.3.3 of this manual, some rooms have a dedicated Videoconferencing (VC) mode. Since VC functions are typically quite different than the presentation mode functions, a separate mode is required. The following sections outline some required behaviours for any VC system integrated into an automated AV system on campus.

5.3.7.1 Starting up/Shutting Down Videoconferencing Mode

5.3.7.1.1 In order to start the AV system in VC mode, the user shall select this mode via the button found on the home page of the Crestron touch panel. The user shall then be prompted to enter a password. Only when the user has successfully entered the password shall the system start up.

5.3.7.1.2 The default password for VC mode shall be 3398

5.3.7.1.3 Upon starting VC mode, the user shall see the home page of the VC codec as well as a view of the video from the near site (the user's own room) displayed.

5.3.7.1.4 Upon starting VC mode, none of the input sources shall be active through the system, and the Content sharing function shall be off.

5.3.7.1.5 When switching from another system mode into VC mode, all selected input sources from the previous mode shall be cleared.

5.3.7.1.6 When switching from another system mode into VC mode, all projectors or displays common to both modes shall remain on, while all others are shut down.

5.3.7.1.7 When switching from VC mode to another system mode, all projectors or displays common to both modes shall remain on, while all others are shut down.

5.3.7.1.8 When switching from VC mode to another system mode, any call in session shall be ended.

5.3.7.1.9 In order to shut down VC mode, the user shall navigate back to the home page, via the home button and select another system mode; or shall shut the system down via the power button located on the Crestron touch panel.

5.3.7.2 Calling and Receiving Calls

5.3.7.2.1 In order to establish a call to a remote site (far site), the user shall either manually dial an IP address using the numeric keypad on the Main tab page (VC mode); or shall select an entry from within the Directory tab page (VC mode) on the Crestron touch panel.

5.3.7.2.2 When the user is first dialing an IP address in an effort to establish a call, the numeric keypad on the Main tab page (VC mode) shall correspond with the IR keypad needed to control the VC Codec.

5.3.7.2.3 Once a call has been established, the numeric keypad on the Main tab page (VC mode) shall turn into a Touch Tone keypad, in order to enable the user to enter meeting codes and other information into a bridging service, or other remote site, should this be necessary.

5.3.7.2.4 When in VC mode, when a new call comes into the system, there shall be a ringtone heard through the system, and there shall be a pop up message on the Crestron touch panel, asking the user to answer or ignore the call. This shall be true for any subsequent additional calls, for example, when setting up a multipoint call. This pop up message, shall only last for the duration that the call is ringing. After the call has stopped ringing without being answered, the pop up shall disappear.

5.3.7.2.5 When not in VC mode (I.e. in Presentation mode), it shall not be possible to hear the ringtone from the VC codec through the audio system, nor shall the popup message asking the user to answer the call appear on the Crestron touch panel.

5.3.7.3 Cameras

Typically, with integrations of Videoconferencing systems in larger rooms, there are multiple cameras, on the near site (the user's own room), to capture the presenter as well as the students sitting in the room. This is in order to show both perspectives to the far site(s) (remote location(s)). Depending on the exact layout of the room in a project, multiple cameras may be required to capture all areas of the student seating area. The number of cameras used with the VC system in any room shall be specified on a project-to-project basis, and shall be dependent on the project requirements.

The video feed of the far site(s) (remote location(s)) is typically always shown.

5.1.1.1.1 Camera switching

For VC systems integrated into public classroom systems with multiple cameras, switching between the cameras presents at the near site shall be possible in two ways: Manual and Automatic.

5.1.1.1.1.1 Manual

5.3.7.3.1.1.1 On the Camera tab page (VC mode), there shall be manual camera selector buttons, allowing the user to individually select any of the cameras present in the system for display.

5.3.7.3.1.1.2 The camera pan, tilt, and zoom controls present on the Camera tab page (VC mode) shall update to control the selected camera (based on the camera's selector button state).

5.3.7.3.1.2 Automatic

5.3.7.3.1.2.1 With the "Podium" or presenter camera selected by default, the system shall automatically switch to a student camera, and trigger the appropriate camera preset, when a student engages the button on their table microphone to speak.

5.3.7.3.1.2.2 Once the button on the table microphone has been released, the system shall stay on the student camera for 4 seconds before automatically switching back to the "Podium" or presenter camera.

5.3.7.3.1.2.3 If two students engage the buttons on their microphones nearly simultaneously, then the microphone whose button was first pressed shall be active through the system. Only when the first microphone is released, and the 4 second hold time has ended, shall it be possible for another microphone to be selected.

5.3.7.3.2 Camera Presets

5.3.7.3.2.1 On the Camera tab page (VC mode) there shall be three buttons to allow users to configure camera Presets. These same three buttons shall update to control the Presets stored for each camera, depending on the camera currently selected (using the manual camera selector buttons [Section 5.1.1.1.1.1])

5.3.7.3.2.2 A new camera Preset shall be stored by pressing and holding any of the three camera preset buttons for 5 seconds.

5.3.7.3.2.3 Once a Preset has been stored, the user shall have a visual confirmation that the Preset has been properly stored.

5.3.7.3.2.4 Only three Presets per camera, shall be user configurable. These shall be the first three presets on each camera.

5.3.7.3.2.5 The remaining Presets, to be triggered when a student microphone is engaged, shall not be user configurable, but shall be located in the hidden pages on the Crestron touch panel.

5.3.7.3.3 Selfview function

When a VC call is in session, and the there is no view of the near site (user's own room), there shall be a Selfview function which, when engaged, shall allow the user to see the following three things simultaneously: near site, far site and any shared content. This function is required in

order to adjust any near site camera view, should this be necessary. This function shall be engaged via a button on the Camera tab page (VC mode).

5.3.7.4 Sharing Content

When in VC mode and actively engaged in a call with a far site (remote site), it is often necessary to present materials or content.

5.3.7.4.1 The system shall make any input source present within the system available for Content Sharing with the remote site.

5.3.7.4.2 Content Sharing with the far site will be started by selecting any input source on the Content tab page (VC mode).

5.3.7.4.3 There shall be a button on the Content tab page (VC mode) to allow the user to stop sharing the selected content.

5.3.7.4.4 Controls shall be available for any input source selected as content and shared with the far site (remote site).

5.3.7.5 Audio

Unless otherwise required within the scope of a project, the Videoconferencing system shall make use of the audio components of the AV system, in the following ways:

5.3.7.5.1 Microphones

All microphones present in the AV system shall be fed to the VC codec. The respective level and mute controls for the microphone feeds shall match what is indicated on the Crestron touch panel (I.e. if a microphone is muted, the far site will not hear it).

5.3.7.5.2 Input sources

The audio from all input sources shall be fed to the VC codec, when they are selected for Content Sharing.

5.3.7.5.3 Incoming/Outgoing Volume

There shall be two additional audio level controls when in VC mode: Incoming Volume, and Outgoing Volume. These shall always be accessible when in VC mode:

5.3.7.5.3.1 The Incoming Volume control shall control the level and mute state, of the audio coming into the VC codec from the Far site (remote site).

5.3.7.5.3.2 The Outgoing Volume control shall control the level and mute state, of the audio being sent from the Near site (user's own room) to the Far site (remote site).

5.3.8 Lighting, Blinds and Shades

5.3.8.1 Lighting

5.3.8.1.1 For all rooms where lighting is to be controlled by a Lutron system interfaced with the Crestron system, there shall be four standard "Presets" configured in the Lutron lighting system, in order for the AV programmers to map the buttons on the Crestron touch panel for control:

- **Preset 1**:
  - Lutron: All lights shall be fully on (Intensity 100%).
  - Crestron programming: The button on the Crestron touch panel labeled "On" shall trigger this preset.

- **Preset 2:**
  - Lutron: Most lights shall be at around half intensity (Intensity ~50%), with the exception of lights that shine on any projection screens, which shall be completely off (Intensity 0%).
  - Crestron programming: The button on the Crestron touch panel labeled "Presentation" shall trigger this preset. This "Presentation" intensity shall be triggered by default when the automation system boots up.

- **Preset 3:**
  - Lutron: Most lights shall be at around one quarter intensity (Intensity ~25%), with the exception of lights that shine on any projection screens, which shall be completely off (Intensity 0%).
  - Crestron programming: The button on the Crestron touch panel labeled "Video" shall trigger this preset.

- **Preset 4: **(If applicable: only to be used when the Videoconferencing function is present in the AV system)****
  - Lutron: All lights shall be completely on (Intensity 100%), with the exception of lights that shine on any projection screens, which shall be completely off (Intensity 0%).
  - Crestron programming: The button on the Crestron touch panel labeled "Videoconferencing" shall trigger this preset.

- **Preset 5:**
  - Lutron: All lights shall be completely off (Intensity 0%).
  - Crestron programming: The button on the Crestron touch panel labeled "Off" shall trigger this preset.

Crestron programming note: When the user shuts down the Crestron system, Preset 1 "On" should be called, turning all of the lights back up to full intensity (Intensity 100%).

5.3.8.1.2 The room lighting shall be controllable when the system is off, starting up or shutting down.

5.3.8.2 Blinds and Shades

Automation of blinds and/or shades is not absolutely required by ITS. However, when the project deems this is a requirement, as with lighting, the Lutron system shall control the blinds and shades, and the Crestron system shall trigger it. The controls implemented in the Crestron system shall be shown on the touch panel in the following way:

5.3.8.2.1 Controls for operating blinds shall be indicated on the Crestron touch panel under the general heading "Blinds". The controls for operating shades, should they also be present, shall be indicated under the general heading: "Shades".

5.3.8.2.2 In the case where there are two zones of blinds or shades, these shall be distinguished from each other using the following labels: "Left" and "Right". If there are more than two zones of blinds or shades, these shall be distinguished from each other in the following fashion: "Left 1" and "Left 2"; "Right 1" and "Right 2".

5.3.8.2.3 Each zone of blinds or shades shall have independent controls.

5.3.8.2.4 The controls for each zone of blinds or shades shall be represented on the Crestron touch panel by three (3) buttons, located in the order that is shown below

- Up (Represented by an up arrow)
- Stop (Represented by the word "Stop" written out)
- Down (Represented by a down arrow)

5.3.8.2.5 Control of the blinds or shades shall be independent of the user powering the system on or off, or selecting an input source.

5.3.8.2.6 The blinds and shades shall be controllable when the system is OFF, warming UP or cooling down.

5.3.8.2.7 The control of the blinds or shades will be independent of the room's lighting presets.

5.3.9 Crestron System Clock

5.3.9.1 The Crestron system clock shall utilize the following DNS Servers:

- Primary DNS: 132.206.44.21 (Kona)
- Secondary DNS: 132.216.44.21 (Moka)

5.3.9.2 The Crestron system clock, including the date, shall be shown on every page of the Crestron touch panel.

5.3.9.3 The Crestron system clock shall respect daylight savings time.

5.3.9.4 The format of the date and time shall be:

5.3.9.4.1 Date: November 12, 2015

5.3.9.4.2 Time: 12:30 PM

5.3.10 Network

5.3.10.1 Xpanel

Xpanel 2.0 Smart Graphics shall be created for each AV system and shall be the same as the user interface on the touch panel or button panel. In cases where McGill University provides the compiled version of the McGill Standard Crestron User Interface to the AV Supplier, the University shall supply the Xpanel.

Anytime the Xpanel is accessed in order to remotely control the AV system in a classroom, a red border shall appear around the edges of the touch panel interface to indicate that it is being controlled remotely.

5.3.10.2 Network Implementation

A dedicated IP address shall be supplied for the purpose of a connection to the AV system, for use by support personnel.

For physical implementation of network for the AV system, please see section 5.4

5.3.11 Administrative and Support Functions

5.3.11.1 Hidden pages

One or more hidden page(s) shall be required within the Crestron touch panel interface. These pages shall be activated by pressing and holding the system clock for 5 seconds. A password, by default (5353), shall be required to enter the hidden page(s). The following functions shall be found in the hidden pages:

5.3.11.1.1 A master volume control and audio control for all sources (to adjust their gain values independently). Each control value shall be saved in the memory in order to retain it in case of loss of power.

5.3.11.1.2 A maximum volume control, to adjust the amount of headroom is available in the AV system.

5.3.11.1.3 Volume controls for the "default" audio level the system reverts to on system start up. These controls are to allow McGill to change the default start-up levels without any program changes being required.

5.3.11.1.4 A separate page for the PTZ camera shall be required (if applicable). This page shall have all of the same functions as the user page, including the position presets 1 to 3. In addition to this, the hidden camera page shall have the control to configure preset 4, the default preset.

5.3.11.1.5 There shall be a hidden page in order to change all passwords. (VC, etc.- if applicable.)

5.3.11.1.6 There shall be a hidden projector page showing the lamp hours, projector hours and projector status information for each projector.

5.3.11.1.7 The hidden pages area in the Crestron touch panel shall have a button to allow the operator to navigate back to the last used system mode, instead of needing to return to the home page.

5.3.11.1.8 The hidden pages shall be accessible via Page flip in order to allow system administrators and support staff to navigate to the hidden pages remotely without the user in the classroom seeing these pages. This shall include the password protect window of the hidden settings area.

5.4 Physical Implementation

This section is to outline some cases where special consideration must be paid to physical implementation of devices that impact on the automation system.

5.4.1 Crestron Processors

5.4.1.1 Each room shall have its own dedicated Crestron processor. Exceptions to this requirement shall be subject to approval by NCS-AV.

5.4.1.2 In the exceptional case where two rooms share the same Crestron processor, each room shall have a separate program.

5.4.2 EDID tables/Scalers

5.4.2.1 The Supplier must configure all EDID tables and scalers such that they match the resolution of the Display/Projector.

5.4.2.2 The scalers feeding the Lecture Recording System (LRS) shall be set to output 1920x1080 p60, unless otherwise required by the project (as stipulated in the AV design drawings or IT Services Needs Assessment document), as per section 3.6.1.3.

5.4.3 Network Switches and Network Implementation

Network switches for AV or otherwise shall be subject to approval by McGill NCS. Typically, NCS shall provide the network switch and subsequent network jacks needed by the AV system for communication and control.

For reasons of visibility on the network, each of the main devices in the AV system shall have its own direct connection to the McGill network. IP addresses in the appropriate range shall be provided to the Supplier by McGill University.

The internal router of the Crestron processor shall not be used in any network implementation on McGill campus.

SECTION 6: EHS (Asbestos Policy)

https://www.mcgill.ca/ehs/programs-and-services/facilities-safety/asbestos/asbestos-policy/

6.1 Asbestos Legislation

Under its Health and Safety Policy and the general provisions of the Occupational Health and Safety Act of Quebec, McGill University is committed to taking every reasonable precaution to protect the health and safety of its employees and students. Furthermore, the Quebec Construction Safety Code, section 3.23.1 which specifies the strict conditions under which asbestos work can be performed, governs work liable to disturb asbestos. This legislation is a minimum standard of care that must always be respected, and in certain instances exceeded, in order to meet the needs of the University Community.

6.2 Training

It is the policy of McGill University that all persons who work with asbestos-containing materials and those who supervise work or manage projects involving the disturbance of asbestos containing materials must be trained in the hazardous properties of asbestos and the applicable procedures to follow to ensure community safety. Such training must be renewed every three years.

6.3 Air Testing

In addition to the air testing specified by the Quebec Construction Safety Code that calls for testing inside of asbestos removal zones, it is the policy of the University to conduct routine air testing in adjacent areas outside of asbestos abatement zones, in order to provide assurances that people in nearby areas are not at risk.

6.4 Visual Inspections

It is the policy of McGill University that managers, supervisors and employees conduct and document annual inspection of all building materials containing asbestos found in mechanical rooms, boiler rooms or other building quarters. If the material is found to be damaged, then corrective measures becomes the responsibility of management and must be addressed immediately.

6.5 Communications

It is the policy of McGill University that all communications related to work on asbestos be transparent and open to the University community. Prior to conducting any asbestos work it is University policy to inform the building occupants by way of advising the Building Director of the work to be done, the methods to be used, the precautions to be followed, what to do if problems are observed, and the schedule of the work to be performed. All tests results and reports of the work are to be made available on a timely basis to the Building Director and any other members of the community who ask for information.

6.6 Project Management

McGill designated project managers are responsible for informing contractors of the presence of building materials containing asbestos within any construction work sites. Also, asbestos abatement projects must be overseen by a McGill designated project manager. This person is responsible for appointing the asbestos abatement firm, informing this firm of McGill health & safety requirements and handling communications with the McGill community. Asbestos containment enclosures must include a viewing panel to enable visual checks of the work in progress. Asbestos abatement enclosures may be taken down only after verification that all air tests were satisfactory and after the inspection and approval by the project manager.
Approved by the University Services Safety Committee on November 3rd, 2009

SECTION 7: Technical Lexicon

Administration**:** The method for labeling, documentation, and usage needed to implement moves, additions, and changes of the telecommunications infrastructure

Alien Crosstalk (or simply Crosstalk)**:** A measure of the unwanted signal coupling between adjacent cabling or components.

All-Thread-Rod: A straight section of round rod stock that has threads installed over its entire length. Also known as a threaded rod.

Anchor: 1) A fastening device. 2) In an outside plant environment, a device made up of a single plate or series of flat plates and combined with a rod having a connecting eye

Architectural Structures: Walls, floors, floor/ceilings, and roof/ceilings that are load bearing.

As-built: The documentation of measurements, location, labeling, and quantities of material work performed. May be in the form of marked up documents or other work order forms.

Attenuation: The decrease in magnitude of transmission signal strength between points, expressed as the ratio of output to input Measured in decibels (dB), usually at a specific frequency for copper or wavelength for optical fiber, the signal strength may be power or voltage.

Authority Having Jurisdiction (AHJ): The entities responsible for interpretation and enforcement of local building and electrical codes.

AV: Audiovisual

Backboard: A panel (e.g., wood, metal) used for mounting connecting hardware and equipment.

Backbone: A facility (e.g., pathway, cable, and conductors) between any of the following spaces: telecommunications rooms, telecommunications enclosures, common telecommunications rooms, floor-serving terminals, entrance facilities, equipment rooms, and common equipment rooms. In a data center, a facility (e.g., pathway, cable, and conductors) between any of the following spaces: entrance rooms or spaces, main distribution areas, horizontal distribution areas, and telecommunications rooms.

Backbone Cable: See **Backbone** and **Backbone Cabling**

Backbone Cabling: Cable and connecting hardware that provides interconnections between telecommunications rooms, equipment rooms, and entrance facilities.

Backbone Pathway: The portion of the pathway system that permits the placing of backbone cables between the entrance location and all cross-connect points within a building and between buildings.

Bandwidth: A range of frequencies available for signaling expressed in hertz. The information handling capability of a medium, expressed in units of frequency (hertz, Hz)

Beam Clamp: A device attached to a building structure to hold cable supports or equipment.

Bend Radius: The radius of curvature that a media can bend without signal degradation.

Binder Group: One of two or more bound copper pairs or optical fiber strands within a cable

Blueprint: A reproduction of an architectural plan and/or technical drawing that provides details of a construction project or an existing structure.

Bonding: The permanent joining of metallic parts to form an electrically conductive path that will ensure electrical continuity and the capacity to conduct safely any current likely to be imposed.

Bonding Conductor: A conductor used specifically for the purpose of bonding.

Bonding Conductor for Telecommunications: A conductor that interconnects the building's service equipment (power) ground to the telecommunications grounding system

Braid: A group of non-insulated conductors interwoven to surround one or more insulated conductors.

Bullwheel: A large wheel used to maintain an arc when feeding large cables into a backbone pathway.

Bundle: 1) Many individual optical fibers contained within a single jacket or buffer tube. 2) A group of buffered optical fibers distinguished in some fashion from another group in the same cable core. 3) A term used to indicate time and common handling of multiple cables routed together.

Cabinet: A container that may enclose connection devices, terminations, apparatus, wiring, and equipment.

Cable: An assembly of one or more insulated conductors or optical fibers within an enveloping sheath.

Cable Run: A length of installed media, which may include other components along its path

Cable Sheath: A covering over the optical fiber or conductor assembly that may include one or more metallic members, strength members, or jackets

Cable Support System: A combination of conduits, cable trays, support hooks, tie wraps, and any other hardware pieces used in a cabling installation to support cables. Cable support systems keep excess stress off the cables and may provide some mechanical protection to the cables being supported.

Cable Termination: The connecting or termination hardware applied to the end of a cable for the purpose of facilitating connection to active or passive transmission equipment.

Cable Tray: A rigid structure for supporting, housing and protecting cables or conductors. Usually consists of one-piece solid or ventilated bottom or individual transverse members with two side rails.

Cable Tree: A vertical rack with multiple arms for holding small reels of cable.

Cabling System: A specific system of cables, equipment/patch cords, connecting hardware, and other components supplied as a single entity.

Channel: 1) The end-to-end transmission path connecting interfaces of any two pieces of application specific equipment. Equipment cords and work area cords are included in the channel. 2) In frequency division multiplexing, a band in the frequency spectrum that is assigned to a specific logical connection. 3) In time division multiplexing, a time that is assigned to a specific logical connection.

Channel Stock: A metallic U-shaped bar with or without evenly spaced holes. Often hung in a trapeze configuration for support of pathway systems, such as conduits and cable trays. Also referred to as: UNISTRUT or CANTRUSS.

Circuit: The electrical or optical path used for communications between two devices.

Code: 1) A rule intended to ensure safety during the installation and use of materials, components, fixtures, systems, premises, and related subjects. Codes are typically invoked and enforced through government regulation. 2) A system of language, visual or text based, used to program software or hardware.

Commercial Building: A building, or portion thereof, that is intended for office use.

Conduit: A raceway of circular cross-section.

Conduit Bank: A structure containing one or more ducts.

Conduit Stub-out: A short section of conduit that is installed from a receptacle box, usually in a wall, curved into an accessible ceiling space.

Conduit Stub-up: A short section of conduit that is installed from a receptacle box, usually in a wall, into an accessible ceiling space directly above the receptacle box.

Cone: Safety marker that is used to designate a secure off-limits area for non-workers.

Connecting Hardware: A device, or combination of devices, used to connect two cables or cable elements.

Connector: A mechanical device used to provide a means for aligning, attaching, and achieving continuity between conductors or optical fibers.

Consolidation Point: A location for interconnection between horizontal cables, extending from building pathways and horizontal cables extending into furniture pathways.

Core: The central, light-carrying part of an optical fiber through which light pulses are transmitted.

Crimp: The act of clamping connectors to a cable.

Cross-connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

Cross-connection: A connection scheme between cabling runs, subsystems, and equipment using patch cords or jumpers that attach to connecting hardware on each end. Also known as a **Patch Bay**

Crossed Pairs: An error condition where physical connection of a wire or wires in a pair of wires is made to another wire or wires in yet another pair of wires. Generally found in the same cable.

Decibel (dB): 1a.)A unit for expressing the ratio of two amounts of electric or acoustic signal power equal to 10 times the common logarithm of this ratio; 1b)A unit for expressing the ration of the magnitudes of two electric voltages or currents or analogous acoustic quantities equal to 20 times the common logarithm of the voltage or current ratio. 2) A unit for expressing the relative intensity of sounds on a scale from zero for the average least perceptible sound to about 130 for the average pain level. 3) Degree of loudness.

Distribution Ring: Wire management ring shaped like the letter D for routing and supporting distribution cables and jumpers or patch cables on a backboard.

Dressing: Placing cables into a neat and symmetrical pattern for proper alignment and positioning for termination.

Drywall: An interior wall construction consisting of gypsum or plasterboard.

Duct: 1) A single enclosed raceway for conductors, wires, or cables. See also **raceway**. 2) An enclosure in which air is moved. Generally part of the heating, ventilating, and air conditioning system (HVAC) of a building.

DVI: Digital Visual Interface. This is a common connection in video and computing.

EDID: Extended Display Identification Data.

EMI: Electromagnetic Interference. A disturbance that affects an electrical circuit due to either electromagnetic induction or electromagnetic radiation emitted from an external source.

EMT: Electrical metallic tubing.

Entrance Facility (Telecommunications): An entrance to a building for both public and private network service cables (including antennae) including the entrance point at the building wall and continuing to the entrance room or space.

Entrance Room (Telecommunications): A space in which the joining of campus or building telecommunications backbone facilities takes place.

Equipment Rack: A rack with standard 19" width, able to accept standard 'rack-mountable' equipment. These are normally nominally specified by the amount of vertical space they possess. This is specified in rack units (RU).

Equipment Room (AV/Telecommunications): An environmentally controlled centralized space for AV or telecommunications equipment that usually houses a main or intermediate cross-connect.

Fire Retardant: Any substance added to delay the start of fire ignition or to slow the spread of flame by the burning material.

Firestop: A fire-rated material, device, or assembly of parts installed in a penetration of a fire-rated barrier.

Firestop System: A specific listed assembly consisting of the material(s) (firestop penetration seals) that fill the opening in the wall or floor assembly, and around and between any items that penetrate the wall or floor (e.g., cables, cable trays, conduit, ducts, pipes), and any termination devices (e.g., electrical outlet boxes) along with their means of support.

Firewall: 1) A continuous barrier used to prevent fire spreading from one fire zone or area to another. 2) One or more security mechanisms (hardware and/or software) designed to prevent, detect, suppress, and/or contain unauthorized access to a network.

Foiled: A type of continuous metal shielding surrounding one or more insulated conductors in a cable.

Floor Slab: 1) That part of a reinforced concrete floor, which is carried on beams below.
2) A concrete mat poured on subgrade serving as a floor rather than as a structural member.

Foldback Splicing: The process of folding back conductors in a splice for future maintenance or rearrangements.

Ground: A conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or to some conducting body that serves in place of earth.

Ground Electrode: A conductor, usually a rod, pipe, or plate (or group of such conductors), in direct contact with the earth for the purpose of providing a low-impedance connection to earth.

Grounded: Connected to earth or to some conducting body that serves in place of the earth.

Ground Wire: See **bonding conductor** and **bonding conductor for telecommunications.**

Grounding System: A system of hardware and wiring that provides an electrical path from a specified location to an earth ground point.

HDCP: High-bandwidth Digital Content Protection.

HDMI: High-Definition Multimedia Interface. This is a common format and connection type for digital video and computing applications.

Infrastructure (AV): A collection of those AV components, excluding AV equipment, that together provide the basic support for the distribution of all information within a room, building or campus.

In-line Splice: A splice in which cable enters one end cap and, after splicing the cable, exits the other end cap of the closure.

Innerduct: A non-metallic pathway, usually circular, placed within a larger pathway.

Insertion Loss: The signal loss resulting from the insertion of a component, or link, or channel, between a transmitter and receiver (compare "Jumper" and "Mushroom"). See **Attenuation.**

Insulation: The dielectric material that physically separates wires and prevents conduction between them.

Insulation Displacement Contact: A type of wire termination in which the insulation that is surrounding a conductor is displaced at the connection point without physically stripping the insulation from the conductor and consequently makes a gas-tight connection to the conductor.

Interconnection: 1) A connection scheme that employs connecting hardware for the direct connection of a cable to another cable without a patch cord or jumper. 2) A type of connection in which single-port equipment connections (e.g., 4-pair and optical fiber connectors) attach to horizontal or backbone cabling by means of patch cord or jumper.

Jacket: The outer layer of a cable. See **Cable Sheath**.

J-hook: A supporting device for horizontal cables that is shaped like a "J." It is attached to some building structures. Horizontal cables are laid in the opening formed by the "J" to provide support for the cables.

Ladder Rack: A device similar to a cable tray but more closely resembles a single section of a ladder. It is constructed of metal with two sides affixed to horizontal cross members.

Local Area Network: The standard industry term for a network installation that serves a relatively small area (e.g., structured cabling installation serving a building).

Loss: Attenuation of a signal, usually measured in dB.

Multimode Optical Fiber: An optical wave guide that allows many bound modes to propagate.

Mushroom: See **Spool**

Network: A series of controllers, all connected via a telecommunications cable.

Optical Fiber: A transmission media using a thin filament of glass or plastic to transmit pulse light signals. Its bandwidth is higher than copper and not subject to electromagnetic interference. The optical fiber consists of a central core (glass or plastic) and an outer cladding.

Optical Fiber Cable: Cable made up of one or more strands of glass or plastic consisting of a central core and outer cladding (optical fibers), strength members, and an outer jacket.

Outlet Box (Telecommunications): A metallic or non-metallic box mounted within a floor, wall, or ceiling and used to hold AV/telecommunications outlets, connectors or transition devices.

Outlet/Connector (AV/Telecommunications): A connecting device in the work area on which horizontal cable or outlet cable terminates.

Pair: 1) Two insulated wires commonly joined. They can be twisted around each other or mated together, as in flat cable. 2) One side circuit (two diametrically facing conductors) in a star quad.

Pair Count: 1) an indication of how many pairs of grouped conductors are in a cable. 2) The pair identification of cable and pairs serving a location.

Patch Bay: (See **Cross-Connect**)

Patch Cord: A length of cable with connectors on both ends used to join AV/ circuits/channels at the patch bay or cross-connect.

Pathway 1) A sequence of connections that provides the connectivity between devices on a network or between networks on an internetwork. 2) The vertical and horizontal route of the AV/telecommunications cable. 3) A facility for the placement of AV cable.

Premises: Building, or set of buildings on common property, that are occupied by a single tenant or landlord.

Pull: 1) The act of placing cable by pulling. 2) The longitudinal force acting on a pole as a result of horizontal loading.

Raceway: Any enclosed channel designed for holding wires or cables.

Rack (See **Equipment Rack**)

Rack Unit (RU): A standardize measure of vertical space in an equipment rack (19" width). 1 RU is 1.75" in vertical measure.

RCA: stands for Radio Corporation of America. A connector used in standard definition video and unbalanced audio applications.

Reel Brake: A device used to control the rate of removal of a cable from a cable reel.

Reversed Pair: A condition in which the conductors in a pair are terminated in the wrong sequence (i.e., tip connects to ring and ring connects to tip).

Ring: A means for identification of one conductor of a pair. Historically associated with the wire connected to the "ring" portion of an operator's telephone plug. See also **Tip.**

TS: Tip-Sleeve**.** Unbalanced ¼" and 1/8" connectors for audio are referred to in this way.

TRS: Tip-Ring-Sleeve. Balanced ¼" and 1/8" connectors for audio are referred to in this way.

Twisted-pair Cable: A cable composed of twisted copper conductors covered with an overall metallic shield. See **Foiled.**

S-video (Y/C): Separate video. A 4-pin mini din format/connection used in standard definition video.

Sheath: (See **Cable Sheath**).

Shield: A metallic layer (e.g., copper braids, metal foils, solid tubing) placed around a conductor or group of conductors.

Short: An unintentional low-resistance connection between two conducting materials.

Single-mode Optical fiber: An optical fiber with a relatively small core diameter of 8–9 micron (micrometers) and a cladding diameter of 125 micron. Light wave propagation is restricted to a single path, or mode, in single-mode optical fiber.

Sleeve: 1) An opening, usually circular, through the wall, ceiling, or floor to allow the passage of cables. 2) The name given to the portion of the connector where the ground is normally connected in a TRS style connector. (See **TRS**)

Slot: An opening though a wall, floor, or ceiling usually rectangular, to allow the passage of cables.

Splice: A joining of conductors in a splice closure, meant to be a permanent device that joins conducting or transmitting media.

Splice Case: A metal or plastic housing with a semi-cylindrical cavity used in identical pairs to clamp around a cable splice to provide a closure.

Splice Closure: A device used to protect a splice. See **Splice Case**

Split Pair: Transposition of two conductors of separate pairs.

Spool: A cylindrical guide, typically used for routing jumpers, cross-connects, and patch cords.

Standard: A collection of requirements that encompass properties of components and systems that are intended to ensure an accepted degree of functionality and longevity.

Stub-out: See **Conduit Stub-out**

Stub-up: See **Conduit Stub-up**

Suspended Ceiling: A ceiling that creates an area or space between the ceiling material and the building structure above.

Telecommunications: Any transmission, emission, and reception of signs, signals, writings, images, and sounds; that is, information of any nature by cable, radio, optical, or other electromagnetic systems.

Telecommunications Enclosure: A case or housing for telecommunications equipment, cable terminations, and cross-connect cabling.

Telecommunications Entrance Facility: See **Entrance Facility (Telecommunications).**

Telecommunications Entrance Room: See **Entrance Room (Telecommunications)**.

Telecommunications Equipment Room: See **Equipment Room (Telecommunications).**

Telecommunications Grounding Bus bar: A common point of connection for telecommunications systems and equipment bonding to ground; located in the telecommunications room or equipment room.

Telecommunications Main Grounding: A bus bar placed in a convenient and accessible location and bonded, by means of the bonding conductor for telecommunications, to the building service equipment (power) ground.

Telecommunications Outlet: See **Outlet/Connector (Telecommunications).**

Telecommunications or AV Room: An enclosed space for housing telecommunications equipment, cable terminations, and cross-connects. The room is the recognized cross-connect between the backbone cable and horizontal cabling.

Tie Wrap: Plastic or hook and loop strip used for binding and dressing cable.

Tip: A means for identification of one conductor of a pair. Historically, associated with the wire connected to the tip portion of an operator's telephone plug. See **Ring.**

Trapeze: A support device using threaded rod and channel stock.

Twisted-pair: Two individually insulated copper wires physically twisted together to form a balanced pair.

Twisted-pair Cable: A multi-conductor cable comprising two or more copper conductors twisted in a manner designed to cancel electrical interference. Also called **balanced twisted-pair cable.**

Unshielded Twisted-pair Cable: Cable containing one or more pairs of twisted copper with-out metallic shielding. The entire assembly is covered with an insulating sheath (cable jacket).

VGA: Video Graphics Array. This is an analog video connection type that has been used for many formats including in High Definition

Volt (V): A unit of electromotive force or potential difference that will cause a current of one ampere to flow through a resistance of one ohm.

Wavelength: The distance between two points in the same phase in consecutive cycles measured in the direction of propagation.

Wire: An individually insulated solid or stranded metallic conductor.

Wireway: An enclosed pathway for cables.

Work Area (Workstation): A building space where the occupants interact with telecommunications terminal equipment.

Work Area Outlet: A connecting device for termination of horizontal media. See also **Telecommunications outlet/connector**.

XLR: is a style of electrical connector, primarily found on professional audio, video, and stage lighting equipment. The connectors are circular in design and have between 3 and 7 pins. Normally associated with balanced audio applications.

McGill | Information Technology Services

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AV SYSTEM INSPECTION SHEET

Commissioning without Crestron/DSP programs

version 2

Project #:	
Building:	
Room:	
Tested by:	
Start Date:	

Item #	Description:	Conforms to specifications			Comments/Deficiency list item	Date Corrected
		Yes	No	N/A		
System Commissioning (Without Crestron/DSP Programs):						
General:						
NOTE: The following items are for use when commissioning AV system in which NCS-AV is providing the Creston and DSP programs.						
NCS-AV will provide the IP Table to the AV Integrator, on a per project basis, for the purpose of configuring the AV devices, and in order for the AV Integrator to complete items 3 , 37, 38 and 39 below.						
1	With the help of the AV system drawing for the project, verify if each video path is working properly (each source displays on each destination). Use any necessary tool to achieve the task, including but not limited to video signal generator and useful software.					
2	With the help of the AV system drawing for the project, verify if each audio patch is working properly (each source plays on each destination). Use any necessary tool to achieve the task, including but not limited to video signal generator and useful software.					
3	Using internal menus, local web pages or console on a laptop, verify proper IP configuartion of each devices connected to the network. This include IP address, subnet mask, gateway, DNS as per IP table.					
4	Verify all firmware on every device. This include source device, audio processor, video processor, control processor, transmitter, receiver, display device. Use any necessary tool to achieve the task, including but not limited to menory stick and useful software.					
5	Verify any control path by sending and receving command string through proper port. This include any type of control (infra red, serial, network, relay, input/output). It may necessary to build a program with adapted software.					
Physical Inspection:						
Video:						
6	All displayed images are the correct aspect ratio, no horizontal or vertical stretching of the image is occurring. (Circles are circles)					
7	The shape of the projected area(s) is/are not distorted (ie. The projected area appears to be perfectly rectangular, no keystone correction is used).					
8	All colours are present in all displayed images. (Red, Green and Blue)					
9	The projected/displayed image is clean (in focus, no artifacts or sync errors)					
10	The manual controls for the raising and lowering of any projection screens function correctly.					
11	Projector Lamp Power is properly set to eco mode.					
12	Projector message, warning and guide are turned off.					
13	Projector Power Management is properly set to normal.					

14	Projection screen is free of defects (imperfections in the texture of the screen, etc.)					
Audio:						
15	General audio levels are appropriate to the room. (Audio playback can be made loud enough that it is sufficient for all functions.)					
16	All loudspeakers are functioning properly. (Signal is passing, no distortion is heard, and no technical noise is heard (ground hum).)					
17	In stereo audio systems, the Left and Right channels are correctly assigned to the Left and Right speakers.					
Cabling:						
18	In the visible cable runs, there are no splices.					
19	In the visible cable runs, no inline adapters have been used to bridge two cable lengths.					
20	In the visible cable runs, any cable bends respect appropriate bend radius (no kinking or acute bending).					
21	In the visible cable runs, cables not run within a conduit or wire mold are installed in a tidy and secure manner.					
22	Cables terminated within the AV equipment rack are installed securely, in a tidy manner, and are properly strain relieved.					
23	Cables terminated to all equipment have been properly prepared (no bare wires visible, no risk of contact shorting).					
24	At the podium (or umbilical), the pull out cables available to connect user equipment (ex. Laptop,etc.) are of sufficient length.					
25	The podium (or umbilical) laptop VGA and analog audio cables are 2 separate cables (not one combo cable)					
Labeling:						
26	All audio, video and control equipment is labeled with a McGill Asset tag.					
27	Each audio, video, control and network cable is labeled with a unique label at both ends, and these labels correspond with what is shown in the AV system drawings (AV schematics)					
28	Cable labels are all printed- not hand written.					
29	Cable labels are properly affixed to the cables. (The labels used don't just fall off.)					
30	The inputs and outputs of the system are labeled in the setup page and on the front of the Crestron Matrix/Presentation switcher.					
Security:						
31	Security devices (Kensington lock) are installed for the AV equipment, where applicable (as indicated in the AV system drawings).					
32	The Crestron button panel is fixed to the wall/cabinet in a secure manner. (The user cannot simply pull it out.)					
33	Any AV cabinet built into a piece of furniture or the podium is keyed with the Häfele brand lock 101TA.					
Ventilation/Dust:						

34	All equipment installed in enclosed or semi- enclosed spaces (cabinets, enclosed AV racks) has an appropriate amount of air circulation around it (ie. Equipment is not overheating)					
35	The room/AV equipment is acceptably clean. (The level of dust is acceptably low- i.e. no dust settling on surfaces in the room; no dust build up at the filters of the AV equipment.)					
Maintenance:						
36	All equipment is easily accessible for the purpose of support. (Removal/configuration of equipment).					
Network:						
37	The network service for the Laptop (Podium, Umilical) is active.					
38	The network service for the PC (Podium PC, Local PC) is active.					
39	All network capable equipment has been connected to the correct network jack. (As per the NCS-AV IP table document for the room.)					
40	The outlets of any network capable power strip have been properly labeled in the device's web interface. (As per the AV system drawings)					

Tester's Signature: _____ Date: _____

RÉNOVATION DES CLASSES 045 ET 046
AU PAVILLON BRONFMAN

1001, rue Sherbrooke Ouest,
Montréal, QC H3A 1G5

Mc Gill

Projet no. 18-094

DEVIS DESCRIPTIF
POUR SOUMISSION

28 juin 2022

Ordre des architectes du Québec
LOUISE HOGUES
Architecte

GROUPE LHA INC.
Louise Hogues, architecte
5805, avenue Christophe-Colomb
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TABLE DES MATIÈRES

1.1 PORTÉE DES TRAVAUX

.1 Les travaux de rénovation comprennent l'agrandissement de deux classes au sous-sol du Pavillon Bronfman, la modification de cloisons et de plafonds, l'ajout des prises et des services pour de nouveaux équipements, la ventilation, l'éclairage, les nouveaux finis de plancher, les ragréages et la peinture des murs affectés par les travaux. Les dessins décrivent la portée des travaux plus en détail.

.2 Des percements de dalle sont aussi demandés pour des prises de plancher dans chaque classe.

.3 Tous les équipements audio-visuels et les lutrins (podium) sont fournis et installés par l'Entrepreneur.

.4 Les tables et les chaises seront fournies et installées par l'Université à la fin des travaux.

.5 La salle doit permettre un arrangement de tables pour cour magistral ou pour cours de groupe. Les prises de plancher et le patron de pose du linoleum servent de repères pour rapidement replacer le mobilier.

1.2 Les mobiliers, contenus, équipements et accessoires seront déplacés hors des pièces par l'Entrepreneur sauf indications contraires.

1.3 La durée des travaux dans les corridors et passages devra être limitée au minimum. Ces secteurs devront être délimités avec une cloison temporaire, et la circulation ne devra jamais être compromise.

1.4 L'Entrepreneur devra inclure dans sa soumission toutes les préparations de surfaces, la main-d'oeuvre, les matériaux et accessoires nécessaires pour installer les finis prévus dans le projet et pour obtenir un ensemble complet et une finition soignée des travaux autant à l'intérieur qu'à l'extérieur de la zone des travaux.

1.5 L'Entrepreneur sera tenu de faire à ses frais tous les menus travaux qui ne sont pas particulièrement décrits aux dessins ou au devis mais qui sont usuels et nécessaires au parachèvement complet de l'ouvrage.

1.6 L'Entrepreneur doit limiter ses opérations aux aires attenantes au chantier, et doit coordonner l'utilisation de l'espace avec le Client. Il doit ériger des cloisons temporaires étanches à la poussière et maintenir des accès sécuritaires en tout temps jusqu'à l'extérieur.

1.7 Avant d'exécuter tout travail, l'Entrepreneur doit vérifier les plans ainsi que tous les niveaux et dimensions sur les lieux et rapporter à l'Architecte toute erreur, omission ou variation entre les plans d'architecture ou autre document et les conditions de chantier. Il doit de plus bien se familiariser avec le site.

1.8 Les relevés fournis à l'Entrepreneur sont indicatifs et servent à l'aider à prendre ses propres relevés des conditions du site.

1.9 La peinture contient du plomb. L'Entrepreneur doit prendre les mesures nécessaires pour informer et protéger ses travailleurs.

1.10 PLANIFICATION DES TRAVAUX

.1 Commencer les travaux dès réception de l'autorisation de débuter les travaux et les achever dans le délai contractuel prescrit. Exécuter les travaux avec célérité, diligence et sans interruption, quelle que soit la période de l'année. Tout travail supplémentaire nécessaire au respect de l'échéancier des travaux, y compris le travail à exécuter à l'extérieur des heures normales de travail, doit être effectué sans frais pour le Maître de l'ouvrage.

.2 Advenant tout défaut de l'Entrepreneur de terminer les travaux au terme fixé au contrat et/ou révisé par ordre de changement, le Maître de l'ouvrage pourra tenir l'Entrepreneur responsable des dommages et des coûts supplémentaires qu'il a dû encourir.

.3 Si l'Entrepreneur accuse un quelconque retard par rapport à son calendrier ou s'il devient évident pour le Maître de l'ouvrage que les travaux ne seront pas complétés pour la date prévue au contrat, le Maître de l'ouvrage peut exiger de l'Entrepreneur qu'il augmente la cadence de ses travaux, qu'il travaille en temps supplémentaire, qu'il augmente le nombre de ses équipes, qu'il augmente le nombre d'ouvriers et/ou qu'il se procure l'équipement supplémentaire nécessaire pour accélérer les travaux. Tous les coûts additionnels encourus par ces mesures supplémentaires pour rattraper ce retard seront à la charge de l'Entrepreneur.

.4 L'Entrepreneur devra en tout temps faire en sorte de ne pas nuire au fonctionnement normal du pavillon et à ne pas entraver le cours de ses opérations. À cet effet, les systèmes mécaniques, électriques, de détection incendie, de sécurité, les autres services et leurs opérations, l'intégrité générale du bâtiment existant incluant son étanchéité, ainsi que les circulations piétonnières et de véhicules devront être maintenus pleinement opérationnels en permanence durant les travaux.

.5 Aucun matériau, outil, accessoire ou équipement ne sera toléré sur les lieux à l'extérieur des périodes où les travaux sont permis.

.6 L'Entrepreneur est également tenu de faire un compte-rendu au Maître de l'ouvrage, à la fin de chaque quart de travail, avant de quitter les lieux ; ce compte-rendu doit faire état des travaux non terminés, des situations temporaires exigeant des précautions de la part des usagers, ainsi que de toute autre indication nécessitant une attention particulière des usagers lors des heures d'affaires.

1.11 PERCEMENTS ET OBTURATIONS

.1 Prévoir et pourvoir tous les percements, découpages requis pour les travaux et réparer toutes les parties ou surfaces endommagées par l'exécution des travaux du contrat.

.2 Les sous-traitants concernés devront employer tous les moyens techniques disponibles de façon à s'assurer que lors des percements ils n'endommageront pas de conduit existant à d'autres services.

.3 L'Entrepreneur devra examiner avec attention les plans et inclure à son prix le coût de tous les découpages, percements et toutes les réparations nécessaires au travail de tous les corps de métiers.

1.11 PERCEMENTS ET OBTURATIONS (suite)

.4 Obturer les ouvertures abandonnées dans les dalles de plancher à l'aide de produits ignifuges et selon des assemblages certifiés par ULC.

1.12 UTILISATION DES LIEUX

.1 Coordonner l'utilisation des lieux selon des directives du Maître de l'ouvrage. Assumer l'entière responsabilité pour ce qui concerne la protection et la garde des produits et matériaux nécessaires à l'exécution du présent contrat.

.2 Trouver les zones de travail ou d'entreposage supplémentaires nécessaires à l'exécution des travaux aux termes du présent contrat et en défrayer le coût.

.3 De plus, vérifier à chaque jour les installations en cours et s'assurer qu'ils ne représentent en aucun temps de risques pour les usagers.

1.13 RÉGLEMENTATION, CODES ET NORMES

.1 Exécuter les travaux conformément au Code de construction du Québec – Chapitre 1, version en vigueur et à tout autre code fédéral, provincial ou local qui s'applique. En cas de divergence ou de contradiction, les exigences les plus strictes prévaudront.

.2 Exécuter les travaux de manière à satisfaire à toutes les exigences des documents contractuels et des normes et codes spécifiés ainsi que des autres documents cités en référence.

.3 L'Entrepreneur devra respecter la Loi sur les relations de travail, la formation professionnelle et la gestion de la main-d'oeuvre dans l'industrie de la construction de la Province de Québec.

1.14 ENTREPOSAGE DES MATÉRIAUX ET LIVRAISON

.1 L'Entrepreneur sera responsable des matériaux et équipements qu'il transporte et il lui incombera de s'assurer qu'ils soient livrés en temps voulu et en bon état.

.2 Lors de la livraison de matériel, s'assurer d'avoir le personnel requis pour la réception.

.3 Tous les matériaux et outils du chantier doivent être livrés par le débarcadère arrière, jamais par le lobby du rez-de-chaussée.

1.15 ANCRAGES

.1 Attacher et fixer les appareils, éléments et raccords solidement et de façon sécuritaire, pour éviter qu'ils ne tombent ou se déplacent pendant l'usage normal du bâtiment, soit par vibration ou toute autre cause.

.2 Les composants non structuraux, les équipements et leurs assemblages à la structure doivent être conçus pour résister aux effets dus aux séismes.

24.1 TRAVAUX CONNEXES

.1	Couvre-sol souple	Section 09 65
.2	Plafond suspendu	Section 09 50
.3	Mécanique	Voir devis de l'ingénieur
.4	Électricité	Voir devis de l'ingénieur

24.2 CONDITIONS

.1 L'Entrepreneur devra visiter les lieux et se familiariser avec les conditions d'exécution avant de présenter sa soumission. Aucune modification au contrat ne sera accordée pour des difficultés d'exécution qui auraient pu être anticipées à la suite d'un examen attentif des lieux.

.2 L'Entrepreneur sera seul responsable pour la protection de tous les travaux et de toutes les surfaces existantes des différentes pièces, du passage emprunté lors des travaux et de l'emplacement du conteneur à déchets le cas échéant. Il réparera à ses frais tout dommage survenu aux surfaces matérielles ainsi qu'au mobilier existant.

.3 Prendre les mesures nécessaires pour abattre la poussière au cours de l'exécution, et veiller à garder le site propre.

.4 Tous les matériaux de démolition non réclamés par le Propriétaire et non réutilisés dans la nouvelle construction deviennent la propriété de l'Entrepreneur et devront être évacués hors du chantier selon les normes en vigueur.

.5 L'Entrepreneur devra prendre ses propres relevés des conditions des murs et plafonds ou planchers à démolir ou à percer. Aucun frais supplémentaire ne sera admissible si les constructions existantes à démolir étaient différentes de celles indiquées aux dessins.

24.3 TRAVAUX PRÉPARATOIRES

.1 Avant d'entreprendre les travaux, réaliser les cloisons temporaires délimitant le site du secteur concerné et permettant de contenir la propagation de la poussière.

.2 S'assurer que les portes, percements de plomberie ou autres, prises de courant, sortie et prise d'air, diffuseur et grille de ventilation soient scellés adéquatement avec 2 couches de polyéthylène de 6 ml chevauchant de 2 pieds de chaque côté et recouvertes d'un ruban adhésif en toile.

.3 Des tapis collants devront être installés à l'entrée du chantier et remplacés régulièrement.

.4 Les secteurs où se font des travaux seront munis d'un extracteur d'air raccordé sur un circuit électrique qui maintient une pression négative.

24.3 TRAVAUX PRÉPARATOIRES (suite)

.5 Maintenir la zone de construction en pression négative 24 heures par jour. Contrôler la pression négative en tout temps, avec un interrupteur de contrôle/manomètre et noter, au début, au milieu et à la fin de chaque jour, les résultats dans un journal de bord.

.6 S'assurer que l'air est évacué directement à l'extérieur à travers un filtre HEPA et loin des diffuseurs de ventilation et de toute prise d'air.

.7 Protéger le couvre-plancher existant du hall pendant toute la durée des travaux.

24.4 PORTÉE DES TRAVAUX

.1 Enlever les chaises fixes et mobiliers existants selon les indications aux dessins et en disposer.

.2 Enlever soigneusement tous les accessoires et tableaux existants et en disposer sauf indication contraire du Maître de l'Ouvrage.

.3 Enlever les comptoirs le long du mur du hall et récupérer les 5 supports existants pour la section *06 20 MENUISERIE*.

.4 Enlever les portes et cadres indiqués et en disposer. Toute la quincaillerie existante non réutilisée doit être remise à McGill.

.5 Dans le hall, décrocher 2 portes vitrées coulissantes et couper le rail au droit du mur pour permettre d'obturer la fente d'insertion.

.6 Démonter le plafond existant dans les locaux où c'est indiqué aux dessins des diverses disciplines.

.7 Percer le plafond de gypse du hall et ouvrir tous les plafonds pour permettre les travaux de ventilation prévus.

.8 Démolir ou percer les cloisons en blocs ou en gypse indiquées aux plans. Bien coordonner les éléments de support temporaire lorsque le mur est porteur. Ragréer les surfaces endommagées prêt à recevoir les nouveaux finis.

.9 Dégarnir le gypse aux endroits où il faut ajouter des fonds de clouage.

.10 L'Entrepreneur doit veiller à maintenir un passage propre et sécuritaire pour l'évacuation de ses déchets, et doit coordonner ses travaux dans le plafond avec les usagers.

.11 Nettoyer soigneusement les dalles de béton qui resteront apparentes au plafond.

24.5 PLANCHERS ET PLINTHES

.1 Sauf lorsqu'ils sont indiqués comme existants à conserver, tous les couvre-sol existants et leur plinthe sont à enlever. Bien nettoyer toute la colle. Les surfaces doivent être ragréées et prêtes à recevoir les nouveaux finis.

.2 Percer la dalle de plancher pour les prises électriques prévues en suivant les instructions de l'ingénieur en structure.

.3 Après l'enlèvement des conduits ou tuyaux traversant le plancher, obturer parfaitement les ouvertures dans la dalle de façon à maintenir une résistance au feu de 2 heures.

24.6 PERCEMENTS

.1 Réaliser tous les percements requis dans les murs pour passer les conduits et fils requis par les ingénieurs. Tailler proprement les bordures pour faciliter le ragréage.

.2 Réaliser aussi les saignées requises dans les murs pour passer les conduits ou tuyaux verticaux requis par les ingénieurs. Tailler proprement les bordures pour faciliter le ragréage.

.3 Coordonner l'enlèvement de tout filage, éclairage, plomberie et autres appareils dans les plafonds ou murs avec les sections de l'ingénieur.

.4 Ragréer les surfaces endommagées et préparer à recevoir les nouveaux finis.

24.7 LE SITE

.1 Débarrasser les lieux de tous les matériaux provenant de la démolition au fur et à mesure que le travail progresse et laisser les lieux dans un état parfait de propreté en les débarrassant de tous les débris périssables ou non, et autres déchets.

.2 Libérer tous les soirs, les terrains environnants de tous les matériaux, déchets, débris. Aucun empilement ne sera toléré.

61.1 TRAVAUX CONNEXES

.1	Menuiserie	Section 06 20
.2	Système intérieur	Section 09 20
.3	Accessoires	Section 10 14

61.2 PORTÉE DES TRAVAUX

.1 Examiner attentivement les plans, les devis et les plans d'architecture, pour déterminer, fournir et poser solidement et aux bons endroits tous les éléments de charpente nécessaires à l'exécution complète des travaux de construction.

.2 Installer les fonds de clouage adaptés aux éléments prévus sur les cloisons.

.3 Construire tous les ouvrages de protection pour les ouvriers, les déplacer et les réparer selon les besoins durant tout le cours des travaux.

.4 Aucun élément de bois de charpente ne devra être apparent une fois l'ouvrage terminé. Du gypse devra toujours les recouvrir.

61.3 MATÉRIAUX

.1 Tous les matériaux seront conformes aux plus sévères des exigences des sections aux chapitres appropriés du Code de Construction en vigueur.

.2 L'Entrepreneur doit être en mesure de fournir une preuve que tous les matériaux de bois ont reçu une certification par l'une des associations suivantes:

- CSA (Canadian Standard Association)
- FSC (Forest Stewardship Concil)
- SFIinc. (Sustainable Forestry Initiative)

.3 Bois de charpente : épinette de l'Est, no 1.

.4 Fourrures : épinette utilité ou plus ou requis.

.5 Contreplaqué de B.C.Fir conforme à la norme ACNOR 0121, du type à languette et rainure, "standard non sablé", épaisseur 19mm ou tel qu'indiqué.

61.4 ATTACHES ET PIÈCES DE QUINCAILLERIE

.1 Les clous, chevilles et agrafes doivent être conformes aux exigences de la partie 9 du Code.

.2 Boulons, écrous, rondelles, vis et goupilles : fini galvanisé par immersion à chaud, selon la norme ACNOR G164, pour les ouvrages d'intérieur situés dans des endroits humides.

61.4 ATTACHES ET PIÈCES DE QUINCAILLERIE (suite)

.3 Rondelles de clouage : chapeaux plats d'au moins 1" de diamètre, en tôle de calibre 26 au moins, façonnées de manière à éviter tout bombage. Les rondelles bombées ou incurvées ne sont pas acceptables.

.4 Sauf indication contraire aux dessins, utiliser les types suivants :

a) Dans la maçonnerie creuse, les revêtements en enduit et les panneaux, utiliser des boulons à bascule.

b) Dans la maçonnerie massive ou en béton, utiliser des tampons expansibles avec des tire-fonds ou des douilles en plomb ou en fibres avec des vis à bois. Dans le béton, des goujons enfoncés au pistolet cloueur peuvent être utilisés.

c) Dans les colombages métalliques, utiliser des vis auto-perceuses et auto-taraudeuses de dimensions appropriées.

.5 Aux endroits indiqués, fixer les éléments au moyen de boulons d'un diamètre minimal de 3/8". Aux autres endroits, les fixer au moyen de vis galvanisées. Poser les attaches à environ 12" des extrémités des éléments et espacer les autres uniformément. Sauf indications contraires, poser les boulons à 4' d'entraxe, et les vis à 2' d'entraxe.

.6 Fraiser les trous, au besoin, de façon que les têtes de boulons ne fassent pas saillie.

61.5 APPLICATION

.1 Tous les travaux de charpente et de menuiserie seront solidement fixés, ajustés, bien alignés, de niveau, rigoureusement d'aplomb, exécutés en respectant les plans.

.2 Toute l'installation sera exécutée selon les plus sévères des exigences des sections ou chapitres appropriés du CODE DE CONSTRUCTION DU QUÉBEC et des règlements municipaux ainsi que leurs amendements pour un bâtiment incombustible.

.3 Bien identifier quels sont les éléments combustibles permis comme fonds de clouage et ne pas excéder les quantités réglementaires, sous peine d'avoir à reprendre les travaux.

.4 Pour les fonds de clouage des accessoires et de l'ébénisterie, installer un contreplaqué de 16mm d'épaisseur minimum entre les colombages. Les clouages doivent être adaptés aux dimensions prévues.

.5 Tous les accessoires dans les murs devront avoir un ancrage de bois de charpente.

.6 Installer les fourrures et les cales d'aplomb et d'alignement.

.7 Construire tous les ouvrages de protection pour les ouvriers tels que garde-fous, échelles, rampes, etc. ; les modifier, les déplacer et les réparer selon les besoins durant tout le cours des travaux, conformément aux exigences du Ministère du Travail.

62.1 TRAVAUX CONNEXES

.1	Charpenterie	Section 06 11
.2	Système intérieur	Section 09 20
.3	Électricité	Voir plans de l'ingénieur
.4	Audio-visuel	Voir NCS de McGill

62.2 ÉTENDUE DES TRAVAUX

.1 Les présents travaux de menuiserie incluent, sans cependant s'y limiter, la fabrication et l'installation du mobilier intégré et des protecteurs montrés aux dessins:

a) Le lutrin hydraulique (podium) de chaque salle,

b) Les comptoirs du corridor incluant les supports récupérés de l'existant,

c) La retombée de plafond incliné en avant de chaque classe,

d) Les protecteurs de murs,

e) La moulure demi-lune au mur du corridor 047,

f) Tout autre élément d'ébénisterie montré aux dessins ou requis par la nature des travaux.

.2 Les travaux à effectuer comprennent la main d'oeuvre, les matériaux, l'outillage, l'emballage, le chargement, le transport, le déchargement, le déballage, la mise en place et tout ouvrage nécessaire à la complète et parfaite exécution suivant les règles de l'art.

.3 L'Entrepreneur sera tenu de faire à ses frais, tous les menus travaux qui ne sont pas particulièrement décrits aux dessins ou au devis mais qui sont usuels et nécessaires au parachèvement complet de l'Ouvrage.

.4 Pour le lutrin, bien coordonner les contacts électriques et s'assurer que toute la filerie sera dissimulée. Coordonner aussi le câblage informatique pour les ordinateurs, leur moniteur et accessoires. Tous ces éléments devront être intégrés.

.5 La fabrication et l'installation de tous les éléments d'ébénisterie seront conformes aux plus sévères standards de qualité de L'AWMAC (Architectural Woodwork Manufacturers Association of Canada), édition la plus récente.

.6 L'Entrepreneur devra se charger d'obturer les trous des attaches et des joints, et de sabler toutes les boiseries, placages et autres moulures.

62.3 GARANTIE ET MANUEL D'ENTRETIEN

.1 Fournir une garantie écrite stipulant que tous les éléments d'ébénisterie de cette section seront garantis pour une période de trois (3) ans à partir de la date d'achèvement substantiel des travaux, contre tout défaut de matériaux, fabrication et installation.

62.4 MANUTENTION

.1 Le manufacturier doit s'assurer d'un emballage adéquat pour garantir l'intégrité des produits jusqu'à destination.

.2 Tous les dessus de mobilier seront protégés, une fois installés, par un carton jusqu'à la date d'inspection des travaux.

.3 Tenir compte des difficultés de manutention des ouvrages, et de l'espace libre dans les ouvertures du bâtiment.

62.5 DESSINS D'ATELIER ET ÉCHANTILLONS

.1 Après avoir relevé les mesures sur le chantier, soumettre les dessins d'atelier et les fiches techniques des produits pour approbation, incluant toutes les composantes des lutrins hydrauliques.

.2 Les dessins doivent montrer les détails de construction et d'assemblage, des profils, des fixations et les autres détails connexes, ainsi que l'emplacement de chaque meuble, en plan et en élévation.

.3 Les dessins doivent indiquer tous les matériaux, finis, épaisseurs et pièces de quincaillerie ainsi que l'emplacement de toutes les ouvertures requises aux fins de raccordement des réseaux de service, les conditions d'installation types et particulières, tous les raccordements, accessoires et ancrages, et l'emplacement des dispositifs de fixation apparents.

.4 Les dessins doivent aussi montrer le sens du grain et tous les joints de placage du plastique stratifié.

.5 Les modules à fabriquer devront être établis par l'Entrepreneur pour obtenir les profils indiqués aux plans.

.6 Les échantillons devront être réalisés avec les couteaux définitifs, et devront être exactement identiques à ceux qui seront produits dans les quantités requises pour l'ensemble du projet.

.7 Soumettre des échantillons du plastique stratifié, du grillage ou de la quincaillerie à la demande de l'Architecte.

62.6 RELEVÉS ET SUPPORTS

.1 Toutes les dimensions doivent être prises sur le chantier par l'Entrepreneur. Bien vérifier l'équerrage des ouvertures existantes avant de fabriquer.

.2 Les dimensions fournies ne sont qu'indicatives et ne doivent servir qu'à aider l'Entrepreneur à prendre ses propres relevés.

.3 Il est de la responsabilité de l'Entrepreneur de vérifier les dimensions et types d'ancrages requis pour ses travaux. Il sera tenu de fournir à ses frais tous supports additionnels requis.

62.7 MATÉRIAUX

.1 Bois d'oeuvre

a) Bois tendre: sauf indication contraire, fini S4S (blanchi sur 4 côtés), ayant un degré d'humidité ne dépassant pas 19% et conforme à la norme ACNOR 0141-05.

b) Bois dur: ayant un degré d'humidité ne dépassant pas 9% conformément à la norme de l'Association nationale du bois dur (NHLA), janvier 2003.

c) L'Entrepreneur devra fournir tous les blocages dissimulés requis pour obtenir les profils de boiseries montrés aux dessins.

.2 Panneaux dissimulés

a) Contreplaqué sans urée formaldéhyde et provenant de forêts renouvelables: conforme à la norme ACNOR 0151.

b) Contreplaqué pour mobilier intégré: sapin de Douglas (Douglas taxi-folié) conforme à la norme CSA0121, classification «construction», catégorie standard, teneur en humidité de 8% au moment de la fabrication, épaisseur de 19mm.

c) Contreplaqué de bois dur: conforme à la norme ACNOR 0115.

d) Panneaux de particules de bois agglomérées sous presse pour usage intérieur: conformes à la norme CAN3-0188.1, à faces poncées et de l'épaisseur indiquée.

e) Panneaux de fibres durs: conformes à la norme CAN/ ONGC-11.3.

f) Panneaux de fibres de bois agglomérées de densité moyenne: (MDF) conformes à la norme ANSI A208.2 et ayant une masse volumique de 700 kg/m3.

.3 Stratifiés

a) Surface du dessus des lutrins: panneau de phénolique de type "compact" de 19mm stratifié de 1.5mm sur les deux surfaces et chants polis. Produit offert par WILSONART, FORMICA ou équivalent approuvé.

b) Plastique stratifié pour surfaces planes et cabinet audio-visuel: conformes à la norme NEMA LD3, catégorie HGS, ayant 1/16" d'épaisseur, couleur et fini indiqué au bordereau.

c) Feuilles de compensation: d'au moins 0,5mm d'épaisseur ou de même épaisseur et même couleur que la feuille de surface lorsque indiqué.

d) Chant de vinyle 4,5mm d'épaisseur de couleur assortie au stratifié des protecteurs de murs.

e) Adhésifs pour stratifiés: adhésif par contact conforme à la norme CAN/CGSB-71-20. Les essais d'émission de COV doivent être effectués conformément aux normes ASTM D2369 et ASTM 2832.

62.7 MATÉRIAUX (suite)

.4 Supports muraux du nouveau comptoir du hall assortis à l'existant.

.5 Dispositifs de fixation

a) Clous et agrafes: conformes à la norme ACNOR B111-06; galvanisés. Types et dimensions en fonction de l'ouvrage.

b) Vis à bois: conformes à la norme ACNOR B35.4, avec fini ordinaire

c) Tiges filetées, écrous et plaques de fixations à angle.

d) Toutes les pièces d'ancrage métalliques nécessaires à l'exécution des travaux, tel que plaques, cornières, ancrages, boulons, tiges et attaches diverses.

.6 Adhésifs

a) Colle à bois conforme à la norme CSA 0112.4-M

b) Adhésif élastomère conforme à la norme CAN 71.25 ou CAN 71.26 selon l'usage.

c) Pour toutes les bordures, moulures, bandes ou insertions, utiliser la colle PRESS-TITE rouge de meilleure qualité.

.7 Produit d'étanchéité: de couleur assortie aux surfaces attenantes.

62.8 LUTRIN HYDRAULIQUE (PODIUM)

.1 Cadre électrique avec module télescopique à 2 pattes sur 4 roulettes:
a) support à deux ou quatre pieds compatibles avec la surface de 30" x 62"
b) déplacement vertical de 27" à 49" ou mieux
c) vitesse de déplacement doit être de 1.5"/seconde ou mieux
d) alimentation 120v AC
e) chaque pied doit être sur roulette
f) Certification UL ou CSA exigée.
g) Fini aluminium anodisé naturel.

.2 Piston hydraulique dans chaque patte et moteur électrique silencieux (<45db(a)) pour ajuster la hauteur du lutrin, complet avec bouton de contrôle et tous les accessoires requis.

.3 Boîte de commande: bouton haut et bas, 4 boutons mémoire et affichage de la hauteur.

.4 Capacité minimum de levage de 1200 Newtons pour l'ensemble. Le mécanisme doit être suffisamment puissant pour lever le poids total du podium incluant tous les équipements audiovisuels en considérant le débalancement occasionné par le cabinet décentré.

.5 Système d'arrêt automatique intégré dans les deux sens (montée et descente).

62.8 LUTRIN HYDRAULIQUE (PODIUM) (suite)

.6 Roulettes multi-directionnelles compatibles avec la base, de grosseur et largeur suffisante pour le poids du podium et de tous ses équipements. Elles doivent être conçues pour surface dure tout en assurant un roulement silencieux. Minimum de deux roulettes avec barrure.

.7 Ventilateur silencieux de 20CFM incluant un contrôleur et capteur de température, tel que MIDDLE ATLANTIC CAB-COOL ou équivalent approuvé.

.8 Grillage d'aluminium en feuille 1/16" d'épaisseur perforée de trous ronds de 3/16" de diamètre placés en quinconce de 1/4" (51% d'ouvertures). Fini aluminium anodisé naturel. Toutes les bordures à crans devront être doublées d'une feuille de métal unie ou d'une moulure. Aucune surface coupante ne sera tolérée.

.9 Pièces de quincaillerie:

a) Serrure avec cylindre HAFELE 101TA.

b) Charnières dissimulées de style européen permettant une ouverture de la porte d'au moins 110 degrés. Les charnières ne doivent pas nuire au montage des équipements audio-visuel.

c) Passe-fils de 45mm de diamètre en vinyle préfabriqué de couleur noire.

d) Crémaillères métalliques de surface tel que montrées aux dessins.

e) Toutes les pièces seront en métal: aucun plastique ou téflon ne sera toléré. Les pièces mobiles seront sur roulement à billes.

62.9 MOBILIER INTÉGRÉ

.1 Les mobiliers seront robustes et recouverts de stratifié sur toutes les faces.

.2 Fixer et ancrer fermement les meubles montés au mur.

.3 Aucune perforation ou fixation mécanique n'est acceptable sur les côtés apparents des meubles.

.4 Bien coordonner toutes les ouvertures et dégagements requis pour les appareils audio-visuels. Au besoin percer dans des endroits dissimulés pour permettre une bonne ventilation dans les cabinets.

.5 En séquence de remise à zéro, le podium descend jusqu'au sol et ne doit pas être en conflit avec les pattes.

62.10 BOISERIES

.1 Réaliser toutes les moulures indiquées aux dessins ou requises pour une belle finition des travaux.

62.9 BOISERIES (suite)

.2 Fixer les boiseries à l'aide d'outil pneumatique et d'agrafes appropriées, et les coller sur le gypse.

.3 Former des joints aboutés contre-profilés rentrants de manière à obtenir un ajustement serré. Tailler d'onglet les joints des angles saillants.

.4 Ajuster soigneusement le dos des moulures contre les murs afin d'éliminer les fentes.

.5 Au besoin, assembler les longueurs en formant des joints en biseau de 45°.

.6 Noyer la tête des agrafes ou clous de finition destinés à être rebouchés au moyen de pâte de bois assortie.

.7 Réaliser les protecteurs de murs en MDF 19mm stratifié avec chant de vinyle assorti. Les munir d'insertion pour les bandes de clouage des clés de fixation. Finir toutes les tranches apparentes d'un chant de vinyle 4,5mm de couleur assortie.

62.11 RETOMBÉE SUSPENDUE DE PLAFOND

.1 Réaliser les retombées de panneaux inclinés réfléchissants pour aider à projeter la voix du professeur vers l'auditoire. Ces panneaux seront fabriqués de MDF stratifiés sur toutes les faces suspendus à la dalle par des tiges filetées permettant d'ajuster la hauteur et l'alignement.

.2 Autant que possible, préfabriquer des modules assemblés en atelier lesquels seront fixés au chantier sur une ossature de suspension.

.3 Espacer également les modules et ajuster à l'angle de la poutre le cas échéant.

.4 Prévoir des sections amovibles pour permettre l'accès futur aux valves et contrôles de mécanique.

62.12 FABRICATION

.1 Les ouvrages doivent être faits avec suffisamment de jeu pour permettre d'être coupés et ajustés sur les lieux aux ouvrages adjacents.

.2 La fabrication de tous les éléments d'ébénisterie sera conforme aux plus sévères standards de qualité de L'AWMAC (Architectural Woodwork Manufacturers Association of Canada).

.3 Les ouvrages doivent être exécutés et installés de niveau, d'aplomb, d'équerre et en alignement, selon les dimensions, les plans de détails et les instructions données lors de la fabrication.

.4 La construction des meubles doit être solide, renforcée partout là où nécessaire au moyen de clefs, d'équerres en métal ou autres types de renforts dissimulés, de façon à former un tout rigide exempt de tout mouvement, craquement et autres défauts semblables.

62.10 FABRICATION (suite)

.5 Aucun clou, vis ou autre moyen de fixation mécanique ne sera toléré sur les surfaces apparentes de l'ameublement.

.6 Couper et percer les meubles pour recevoir les accessoires et appareils tels que les sorties électriques et mécaniques.

.7 Exécuter les coupes avec précision, selon les gabarits fournis par le manufacturier de ces articles. L'endroit exact des coupes doit être franc, net et exempt de cassé dans les courbes.

.8 S'assurer que les couleurs et les motifs des ouvrages en plastique stratifié continu sont les mêmes sur toute la surface.

.9 La fourniture et l'installation de toutes pièces de support, de renfort, de fixation et autres indiquées à l'ameublement, font partie des travaux.

.10 Lorsqu'un panneau est recouvert de stratifié, l'endos doit être couvert d'un matériau de compensation de même type de façon à éviter sa déformation.

62.13 QUALITÉ D'EXÉCUTION

.1 Installer les ouvrages de menuiserie pré-finis avec précision, de niveau, d'aplomb et d'alignement, et les ajuster aux surfaces adjacentes avec joints serrés et d'affleurement.

.2 Les finis en plastique stratifié auront des joints où jugés indispensables, lesquels devront être aux endroits approuvés par le chargé de projet. Toutes les arêtes de plastique stratifié devront être biseautées à onglet à 20 degrés.

.3 L'assemblage de tout bâti sera collé et vissé; tous les joints seront mortaisés, à languette et rainure ou à demi-bois selon le cas pour obtenir le maximum de solidité. Si les joints à onglet sont utilisés, ils seront pourvus d'une clé continue.

62.14 FIXATIONS DES OUVRAGES

.1 Positionner les ouvrages de menuiserie avec précision, de niveau, d'aplomb et d'équerre, et les fixer ou les ancrer fermement.

.2 Concevoir, au besoin ou choisir des dispositifs de fixation appropriés aux dimensions et à la nature des éléments constituants à assembler. Utiliser les dispositifs de fixation brevetés suivant les recommandations du fabricant.

.3 Noyer la tête des clous de finition destinés à être rebouchés. Si l'on utilise des vis pour fixer les éléments, poser les vis dans des trous fraisés, ronds et soigneusement percés, et obturer les trous au moyen de capuchons assortis.

.4 Remplacer les éléments de menuiserie dont la surface a subi des dommages, incluant les coups de marteau ou autres marques.

79.1 TRAVAUX CONNEXES

.1	Démolition sélective	Section 02 41
.2	Système intérieur	Section 09 20
.3	Couvre-sol souple	Section 09 65
.4	Mécanique	Voir ingénieur
.5	Électricité	Voir ingénieur

79.2 PORTÉE DES TRAVAUX

.1 Réaliser des ensembles coupe-feu et pare-fumées aux endroits suivants:

a) Traversées de cloisons et murs en maçonnerie, béton et panneaux de gypse ayant une cote de résistance au feu.

b) Traversées de dalles de planchers ayant une cote de résistance au feu.

c) Autour des ensembles mécaniques et électriques traversant des cloisons coupe-feu ou des planchers.

.2 Obturer les ouvertures désuètes dans la dalle de béton pour obtenir une résistance au feu de 2 heures.

79.3 DESSINS D'ATELIER

.1 Soumettre les dessins d'atelier illustrant le matériau proposé, les pièces de renfort, les ancrages, les fixations et la méthode d'installation. Les détails de construction doivent refléter les conditions réelles de mise en oeuvre.

.2 Soumettre la documentation du fabricant visant les matériaux et les éléments préfabriqués. Les descriptions doivent être suffisamment complètes pour permettre de reconnaître sur place les matériaux/éléments visés. Joindre les instructions écrites du fabricant relatives au mode d'installation.

79.4 GARANTIE

.1 L'Entrepreneur garantit par la présente les ouvrages de coupe-feu et de pare-fumée contre les pertes d'étanchéité, la fissuration, l'effritement, la perte de consistance, la contraction, les coulures, la perte d'adhérence aux surfaces adjacentes, et ce, pour une période de trois (3) ans.

79.5 MATÉRIAUX

.1 Ensembles coupe-feu et pare-fumée: conformes à la norme CAN4-S115.

79.5 MATÉRIAUX (suite)

.2 Matériaux et ensembles exempts d'amiante, constituant une barrière efficace contre les flammes, les fumées et les gaz, conformément aux exigences de la norme CAN4-S115, et ayant des dimensions n'excédant pas celles de l'ouverture à laquelle ils sont destinés.

.3 Ensembles pour traversées par des conduites techniques: homologués par les ULC selon la norme CAN4-S115, et figurant dans le guide n° 40 U19 publié par les ULC.

.4 Éléments composants d'ensembles pour traversées par des conduites techniques: homologués par les ULC selon la norme CAN4-S115 et figurant dans les guides n°s 40 U19.13 et 40 U19.15 des ULC.

.5 La cote de résistance au feu de l'ensemble coupe-feu installé ne doit pas être inférieure à celle de l'ensemble plancher-mur adjacent.

.6 Scellant coupe-feu sans affaissement élastomères inorganiques au silicone à un seul composant, prêts à utiliser et applicables au pistolet.

.7 Mousse coupe-feu d'élastomère de silicone souple à deux composants.

.8 Matériau de remplissage: Laine minérale.

.9 Apprêts: conformes aux recommandations du fabricant quant au matériau spécifique ou au support visé et à la destination du produit.

.10 Dispositifs de retenue, de support, d'appui et d'ancrage: selon les recommandations du fabricant et compatibles avec l'ensemble éprouvé, installé et jugé acceptable par les autorités compétentes.

.11 Produits de scellement pour joints verticaux: ne s'affaissant pas.

.12 Toujours s'assurer de la compatibilité des matériaux entre eux, et n'utiliser que les produits de nettoyage recommandé par le fabricant.

79.6 TRAVAUX PRÉPARATOIRES

.1 Examiner la dimension et l'état des vides à remplir afin de déterminer l'épaisseur du matériau nécessaire et le mode de pose à utiliser. S'assurer que les surfaces du support et des matériaux sont propres, sèches et non gelées.

.2 Les espaces à calfeutrer devront être nets et débarrassés de débris de toute matière étrangère.

.3 Préparer les surfaces venant en contact avec les matériaux coupe-feu et pare-fumée selon les instructions du fabricant.

.4 Assurer l'intégrité du calorifuge autour des tuyaux et des conduits traversant des séparations coupe-feu.

79.6 TRAVAUX PRÉPARATOIRES (suite)

.5 Au besoin, couvrir les surfaces adjacentes pour les protéger contre les gouttes et les éclaboussures.

.6 Bien coordonner tous les travaux avec mécanique et électricité.

79.7 INSTALLATION

.1 Installer les matériaux et ensembles exempts d'amiante, constituant une barrière efficace contre les flammes, les fumées et les gaz, conformément aux exigences de la norme CAN4-S115, et ayant des dimensions n'excédant pas celles de l'ouverture à laquelle ils sont destinés.

.2 Sceller les vides et espaces libres autour des canalisations ou objets qui traversent, en totalité ou en partie, les ensembles coupe-feu, et sceller également les joints des ensembles non traversés par des canalisations ou objets afin d'assurer la continuité de la barrière de protection et de préserver l'intégrité de la séparation coupe-feu.

.3 Au besoin, installer des dispositifs de retenue temporaires et ne les enlever que lorsque les matériaux ont atteint une résistance suffisante et une fois la période de cure initiale terminée.

.4 Façonner les surfaces apparentes ou les lisser à la truelle jusqu'à obtention d'un fini soigné.

.5 Enlever au plus tôt le surplus de produit de scellement au fur et à mesure de l'avancement des travaux et dès que ceux-ci sont terminés.

79.8 INSPECTION

.1 Avant de dissimuler ou d'enfermer les matériaux coupe-feu et les ensembles coupe-feu traversés par des conduites techniques avertir l'Architecte que les travaux sont prêts pour son inspection.

79.9 NETTOYAGE

.1 Enlever les surplus de matériaux et les débris, et nettoyer les surfaces adjacentes immédiatement après la fin de l'installation, à la satisfaction de l'Architecte.

.2 Enlever les dispositifs de retenue temporaires après la période de prise initiale des matériaux coupe-feu et pare-fumée.

81.1 TRAVAUX CONNEXES

.1	Quincaillerie	Section 08 71
.2	Peinture	Section 09 90

81.2 PORTÉE DES TRAVAUX

.1 Les travaux de la présente section comprennent, sans toutefois s'y limiter, la fourniture et la pose des portes et cadres indiqués incluant la fabrication, la finition, la livraison et l'installation complète.

.2 Bien coordonner avec le bordereau de quincaillerie approuvé afin de s'assurer que tous les renforts sont en place, et que les ouvertures se situent au bon endroit pour l'usage.

.3 Toutes les portes existantes doivent être ajustées de manière qu'elles fonctionnent en souplesse. S'assurer que les composantes sont en bon état.

81.3 DESSINS D'ATELIER

.1 L'Entrepreneur doit fournir des dessins d'atelier lesquels doivent indiquer clairement le type de porte, la nature des matériaux, les épaisseurs des âmes, les assemblages à mortaises, les pièces de renfort, l'emplacement des ancrages et le nombre d'ouvertures.

.2 Toutes les dimensions doivent être prises sur le chantier par l'Entrepreneur.

.3 Soumettre le bordereau de quincaillerie et des fiches techniques complètes pour chacun des éléments. Bien identifier les abréviations et symboles utilisés.

81.4 GARANTIE

.1 Les portes, cadres, quincaillerie et le vitrage seront garantis contre toute défectuosité dans des conditions normales d'utilisation, pour une période de dix (10) ans à compter de l'acceptation provisoire.

81.5 PORTES ET CADRES

.1 Cadre soudé en acier calibre 16, ancrages au sol et aux murs, 1.6mm d'épaisseur. Fini galvanisé G90 à peindre. Les cadres intérieurs seront emboîtant ou selon les indications au bordereau. Munir d'une étiquette attestant la résistance au feu de 45 minutes.

.2 Portes de bois à âme pleine de 45mm d'épaisseur à coeur massif d'aggloméré de particules de bois, densité de 28 livres par pied cube, montants en bois dur lamellé. Fini bouleau blanc ou jaune du Canada 6mm, à peindre. Munir d'une étiquette attestant la résistance au feu de 45 minutes.

81.5 PORTES ET CADRES (suite)

.3 Verre clair trempé de sécurité de 5mm d'épaisseur. Les points de trempage seront dissimulés.

.4 Toute porte ayant plus de 1.6mm de gauchissement dans sa longueur sera refusée.

.5 À l'endroit de la quincaillerie, renforcer la porte selon les standards de l'industrie.

.6 Tous les cadres de portes seront munis de 3 butées de caoutchouc sur la face intérieure du jambage de l'arrêt de porte

81.6 FABRICATION

.1 Fabriquer les cadres en tôle d'acier laminée à chaud galvanisée.

.2 Mortaiser, renforcer, percer et tarauder portes et cadres pour leur permettre de recevoir la quincaillerie, à l'aide de gabarits appropriés.

.3 Retoucher les surfaces sur lesquelles le fini galvanisé aurait été égratigné ou autrement endommagé pendant l'assemblage ou le transport, avec l'apprêt à base de zinc.

.4 Bien découper les onglets et les joints des cadres et souder en exécutant un cordon continu à l'intérieur du profilé.

.5 Meuler les joints et les angles soudés, les garnir de pâte de remplissage chargée de métal, et les poncer jusqu'à obtention d'un fini lisse et uniforme.

81.7 EXÉCUTION

.1 Prévoir tous les renforts nécessaires pour les ferme-portes, et pour toute autre pièce de quincaillerie indiquée, autant dans les portes que dans les cadres.

.2 Installer les cadres d'aplomb, d'équerre, de niveau et à la hauteur appropriée, et selon les instructions du fabricant.

.3 Fixer les ancrages aux éléments adjacents de la charpente ou au plancher selon le cas.

.4 Laisser les jeux nécessaires à la flexion de la charpente pour éviter que les charges exercées par cette dernière ne soient pas transmises aux cadres.

.5 Monter les portes sur l'axe rigoureusement vertical de leurs charnières.

.6 Régler les jeux des pièces mobiles pour que les portes fonctionnent en souplesse.

87.1 TRAVAUX CONNEXES

.1	Portes et cadres	Section 08 10
.2	Électricité	Voir Ingénieur

87.2 PORTÉE DES TRAVAUX

.1 La présente section inclut, sans toutefois s'y limiter, tous les travaux de quincaillerie indiqués et tous les ajouts et ajustements requis aux portes existantes.

.2 Sur les nouvelles portes, fournir et installer la quincaillerie indiquée au bordereau.

.3 Munir toutes les serrures de cylindres de construction sur une clé maîtresse. Ne les enlever qu'à la prise de possession par le Maître de l'Ouvrage.

.4 McGill fournira les cylindres et les clés Medeco mais l'Entrepreneur devra les installer.

.5 Commander la quincaillerie d'avance, en particulier les lecteurs de cartes qui ont de longs délais de livraison.

87.3 GARANTIE

.1 L'Entrepreneur fournira une garantie écrite, au nom du propriétaire contre tout défaut, dans la main-d'oeuvre et les matériaux pour une période de trois (3) ans à partir de la date d'acceptation provisoire du projet. La garantie pour les ferme-portes sera de 10 ans.

87.4 BORDEREAU

.1 Le devis de quincaillerie est donné à titre de guide pour établir le type, la fonction et la qualité des articles requis. Le fournisseur devra référer aux plans pour établir son bordereau et il sera seul responsable des quantités.

.2 Soumettre le bordereau de quincaillerie pour approbation par l'Architecte. Bien identifier les abréviations et symboles utilisés. Fournir des fiches techniques pour chacun des éléments.

87.5 MATÉRIAUX

.1 Chaque pièce de quincaillerie est accompagnée des fixations mécaniques appropriées, des patrons pour la préparation des portes, des encadrements et autres ouvrages où sont installés des serrures.

.2 Les nouvelles poignées et serrures devront avoir une couleur assortie à l'existant. Elles seront toutes munies de la gâche assortie à installer sur le cadre.

87.5 MATÉRIAUX (suite)

.3 Toute la quincaillerie aura la même résistance au feu que la porte qu'elle garnit. Elle sera certifiée par un organisme reconnu.

.4 Toute la quincaillerie doit être robuste à usage intensif.

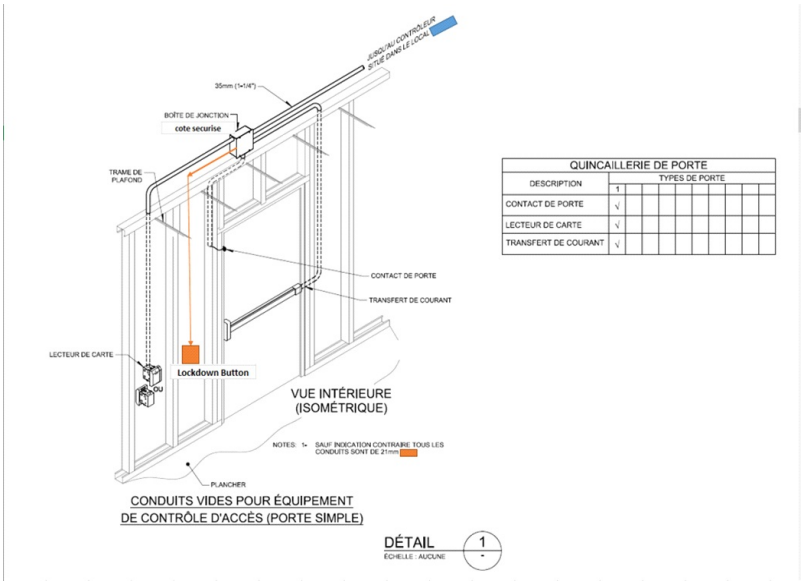
.5 Toutes les charnières seront de type robuste "à billes" de MCKINNEY, à moins d'indications contraires.

.6 Les nouvelles serrures seront de type cylindrique CORBIN CL à rosette Newport munies de cylindres MEDECO. Elles seront toutes munies de gâche assortie avec lèvre courbée.

.7 Tous les fermes-portes devront être de qualité ultra robuste et devront avoir un bras d'arrêt. Ils seront de type LCN 4041 à moins d'indications contraires.

.8 Chaque porte sera munie d'un nouveau butoir.

.9 Les boutons de panique et leur couvercle seront fournis par McGill et installés par l'Entrepreneur.



87.6 APPLICATION

.1 Poser les pièces de quincaillerie aux positions normalisées conformes aux exigences du Canadian metric Guide for Steel Doors and Frames (modular construction) préparé par la Canadian Steel Door and Frame Manufacturers' Association.

.2 Faire l'installation solide et soignée de toutes les pièces de quincaillerie.

.3 Régler le jeu des pièces mobiles pour que les portes fonctionnent en souplesse.

92.1 TRAVAUX CONNEXES

.1	Charpenterie	Section 06 11
.2	Menuiserie	Section 06 20
.3	Pare-feu et coupe-fumée	Section 07 94
.4	Portes et cadres	Section 08 10
.5	Couvre-sol souple	Section 09 65
.6	Peinture	Section 09 90
.7	Accessoires	Section 10 14

92.2 PORTÉE DES TRAVAUX

.1 Les présents travaux incluent, sans cependant s'y limiter, toutes les cloisons intérieures, les plafonds de gypse, les ragréages et les soufflages de gypse indiqués aux dessins ou requis par les présentes.

.2 La finition des murs existants doit être retouchée au besoin pour obtenir des surfaces sans défaut apparent.

.3 Les classes doivent avoir une heure de résistance au feu. Bien ajuster les divers assemblages pour l'obtenir. Au besoin, ajouter un gypse sur les cloisons existantes conservées afin d'en améliorer la performance.

.4 Certaines cloisons ont des largeurs non standards. Réaliser les assemblages afin que les surfaces existantes conservées et nouvelles soient alignées et qu'elles arrivent d'affleurement.

.5 Mettre en place les trappes d'accès fournies par les autres sections en fonction de leur résistance au feu.

.6 Les travaux à effectuer comprennent la main-d'oeuvre, les matériaux, l'outillage, le chargement, le transport, le déchargement, la mise en place et tout ouvrage nécessaire à la complète et parfaite exécution suivant les règles de l'art.

.7 L'Entrepreneur devra se charger d'obturer les trous des attaches et des joints, et de sabler toutes les plinthes, boiseries, placages et autres moulures, le tout prêt pour les travaux de peinture.

92.3 GARANTIE

.1 Tous les travaux de cette section seront garantis contre tout défaut de matériel ou de main-d'oeuvre pour une période de trois (3) ans à compter de la date d'achèvement substantiel.

92.4 CONDITIONS

.1 Avant de commencer les travaux, examiner l'état des ouvrages et signaler à l'Architecte toute condition non décrite sur les dessins et ayant une incidence sur l'exécution du présent contrat.

.2 L'Entrepreneur est responsable de faire ses propres relevés, et ce autant pour déterminer les matériaux requis que les quantités à utiliser.

.3 Bien vérifier tous les dessins des ingénieurs et inclure les recouvrements, saignées et ragréages en conséquence. Aucun supplément ne sera recevable à cet égard.

.4 Il est de la responsabilité de l'Entrepreneur de vérifier les dimensions et types d'ancrages requis pour ses travaux. Il sera tenu de fournir à ses frais tous supports additionnels requis pour ses travaux.

.5 Les dimensions des ouvertures montrées aux dessins indiquent l'ouverture nette. L'Entrepreneur a la responsabilité d'établir les dimensions brutes et les dégagements requis pour les cadres de portes et autres éléments à mettre en place.

92.5 MATÉRIAUX

.1 Ossature non porteuse composée de colombages profilés en U : conforme à la norme ASTM C645; poteaux en tôle d'acier laminé et galvanisé par immersion à chaud de calibre 22 sauf lorsque le poids du parement, du mobilier ou des équipements qui s'y fixent justifie un calibre plus fort; les poteaux doivent être conçus de façon qu'on puisse y visser les panneaux de gypse, et comporter des ouvertures pour canalisations, mi-perforées et disposées à 400 mm d'entraxe. Largeur indiquée aux dessins.

.2 Sablières supérieure et inférieure : conformes à la norme ASTM C645, de largeur appropriée à la dimension des poteaux, calibre identique aux poteaux, dotées de semelles de 32 mm (1¼") de hauteur.

.3 Isolant acoustique en nattes d'épaisseur indiquée par l'entraxe des colombages, conforme à la norme ONGC 19-GP-21M.

.4 Panneaux de placoplâtre unis : conformes à la norme ASTM C1396, standards, hydrofuge ou ignifuges, ayant 16mm d'épaisseur sauf indications contraires, longueur utilitaire maximale, rives amincies.

.5 Fourrures métalliques (profilés en U, tiges de suspension, fils de fixation, pièces rapportées et ancrages) conforme à la norme ASTM C645, galvanisé.

.6 Moulures d'affleurement, renforts d'angles en tôle d'acier galvanisé de 0,5 mm d'épaisseur, à brides ajourées; d'une seule pièce.

.7 Matériau de traitement des joints : pâte à joints, ruban de joint et pâte de remplissage conformes à la norme ASTM C475 sans amiante.

92.5 MATÉRIAUX (suite)

.8 Vis auto-taraudeuse Philips conformes à la norme ASTM C1002 de 32 mm de longueur minimum.

.9 Clous et agrafes : conformes à la norme ASTM C 514; galvanisés. Types et dimensions en fonction de l'ouvrage.

.10 Moulures en «L», moulures d'affleurement, renforts d'angles et joints d'expansion : en tôle d'acier de qualité commerciale, de 0,5 mm d'épaisseur à nu, à zingage Z275, ailes perforées, d'une seule pièce.

.11 Toutes les pièces d'ancrage métalliques nécessaires à l'exécution des travaux, tel que plaques, cornières, ancrages, boulons, tiges et attaches diverses.

92.6 POSE DE L'OSSATURE

.1 Poser les sablières sur le plancher en les alignant avec précision et les fixer à 24" d'entraxe au maximum. Toujours placer des renforts horizontaux dans le haut des cloisons s'arrêtant au plafond pour les contreventer.

.2 Poser les poteaux verticalement à 16" d'entraxe et à 2" au plus de l'intersection des murs et de chaque côté des ouvertures et des angles. Fixer les poteaux dans les sablières supérieures et inférieures à l'aide de vis. Contreventer les poteaux de façon à assurer la rigidité de l'ossature, conformément aux instructions du fabricant.

.3 Coordonner la pose des poteaux avec celle des cadres et autres supports ou dispositifs d'ancrage destinés aux ouvrages prescrits dans d'autres sections.

.4 Jumeler les poteaux (sur toute la hauteur de la pièce) de chaque côté des ouvertures dont la largeur est supérieure à l'entraxe prescrit pour les poteaux. Assembler les poteaux jumelés tout en laissant un jeu de 50 mm; pour ce faire, utiliser des agrafes ou autres dispositifs de fixation approuvés, placés à côté des pattes d'attache de l'ossature.

.5 Insérer les nattes d'isolant acoustique entre les montants dans toutes les cloisons indiquées. L'isolant doit couvrir la pleine surface des murs, et doit bien remplir toutes les cavités autour des éléments traversant.

.6 Poser des profilés de fourrure autour des ouvertures du bâtiment et autour du matériel encastré, des armoires et des panneaux d'accès. Se renseigner sur les jeux et les dégagements requis auprès des fournisseurs de matériel.

.7 Poser des poteaux ou profilés de fourrure en acier entre les poteaux principaux de façon à permettre la fixation des boîtes de jonction pour les installations électriques ou autres.

.8 La fourrure indiquée dans les dessins est purement schématique. Ne pas la considérer comme exacte ou complète.

92.6 POSE DE L'OSSATURE (suite)

.9 Réaliser les retombées de plafond indiquées en tenant compte des conduits existants.

.10 Installer toutes les trappes d'accès fournies par les autres sections, par la mécanique, l'électricité ainsi que toute trappe d'accès demandée par les autorités municipales.

.11 Installer tous les fonds de clouage requis pour les cabinets, armoires, équipements, selon les instructions de leur fournisseur.

.12 Coordonner tous les fonds de clouage avec la section *06 11 CHARPENTERIE.*

.13 Au besoin mais sur approbation de l'Architecte, souffler les murs de façon à permettre l'installation des boîtiers électriques et des autres conduits à dissimuler.

92.7 POSE DU GYPSE

.1 Ne pas poser de placoplâtre avant que les faux-cadres, les ancrages, les cales et les installations électriques et mécaniques aient été inspectées et approuvées par les Consultants.

.2 Tout le gypse sera vissé au support. Les moulures et coins de fer requis devront être installés pour obtenir des assemblages solides et uniformes, selon les règles de l'Art décrites dans le manuel du CGC. Revisser tous les gypses existants aux supports et réparer les fissures.

.3 Prévoir toutes les ouvertures et percées nécessaires aux autres ouvrages. Faire approuver la position exacte des appareils par l'Architecte.

.4 Exécuter tous les travaux de placoplâtre de façon à réaliser des assemblages solides, droits d'aplomb et de niveau.

.5 N'utiliser les moulures en J que lorsque les détails le permettent. Autrement, finir les bordures apparentes avec une moulure en L.

92.8 FINITION

.1 Finir les joints entre la face des panneaux et les angles intérieurs au moyen des produits suivants : une pâte à joints, un ruban à joints et un enduit à ruban. Placer ces produits selon les recommandations du fabricant et lisser le tout sur la surface des panneaux de façon à rattraper le fini de ces derniers.

.2 Recouvrir les moulures d'angles, les joints de rupture et, au besoin, les garnitures, de deux couches de pâte à joint et d'une couche d'enduit à ruban lissées sur la surface des panneaux de façon à rattraper le fini de ces derniers.

92.8 FINITION (suite)

.3 Remplir les creux sur têtes de vis de pâte à joint et d'enduit jusqu'à l'obtention d'une surface uniforme et d'affleurement avec les surfaces adjacentes des panneaux de gypse, de façon à ce que ces creux ne soient plus visibles après le peinturage.

.4 Poncer légèrement les arêtes vives et leurs autres imperfections. Il faut éviter de poncer les surfaces adjacentes en panneaux de gypse.

.5 Une fois la pose terminée, l'ouvrage doit être lisse, de niveau ou d'aplomb, exempt d'ondulation et d'autre défaut, et prêt à être peinturé.

.6 Il est interdit de déverser des produits de jointoiement inutilisés dans les égouts, sur le sol ou à tout autre endroit où cela pourrait présenter un risque pour la santé ou pour l'environnement.

95.1 TRAVAUX CONNEXES

.1	Système intérieur	Section 09 20
.2	Mécanique	Devis de l'Ingénieur
.3	Électricité	Devis de l'Ingénieur
.4	Audio-visuel	Voir NCS de McGill

95.2 PORTÉE DES TRAVAUX

.1 Les travaux de la présente section comprennent, sans toutefois s'y limiter, tous les nouveaux plafonds suspendus et les ragréages de plafond requis.

.2 L'Entrepreneur sera tenu de faire à ses frais, tous les menus travaux qui ne sont pas particulièrement décrits aux dessins ou au devis mais qui sont usuels et nécessaires au parachèvement complet de l'Ouvrage.

.3 L'Entrepreneur sera responsable de la coordination de tous les éléments montés en plafond, autant en mécanique, en électricité qu'en protection incendie.

.4 L'Entrepreneur doit utiliser des assemblages et ancrages parasismiques se conformant aux codes en vigueur.

.5 Le dispositif de suspension devra supporter les plafonds conformément aux plans et limitera le fléchissement à 1/360 de la portée.

.6 L'Entrepreneur devra s'assurer que les haut-parleurs peuvent être fixés dans des carreaux souples.

95.3 GARANTIE

.1 Tous les travaux de cette section seront garantis contre tout défaut de matériel ou de main-d'oeuvre pour une période de trois (3) ans à compter de la date d'achèvement.

95.4 MATÉRIAUX

.1 Nouveaux carreaux acoustiques en fibre de verre à bordure carrée, texture fine, blanc, 610mm x 610mm x 25mm, ARMSTRONG OPTIMA ou CERTAINTEED PAINTED NUBBY ou équivalent approuvé.

.2 Dans le hall et le vestiaire 043, utiliser des carreaux acoustiques assortis à l'existant :

95.4 MATÉRIAUX (suite)

.3 Nouveaux treillis de suspension PRELUDE XL 15/16" blanc de ARMSTRONG ou équivalent approuvé; pièces d'assemblage en acier marchand galvanisé laminé à froid; surfaces apparentes apprêtées et finies mat satiné. Té principal, Té secondaire et profilé périmétrique en cornière, fil de suspension de calibre 12 et toutes autres pièces requises.

.4 Ancrages pour suspentes : fabriqués selon les besoins.

.5 Accessoires : éclisses, fixations, attaches en fil métallique, agrafes antirouille, d'affleurement qui viennent s'ajouter aux éléments de l'ossature conformément aux recommandations du fabricant de l'ossature.

95.5 PRÉCAUTIONS GÉNÉRALES

.1 L'Entrepreneur examinera attentivement tous les ouvrages existants et verra à y raccorder ses propres ouvrages proprement et solidement.

.2 Toutes les composantes doivent être disposées de façon à former des lignes bien droites et une surface nivelée.

.3 Bien coordonner la disposition de l'ossature avec l'emplacement des autres éléments montés en plafond (gicleurs, détecteurs de chaleur, appareils d'éclairage, diffuseurs, etc.). Coordonner en particulier avec les gicleurs et bien vérifier que le sens et le type des têtes prévues sont compatibles et au bon niveau.

.4 Ne pas mettre en place les carreaux de plafond tant que tous les travaux dégageant de l'humidité (tels le plâtrage et la peinture) ne sont pas terminés.

95.6 POSE DE L'OSSATURE DE SUSPENSION

.1 Fournir et installer le nouveau système apparent aux endroits indiqués et selon les recommandations de la norme ASTM C 636.

.2 Toutes les composantes doivent être disposées de façon à former des lignes bien droites et une surface nivelée.

.3 Munir les appareils d'éclairage et les diffuseurs de suspentes supplémentaires installées à 150 mm au plus de chaque coin et à tous les 600 mm au plus sur la périphérie de l'appareil.

.4 Installer une moulure murale à l'intersection de toutes les surfaces verticales avec le plafond. Tailler à onglet les coins.

.5 Lorsque le nouveau plafond vient buter sur une trame de plafond existante, aligner parfaitement les tés de suspension à moins d'indications contraires aux dessins.

95.7 POSE DES CARREAUX

.1 Toutes les bordures seront taillées à l'aide de l'outil approprié pour être de même profil que les bordures types. Les carreaux seront sciés, coupés ou percés pour accommoder les ouvrages connexes. Les pièces cassées ou écornées seront refusées.

.2 Poser les carreaux acoustiques dans l'ossature de suspension. Les carreaux devront s'ajuster parfaitement à la suspension.

.3 Intégrer les appareils d'éclairage et les appareils de mécanique d'une façon soignée.

95.8 RAGRÉAGES

.1 Ragréer les plafonds existants après le passage des divers conduits montrés aux plans de mécanique et d'électricité.

.2 Ragréer la trame selon l'arrangement des nouvelles cloisons et des conduits de ventilation. Les tés perforés doivent être ragréés et tous les trous bouchés parfaitement avec de la potée à métal. Lorsque la suspension existante est trop endommagée, qu'elle est tordue, pliée ou trop perforée, elle doit être remplacée par une trame neuve de même type, le tout à la satisfaction de l'Architecte.

.3 Coordonner les ragréages de plafond requis avec les autres sections de travaux.

.4 Remplacer le cas échéant tout carreau brisé ou sali en utilisant des carreaux assortis.

95.9 NETTOYAGE

.1 Retoucher les surfaces de l'ossature qui présentent des égratignures, des éraflures ou d'autres défauts. Enlever et remplacer les tuiles endommagées ou mal installées.

96.1 TRAVAUX CONNEXES

.1	Démolition sélective	Section 02 41
.2	Système intérieur	Section 09 20
.3	Électricité	Voir ingénieur

96.2 PORTÉE DES TRAVAUX

.1 L'Entrepreneur devra inclure dans sa soumission toutes les préparations de surfaces, la main-d'oeuvre, les matériaux et accessoires nécessaires pour installer les finis de plancher prévus dans le projet. L'installation des revêtements de sol devra être à la satisfaction du Maître de l'Ouvrage.

.2 Les travaux de la présente section comprennent, sans toutefois s'y limiter :

a) Le revêtement de plancher des locaux indiqués selon le patron de pose au plan des finis.

b) La préparation de plancher ainsi que l'obturation et la réparation des fissures, trous d'ancrage, empreinte de cloisons démolies et autres trous lorsque applicable.

c) La nouvelle plinthe de 100mm ou 150mm selon les indications.

d) Les ragréages de linoleums existants, leur nettoyage et cirage.

e) Tout autre travail de couvre-sol souple requis sur les dessins.

.3 Lorsque les dessins demandent de remplacer un fini de plancher, cela comprend l'enlèvement du fini existant, la préparation de surface et le nouveau fini indiqué.

.4 L'Entrepreneur est tenu de visiter le site des travaux avant de présenter sa soumission et d'inclure tous les travaux de préparation ou de ragréage requis. Aucun supplément à ce chapitre ne sera recevable.

96.3 ÉCHANTILLONS

.1 Fournir des fiches techniques et échantillons pour approbation par l'Architecte.

.2 Fournir un dessin montrant les patrons de pose des bordures et des insertions, et bien coordonner avec l'Architecte au chantier. Le patron de pose permettra de bien localiser les tables en mode magistral ou groupe.

96.4 GARANTIE

.1 Fournir une garantie écrite stipulant que les matériaux et la main-d'oeuvre couverts par la présente section sont garantis contre la délamination et la fissuration des joints pour une période de cinq (5) ans, à compter de la date de l'acceptation provisoire des travaux.

96.5 CONDITIONS EXISTANTES

.1 Avant de commencer les travaux, examiner l'état des ouvrages et signaler à l'Architecte toute condition non décrite sur les dessins et ayant une incidence sur l'exécution du présent contrat.

.2 L'Entrepreneur est responsable de faire ses propres relevés, et ce autant pour déterminer les matériaux requis que les quantités à utiliser.

96.6 MATÉRIAUX

.1 Linoleum FORBO MARMOLEUM DUAL, FRESCO ou CONCRETE, 4 couleurs au bordereau des finis, 2.5 mm d'épaisseur, en rouleau de 2 m de largeur, fini sans cirage.

.2 Cordon de soudure assorti au fini de plancher.

.3 Adhésifs pour trafic lourd et travaux commerciaux, ayant une forte adhérence, peu d'odeur et sans risque pour l'environnement, tel que recommandé par le fabricant de linoleum.

.4 Profilé adaptateur au joint d'un autre fini, modèle et couleur au choix de l'Architecte.

.5 Plinthe de vinyle, partie inférieure à gorge, hauteurs indiquées, en rouleau, type et couleur au choix de l'Architecte.

.6 Apprêts et adhésifs pour la plinthe : de types recommandés par le fabricant de plinthe.

96.7 PRÉPARATION

.1 Le fini existant doit être enlevé par la section *02 41 DÉMOLITION SÉLECTIVE*, et la dalle nettoyée à fond pour recevoir les nouveaux finis.

.2 Au besoin, scarifier la surface existante de la dalle pour uniformiser le niveau et enlever toute partie non adhérente. Sabler la surface au besoin pour obtenir une dalle lisse prête à recevoir le fini indiqué. Le plancher doit être exempt de poussière ou de vieil adhésif.

.3 Aplanir les bosses et aspérités du plancher.

.4 Boucher les cavités, fissures, joints, trous et autres défauts susceptibles d'altérer l'apparence.

.5 Niveler les surfaces de plancher à l'endroit des empreintes de cloisons démolies, des bases d'équipement, etc., à égalité avec les finis de plancher existants. Ajuster le niveau du plancher dans les parties dégarnies afin que le nouveau couvre-sol se marie à égalité avec le fini existant.

.6 S'assurer que le plancher est de niveau, lisse, sans huile, graisse, cire ou poussière.

96.7 PRÉPARATION(suite)

.7 À l'aide d'un aspirateur enlever toute poussière, saleté et matériaux délétères par une méthode mécanique. La surface doit être sèche, solide et libre de tout contaminant.

.8 Appliquer l'apprêt recommandé sur toute la surface à recouvrir.

.9 Réaliser les pentes de ciment pour rejoindre des niveaux de plancher différents sans jamais former des pentes de plus de 1% ou de moins de 36" de largeur. Utiliser du ciment avec adhésif incorporé.

96.8 POSE DU COUVRE-SOL

.1 Poser le couvre-sol après l'exécution complète des travaux de finition et selon les plus sévères exigences du fabricant.

.2 Tailler les longueurs de revêtement et laisser reposer avant d'installer.

.3 Agencer selon les patrons de pose fournis. La pose doit toujours se faire sur des lignes parallèles.

.4 Limiter le nombre de joints au minimum et les placer aux endroits moins passant.

.5 Finir la pose de manière à assurer une surface lisse, exempte de joints, d'effilochures et autres défauts apparents.

.6 Dans toutes les zones à recouvrir, assurer l'harmonie parfaite des couleurs, du motif et de la texture.

.7 Ajuster avec soin aux contours. Rouler la surface dans les deux directions avec un rouleau de 45kg afin d'assurer une adhérence complète et d'éliminer toute bulle d'air sous la surface du fini. Répéter l'opération une heure plus tard.

.8 Bien coller les bords pour éviter tout soulèvement éventuel. Insérer le linoleum dans les collerettes de prises de plancher afin qu'il soit pincé solidement et bien étanche.

.9 Découper et souder les coins intérieurs et extérieurs pour assurer la continuité du revêtement en utilisant la technique du papillon.

.10 Les joints devront être très serrés et bien lisses en surface. Les rainurer à la main ou mécaniquement. Assurer une rainure de 1.5mm de profond par 4mm de largeur. Bien souder à chaud tous les joints de façon à former une surface monolithique. Les joints devront être assortis et invisibles.

.11 Poser une bordure à la rencontre d'un autre fini.

.12 Interdire tout trafic sur le plancher pendant les 24 heures qui suivent la pose ou selon les recommandations du fabricant.

96.9 POSE DE LA PLINTHE

.1 Tous les nouveaux murs seront munis d'une plinthe de vinyle sauf indications contraires aux dessins.

.2 Enduire la plinthe d'adhésif et l'assujettir fermement au mur et au plancher. Employer des sections de plinthe d'au moins 16" de longueur.

.3 Poser la plinthe droite et de niveau à 3mm près, sur une longueur de 4m.

.4 Découper les plinthes et les ajuster aux cadres de portes et aux autres obstacles.

.5 Poser la plinthe sur tout le périmètre des pièces indiquées.

96.10 RAGRÉAGES

.1 Partout où le fini de plancher existant est affecté par les travaux, effectuer tous les ragréages requis de façon à obtenir des surfaces lisses et uniformes.

.2 Dans les pièces où le fini de plancher existant est conservé, ajouter et sceller une plinthe de vinyle sur les murs de périmètre.

.3 Puis nettoyer parfaitement le plancher et donner 3 couches de cire.

96.11 NETTOYAGE

.1 Enlever avec soin le surplus d'adhésif à la surface des planchers, plinthes et murs.

.2 Laisser le chantier propre et libre de toute retaille ou débris.

98.1 TRAVAUX CONNEXES

.1	Charpenterie	Section 06 11
.2	Plafond suspendu	Section 09 50
.3	Protection incendie	Voir ingénieur
.4	Électricité	Voir ingénieur
.5	Audio-visuel	Voir NCS de McGill

98.2 PORTÉE DES TRAVAUX

.1 La présente section comprend, sans cependant s'y limiter, la fabrication, la fourniture et l'installation de tous les panneaux acoustiques absorbants au plafond des nouvelles classes.

.2 Il est de la responsabilité de l'Entrepreneur de vérifier les dimensions, niveaux et types d'ancrages requis pour ses travaux. Il sera tenu de fournir à ses frais tous supports additionnels requis pour ses derniers.

.3 Coordonner soigneusement avec les divers autres éléments présents sous les dalles de béton apparentes, notamment les conduits et gicleurs.

.4 Porter une attention particulière à l'agencement des panneaux en fonction de l'éclairage indirect prévu. Noter aussi qu'une partie de la dalle du local 045 est inclinée.

98.3 GARANTIE

.1 Fournir une garantie écrite stipulant que les matériaux et la main-d'oeuvre couverts par la présente section sont garantis pour une période de trois (3) ans, à compter de la date de l'acceptation provisoire des travaux.

98.4 DESSINS D'ATELIER

.1 Après avoir relevé les mesures sur le chantier, soumettre les dessins d'atelier, le patron de pose et les fiches techniques pour approbation.

98.5 MATÉRIAUX

.1 Panneaux acoustiques de fibres de feutre de polyester non tissées, colorés dans la masse, tel que FELTWORKS 8246 de ARMSTRONG ou équivalent approuvé. Couleur Beige FBG.

a) Les panneaux auront une épaisseur constante de 25mm à bordures droites. Largeur de 1220mm, longueur selon le plan de plafond réfléchi.

98.5 MATÉRIAUX (suite)

b) Conforme à la norme ASTM E 84, Class A et testé selon CAN/ULC S102.2-10. Propagation de la flamme <25. Indice de dégagement de la fumée de 140 < 450.

c) Méthode de montage pour obtenir une performance acoustique de 0,90 CRB soit sur des fourrures de 38mm au minimum.

d) Agrafes dissimulées, aimants, vis et adhésifs recommandés pour l'usage.

e) Bandes continues de velcro proposées en alternatives aux aimants.

f) Fourrures et profilés métalliques de 38mm conforme à la norme ASTM C645, galvanisé.

98.6 POSE DES PANNEAUX

.1 Tracer au plafond et faire approuver la position des panneaux par l'Architecte avant de commencer.

.2 Toutes les composantes doivent être disposées de façon à former des lignes bien droites selon le patron de pose approuvé. Espacer les panneaux de 50mm au minimum ou selon les indications au plan.

.3 Mettre en place les profilés métalliques espacés de 400mm environ, au moins 3 rangées par panneau. Les placer pour éviter les conduits existants et les fixer directement dans le béton de la dalle. Augmenter la hauteur des profilés au besoin, mais jamais plus bas que les têtes de gicleurs.

.4 Ces fourrures ne devront pas être visibles une fois les feutres mis en place.

.5 Préparer les panneaux selon l'arrangement des profilés en y fixant des aimants sur la face arrière selon la méthode suggérée par le fabricant, ou des bandes Velcro renforcées de vis.

.6 Fixer les panneaux acoustiques au support. Tous les ancrages doivent être dissimulés.

.7 Tailler proprement les bordures au besoin. La fibre ne doit pas former de bosses ou de creux sur la surface.

.8 Porter des gants blancs pendant l'installation pour ne pas salir les surfaces.

.9 Nettoyer avec un aspirateur à la fin des travaux.

99.1 TRAVAUX CONNEXES

.1	Portes et cadres	Section 08 10
.2	Système intérieur	Section 09 20

99.2 PORTÉE DES TRAVAUX

.1 Les travaux de la présente section comprennent, sans toutefois s'y limiter:

a) La peinture de toutes les surfaces de gypse neuves, existantes et des surfaces ragréées, incluant les plafonds.

b) La peinture de toutes les portes et de leur cadre.

c) La peinture de tous les conduits et tuyaux apparents de couleurs assorties aux surfaces adjacentes, sauf indications contraires.

d) Tout autre travail de peinture indiqué aux dessins ou requis pour une belle finition.

.2 L'Entrepreneur devra inclure dans sa soumission toutes les préparations de surfaces, la main-d'oeuvre, les matériaux et accessoires nécessaires pour installer les finis prévus dans le projet et obtenir des surfaces lisses et faciles d'entretien.

.3 Protéger les surfaces adjacentes contre les éclaboussures et les taches de peinture. Masquer avec soin tous les appareils et équipements mécaniques, électriques ainsi que le vitrage, la quincaillerie et toutes les autres surfaces qui ne sont pas à peindre.

.4 Le bâtiment sera occupé en tout temps. L'Entrepreneur devra coordonner ses travaux avec les occupants afin de limiter les interruptions au minimum. Il devra protéger les mobiliers et appareils existants avec des toiles.

.5 Ne pas peindre l'acier inoxydable, l'aluminium, la céramique, le stratifié et les autres éléments ayant un fini permanent appliqué à l'usine, à moins d'indications contraires.

.6 L'Entrepreneur sera tenu de faire à ses frais, tous les menus travaux qui ne sont pas particulièrement décrits aux dessins ou au devis mais qui sont usuels et nécessaires au parachèvement complet de l'ouvrage.

99.3 GARANTIE

.1 Fournir une garantie écrite de 5 ans sur les matériaux et la main d'oeuvre, effective à compter de l'acceptation provisoire des travaux.

99.4 MATÉRIAUX

.1 Utiliser des matériaux de première qualité et conformes au devis ONGC applicable. Seuls les matériaux apparaissant à la liste MPI (APL) sont acceptables pour ce projet.

99.4 MATÉRIAUX (suite)

.2 Toutes les peintures utilisées seront exemptes de mercure, d'arsenic, de phénol et d'autres métaux complexes. Elles auront de faibles taux de composés organiques volatils (COV) et porteront l'Écologo ou le Green seal.

.3 Les couleurs seront mélangées par le manufacturier selon le choix fait par l'Architecte au bordereau des finis.

.4 Des couleurs différentes pourront être choisies pour les plafonds, les murs, et les portes et cadres.

.5 Utiliser les couches d'apprêt recommandées par le fabricant de la peinture de finition.

.6 L'usage de diluants et de réducteur est formellement défendu.

.7 Les peintures seront livrées dans leur contenant d'origine avec toutes leurs étiquettes intactes pour en permettre l'identification.

.8 Seuls les plafonds pourront être fini mat. Les murs, portes et cadres doivent avoir un lustre de 20% à 30% au moins pour en faciliter l'entretien.

99.5 PRÉPARATION DES SURFACES

.1 Nettoyer parfaitement les murs existants conservés. Enlever toute trace de colle et ragréer les endroits abîmés. Bien laver au détergent pour éliminer toutes les saletés.

.2 Les surfaces doivent être exemptes d'eau, de givre, de glace, de poussière, de saleté, de moisissures, de cire, de rouille, d'huile et de graisse.

.3 Au besoin, gratter les surfaces existantes pour enlever les finis écaillés et sabler jusqu'à obtention d'une surface bien lisse.

.4 Nettoyer parfaitement les murs existants conservés. Enlever toute trace de colle et ragréer les endroits abîmés.

.5 Bien laver au détergent pour éliminer toutes les saletés.

.6 Préparer les surfaces en bois conformément à la norme ONGC 85-GP-la. Appliquer un bouche-pores vinylique sur les noeuds et les trous de résine. Remplir les trous de clous avec une pâte de remplissage.

.7 Préparer les surfaces d'acier galvanisé et zinguées conformément à la norme ONGC 85.10.

.8 Préparer les surfaces de placoplâtre conformément à la norme ONGC 85.100. Remplir les petites fissures avec un produit d'obturation et de ragréage.

.9 Appliquer l'apprêt immédiatement suivant la préparation de la surface afin d'en éviter la contamination.

99.6 DESCRIPTION DES PRODUITS

.1 Surface de gypse neuf:

a) 1 couche d'apprêt au latex SICO ECOSOURCE #870-177 ou équivalent
b) 2 couches de latex 100% acrylique SICO ECOSOURCE #855, fini velours

.2 Surface de gypse existant :

a) 2 couches de latex 100% acrylique SICO ECOSOURCE #855, fini mélanine

.3 Boiseries et portes peintes :

a) 1 couche de peinture d'apprêt SICO SIERRA GRIPTEC ou équivalent approuvé
b) 2 couches d'uréthane acrylique SICO SIERRA METALMAX ou équivalent approuvé.

.4 Cadres et portes d'acier :

a) 1 couche de peinture d'apprêt SICO SIERRA GRIPTEC ou équivalent approuvé
b) 2 couches d'uréthane acrylique SICO SIERRA METALMAX ou COROTECH DTM V331 de BENJAMIN MOORE.

99.7 APPLICATION

.1 Aucun travail de peinture ne sera exécuté à des températures inférieures à 10°C ou lorsque les surfaces sont humides et mouillées.

.2 Sabler et épousseter entre l'application de chaque couche de peinture, afin de corriger les défauts visibles d'une distance de 150 mm.

.3 Découper proprement et suivant une ligne droite entre les couleurs sur un même fini.

.4 N'appliquer aucune couche de peinture avant de s'être assuré que la couche précédente est impeccable et parfaitement sèche. Attendre 24 heures minimum entre chaque couche.

.5 Dans le cas de réparation, appareiller les finis des surfaces adjacentes. Ils seront exempts de marques de pinceaux ou de rouleaux, fléchissements, traînées, coulées ou autres défauts qui pourront en affecter l'apparence ou la durée.

.6 Pour un ragréage, peindre les surfaces adjacentes jusqu'au mur ou plafond perpendiculaire.

.7 Réparer toute coulisse de peinture en la ponçant avec un papier sablé, puis faire les retouches au pinceau en prenant soin de l'estomper avec le reste de la surface.

.8 Faire toutes les retouches requises à la fin des travaux de construction. Enlever tous les déchets et nettoyer tout ouvrage sali par la peinture, y compris la quincaillerie et les vitrages.

101.1 TRAVAUX CONNEXES

.1	Charpenterie	Section 06 11
.2	Système intérieur	Section 09 20
.3	Couvre-sol souple	Section 09 65

101.2 PORTÉE DES TRAVAUX

.1 Les travaux décrits dans la présente section comprennent, sans cependant s'y limiter :

a) La fourniture et la pose des bandes à crochets,

b) La fourniture et la pose de tableaux indiqués,

c) La fourniture et la pose de protecteurs de coin sur tous les angles sortant,

d) Tous les autres accessoires requis ou indiqués aux dessins.

.2 La signalisation intérieure sera réalisée par d'autres.

101.3 DESSINS D'ATELIER

.1 Soumettre des dessins d'atelier ou illustrations de catalogue pour approbation par l'Architecte.

.2 Les dessins d'atelier doivent indiquer la dimension et la nature des éléments, du matériau de base, du fini des surfaces intérieures et extérieures, des ferrures et des serrures, des dispositifs de fixation, la description et les détails d'installation des ancrages.

.3 Les dessins doivent aussi montrer l'emplacement des parements et bien détailler chaque condition particulière d'installation en élévation et en coupe.

.4 Soumettre à l'Architecte des échantillons de produits pour le choix des couleurs. Des reproductions ou des imprimés ne seront pas acceptables.

101.4 SUPPORTS

.1 L'Entrepreneur sera tenu de visiter le site pendant les travaux, afin d'y constater le type et l'espacement des supports, fond de clouage et ancrages disponibles pour ses propres travaux.

.2 Il est de la responsabilité de l'Entrepreneur de vérifier les dimensions et types d'ancrages requis pour ses travaux. Il sera tenu de fournir à ses frais tous supports additionnels nécessaires pour fixer ses ouvrages.

101.5 GARANTIE

.1 L'Entrepreneur fournira une garantie écrite au nom du propriétaire contre tout défaut dans la main-d'oeuvre et les matériaux pour une période de trois (3) ans à partir de la date d'acceptation provisoire du bâtiment.

101.6 QUANTITÉS

.1 L'Entrepreneur est responsable d'établir ses propres quantités d'après les plans.

.2 Toutes les dimensions doivent être prises sur le chantier par l'Entrepreneur.

.3 Les dimensions fournies ne sont qu'indicatives et ne doivent servir qu'à aider l'Entrepreneur à prendre ses propres relevés.

101.7 TABLEAUX

.1 Tableaux à écrire de 13mm d'épaisseur: en porcelaine de couleur blanche composée de deux couches d'émail vitrifié appliquées sur feuilles d'acier 0.4mm cuites à très haute température tel que la série 2000 par COMPAGNIE CANADIENNE DES TABLEAUX NOIRS LTÉE ou équivalent accepté.

a) Dimensions : hauteur 1220mm. Largeurs de 1524 ou 2440mm, voir les élévations.

b) Bordures en aluminium anodisé clair

c) Ancrages mécaniques (à vis) dissimulés

d) Accessoires à inclure pour chacun des tableaux :
.1 Un auget pleine longueur du tableau,
.2 un jeu de crayons feutre pour nettoyage à sec,
.3 une brosse standard,
.4 un contenant de solvant.

101.8 CROCHETS

.1 Bande à crochets en acier inoxydable tel que RIDALCO 6ch/36-4ss-6-prong, 915mm de longueur.

101.9 PROTECTEURS D'ANGLES

.1 Protecteurs d'angle en acier inoxydable de calibre 18 de type 304 d'une seule pièce avec extrémités arrondies et aucune saillie. Dimensions : 75mm x75mm x1220mm de hauteur sauf dans le hall où ils sont pleine hauteur du mur.

101.9 PROTECTEURS D'ANGLES (suite)

.2 Des protecteurs de coins devront être fournis et installés partout ou un coin de mur est saillant. Le cas échéant, même les angles de plus de 90° devront être protégés.

.3 Adhésif: colle contact au latex LEPAGE ou DURALL tel que recommandé par le fabricant.

.4 Fixations: auto-taraudeuses, en acier inoxydable, pour montage dissimulé. Choisir les ancrages requis pour un fond de gypse. Espacement maximum 16" c/c.

101.10 EXÉCUTION

.1 Installer et fixer solidement les appareils à leur support. Fixer les attaches à l'aide de vis/boulons inviolables.

.2 Tous les équipements doivent être fixés à leur support de façon sûre et doivent être en mesure de supporter une charge de 115 kg.

.3 Faire approuver la position des tableaux et des crochets par le Client et mettre en place de façon soignée et bien solide.

101.11 POSE DES PROTECTEURS D'ANGLES

.1 Coordonner avec la section *06 11 CHARPENTERIE* tous les renforcements de murs requis.

.2 Poser les protecteurs sur un support solide, tous les éléments étant d'aplomb, solidement assujettis et en parfait alignement.

.3 Tous les protecteurs auront des fixations mécaniques appropriées, et toujours dissimulées. Aucune vis ne doit être dans le gypse seulement, sans être munie au minimum d'un papillon ou d'un mécanisme d'expansion.

.4 Fixer les protecteurs en utilisant les ancrages recommandés par le fabricant à cette fin.

.5 Prendre un soin particulier à la finition au-dessus des plinthes du plancher. Il ne doit pas y avoir de coins difficiles d'accès pour le nettoyage.

.6 Ajuster soigneusement le dos des moulures contre les murs ou les cadres afin d'éliminer les fentes.

.7 Aucun joint ne sera toléré sur la longueur des pièces : chaque coin doit être constitué d'un seul morceau de finition.

.8 Les protecteurs de coin doivent épouser parfaitement l'angle de la cloison.

.9 S'assurer que les couleurs et les motifs des ouvrages sont les mêmes sur toute la surface.